BUILDING DISAPPOINTMENT:

THE LIMITS AND POTENTIAL OF TORT LIABILITY FOR ENERGY EFFICIENCY PROBLEMS IN DOMESTIC BUILDINGS

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I, Kim Alexandra Bouwer confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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ABSTRACT

This interdisciplinary thesis examines the potential for liability in tort in relation to two problems, which recur frequently in energy efficient buildings: energy efficiency failings – the 'performance gap' – and summer overheating. It works at the interface between tort theory, climate change litigation and energy efficiency, a key requirement for the mitigation of climate change.

It is grounded in two key theoretical perspectives. The conception of private law is pluralist: a structural model of tort based on Cane's 'anatomy': variably protected interests of parties in a correlative relationship. It relies on instrumental approaches to private law, informed by regulatory theory, strongly to emphasise the potential for liability outcomes to frustrate an already weak and poorly enforced policy area. The second theoretical perspective is a conception of climate change as a multiscalar phenomenon, a workable solution to which will require coherent treatment on all levels and across all scales. It highlights the need for 'climate consciousness': greater attention on small and more mundane issues that interface with aspects of domestic climate policy.

The first half of the thesis explores the research context and encompasses most of the interdisciplinary work. It explains how building energy efficiency might technically be achieved and how problems arise. It explores the governing regulation, including the shortcomings of regulatory enforcement. The second half of the thesis examines doctrinal and theoretical mismatches that could arise in adjudicating the problem areas. The core conclusions include concerns that disputes in this poorly regulated area might undermine decarbonisation and hence, climate change mitigation policy; in addition, 'climate blind' litigation can lead to perverse

outcomes which reinforce a lack of awareness of both climate adaptation and mitigation policy goals.

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ACRONYMS

BIM Building Information Modelling
BR Building Regulations
BUILD Building Users Insurance against Latent Defects
CCC Committee on Climate Change
CIBSE Chartered Institute of Building Services Engineers
CSH Code for Sustainable Homes
DCLG Department for Communities and Local Government
DECC Department of Energy and Climate Change
DEFRA Department of Food and Rural Affairs
DPA Defective Premises Act
EPBR Energy Performance of Building Regulations
EPC Energy Performance Certificate
EU European Union
GHG Greenhouse gas
HCECCC House of Commons Energy and Climate Change Committee
IEA International Energy Agency
IPCC Intergovernmental Panel on Climate Change
MVHR Mechanical ventilation heat recovery
NHBC National House Building Council
POE Post Occupancy Evaluation
RdSAP Reduced Standardised Assessment Procedure
SAP Standardised Assessment Procedure
UK United Kingdom
UNEP United Nations Environment Programme
UNFCCC United Nations Framework Convention on Climate Change
WHO World Health Organisation
ZCH Zero Carbon Hub

ONE: INTRODUCTION

a) Thesis

Volumes have been written both about climate change and the challenges presented by climate change governance. The 'superwicked'[1] problem of climate change derails economic, ethical and epistemological certainties.[2] It challenges given behaviours and accepted 'goods' of society on a global level, and compels personal and structural self-examination on a level that is not only uncomfortable, but also potentially futile, unless it is co-ordinated with meaningful universal action on climate change. An overwhelming majority view has it that without any or any sufficient response, anthropogenic climatic changes stand to bring about changes in the climatic patterns in all parts of the globe, reducing habitability for many species, including ours.[3] Inherent in the very terminology used to describe our response to climate change – climate change *mitigation* – is the appreciation that we are engaging in a process of damage control.[4] This global issue certainly demands a coherent and comprehensive response from states to co-ordinate extensive reductions in greenhouse gas emissions, the chief driver for climate change.[5] However, I shall argue in

[1] RJ Lazarus, 'Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future' (2009) 94 *Cornell Law Review* 1153; K Levin and others, 'Overcoming the Tragedy of Super Wicked Problems: Constraining Our Future Selves to Ameliorate Global Climate Change' (2012) 45 *Policy Sciences* 123.

[2] D Jamieson, *Reason in a Dark Time: Why the Struggle Against Climate Change Failed and What It Means for Our Future* (OUP USA 2014).

[3] IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [TF Stocker, D Qin, GK Plattner, M Tignor, SK Allen, J Boschung, A Nauels, Y Xia, V Bex and PM Midgley (eds.)]. CUP, Cambridge, United Kingdom and New York, NY, USA. But see: M Maslin and P Austin, 'Climate Models at Their Limit' (2012) 486 *Nature* 183.

[4] This is implicit in Article 2 of the United Nations Framework Convention on Climate Change [1992] 31 ILM 851 (UNFCCC) which seeks to stabilise greenhouse gases at a level that will 'avoid *dangerous* anthropogenic interference with the climate system'.

[5] Some 30 greenhouse gases contribute to climate change, but only six are regulated under the international agreements, chiefly carbon dioxide, nitrous oxide and methane. These are listed in Annex A to Kyoto Protocol to the United Nations Framework Convention on Climate Change ([1997] ILM 22) 'the Kyoto Protocol'.

this thesis that a global agreement on emissions reduction is simply the starting point of a coherent and appropriate response.

This thesis examines a particular aspect of the complexity required for a satisfactory response to the problem of climate change, which I characterise as *'small scale climate change litigation'*. I discuss this in the context of the thesis study area, which explores the limits of and potential for liability in tort to address problems arising from energy efficiency works in domestic buildings. As such I am working in the intersection between energy efficiency, climate change liability and tort theory and doctrine. The thesis has two chief aims, which are reflected in joint perspectives on the subject matter of the thesis. The first aim is to explore what recourse is available for known problems arising from energy efficiency improvements in domestic buildings. The second, is to begin an enquiry about the engagement of private liability with climate change issues; here, in relation to climate change mitigation strategy on the local or domestic scale. I characterise this as *small-scale climate change liability,* because the process and implications of private liability stand to support or undermine climate change policy and regulation. Acknowledging this ensures that the impact of tort claims on climate change, and the manner and extent to which climate change issues influence tort, are explicit.[6]

Creating more energy efficient infrastructure has potential easily to yield significant energy savings, key for greenhouse gas emission reduction targets.[7] The reduction of energy demand is (or should be) a policy

[6] I shall explain this argument in more detail below, and return it throughout the thesis, arguing that there are myriad respects in which tort liability might interface with climate change issues.
[7] Energy efficiency and conservation is also important for energy security and household expenditure/fuel poverty reasons.

priority.[8] The potential of energy efficiency is reflected in ever-increasing formal efficiency standards for new builds and (unfortunately not very effective) financial incentives to stimulate the renovation of the existing stock. However, any expectation that the achievement of energy efficiency in domestic buildings would be 'low-hanging fruit' remains sorely unfulfilled. It is now broadly acknowledged that the rate of transformation of the built stock is insufficient for climate change mitigation goals. Moreover, significant systemic and industry wide shortcomings in the quality and effectiveness of these improvements, mean that often the prescribed (or promised) levels of energy efficiency are not achieved.[9] This is called 'the performance gap'. In addition, measures taken to achieve high levels of energy efficiency can have adverse effects on the health and wellbeing of its occupants, as well as on the long-term condition of the building.[10] Just one of these 'unintended consequences' is the tendency of energy efficient buildings to overheat in hot weather. In the context of the thesis – which only covers domestic property - it falls to the householder[11] to seek recourse for these problems, even though energy efficiency in the built environment is intended (and necessary) to reduce greenhouse gas emissions and contribute to climate change mitigation.[12] Placing responsibility for securing compliance and enforcement of climate change mitigation measures with private individuals, and potentially leaving those individuals to bear the brunt of poorly-thought-through regulation. The absence of recourse means that no mechanism exists through which to

[8] CCC, 'Building a Low-Carbon Economy – the UK's Contribution to Tackling Climate Change' (2008). Chapter Six; DECC, 'The Carbon Plan' (2011) http://www.decc.gov.uk/en/content/cms/tackling/carbon_plan/carbon_plan.aspx.

[9] ZCH, 'Closing the Gap Between Design and As-Built Performance: End of Term Report' (2014).

[10] C Shrubsole and others, '100 Unintended Consequences of Policies to Improve the Energy Efficiency of the UK Housing Stock' (2014) 23 *Indoor and Built Environment* 340.

[11] The term 'householders' is used here for brevity. I consider the range of potential parties to such disputes in Chapter Four text to ftn 436 – 449.

[12] The simplicity of this issue has been overstated. It is, of course, in householder's financial interests to ensure energy efficiency in their homes, and arguably everyone bears some sort of duty or responsibility to reduce their demands on use of natural resources.

enforce quality standards for energy efficiency improvements.[13] This can only stand to undermine an already weak policy area.

Exploring these implications opens the door to a more general discussion about litigation that interfaces with climate change issues. I explain that the climate change problem demands a response across scales,[14] and that the areas explored in the thesis could be conceptualised as instances of small-scale climate change litigation. This adds to the burgeoning scholarship around climate change litigation, by extending this concept to include small and unglamorous issues that nevertheless interface with climate change policy areas.[15] I seek to identify key points in my notional disputes, where climate harms and climate change impacts fit uneasily with tort doctrine and structure. I argue that the common law and private parties' preoccupation with their private interests, are incompatible with climate change issues. As such, climate change issues could be 'invisible' even in disputes of this nature where the very substance and context relates to climate change. I emphasise how, in issues such as these, parties and adjudicators are presented with a choice as to whether to 'see' the climate issues, whether with respect to their interpretation of tort doctrine, or the potential impact or effect of dispute outcomes.

As I explore above, this includes an examination of the instances in which the outcomes (or non-outcomes) of private disputes might support or

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[13] This argument spans Chapters Three, Four and Six. The picture in relation to unintended consequences, is more complex. There is potential for some narrow liability in tort, particularly where the claimant suffers injury as a consequence of overheating problems. As I explore in Chapter Seven, however, there is no clear answer or outcome, and particularly as the climate warms, the choices as to whether to acknowledge climate issues or not, become starker.

[14] I explain what is meant by this, later in the chapter.

[15] In the thesis, because of the focus on energy demand reduction, the climate change policy area of most relevance is the mitigation of climate change through the abatement of greenhouse gas emissions. However, as I discuss further in Chapter Seven because of the complex and pervasive nature of the climate problem, it is not inconceivable that private (or other) disputes could cut across climate policy areas. For instance, the overheating problems discussed in that chapter arise from climate change mitigation measures, but become exacerbated by the effects of climate change.

undermine related climate policy goals. Underlying the discussion above is a recognition that, to some degree, either a perceived risk of or absence of liability will impact on the behaviour and decisions of putative parties. I argue this is simply one instance or area where the results yielded by tort liability impact on climate change mitigation in an unhelpful way. Specifically, where no or virtually no remedy exists for ineffective climate change mitigation measures, this undermines quality standards both in a discrete building, and more generally. Recognising this demands that our attention be given to all possible circumstances where private law outcomes could undermine climate policy.

This introductory chapter starts with a very specific discussion about the governance of climate change. Emphasising the need for a multiscalar climate change response, it discusses the importance of due attention to climate change governance at all levels, and in all forms (specifically discussing the potential in litigation). I go on to explain the importance of energy efficiency in the built environment and its role in climate change mitigation. I then examine the scope of the thesis and explain the varied research methodology and some of the challenges involved in undertaking this work. The chapter concludes with an outline of the thesis structure.

b) The governance of climate change

In this thesis I argue that litigated disputes about mundane issues relating to decarbonisation, stand to contribute to (or undermine) climate change mitigation, and that this contribution is important and should be acknowledged. Even a brief overview of the global climate change governance regime is an enormous task, that lies well beyond the scope of this thesis. However, it is necessary to make a few comments about the

limits and relevance of the global climate governance regime, in order to illustrate the possible contribution of climate change litigation.

The beginning of 2016 brought about a 'new' agreement on international climate change governance that has simultaneously been heralded as a miraculous achievement, and criticised for its lack of ambition.[16] Regrettably, both points are valid. Its relevance for the thesis lies both in its implicit recognition that climate change demands a multiscalar response; as well as in its continuing lack of ambition that reinforces the importance of additional mitigation measures.

Dealing with the first point: much of the structural criticism of the 'old' regime stresses the futility of relying on one measure – such as imposed international emissions reduction pledges – to achieve the broad change we need to in order to solve the climate problem.[17] Effective climate governance would happen simultaneously at different levels of governance,[18] and using a variety of regulatory measures.[19] Rather than imposing 'top down' reductions targets, the new regime incorporates an international governance and accountability regime, with a 'bottom up' approach. State (and other) parties determine their own emissions reduction goals in an 'iterative' process that both demands transparency and accountability, and permits increasing ambition to be written in, over

16 I refer to the Paris Agreement (FCCC/CP/2015/L9/Rev1) as a 'new' regime on climate change, and there are many reasons why it might be thought of in this way. Technically it is a continuation of the Conference of the Parties process under the UNFCCC. This agreement, signed on 22 April 2016 and not yet in force, has already generated an enormous amount of literature. I have referenced some key pieces below.
17 D Campbell, 'After Doha: What Has Climate Change Policy Accomplished?' (2013) 25 *JEL* 125.
18 J Peel, L Godden and RJ Keenan, 'Climate Change Law in an Era of Multi-Level Governance' (2012) 1 *Transnational Environmental Law* 245; J Scott, 'The Multi-Level Governance of Climate Change' in P Craig and G De Burca (eds), *The Evolution of EU Law* (OUP 2012). See further my discussion of scale below.
19 The 'silver buckshot' of G Prins and S Rayner, 'The Wrong Trousers: Radically Rethinking Climate Policy' (2007).

time.[20] This broad conception of climate change mitigation acknowledges the role played by different kinds of mitigation action to contribute to the reduction goals. As such, it might also be seen as taking steps towards polycentricism, or the multiscalar governance of climate change, which I discuss further below.

The potential for a broad multiscalar response to climate change under the Paris Agreement could provide the solution to what is probably the most significant criticism of it: it lacks ambition in terms of its capacity to achieve its stated targets. The previous regime was also subject to an 'ambition gap' which manifested in two key ways. First, it was doubted that the emissions reductions trajectory [21] would be sufficiently deep to limit warming to 2 degrees.[22] This strongly suggests that actors across lower scales of governance should contribute to reducing emissions, and not leave matters to the international community. Second, as much as a 2-degree limit might not be feasible, it also might not be adequate. It is questionable whether seeking to restrict warming to 2 degrees would avoid 'dangerous' climatic change,[23] and the new agreement acknowledges this. A 1.5-degree target would reduce significant risks for (particularly) small

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[20] D Bodansky, 'The Paris Climate Change Agreement: A New Hope?' (2016) 110 *American Journal of International Law* (forthcoming).

[21] The first commitment period under the Kyoto Protocol was inadequate to reduce emissions by the required amount – K Anderson and A Bows, 'Beyond "dangerous" Climate Change: Emission Scenarios for a New World' (2011) 369 *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 20.

[22] First tabled in Cancun in 2010 'bottom up' targets – voluntary self-selected targets from each state, the combined effect of which would be unlikely to limit warming to 2 degrees - D Bodansky and L Rajamani, 'The Evolution and Governance Architecture of the Climate Change Regime' in D Sprinz and U Luterbacher (eds), *International Relations and Global Climate Change* (2nd edn, MIT Press 2013). A recent IPCC synthesis report has confirmed that the best we could achieve with the depth of cuts tabled in COP16 in Cancun, in 2010, would be 3 degrees of warming, which would carry more severe consequences in terms of climatic changes: IPCC 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, PK Pachauri and LA Meyer (eds) IPCC Geneva, Switzerland 85. Regardless of agreements and commitments, in any event in practical terms the international community is not on track with sufficient emissions reductions to restrict to 2 degrees warming: UNEP, 'The Emissions Gap Report 2015: A UNEP Synthesis Report' (2015).

[23] J Hansen and others, 'Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature' (2013) 8 *PLoS ONE* e81648.

island states, but of course, require deeper emissions reductions to be made sooner. In this way the Paris agreement both encapsulates an appreciation of the preferable, multiscalar response to the climate change problem, while simultaneously re-creating the need for this.

From our perspective, the UK's submissions on nationally determined contributions to this global emissions reduction regime, are informed by its anticipated domestic reduction of greenhouse gas emissions. Both the EU [24] and domestic [25] level climate change policy packages reflect the enormous potential for achieving a reduction in energy demand necessary to bring down carbon emissions. While, again, this is regrettably not the place for a detailed discussion of the relevant regional and domestic climate change regime, it is necessary to touch on aspects of this regime that are relevant to the thesis subject matter. Specifically, I shall explain briefly how broader progress towards decarbonisation is driven and measured. I shall return to issues of energy and the built environment below and in the next two chapters.

The UK's regional commitments are driven by European Union level climate packages aimed at progressive realisation of decarbonisation at key stages: 2020, 2030,[26] and 2050.[27] Its climate change program is dominated by the star-crossed ETS,[28] a complex 'cap-and-trade' economic instrument. The program also includes a tripartite package of measures to reduce

[24] Recital 7 to Directive 2012/27/EU on energy efficiency [2012] OJ L315/1 (Energy Efficiency Directive or EED) – as buildings are responsible for up to 40% of end us consumption across Europe.
[25] DECC (n 8) 29; CCC, 'Building a Low-Carbon Economy – the UK's Contribution to Tackling Climate Change' (n 8). The end use figures in the UK are higher than the European average because of our greater demand for space heating.
[26] The 2030 Framework for climate and energy policy sets a target of 40% reduction in emissions as against a 1990 baseline and much weaker renewables and energy efficiency targets then expected. 24 October 2014, conclusions of the European Council, available at: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf
[27] A roadmap for moving to a competitive low carbon economy by 2050 COM/2011/0112 final
[28] M Lee, *EU Environmental Law, Governance and Decision-Making* (2nd ed, Hart Publishing 2014) 137 - 146 discusses the interesting progress of this 'second choice' policy option.

carbon emissions. The current '20-20-20' program has required a 20% reduction in emissions, a 20% improvement in energy efficiency and to increase the share of renewable energy to 20%, in the EU, by 2020.[29] The Buildings Directive [30] and a more generally applicable Energy Efficiency Directive,[31] specify measures to be taken to improve energy efficiency in domestic buildings,[32] and I return to them below. While generally the EU is on track to meet its commitments to 2020,[33] it has not achieved the desired level of energy efficiency improvements.[34]

The EU has undertaken carbon reduction commitments for the period 2020 – 2030. [35] The increased requirement is a 40% reduction in greenhouse gas emissions, for a 27% share of energy to be from renewable sources, and a non-binding commitment to improve energy efficiency by 27%. [36] While these improvements sound ambitious, they have been criticised as inconsistent with the required level of emissions reduction,

[29] R Pereira and C Jourdain, 'International and EU Climate Change Law' in K Makuch and R Pereira (eds), *Environmental and Energy Law* (Wiley-Blackwell 2012).
[30] Directive 2010/31/EU on the energy performance of buildings (recast) [2010] OJ L153/13 (Buildings Directive). See R Dawes, 'Building to Improve Energy Efficiency in England and Wales' (2010) 12 *Environmental Law Review* 266.
[31] EED (n 24). Article 4 requires Member States to set out national strategies for the renovation of their building stocks. The suite of directives is required to be transposed into domestic legislation by Member States. The impact and relevance of the specific provisions in these directives, to UK energy and buildings regulation will be explored in more depth in Chapter Three.
[32] These include a directive on renewable energy: Directive 2009/28/EC on the promotion of energy from renewable sources [2009] OJ L140/16 (Renewable Energy Directive). Although the thesis is predominantly 'about' energy efficiency measures, targets to increase the use of renewable energy are of tangential relevance because measures for the microgeneration of renewable heat and power are often included or required to be included either in high efficiency new builds or deep retrofit projects.
[33] UNEP (n 22).
[34] EC, *Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy* COM (2014) 520 final 4: This communication describes 18 – 19% energy savings but makes it clear that to some degree this figure reflects reduced consumption, not energy efficiency improvements.
[35] EC *A policy framework for climate and energy in the period from 2020 to 2030* (2014) COM 15 final
[36] (n 31) The United Kingdom, along with Poland, was instrumental in ensuring both a lower target than previously proposed, and that this should be non-binding. Euractiv *Efficiency hopes pinned on Parliament after summit* 4 November 2014, available at http://www.euractiv.com/sections/renovate-energy-efficiency/efficiency-hopes-pinned-parliament-after-summit-309709

from the EU, to restrict warming to within the 2-degree limit.[37] Thus as with international obligations, the EU's emission reduction targets and commitments might not be designed to prevent dangerous impacts of climate change.

As for the UK, its legislated regime on climate change mitigation is world leading, the Climate Change Act 2008 ('CCA') being an early piece of national legislation binding a state to carbon reduction targets.[38] It also both contributes to and represents a 'bottom up' approach to climate governance as referred to above.[39] As above, a detailed analysis of the regime is superfluous to this thesis, but I shall briefly mention two features that are of background relevance: the 'bottom up' system of targets and budgeting and the role of the Committee on Climate Change ('CCC').

The headline feature of the CCA is that it imposes a duty on 'the Secretary of State' to reduce the net UK carbon account by at least 80% relative to 1990 levels, by 2050.[40] While the exact nature of this duty or the implications of failing to meet it remain undefined and untested,[41] the

[37] Ecofys *Assessing the EU 2030 Climate and Energy targets: A Briefing Paper* 17 March 2014. This paper predates the reduction of energy efficiency targets of November 2014.
[38] S 1(1) Climate Change Act 2008 (CCA). The precursor legislation, the mostly repealed Climate Change and Sustainable Energy Act 2006, in s1 defined its purposes as the alleviation of climate change, fuel poverty and the consolidation of energy security.
[39] National targets for emissions reduction inform the nationally determined contribution approach encapsulated in the Paris Agreement, but the UK climate change regime also operates a 'bottom up' approach in that the carbon budgets are based on potential achievable sectoral reductions in emissions.
[40] S 1(1). The rest of the section contains similarly worded duties leading up to the target date of 2050.
[41] M Stallworthy, 'Legislating Against Climate Change: A UK Perspective on a Sisyphean Challenge' (2009) 72 *MLR* 412 243 explains that while the CCA appears to create legal duties to tackle climate change, it is difficult to envisage an enforceable public (or even less, private) law basis on which to hold a party accountable for a failure to meet the relevant targets. JF Garner, P Street, C Smith, I Doolittle, and DJ Harris, *Garner's Environmental Law* (Revised edn. Butterworths Law 1991) 5B.23 suggest that it is enforceable by means of judicial review. CT Reid, 'A New Sort of Duty?: The Significance of 'Outcome' Duties in the Climate Change and Child Poverty Acts' (2012) P*ublic Law* 749 asserts that the section 1 duty is of a particular nature that motivates for enforcement in relation to outcome, even as this seems implausible. The headline duty might be better conceptualised as having a broader institutional significance, or being a 'socially transformative broader goal', than creating

short-term duties imposed on the Secretary of State are of more immediate interest.[42] She is required to set five yearly carbon budgets,[43] and ensure they are met, but the CCA does not specify how these reductions should be achieved.[44] The Secretary of State is required to 'prepare proposals and policies' for this purpose,[45] and report on these to Parliament.[46] She is accountable to Parliament to submit reports of net emissions annually[47] and at the end of each budgetary period,[48] or provide an explanation and modifying policy plan if the specified targets are not met.[49]

The CCC advises the Secretary of State and Parliament on setting and amending targets and periodic budgets.[50] It also advises on the level of the 2050 targets,[51] on the level of the periodic carbon budgets and how these should be met.[52] The CCC produces annual reports on mitigation progress, and more recently, in more broadly 'preparing' for climate change, a more holistic approach which includes the adaptation response. The CCC's reports demonstrate formal progress towards decarbonisation, but express concern that this is attributable to external factors (key factors

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enforceable legal rights: see A McHarg, 'Climate Change Constitutionalism? Lessons from the United Kingdom' (2011) 2 *Climate Law* 469 479

[42] J Church, 'Enforcing The Climate Change Act' (2015) 4 *UCL Journal of Law and Jurisprudence* 109 argues for the public law enforceability of the interim procedural duties.

[43] S4(1). Save for the 2020 budget, which is to be 26% lower than the 1990 baseline (s5(1)(a)). The Secretary of State has a power to set ranges for later years (section 5(1)(c)), and he must also set indicative annual budget ranges for each year (s12(1)).

[44] Stallworthy (n 41).

[45] In so doing the UK government is required to 'have regard to' the need for UK domestic action on climate change: ss15 (1) and (2). This presumably means that although provision is made for carbon offset and trading some work must be done reducing or removing domestic carbon emissions.

[46] Ss13 and 14

[47] S16, s36(1)(a) – (c). There is also a duty to provide advice on various climate change related issues on request – see s38. There are also provision in terms of which the Secretary of State or various national authorities are empowered to provide guidance or direction to the Committee on various matters, to which it must have regard – see ss41 and 42. S37 permits the Secretary of State a right of response to this report and accompanying recommendations.

[48] Ss18(1) and 20(1) and (2)

[49] Ss18(8) and 19(1), and 20(6) in relation to the 2050 target

[50] Ss3(1)(a) 2050 target or baseline year; section (7)(1)(a) amending target percentages; section 9(1)(a) and 34 consulting on carbon budgets and s22(1)(a) on the alteration of carbon budgets; 17(4)(c) on carrying amounts between budgetary periods.

[51] Ss33(1)

[52] Ss34(1)(a), and (b)

include recent mild winters and economic recession) rather than truly reflective of a low carbon pathway.[53] A lack of meaningful progress combined with recent policy turmoil inform the CCC's expressed concerns as to the UK's potential to meet its 2020 target.[54]

c) Climate change litigation across scales

The discussion above serves to illustrate the extent to which different levels of governance engage with the 'global' phenomenon of climate change. Regional, national and local governments have taken responsibility for mitigating emissions within their areas of remit.[55] Whether inspired by the international processes or implemented through frustration at perceived paralysis in the international negotiations, there is great potential for climate change mitigation even at the city scale, or lower.[56] The new agreement even acknowledges the potential of non-state parties to contribute to the climate response. Indeed, these very basic outlines of the formal structures governing climate change do not nearly exhaust the cross-cutting and diverse ways in which climate change issues engage with and impact on existing legal structures.

The 'bottom-up' approach to climate change governance encapsulated in the new international agreement, can be interpreted as a movement towards an acknowledgement that the pervasive nature of the climate problem demands a multiscalar response. In writing this thesis I have been strongly influenced by the work of Hari Osofsky in her strong emphasis of

53 CCC *Reducing Emissions and Preparing for Climate Change: 2015 Progress Report to Parliament* July 2015.
54 Ibid
55 Peel, Godden and Keenan (n 18). Scott (n 18).
56 H Bulkeley, *Cities and Climate Change* (Routledge 2012) Chapter 5.

the need for dynamic and multi-agency approaches to the governance of climate change. Osofsky explains:

> Climate change is an individual, local, state, national, regional and international problem. Because carbon is so deeply embedded in the global economy and its impacts manifest in specific ways in different places, emissions and impacts occur at multiple levels simultaneously. …[T]he valorisation of the 'international' in the climate change debate… serves as an impediment to such cross-cutting efforts. If regulatory strategies focus only on top-down, international-level approaches grounded in nation-state consent, we will miss opportunities for much needed innovation and emissions reduction.[57]

However, leaving it there would offer little more than an acknowledgement that multiple levels of governance need to be involved. This of course, already offers some progression beyond the rigidity of internationalisation, however, Osofsky argues that such an approach would be limited if it overlooks the fluid interactions between scales.[58] Scale is a complex and contested notion, and is used in diverse ways across disciplines.[59] It is instructive for the thesis because treating jurisdictional levels as inert ignores what is frequently happening in the interpretation or adjudication of legal issues.[60] The notion of scale encapsulates the need for fluidity in our conception of the spatial, but also the temporal, aspects of climate change. According to Osofsky, the literature on scale supports an understanding of the regulatory complexity surrounding the climate change problem in three different ways. The first is that it illuminates the need for

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[57] H Osofsky, 'Scales of Law: Rethinking Climate Change Governance' (University of Oregon 2013) https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/13297/Osofsky_oregon_0171A_10730.pdf?sequence=1 accessed 24 May 2016.

[58] Osofsky (n 57).

[59] Geographers and political scientists employ the concept of scale slightly differently. Recent valuable scholarship has brought notions of scale and spatiality into our understanding of law, see in particular J Holder and C Harrison (eds), *Law and Geography* (OUP 2003).

[60] HM Osofsky, 'Adjudicating Climate Change across Scales' in WCG Burns and HM Osofsky (eds), *Adjudicating Climate Change* (CUP 2009). Or any of the case studies in Osofsky (n 57).

a pluralistic or 'polycentric' governance structure.[61] This entails that obsessions with unitary approaches such as top-down targets, or deference to national policies, are not simply unnecessary but also insufficient. This is the best way to make sense of the impacts of climate change litigation.

The second way in which a conception of scale contributes to our understanding of effective climate change governance, is that it demands an inclusion of the smaller scales in relation to the globalised approach taken to climate change mitigation. I would argue that this is less a requirement for permission for these scales to interact with higher levels of governance, and more an imperative that the impact of their multiple actors be recognised, as they will have an impact whether this is acknowledged, or not. As Osofsky explains: "[E]ach lost opportunity to limit emissions and respond constructively to this problem increases the risks.'[62]

Osofsky's third principle for framing regulatory solutions in the face of geographic complexity, in the context of climate change, is that this variety of multiscalar governance structures must be aware of and responsive to change. This is an excellent tool for exploring how '…complex multi-level contestation, such as in litigation, forms part of climate change regulation.'[63] Thus, climate change litigation can force climate regulation up or down scales. Indeed, the particularity of private law litigation demands the flexibility and responsiveness that is required in an effective and appropriate climate change response.

[61] Osofsky (n 57) 39 – 43. This of course echoes the point made above in the text below n 20.
[62] Ibid 54.
[63] Osofsky (n 57) 48.

In a sense, this conception of what is required in a multiscalar response to climate change, and the role of litigation in this, informs this entire thesis, and informs its conception of itself as a study in *small-scale climate liability*. Where, later in the thesis, I refer, say, to the distributional impacts of litigation, this is done with the understanding that the litigation has potential to form part of a polycentric response, and that this matters, however insignificant it might seem. The rest of this section of the chapter takes an overview of what is currently conceived of as 'climate change litigation'; thereafter I move on to a discussion of energy efficiency and the built environment.

A wealth of scholarship explores the prospects of and potential for 'climate change litigation'. Trends and forecasts in the kinds of climate related matters coming before the courts vary across jurisdictions,[64] and a wealth of scholarship has developed, seeking to draw thematic or definitional lines [65] around, impose coherence on [66] or simply document [67] this exploding area of legal action. Probably because of the unruly nature of this collection of actions, existing scholarship limits the scope of examination to actions that explicitly or overtly relate to climate change.[68]

While much of the scholarship discusses this in general terms, it is possible to make distinctions between 'liability' and 'litigation', as well as the public and private litigation processes often conflated in the literature. While not terms of art, it seems to be that the term 'liability' approaches litigation

[64] M Wilensky, 'Climate Change in the Courts: An Assessment of Non-U.S. Climate Litigation' (Sabin Center for Climate Change Law, Columbia Law School 2015).
[65] E Fisher, 'Climate Change Litigation, Obsession and Expertise: Reflecting on the Scholarly Response to Massachusetts v. EPA' (2013) 35 *Law & Policy* 236; L Vanhala and C Hilson, 'Climate Change Litigation: Symposium Introduction' (2013) 35 *Law & Policy* 141.
[66] J Peel, 'Issues in Climate Change Litigation' (2011) 5 *Carbon and Climate Law Review* 15.
[67] E.g. J Lin, 'Climate Change and the Courts' (2012) 32 *Legal Studies* 35; Wilensky (n 64).
[68] C Hilson, 'Climate Change Litigation in the UK: An Explanatory Approach (Or, Bringing the Grievance Back in)' in F Fracchia and M Occhiena (eds), *Climate Change: La Riposta del Diritto* (Naples, Editorale Scientifica 2010).

outcomes from a purely instrumental perspective; litigation on the other hand seems to encompass a broader perspective including the normative processes involved in the adjudication process itself. Public litigation has undoubtedly played a role in climate change governance.

Writing in a public law context, Osofsky outlines the potential litigation has to strong-arm regulators into action. Not only are the outcomes of challenges to regulation (or failures to regulate) significant, but this repeat strategic litigation has forced energy regulation to different levels of governance.[69] Aggressive and strategic[70] administrative law challenges from both 'sides' have unarguably shaped the US domestic regulation relating to the production and consumption of energy.[71] Echoing this approach, Fisher identifies response to institutional failure as one of three key factors driving climate litigation.[72] In an area where policy measures to tackle climate change across different levels of governance, have been varying degrees of disappointing, it is key to acknowledge the importance and potential of the conduct of non-state parties or corporations to stimulate or at least challenge government failures in this regard.

In England the bulk of what might be called climate change litigation comprises challenges to administrative decisions regarding the grant of planning permission in relation to renewable energy projects, mainly windfarms.[73] There has also been a challenge concerning the withdrawal of subsidies linked to solar renewable energy installations in domestic

[69] HM Osofsky, 'The Role of Climate Change Litigation in Establishing the Scale of Energy Regulation' (2011) 101 *Annals of the Association of American Geographers* 775.
[70] MB Gerrard, 'Scale and Focus of Climate Litigation outside of United States' (2015) *The New York Law Journal* Vol 253, 47.
[71] Osofsky (n 69). D Markell and JB Ruhl, 'An Empirical Assessment of Climate Change in the Courts: A New Jurisprudence or Business as Usual' (2012) 64 *Florida Law Review* 15. See also J Peel and HM Osofsky, *Climate Change Litigation* (CUP 2015).
[72] Fisher (n 65).
[73] L Butti, 'The Tortuous Road to Liability: A Critical Survey on Climate Change Litigation in Europe and North America' (2011) 12 *Sustainable Development Law & Policy* 32; Wilensky (n 64).

property.[74] While this seems fairly modest compared to the US experience, and no sustained analysis has been done, it is likely that this litigation has borne some impact on the regulation or provision of renewable energy, which in turn would bear on the continued demand for carbon-based forms of energy.

Until recently, private law climate change litigation has been predominantly an academic curiosity. An early trend in the literature interrogated the potential for liability, predominantly in tort, 'for' climate change, specifically seeking compensation against major emitters for climate change loss or damage.[75] While interesting from a tort scholar's perspective because of the sophisticated analyses sought to 'match' climate change with elements of tort doctrine,[76] this project seemed doomed to failure. Three high-profile group actions have been brought in the US in the past decade, and none of these has progressed even to a substantive hearing of the issues.[77] However, a recent and unexpected triumph in The Hague District Court in the matter of *Urgenda Foundation v the Kingdom of the Netherlands*[78] has re-enlivened interest in the potential of private litigation 'for' climate change harms – not least because the decision required an increase in ambition in the Dutch emission reduction target.[79]

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[74] *Homesun Holdings Ltd, R (on the application of) v SoS for Energy and Climate Change* [2011] EWHC 3575.

[75] DA Grossman, 'Warming up to a Not-So-Radical Idea: Tort-Based Climate Change Litigation' (2003) 28 *Columbia Journal of Environmental Law* 1; D Hunter and J Salzman, 'Negligence in the Air: The Duty of Care in Climate Change Litigation' (2007) *University of Pennsylvania Law Review* 1741; EM Penalver, 'Acts of God or Toxic Torts - Applying Tort Principles to the Problem of Climate Change' (1998) 38 *Natural Resources Journal* 563; D Kysar, 'What Climate Change Can Do About Tort Law' (2012) 42 *Environmental Law Reporter* 10739–44 - a lengthy list of articles discussing this issue is found at Kysar's note 3; J Brunnee and others, 'Overview of Legal Issues Relevant to Climate Change' in R Lord QC and others (eds), *Climate Change Liability: Transnational Law and Practice* (CUP 2011).

[76] I will return to this point later and throughout the thesis.

[77] Butti (n 73) provides a good summary.

[78] ECLI:NL:RBDHA:2015:7196

[79] KJ de Graaf and JF Jans, 'The Urgenda Decision: Netherlands Liable for Role in Causing Dangerous Global Climate Change' (2015) 27 *JEL* 517. Also J van Zeben, 'Establishing a Governmental Duty of Care for Climate Change Mitigation: Will Urgenda Turn the Tide?' (2015) 4

Less high profile private litigation in the climate arena certainly has some impact on the behaviour and decisions of governments or private parties.[80] Later in the thesis I shall discuss in more depth, what I perceive the public role of private litigation to be, and have referenced Hari Osofsky's observations that litigation can move climate change issues between scales of governance. There are, however, other actions and disputes that engage with issues relevant to climate change in a less overt way. I would argue that these issues need to be recognised and acknowledged as 'climate change litigation' in order, as Osofsky says, that each opportunity for a good response to climate change is not missed.

Scholarship about climate change litigation tends to categorise as climate litigation only actions that explicitly identify themselves as such.[81] It is obvious, not least for methodological reasons, why this would be the case. But private litigation that somehow interfaces with climate change issues or policy will bear some impact, whether or not it is expressly delineated as climate change litigation. Particularly in relation to smaller private disputes, which are not beset with political barriers or likely to be found non-justiciable, it is clear that conflicts will arise and be resolved in one manner or another. Because private law liability and litigation will shape behaviour, private law claims in the climate change context may well have some instrumental impact on climate policy, whether or not this categorised as climate litigation. It is better, therefore, that this is recognised. The implications of this are that we need to recognise the relevance of even

Transnational Environmental Law 339. The unstoppable nature of the new private change litigation project is clear: R Cox, *Revolution Justified* (Planet Prosperity Foundation 2012).

[80] BJ Preston, 'The Influence of Climate Change Litigation on Governments and the Private Sector' (2011) 2 *Climate Law* 485.

[81] Markell and Ruhl (n 71).

very small and mundane disputes, such as those between private parties or individuals, or of low financial value.[82]

Of course, determining the implications of private litigation is complex and unpredictable. As I shall discuss in more detail in Chapter Five, if we accept that both the absence or threat of liability risk can act as a pricing mechanism, shaping defendant behaviour either directly or through their insurers,[83] then private liability claims in the climate change arena stand to shape climate regulation. This must include actions that resist litigation either for procedural reasons (for example, jurisdictional, standing or costs problems) or doctrinal (for example, the absence of a duty of care) reasons. Of course, while these outcomes might either discourage behaviour that undermines climate change (or the opposite) the regulatory role of liability risk is complex and is unlikely to be reducible to simple deterrence, in every instance. Depending on the circumstances of each private dispute, these disputes have potential to make determinations about how parties should treat climate risks, the importance of mitigation measures, and who should bear the costs of climate damage. The impact of litigation also has potential to extend beyond the direct effect of liability findings to include the more subtle effects of judicial pronouncements,[84] or socio-technical advancements stimulated by the subject matter of the litigation.[85] For this reason it is both important and valuable to investigate how climate issues will be dealt with in private litigation, and to explore their potential impact on climate policy.

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[82] This ties in with Osofsky's third principle of multiscalar responses to climate change, considered below n 62.
[83] J Black, 'Decentring Regulation: Understanding the Role of Regulation and Self-Regulation in a "Post-Regulatory" World' (2001) 54 *CLP* 103.
[84] Fisher (n 65) identifies this as one of the factors driving climate litigation.
[85] Preston (n 80) uses examples in the context of US atmospheric trust litigation

Thus, even the small and mundane issues I deal with in the thesis – actions for poorly performance energy efficiency improvements and overheating in domestic buildings - may be categorised as climate change litigation, because of the impact or dearth thereof that litigation outcomes would have on enforcing climate targets. I will refer back to these issues when I discuss the instrumental effects of the case study areas, later in the thesis.

d) Energy, energy efficiency and the built environment

Having discussed the climate change mitigation targets and broader context of this thesis, I shall now move on to discuss the more specific policy areas in which the discussion is based. First, I shall clarify some key terms and highlight the importance of energy efficiency at the smaller scales; then I shall touch on progress in improving the energy performance of the built environment sector. As above, this discussion is regrettably brief, but necessary to inform the broader context of the research.

'Energy' is not necessarily equivalent to 'carbon' or 'carbon emissions,' and 'greenhouse gas' (GHG) emissions.[86] At present, most of our energy needs are met through an energy system in which the production, transportation and incineration of fossil fuels is embedded. The gases emitted when fossil fuels are burned, retain heat in the atmosphere, like a greenhouse. This contributes significantly to the 'global warming', which is both a cause and effect of anthropogenic climate change.[87] Carbon dioxide is the most

[86] JR Goulding, J Owen Lewis, TC Steemers *Energy Conscious Design: A Primer for Architects* (Batsford 1992) 51-61

[87] See generally IPCC 2013 (n 3) – this is to acknowledge that some climate change drivers are natural, although the human impact is undeniable. Also, of course, other anthropogenic drivers of climate change exist – most notably land use change and cement production.

significant warming gas; I shall refer to carbon emissions/decarbonisation throughout the thesis.[88]

Assuming the carbon intensity of our energy supply remains constant, using less energy is key for reducing carbon emissions. In a buildings context, 'energy' refers to the amount of power required to heat the building to an acceptable temperature for living, so primarily space heating, fuel for cooking and lighting/appliances and heating water.[89] Thus, energy intensity is energy use per unit of activity,[90] in this case, square meter of floor space. Energy efficiency is a matter of using specific design and technologies to achieve equivalent or improved energy intensity, at lower energy consumption and cost;[91] in lay terms this is simply getting more power for the same expenditure of energy (and money). In my discussion this is very much an issue of infrastructure and technology; individual or collective habits, behaviours or decisions aimed at minimising energy use are better described as energy conservation behaviours. Both energy efficiency improvements and energy conservation behaviours can be categorised as solutions to energy demand problems.[92] Energy supply issues in contrast, cover the sources and composition of fuel.[93] As far as decarbonisation is concerned, sourcing energy from renewable or 'cleaner' forms of supply would generate an equivalent amount of power with lower

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88 Others include nitrous oxide, methane, and water vapour; I appreciate that these also contribute to global warming.

89 See e.g. D ürge-Vorsatz, LD Danny Harvey, S Mirasgedis, and MD Levine, 'Mitigating CO2 emissions from energy use in the world's buildings' (2007) 35 *Building Research & Information* 379–398 381

90 B Barton, 'The Law of Energy Efficiency' in DN Zillman and others (eds), *Beyond the carbon economy : energy law in transition* (OUP 2008) 62

91 See discussion in Dawes (n 30) 267 – 8. Dawes' definition includes reference to 'practices' which I have excluded, as this sits better with behavioural energy conservation issues.

92 The IEA has recently attempted to recategorise energy efficiency as a resource – the 'first fuel' - see International Energy Agency, 'Capturing the Multiple Benefits of Energy Efficiency' (2014). While this can be seen a part of a necessary and well-meaning attempt glamorise this neglected but auspicious area, conceptually it confuses energy demand and supply issues. For this reason I have chosen not to use this terminology or conception in the thesis.

93 Barton (n 90) 61

carbon intensity and without the same deleterious environmental impact. On the whole, decarbonising main grid power supply is beyond the control of individuals on the small scale, but they could generate small amounts of low-carbon power through microgeneration, in or near their own buildings. [94]

Focusing on energy demand, early reports from the Committee on Climate Change emphasised that because of the UK's high winter energy demand, dense population and historic lack of attention to structural energy efficiency, the built environment was an area with particular potential to reduce energy demand. [95] Implicit in these recommendations is the appreciation that improvement of infrastructure represents an enduring reduction in energy demand, not at the mercy of the vagaries of behaviour. Initial progress in this area showed promise, but this was largely attributable to inherent improvements in design and construction of new build properties resulting in superior energy performance, and because measuring progress against a baseline year of 1990, creates the impression of swift progress from what actually represents decades of incremental changes. Because the built infrastructure in the UK is durable and developed, a key challenge is how to incentivise decarbonisation of existing properties in order to achieve a full transformation of the existing stock. A number of barriers to energy efficiency transformation require careful and

[94] Consider DECC, 'UK National Renewable Energy Action Plan' (2010) – which specifies that 2% of the UK's 15% renewable energy target should come from small scale generation projects, like those incorporated in building units. (The Action Plan purports to be in accordance with Article 4 of the Renewable Energy Directive (n32))

[95] CCC (n 8). On a discrete building basis this is attributable to the changes in regulations concerning household appliances, insulation and water boilers: SH Hong, T Oreszczyn and I Ridley, 'The Impact of Energy Efficient Refurbishment on the Space Heating Fuel Consumption in English Dwellings' (2006) 38 *Energy and Buildings* 1171.

nuanced regulatory encouragement;[96] a requirement that has in no means been met.[97]

In addition, the Committee on Climate Change's progress reports over the last five years have shown a trend of disquiet over the progress of reducing carbon emissions in the built environment. Progress where noted has been attributable mainly to the economic recession (2010) and milder winters (2012,2013) and not to a fundamental transformation of the building stock.[98] This 'progress' in entirely contingent, and a change in circumstances (for example, colder winters, economic improvements combined with a falling gas price) might quickly expose these gains for what they are. While the most recent Committee report does seem to reflect improvements even when reduced demand is taken into account, the rate of improvement is still not sufficient for the reduction of energy demand in the built environment to fulfil its potential in contribution to carbon reduction.[99] It is also significant that the figures presented seem based on assumptions that energy efficiency improvements, where undertaken, will be effective. When the gap between intended and designed performance (the subject matter of much of this thesis) is taken into account, the shortfall would be even more significant.

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[96] AB Lovins, *Energy Efficient Buildings: Institutional Barriers and Opportunities* (Rocky Mountain Institute 1992).

[97] Notably B Boardman, University of Oxford and Environmental Change Institute, *Achieving Zero: Delivering Future-Friendly Buildings* (ECI, Oxford University Centre for the Environment 2012) Chapter One; F Stevenson, 'Reducing Energy Demand through Retrofitting Buildings' (2013) 41 *Building Research & Information* 605; R Lowe and T Oreszczyn, 'Regulatory Standards and Barriers to Improved Performance for Housing' (2008) 36 *Energy Policy* 4475 4475 – 6. KJ Lomas, 'Carbon Reduction in Existing Buildings: A Transdisciplinary Approach' (2010) 38 *Building Research & Information* 1.1 also explains that the achievement of current targets requires a retrofit rate of 11.5 – 13.8% in the existing building stock. At his time of writing the rate was closer to 1%. This is not to say that the recent dramatic eradication of regulation supporting the development of renewable energy and energy efficiency is any better – I go into this in more detail in Chapter Three.

[98] CCC, 'Meeting Carbon Budgets – 2013 Progress Report to Parliament' (2013); CCC, 'Meeting Carbon Budgets – 2014 Progress Report to Parliament' (2014).

[99] CCC (n 53).

In passing I should add, that in the earlier years the focus on emissions reduction distracted from the need to ensure that the built environment is also *adapted* to meet the future challenges of a changing climate. The process of thinking about the risks presented by climate change started somewhat later than the climate driven need to manage energy demand.[100] There does appear to be a need for joined-up thinking in this (and probably other) areas. The Committee has recently drawn attention to the risks of overheating occasioned by energy efficiency improvements, and added to its recommendations the need for infrastructure to be developed safely.[101]

Scope of the thesis, methodology and structure

i. Scope

As explained above, the thesis considers the limits and potential of tort in relation to problems arising from climate change mitigation measures in domestic buildings – specifically the energy efficiency performance gap and overheating. As such, it intersects with an enormous range of materials. This has required a precise and ruthless approach in confining the thesis to the areas discussed. Not least, locating the research at the junction of fast-developing areas has presented some particular challenges in terms of cut off. Submission is in May 2016, and the last systematic searches for new or updated materials were conducted in late 2015; as such the thesis reflects the law as at December 2015. I have added some additional materials here and there, but not comprehensively so. In particular, this thesis will not engage in speculation concerning 'Brexit'. The UK's positive contribution to EU energy and climate change policy needs to be seen in political

[100] DEFRA, 'UK Climate Change Risk Assessment: Government Report' (2012). CCC, 'Managing Climate Risks to Wellbeing and the Economy; Adaptation Sub-Committee Progress Report 2014' (2014).
[101] See e.g. CCC, 'Reducing Emissions and Preparing for Climate Change - 2015 Progress Report to Parliament Summary and Recommendations' (2015).

context;[102] and of course recent years have seen the UK pushing for weaker, non-mandatory forms of regulation in relation to energy efficiency and renewables. It certainly is not inconceivable that a departure from Europe could signal the end of the remaining energy efficiency regulation in the UK; however a 'remain' route might well see the UK continue actively to undermine the imposition of mandatory standards from the EU. Also geographically, although I refer to 'the UK' throughout, the thesis covers the law in England and Wales.

As far as the discussion of climate change is concerned, this is neither the place for engagement with the scientific and political controversies enveloping the climate change debate, nor for a detailed account of beleaguered attempts to co-ordinate effective global climate action.[103] The discussion of climate change governance generally, and broader issues of climate change liability and litigation, is confined to the brief sections above. The study of these areas does however inform my understanding of 'climate consciousness' and the broader context of the thesis.

In terms of the key climate change response areas of mitigation and adaptation, this focus of the thesis is on climate change mitigation measures. A study of adaptation needs in relation to the domestic building stock is necessary and urgent. The second study area – overheating in buildings – clearly engages with adaptation and resilience/vulnerability issues, but this is approached as a 'side-effect' – an unintended consequence – of mitigation measures. This should not be seen as

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[102] C Burns, A Jordan, V Gravey, N Berny, S Bulmer, N Carter, JR Cowell and others, *The EU Referendum and the UK Environment: An Expert Review. How Has EU Membership Affected the UK and What Might Change in the Event of a Vote to Remain or Leave?* <http://ukandeu.ac.uk/wp-content/uploads/2016/04/Expert-Review_EU-referendum-UK-environment.pdf> accessed 21 April 2016 15 – 35.

[103] See generally Jamieson (n 2); M Hulme, *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity* (CUP 2009); N Klein, *This Changes Everything: Capitalism vs. the Climate* (Penguin 2015) and countless others.

comprehensive review of adaptation needs. In addition, I am aware that 'construction law' exists as a broader disciplinary area which, much like environmental law, tracks across different doctrinal areas in order to construct a full regulatory picture for a specific purpose. I am conscious that had I approached this thesis from a construction law perspective, rather than an environmental law perspective, the shape and focus of the thesis might have been quite different.

From a private law perspective, as is clear even from the introduction to this thesis, the focus of the thesis is on the theory and doctrine of tort. I have sought in this arena to provide an indepth study of these areas of private law. I emphasise that in my deep inspection of tort law in the two penultimate chapters, I have not addressed any form of public authority liability. As I explain in Chapter Six, this is to some extent because of the approach taken in *Murphy v Brentwood,* [104] where equating local authority liability with that of the builder meant that few public authority issues came to fore. In addition, although the line between public and private in this context is fluid, it is possible that the privatisation of many of the public functions relevant to the thesis could undermine any public authority 'immunities'.[105] However, most significantly, the thesis makes a crucial contribution in its emphasis on the need for 'climate consciousness' in entirely private disputes; thus engagements between two entirely private parties, exercising private functions, are most interesting for the research area. Questions about the nature and extent of the duties owed by 'climate conscious' public authorities would form an interesting area for future research.

[104] [1991] 1 AC 398.
[105] *Welton v North Cornwall District Council* [1996] EWCA Civ 516.

Of course, in (particularly) Chapter Four I consider remedies in other areas of common law, as well the potential for regulatory enforcement. This process is required more for 'gapfilling', to explain the shortcomings in other forms of enforcement, and to pave the way for and explain the relevance of tort. As such, the discussion in these areas does not explore the theory or the authorities in as much depth as the subsequent chapters. In particular, there is no deep theoretical discussion of regulatory theory or theories of governance. As I explain Chapter Three, understanding regulation in this way is not the purpose of the thesis, although I do draw on some regulatory scholarship to inform my understanding.[106] It might also be noted that 'climate change governance' has become a term that has taken its own meaning in the literature, independent from established theories of governance and regulation.

Furthermore, as I explain above the thesis proceeds from a strongly theoretical/doctrinal perspective. The generalised nature of the situation analysis approach does however come with limits; in particular, because no 'factual' cases are considered, the particularity that give tort decisions their depth and richness, is absent. As such, as I explain in the doctrinal discussions later in the thesis, the doctrinal chapters can not purport to have predictive force, because many of the factual issues that could determine the outcome are fabricated or absent. As such, the doctrinal discussions are broadly to be seen has having generalised or theoretical value. Another dimension where the theoretical discussions deviate from what might be expected in 'live' litigation is in the underlying presumption that where a viable cause of action exists, a claimant would litigate. Apart from some light references,[107] I have not looked in any depth at access to

[106] This is a less elegant version of the approach taken by Lee (n 28) at 81 – 82 – the thesis locates itself broadly within current theories of regulation and governance, without any particular allegiances.
[107] Chapter Five at n 754 and Chapter Seven at n 943.

justice issues or questions of whether even viable causes of action could ever be brought. In the 'live' sense, however, access to justice problems would clearly undermine the 'functions' of tort as I outline them in Chapter Five.

I will explain below in my methodology section, that I have conducted no empirical work of my own to support the assertions made in this thesis. My approach is predominantly theoretical/doctrinal, although I do on occasion draw on the empirical work of others. There are some areas where the theoretical discussion is to some extent based on accepted assumptions. Pertinent areas where this applies are as follows: a fundamental concern throughout the thesis is that the problems explored are to some extent underpinned by a 'trivialisation' of energy efficiency and the measures taken to achieve this. There are some modest references to this in the literature, and as I explain elsewhere, I am conscious that this comes across strongly in colloquial discussions about energy efficiency, as informed by resentment about European regulation, climate denial, scorn about environmentalism generally and concerns about the difficulty of achieving the good outcomes. More specifically, despite having several conversations where I was informed categorically that developers would not guarantee energy efficiency performance even on retrofit, and why, both this and the significance of it were not reflected in the peer-reviewed literature.[108]

[108] Some examples: on 15 February 2016 UCL co-hosted a conference with ZCH 'Building Better Buildings'. A presenter openly declared 'we are lying' in a presentation about the performance gap. On 26 April 2012 UCL co-hosted a conference with the Good Homes Alliance 'LowCarbon Homes for Real: Part L compliance and proof of performance'. Over coffee a developer responded to hearing of my PhD topic: 'No one will sue about energy efficiency because no one cares. We care about fires and buildings falling down, not energy.' In similar vein I was told on numerous occasions that contractual warranties for energy performance are necessary – even on retrofit – because developers cannot be sure of the results. On contractual issues, see Chapter Four Section d).

As far as the 'physical' energy efficiency aspects are concerns, there are numerous interesting areas that intersect with the thesis area that could not be explored in any depth. My thesis focus on discrete buildings, or building developments, and extending the focus to the city or national scale would create unmanageable breadth. Factors such as the carbon intensity of the main grid power supply and features of the urban design that contribute to a low-carbon lifestyle, are also significant.[109] In addition, the study is confined to domestic buildings, as commercial property is governed by distinct regulation and has quite different significance to claimants.[110]

In addition, for reasons I explain when I define energy efficiency above, the thesis focuses on the engineering and physical sciences aspects of energy efficiency in buildings. There is a vast and burgeoning literature that engages with the social sciences and behavioural aspects of energy use in buildings; there is no scope in the thesis to engage with this in any depth. This literature relates both to socio-technical adjustments and the way the occupants use the building;[111] includes but is not reducible to frugality, or energy conservation behaviour.[112] There is also a growing body of literature studying of perceptions of indoor thermal comfort have revealed a complex and nuanced interplay between personal behaviour, energy use, socio-economic status and personal habituation to degrees of 'comfortable'

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[109] J Hunt, 'How Can Cities Mitigate and Adapt to Climate Change?' (2004) 32 *Building Research & Information* 55. Also see e.g. J Adshead, 'The Quest for Sustainable Buildings: Getting It Right at the Planning Stage' in J Adshead (ed), *Green buildings and the law* (Spon 2011); Bulkeley (n 56) especially 118. This is of particular relevance in relation to onsite renewables, and because of the potential for local authorities to require higher levels of building energy performance than required in the Building Regulations. Also Stevenson (n 97) 604.

[110] See my discussion about the claimant's interest in her property in Chapter Six in text around n 899.

[111] See e.g. JA Love, *Understanding the interactions between occupants, heating systems and building fabric in the context of energy efficient building fabric retrofit in social housing*. A thesis submitted for the degree of Doctor of Philosophy, Energy Institute, University College London, June 2014, 39 - 50

[112] V Oikonomou and others, 'Energy Saving and Energy Efficiency Concepts for Policy Making' (2009) 37 *Energy Policy* 4787.

temperature.[113] Dangerous overheating, as discussed in Chapter Seven, is very much at the extreme end of indoor thermal comfort issues. At the other extreme end of 'thermal comfort' is the problem of fuel poverty. Fuel poverty is a complex social-economic syndrome, affecting human health and wellbeing in numerous ways.[114] Of course, it weighs most heavily on the poor and vulnerable. Improving energy efficiency in buildings is a necessary but possibly not sufficient condition to remedy fuel poverty,[115] and may not lead to any meaningful reduction in energy demand, if the improvements are reflected in thermal comfort. While I can not discuss this issue in any depth, it does not seem to me that access to affordable warmth needs to be compromised in order to achieve climate change targets.[116]

I also do not deal with any depth with the paradoxical 'rebound' effect – the tendency of resource savings to result in net increased resource use where prices remain fixed.[117] In context, investing in energy savings in the home may result in higher carbon emissions, say, due to a more cavalier attitude to 'cheaper' energy in the domestic context e.g. warmer rooms after insulating a building, or by spending saved money on other carbon intensive activities.[118]

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[113] H Chappells and E Shove, 'Debating the Future of Comfort: Environmental Sustainability, Energy Consumption and the Indoor Environment' (2005) 33 *Building Research & Information* 32.
[114] B Boardman, *Fuel Poverty: From Cold Homes to Affordable Warmth* (John Wiley & Sons Ltd 1991).
[115] B Boardman, *Fixing Fuel Poverty: Challenges and Solutions* (Routledge 2013).
[116] D Ürge-Vorsatz and ST Herrero, 'Building Synergies between Climate Change Mitigation and Energy Poverty Alleviation' (2012) 49 *Energy Policy* 83; P Guertler, 'Can the Green Deal Be Fair Too? Exploring New Possibilities for Alleviating Fuel Poverty' (2012) 49 *Energy Policy* 91.
[117] See e.g. M Chitnis and others, 'Turning Lights into Flights: Estimating Direct and Indirect Rebound Effects for UK Households' (2013) 55 *Energy Policy* 234. The authors highlight these respectively direct and indirect effects, also calculating the value of the embodied carbon in e.g. insulation materials. S Sorrell, 'Jevons' Paradox Revisited: The Evidence for Backfire from Improved Energy Efficiency' (2009) 37 *Energy Policy* 1456.
[118] Awareness of this issue does, however, inform my focus on the structural aspects of energy demand reduction and my conceptual preference for a strong division between energy efficiency and energy conservation measures. Features around human behaviour and use of energy efficiency measures have been presented as arguments for deeper structural measures in domestic properties: see Love (n 111) summarised at 298 – 90. Given the problem explored in this thesis and elsewhere,

ii. Methodology

The thesis aims to explore the limits and potential of tort to address two specific problems – underperformance and overheating – in energy efficient domestic buildings. It has twin aims. First, it seeks to clarify what recourse exists for consumers experiencing these problems. Second, it seeks to use these two areas as the basis for a deep exploration and illustration of the inherent incompatibility of tort law, with problems and challenges presented in the context of climate change. This section of the chapter will provide an overview of the methodological approaches taken, then explore three methodological phases in further depth.

In order to achieve the aims of the thesis, it was necessary to develop a methodological approach that could properly explore and identify the existing problems and their underlying reasons and causes, and conduct a doctrinal analysis. It also needed to interpret the doctrinal analysis both in terms of how this worked internally (focusing on tort's structure) and externally (examining the impacts and implications in context). This demanded different methodological techniques grouped into three overlapping methodological phases.[119] The entire thesis can be characterised as a law in context or socio-legal (but not empirical) project, which encompasses theoretical, doctrinal, and contextual/interdisciplinary methodologies. This is a true interdisciplinary project, in that it has

strong arguments can be made for abandoning building energy efficiency all together in favour of decarbonising energy supply: KJ Lomas, 'Decarbonizing National Housing Stocks: Strategies, Barriers and Measurement' (2009) 37 *Building Research & Information* 187; Horace Herring, 'National Building Stocks: Addressing Energy Consumption or Decarbonization?' (2009) 37 *Building Research & Information* 192.

[119] My general understanding and appreciation of legal research methods and methodologies was informed by M McConville and WH Chui, *Research Methods for Law* (Edinburgh University Press 2007); C Morris and C Murphy, *Getting a PhD in Law* (Hart Publishing 2011); BZ Tamanaha, *A General Jurisprudence of Law and Society* (OUP 2001); RC Hunter, R Ingleby and R Johnstone, *Thinking about Law : Perspectives on the History, Philosophy and Sociology of Law* (Allen & Unwin 1995).

required research and analysis to be conducted in two discrete and defined disciplines – law and aspects of the science and policy behind energy efficiency improvements. However, these two disciplines are not evenly represented. I would describe the thesis as a legal endeavour, with interdisciplinary sections to inform and underlie the legal analysis.

The interdisciplinary nature of the project, and the demand for diverse methodologies, is coming to be recognised as characteristic of scholarship in environmental law.[120] The subset of environmental law that engages with climate change offers additional challenges by virtue of its overwhelming and fragmented nature.[121] As far as climate change is concerned, careful choices had to be made to select appropriately narrow materials from the impossibly broad literature, in order that I could engage with the materials in meaningful depth.[122] Although clearly not an environmental issue, the same problem existed with respect to the relentless debate in relation to the structure and functions of tort.[123]

On the other hand, the role of liability or litigation in relation to the regulation of sustainable building is an almost entirely unexplored area.[124] Attempts that have been made are both limited and broad.[125]

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120 E Fisher and others, 'Maturity and Methodology: Starting a Debate about Environmental Law Scholarship' (2009) 21 JEL 213 especially at 226 – 231.
121 C Carlarne, 'Exploring Methodological Challenges within the Context of Climate Change Law and Policy' (2011) 105 *American Society of International Law Proceedings* 255.
122 U Eco and others, *How to Write a Thesis* (1st transl edn, MIT Press 2015) Chapter 1
123 See e.g. S Hedley, 'Is Private Law Meaningless?' (2011) 64 *CLP* 89.
124 The only published work in the England that deals with sustainable building law does not include a chapter on liability: Adshead (n 110). A US edition speaks of promises of liability that has not extended beyond three peripheral areas of liability: J Cullen Howe, 'Overview of Green Buildings' in J Cullen Howe and MB Gerrard (eds), *The law of green buildings : regulatory and legal issues in design, construction, operations, and financing* (ABA, Section of Environment, Energy and Resources 2010).
125 K Bowers and L Cohen, 'Green Building Revolution: Addressing and Managing Legal Risks and Liabilities' (Harvard Law School, Environmental Law and Policy Clinic 2009); HM Tollin, 'Green Building Risks: It's Not Easy Being Green' (2011) 23 *Environmental Claims Journal* 199.

My initial project involved a broad survey of potential problems and solutions, which was narrowed quickly and progressively in the early stages of the research, as the scale of potential problem areas became apparent. I decided to focus on four areas – performance gap, overheating, mould and fuel poverty. I considered conducting case studies in these areas,[126] but the available material did not lend itself to these studies, so the practical doctrinal approach taken was chosen instead. The latter two potential study areas were rejected after a brief review of the literature. Fuel poverty was deemed unsuitable because of the socio-economic issues that contribute to this phenomenon.[127] Mould was rejected predominantly due to space constraints, as the complexity of the overheating problem made it clear that it would demand more analysis that I had previously expected.

Because of the contextual nature of the research, and indeed, because of the highly charged nature of that specific context, a considerable amount of work has been required to get to grips with the broader research context of climate change and energy efficiency. This is necessary not only to appreciate how the research context weighs on the legal analysis, but also the converse. This extensive area of enquiry is not spotlighted in the thesis, but rather informs the work, sometimes more overtly than others.[128]

I explained above that a great deal of the doctrinal-theoretical enquiry is unashamedly instrumental: I explore the extent to which liability outcomes (or the risk of liability outcomes) could influence defendant conduct and behaviour, and also the extent to which incentives around liability stand to undermine existing climate change regulation. Again, it is characteristic of environmental law scholarship that the fragmentation of a regulatory

[126] J Clyde Mitchell, 'Case and Situation Analysis' (1983) 31 *Sociological Review* 2 187–211.
[127] Discussed above text to n 113 – 116.
[128] For instance, an appreciation of modeled and predicted future climatic changes in different parts of the UK was necessary to discuss problems of foreseeability and causation in Chapter Seven.

regime in a study area demands that a broad range of novel conceptual tools are required in order properly to understand and synthesise these with the research.[129] In order to do so, I not only (as above) required an appreciation of the broader research context, but I also required an understanding of regulatory tools, incentives and enforcement, and an appreciation of the rich literature informing contemporary regulatory theory. The demands of the core research questions were such that a full and detailed review of the regulatory literature was not possible; however, I conducted an overview of the most authoritative or relevant texts.[130]

In as much as deep understanding of both the theory of governance and regulation and the regulation and governance of climate change, was necessary both for contextual and analytical reasons, there is no dedicated discussion and review of salient literature in the thesis. This would detract from the specificity of the thesis, which explores issues around energy efficiency and buildings, not climate change, and is nested in theories of private law. The thesis is informed by private law theories' conception of the functions of tort, not a pure regulatory perspective. I do however draw on these two rich bodies of literature, throughout, to support and contextualise the thesis.

The material analyses are conducted in three overlapping phases, with each phase requiring a distinct methodological approach and tools. The research phases were not distinct, and required an interplay of methods as the material was revisited and analysis refined.

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[129] Fisher and others (n 121) 231

[130] In particular, the regulatory literature has strongly enriched and supported the analyses in Chapter Three (where I deal with standards and incentives), Chapter Four (where I deal with compliance and enforcement) and Chapter Five (where I describe the deterrent effect of private law). See n 276 in Chapter Three for core literature considered.

a. First phase

The purpose of the first phase was to identify potential liability areas to identify worthwhile and interesting areas for study. As I explained above, liability in relation to energy efficient buildings is a nascent study area there was very little literature on which to draw. I decided to select and identify problems from the technical literature to explore from a liability perspective in the second phase. This was not simply necessary to identify problems, I sought a sufficient understanding of the scientific basis of the problem underlying the area of enquiry.[131]

Using textual analysis largely of energy policy literature (including grey literature), but also covering primary and secondary legislation and basic physics I developed a technical understanding of the area. This produced an appreciation of what is intended in energy performance measures and how regulatory and technical measures seek to achieve these. In addition to these technical and purely academic textual pursuits, I also immersed myself in the environment of energy and buildings research, and conducted numerous conversations, interviews and discussions with colleagues and acquaintances about my study area. I am not purporting to suggest that I conducted any kind of empirical work, but rather than this immersion approach helped to inform my understanding of this alien disciplinary area,[132] and to communicate (albeit haltingly) in this different paradigmatic language.[133] It also exposed a few areas where 'known' phenomena are discussed freely, but are invisible in the literature. The most crucial issue is the extent to which both the prevalence and lack of regard for the energy

131 Fisher and others (n 121).
132 See LR Lattuca, 'Learning Interdisciplinarity: Sociocultural Perspectives on Academic Work' (2002) 73 *The Journal of Higher Education* 711 particularly her discussion of constellations of social practice at 713 – 714 and customised participation or immersion in disciplinary communities of practice at 729 and generally.
133 TS Kuhn, *The Structure of Scientific Revolutions* (3rd edn, University of Chicago Press 1996).

efficiency performance gap are discussed colloquially, compared to the relatively coy approach taken in the academic literature.[134]

I selected the study areas demanding the most scholarly and industry attention, and settled on two, energy performance problems and overheating.[135] I then explored further into the literature areas outlined above, in order to achieve a deep understanding of how these problems come about and their implications. This material would be used to provide the 'factual' basis of the problem analyses in the second phase.

b. Second phase

In the second phase of the research I conducted a doctrinal analysis where I explored potential liability outcomes in relation the specific problem areas identified in the first phase. This applied or problem-based analysis remains doctrinal work in the true sense, in that it provides a systematic exposition and synthesis of the rules in the relevant legal area,[136] then a prediction of their likely application in relation to specific problem areas.[137]

An immature version of the second phase tracked back and forth into the first phase, as some early analysis was conducted concerning likely liability outcomes in relation to specific problems.[138] The interesting contrasts and parallels between prospective tort claims in the emerging study areas (in

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134 See Chapter Two n 401.

135 It was entirely through serendipity that these areas reflected interesting and complementary issues in the tort enquiry and also that these proved to be subject to highly informative and recent empirical studies by the ZCH – see Morris and Murphy (n 120) Chapter Four; also Lattuca (n 133) on serendipity generally.

136 T Hutchinson and N Duncan, 'Defining and Describing What We Do: Doctrinal Legal Research' (2012) 17 *Deakin Law Review* 83 101 - 105

137 Hutchinson and Duncan (n 137) 106

138 This parallels but seems slightly more than the first 'screening' part of a doctrinal enquiry contemplated in Hutchinson and Duncan (n 137) 110 -112

addition to the issues outlined above)[139] supported the nascent decision to focus on tort. Following my upgrade examination I was advised to restrict my enquiry entirely to tort.

Problem-based legal doctrinal research methodology forms a central part of the work regularly undertaken by lawyers,[140] and applying the 'black letter' law to the 'facts' distilled in the first phase demanded textual analysis and a synthesis and extrapolation of existing legal precedent to cover the studied areas.

I had anticipated that theoretical and contextual analysis would only come about in the third phase, where I analysed the doctrinal 'outcomes' and drew conclusions from my findings. However, as the doctrinal work progressed I found myself on occasion using the contextual material (particularly to do with climate change) to add meaning and context to the black letter analysis. Although it had never been my intention to conduct a normative enquiry or make specific recommendations, it did become apparent that that sociological context did bear on many aspects of the evaluation and analysis. In this way the doctrinal enquiry also had a strongly socio-legal aspect to it as well.

Many legal scholars would argue that all legal analysis, including that which is overtly doctrinal, has an inherently socio-legal component to it.[141] I accept this proposition. Of course, lawyers and judges draw consistently on their own experience of the world. It is interesting that the need for reading and study in alien disciplines in order to do this represents to some

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[139] Specifically, the interesting engagement by scholars examining the prospects of 'climate change litigation' and their examination of the specific elements of tort claims – see above text between n 75 – 79.

[140] Hutchinson and Duncan (n 137) 106

[141] R Cotterrell, 'Why Must Legal Ideas Be Interpreted Sociologically?' (1998) 25 *Journal of Law and Society* 171.

extent the problematic nature of climate change: its invisibility and uncertainty.[142]

c. Third phase

The third phase of the thesis is theoretical and jurisprudential, in which the combined 'findings' of the earlier phases are interpreted and legal theory used to explain the doctrinal findings. This required textual synthesis both of the voluminous literature concerning the structure and function of tort, but also interpretation and analysis of the salient materials in order to extract helpful theoretical frameworks to inform the study. This included a strongly instrumental focus, as the literature concerning the function and impacts of tort liability were studied to support a theoretical understanding of what outcomes might achieve and in what circumstances.

The second part of this phase was analytical and interpretive, requiring the application of the theoretical frameworks identified to the technical and doctrinal case study areas. As alluded to above, this phase also had a strongly socio-legal component. It drew on the contextual work done both in relation to regulation, and climate change, in order properly to understand particularly the instrumental aspects of the analysis.

iii. Thesis structure

The thesis is in two parts. The first part establishes the background and context of the research, setting the stage for the relevance of tort liability in this context. The second part of the thesis is devoted to a discussion of tort, concerning itself with two key doctrinal and theoretical enquiries.

[142] Jamieson (n 2) Chapter 2, especially at 102.

Part One (Chapters 2-4) comprises the interdisciplinary and overtly contextual work.[143] This chapter has explained a little of the background around climate change governance, the importance of a multiscalar approach and the importance of climate change litigation. Chapter Two describes how building energy efficiency might technically be achieved. I examine the technical defects that can give rise to energy performance problems, and focus on one unintended consequence (overheating) and its associated health problems. In Chapter Three, I draw out key aspects of the governing regulatory framework. The final chapter in this part, Chapter Four, explores the potential for and constraints of contractual remedies and regulatory enforcement in relation to these problems.

Part Two (Chapters 5-8) discusses the limitation and potential of tort in relation to the identified problem areas. The discussion includes my doctrinal analysis but is entirely contextual and theoretical in that it both the structure and functions of tort, in the context of a wealth of theoretical private law material. In Chapter Five, I explain my perspective on and understanding of the structure and functions of tort. Chapter Six contains an examination of the barriers to tort liability in relation to poor construction and miscertification of domestic buildings intended to have a high level of energy efficiency. I reflect on what this means for private parties and climate change mitigation strategies. The second doctrinal chapter, Chapter Seven, examines the various potential approaches that could be taken by a court in adjudicating common law and statutory claims arising from overheating problems in energy efficient domestic buildings. I explain that in some contexts, establishing elements of negligence such as foreseeability and causation will become increasingly complex as the

[143] This division is slightly muddied by Chapter Four, which creates a bridge between the interdisciplinary and doctrinal sections of the thesis, and incorporates doctrinal and interdisciplinary work.

climate changes. I conclude that persons suffering from the unintended consequences of building energy efficiency measures are more likely to recover damages in 'climate blind' litigation, a perverse outcome which encourages a lack of awareness of both climate adaptation and mitigation policy goals. Chapter Eight concludes, drawing together the diverse strands of enquiry.[144]

[144] As I explain above, the thesis reflects the law as at end December 2015. Piecemeal updating has been done since, but I have not conducted any systematic updating on any of the areas covered in the thesis.

TWO: DECARBONISING THE BUILT ENVIRONMENT

a) Introduction

The purpose of this chapter is to frame and explain the research context in order to provide substance for the doctrinal examinations that follow. In the introduction to this thesis, I explained that its core doctrinal chapters would analyse the application of (chiefly) the common law of negligence in relation two specific issues pertinent to the decarbonisation of the built environment. These are: poor energy performance and the manifestation of one unintended consequences, overheating. I first need to flesh out the context in which the doctrinal analysis takes place. What follows explains what practically is required to achieve requisite energy performance in domestic buildings, and the shortcomings that can bring about the relevant problems. Also important, is an analysis of regulatory measures underlying these physical measures or changes. I shall deal with these in the following chapter. Because these measures overlap it makes sense to deal with them together at the beginning of the thesis, drawing a picture of energy efficiency improvements, rather than trying to incorporate this 'factual' material in each doctrinal chapter.

In preparing this chapter, I have drawn on a broad body of literature to seek to set out an established 'factual' basis in each case. This chapter rests heavily on empirical literature from the disciplines of building physics, energy modelling and the social sciences. A full critical analysis of the scholarship in any of these areas is an extensive work in itself, and space and disciplinary constraints restrict this. As such, I have not engaged exhaustively with existing debates or disputes, although I occasionally refer

to these *en passant*. The material is presented as a narrative that informs the substance of the doctrinal enquiries in Chapters Six and Seven.

This chapter has three main sections. Following this brief introduction, I explain how good energy performance in domestic buildings can be achieved, and the ways in which energy performance is measured and tested. Second, I consider the literature around the continuing 'performance gap' problem, referencing the debate about how this happens, but also questioning how an understanding of building energy performance is managed in the industry. The third section discusses an unintended consequence [145] of building energy performance measures, overheating. I explain how this occurs, and discuss the health implications of overheating. In Chapter Three, which follows this one, I look at the key regulatory measures that set standards for energy performance and associated issues, and assessment and certification. Regulatory enforcement is in Chapter Four.

b) How we make buildings energy efficient

i. Achieving energy performance

With a focus on energy efficiency, this part of the chapter provides an overview of what is meant by good 'energy performance' in both new and existing domestic buildings. It explains what steps are taken to achieve this, and how the quality and effectiveness of these measures are assessed.

In the Introduction, I explained that energy efficiency might be understood as the use of techniques (or technologies) to reduce energy demand, by providing equivalent energy services with reduced consumption (and

[145] Shrubsole and others (n 10).

cost).[146] In the UK domestic market and hence the research context, most energy is used for space heating, with fuel for cooking and lighting/appliances and heating water contributing.[147] The overwhelming priority then is to reduce the energy intensity - energy use per unit of activity [148] - per square meter of floor space. This is achieved by improving the efficiency of the conversion of fuel to energy, and by decreasing the rate of heat loss through the building fabric. It is common to combine this with technologies for the microgeneration of renewable energy, further reducing reliance on energy grid. [149] A high performance unit is represented at its zenith by a zero-carbon house, which generates its own clean energy and is so energy efficient it requires little more energy input.[150] This extremely ambitious target is difficult to achieve without a high level of design specification.[151]

A combination of measures including: the positioning of the building, the permeability of the building envelope and the efficiency of the energy use and conversion fixtures inside it, combine to ensure good energy performance. [152] The spatial positioning of the property can ensure maximum solar gains for light and space heating (particularly during the summer months). An impermeable building envelope regulates internal temperatures by preventing heat loss. Ensuring impermeability requires

[146] See discussion in Dawes (n 30) 267 – 8.
[147] See e.g. ürge-Vorsatz and others (n 89)
[148] Barton (n 90) 62
[149] See e.g. R Lowe 'Technical Options and Strategies for Decarbonizing UK Housing' (2007) 35 *Building Research & Information* 412 for a detailed discussion of the contribution of existing energy conversion technologies and decarbonised power supply.
[150] For the purposes of this chapter, this shall be the extent of the discussion of 'zero-carbon homes', that these are simply a perfected version of buildings with high energy performance. A brief discussion of what remains of the regulatory concept of a zero-carbon home, will follow in the next chapter. There is actually a further level of performance, the so-called 'Passivhaus': see e.g. K Baker and R Emmanuel, *Carbon Management in the Built Environment* (Routledge 2012) 63 – 66.
[151] Boardman, University of Oxford and ECI (n 97) 31
[152] A Stone and others 'Key Factors Determining the Energy Rating of Existing English Houses' (2014) *Building Research & Information* 1: the key factors that determine building energy rating are building geometry, the efficiency of the heating system and the U-value of walls, roof and at ground level.

walls, lofts and floors to be properly insulated and windows (and doors and skylights) to have secondary or tertiary glazing. Ensuring no gaps in the material prevents draughts and heat loss through thermal bridging.[153] Installing low energy boilers to heat space or water ensures that very little energy is used generating heat or light in the building, ensuring efficient use.[154] Combining a use of energy from natural resources (either directly, or through low carbon microgeneration) and maximising the efficiency with which all energy is consumed in the building, contributes significantly to low energy, low carbon housing. Building design can also actively encourage low carbon choices or lifestyles more generally.[155]

Securing good energy performance in existing buildings is more challenging.[156] Buildings are constructed with an intended life span of hundreds of years. This longevity, the embodied carbon in buildings and the energy used in demolition and construction means that low carbon transformation of the building stock is best achieved through renovation.[157] Of course, the location and orientation of existing structures is already fixed, but significant improvements in energy performance can be achieved by renovation.[158] Practically, householders frequently undertake piecemeal measures such as fitting loft or wall insulation, draught proofing, installing

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153 These create other problems, see e.g. J Singh, C Wah, F Yu and JT Kim, 'Building Pathology, Investigation of Sick Buildings —Toxic Moulds' (2010) 19 *Indoor and Built Environment* 40.
154 Baker and Emmanuel (n 150) Chapter Five.
155 Such as: space for line drying of clothing (minimising tumble drier use), cycle storage and home office space. See discussion in Chapter Three in text to n 319 – 325.
156 The literature on the range of potential measures and their effectiveness, is vast and varied. For a good overview: S Roberts, 'Altering Existing Buildings in the UK' (2008) 36 *Energy Policy* 4482; M Bell and R Lowe, 'Energy Efficient Modernisation of Housing: A UK Case Study' (2000) 32 *Energy and Buildings* 267 noted an equivalence between energy efficiency measures, energy use and carbon dioxide emission reduction, see Table 6 and text accompanying; Baker and Emmanuel (n 150) Chapter 6; KJ Lomas, 'Carbon Reduction in Existing Buildings: A Transdisciplinary Approach' (2010) 38 Building Research & Information 1; P Wilkinson and others, 'Energy, Energy Efficiency, and the Built Environment' (2007) 370 The Lancet 1175. For an overview of the different approaches see R Lowe, 'Policy and Strategy Challenges for Climate Change and Building Stocks' (2009) 37 *Building Research & Information* 206 or KJ Lomas, 'Decarbonizing National Housing Stocks: Strategies, Barriers and Measurement' (2009) 37 *Building Research & Information* 187.
157 Wilkinson and others (n 156) 1179 – 1180; Baker and Emmanuel (n 150) Chapter 8
158 Although Stone and others (n 152) suggest that up to 80% of carbon reduction potential could lie in a building's geometry – at 737.

low energy technologies for space and water heating (such as condensing boilers[159]) or double-glazing windows.[160] Such improvements undertaken 'over time' can gradually improve a dwelling's energy performance.[161] Extensive works, or 'energy retrofit', involve the combination of a range of such measures, often combined with the installation of some technology for the onsite microgeneration of renewable energy (such as biomass boilers or solar photovoltaics for water heating). A successful retrofit can transform a building's energy performance.[162]

ii. How we measure energy efficiency

Explaining how the efficacy of the physical improvements to buildings is measured, or assessed, fits naturally at this point in the thesis, although it is a subject that recurs. In particular, as I detail in this chapter and the next one, errors in assessment are both more pervasive and more complex than might be thought, and thus assessment of energy performance is implicated in the performance gap. In a sense there are two performance gaps, first in shortcomings in the physical structure of the building as against design intent, but also in the difference between the physical reality and certified energy status (so assessment of the performance) of a building. Furthermore, methods of assessment are prescribed by regulation, which I discuss in the next chapter. For clarity, it is helpful to outline upfront in practical terms how energy performance is measured, expanding on the

[159] Boardman, University of Oxford and ECI (n 97) 31- 35.
[160] SH Hong, T Oreszczyn and I Ridley, 'The Impact of Energy Efficient Refurbishment on the Space Heating Fuel Consumption in English Dwellings' (2006) 38 *Energy and Buildings* 1171 say loft and wall insulation are the most effective measures.
[161] T Fawcett, 'Exploring the Time Dimension of Low Carbon Retrofit: Owner-Occupied Housing' (2014) 42 *Building Research and Information* 477.
[162] This efficacy can depend on proper use of technologies, see e.g. KB Janda, 'Buildings Don't Use Energy: People Do' (2011) 54 *Architectural Science Review* 15; F Stevenson and A Leaman, 'Evaluating housing performance in relation to human behaviour: new challenges' (2010) 38 *Building Research & Information* 437–441; SL Walker, D Lowery and K Theobald, 'Low-Carbon Retrofits in Social Housing: Interaction with Occupant Behaviour' (2014) 2 *Energy Research & Social Science* 102; PF Smith, *Architecture in a Climate of Change* (2nd edn, Architectural Press 2005) Chapters 15 and 16.

detail of this when I discuss regulation in the following chapter.[163] I start by outlining the reasons why the assessment or measurement of energy performance can yield such contention.

First, the majority of energy assessments are conducted by computer modelling based on standardised assumptions, and as such do not include a hands-on assessment of an actual building. This makes it difficult to detect deviation from the design intent, which is common. Second, it seems that a fairly cavalier approach is often taken to energy efficiency assessment, energy efficiency being perceived as fairly trivial in the context of building projects as a whole. And third, the building regulations' minimum standards, and graded energy performance for the purpose of energy performance certification, measure different things. This means it is entirely conceivable that a building would comply with the energy efficiency minimum standards in the regulations, but nevertheless have quite poor energy performance. These issues resurface over the following three chapters; in what follows I explain how the assessment process works.

For purposes of building control, standardised calculations are used to assess the fabric energy efficiency and likely carbon emissions from a unit, calculated as a function of the permeability of the structure.[164] For reasons of cost and scale, and partially due to a dearth of material testing techniques, only larger or experimental developments are likely to be subject to material assessment. In the main, these seek to assess the fabric

[163] I should add that these comments are fairly general and are added to aid the reader in this fairly technical discussion; in particular at this juncture I do not draw distinctions between building control and energy assessment.
[164] This is the process specified in the Building Regulations.

efficiency of the building.[165] Pressure testing (a technique for testing the permeability of building fabric, commonly walls) and thermal imaging (the use of an infrared camera to detect heat balance across spaces, determining where there might be, for example, poor insulation covering and heat leakage points known as 'thermal bridges') can be used to end-test buildings.[166] Pressure testing is the only commonly used material test of energy performance in built dwellings.[167] However, this is not to say that all new or renovated buildings are pressure tested: it is permitted to use data from other, similar buildings, or to rely on standardised assumptions.[168] In theory, there are 'aggregated' techniques such as coheating tests, assess the efficacy of combined energy efficiency works over a whole space, but are time consuming and expensive to perform.[169]

A second layer of assessment exists for the purposes of energy performance certification,[170] and as I explain above, the unit of measurement - energy performance as a systemic feature of the building – is different. This assessment of a building's energy performance is a process that can span design, assessment and measurement stages, depending on the size and scale of the development. At design stage, particularly with larger developments, the use of building information modelling (BIM) can be used to support building design and predict energy

[165] P de Wilde, 'The Gap between Predicted and Measured Energy Performance of Buildings: A Framework for Investigation' (2014) 41 *Automation in Construction* 40 explains that this is to some extent an iterative process, where material testing can be fed back into modelled results.
[166] For example, these were both used in Hong, Oreszczyn and Ridley (n 160) see 1180.
[167] ZCH, 'Closing the Gap Between Design and As-Built Performance: End of Term Report' (2014) 46
[168] HM Government, 'The Building Regulations 2010. Approved Document: L1A Conservation of Fuel and Power in New Dwellings' (2013) para 2.9.
[169] D Johnston, D Miles-Shenton and D Farmer, 'Quantifying the Domestic Building Fabric "Performance Gap"' (2015) Building Services Engineering Research and Technology 1014.
[170] As above, the regulatory basis of this will be discussed in more depth in the following chapter – see Chapter Three section c)i.

performance.[171] This can be the start of an iterative process in which design and construction teams exchange information to assess material performance against design.[172] The use of all but the most basic BIM, either at all or involving dynamic energy simulations, is unlikely in smaller developments.[173]

Critiques of both the approaches to energy assessment discussed above, stem from their failure to take proper account of the operation of the building when occupied. This would include factors such as the impact of climatic changes (such as normal seasonal variations) but by necessity would have to include details about use, including even basic details such as the number of occupants and their time spent in residence. The common 'lay' technique of determining energy performance is based on occupant experience of thermal comfort balanced with the relative affordability of energy bills.[174] Of course, while occupant experience can register dissatisfaction with energy savings or comfort, it does not offer a quantitative measure of energy efficiency.

There are forms of energy performance assessment where energy use is monitored within the completed dwelling after occupation. Absent the potential for more sophisticated data about occupant behaviour to be included in standardised models, proponents of this approach argue that the correct energy performance of a building can only be ascertained by means of a 'post-occupancy evaluation' (POE).[175] This requires the project

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171 K Gough, 'The Use of Building Information Modelling ('BIM'); the UK Experience' (ICP Seminar on Liability for Design Defects in a Collaborative, Integrated Digital Age, IBA Boston 2013, October 2013) provides a helpful overview of building information modelling tools.
172 de Wilde (n 165).
173 Gough (n 171).
174 This of course applies to retrofit, where a comparator with previous energy use and experience is possible. See Love (n 111) .
175 Janda (n 162). LF Chui and others, 'A Socio-Technical Approach to Post-Occupancy Evaluation: Interactive Adaptability in Domestic Retrofit' (2014) 42 *Building Research & Information* 1.

team to retain continued involvement in the completed development, preferably across seasons.[176] A POE approach avoids uncertainties caused by inhabitant presence and behaviour, but also incorporates a proper handover, ensuring that occupants understand and can operate the building and appliances properly. This is important where complex systems have been installed.[177] Continued involvement and assessment is a feature of Bordass' 'Soft Landings' approach;[178] the adjustment and fine-tuning of systems within the specific building can be evaluated, but this process also supports learning and development of energy performance expertise within project teams, and the industry as a whole. Conversely, however, some of the empirical literature draws on a range of factors such as the costs of ongoing project involvement, which disincentivise POE's for all but the largest and most high cost (and profile) developments.[179] Interesting, developers also declare concerns about litigation as a factor discouraging through assessment of energy performance.[180] This time consuming and expensive approach is unsuitable as a general assessment tool. [181]

As I indicated above, this deeply flawed system of assessment is implicated in the masking of problems in energy efficient domestic buildings. This is important, because flawed assessments lead to incorrect certification of buildings, which is one aspect of the 'performance gap' problem. I shall discuss this in more detail in the following chapter. First however I shall

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176 See e.g. Stevenson and Leaman (n 162).

177 Problems with occupation and handover are implicated in many instances of the performance gap; the occupant might simply not know how to operate a high-tech building, see e.g. de Wilde (n 165) 42. Although this issue is not insignificant in the problems I discuss, it will not be discussed in any depth in the thesis, which focuses on infrastructure.

178 M Way and B Bordass, 'Making Feedback and Post-Occupancy Evaluation Routine 2: Soft Landings – Involving Design and Building Teams in Improving Performance' (2005) 33 *Building Research & Information* 353; de Wilde (n 162).supports this approach.

179 C Robertson and D Mumovic, 'Meeting legislation and enhancing reputation: Working within the contextual pressures of regulatory, social, economic and other drivers to reduce building energy consumption.', ECEEE Summer Study 2013, France

180 Ibid.

181 I do, however, discuss in Chapter Four (contractual liability for poor energy performance) that continual post-occupancy evaluation is usually demanded if any kind of contractual warranty is to be extended.

move on to the physical aspects of the performance gap, explaining how defects in design and construction can produce/renovate buildings that do not live up to promise when it comes to energy efficiency.

c) The performance gap

Discrepancies between target and achieved energy performance – the so-called 'performance gap' - has persisted since the advent of energy efficient building more than four decades ago.[182] This 'gap' is not a singular phenomenon and the term 'performance gap' could refer to discrepancies in designed and 'as built' performance, a failure to comply with the prescribed or agreed minimum standards of energy performance,[183] incorrectly certified dwellings, or improper use of the building undermining its efficiency potential.[184] Excluding behavioural issues,[185] there are roughly two 'performance gaps': shortcomings in the physical structure and inaccurate assessment and certification. As I explain above, I discuss aspects of the assessment process in various places over this and the next chapter. Accordingly this section focuses mainly on the physical structure of the building.

The literature exploring the reasons for, implications of and potential solutions to the energy performance gap falls into two intersecting categories. The first category examines project-specific failings

[182] RH Socolow, 'The Twin Rivers Program on Energy Conservation in Housing: Highlights and Conclusions', *Saving Energy in the Home: Princeton's Experiments at Twin Rivers* (HarperBusiness 1979).
[183] See discussion of compliance with minimum standards in Chapter Three b) i and iii.
[184] de Wilde (n 165) especially at 41 – 2 Regarding the third point, the presence of the occupiers and the way in which they use the building affects the thermal properties of the interior space. Issues that arise with occupancy are not reducible to unreasonable or misinformed operation of the building by occupants. Systems or devices that prove impenetrable to lay users, or fail to take account of how human beings operate complex systems also do not provide optimal performance. Smith (n 162) 199-200 explains the importance of seemingly innocuous issues, such as whether switches default to 'on' or 'off' – the former is common but requiring active operation prevents energy waste. Chui and others (n 175) demonstrate how occupants might struggle to adapt to new technologies.
[185] Chapter One text n 111 – 118.

contributing to a gap between intended and actual performance.[186] These can be characterised as a series of deep case studies exploring the impact and efficacy of energy efficiency measures (usually retrofit) on a particular development.[187] The second category takes a 'big picture' approach to performance problems, exploring how systemic problems in the industry contribute to underperformance in energy efficient buildings.

The project-specific perspective seeks to analyse various kinds of technical challenges that could undermine the achievement of energy efficiency goals. These occur either or both at design and construction stage. Design mistakes include over- or under-estimating the potential of new or not-so-new technologies or components.[188] This could include matters as simple as underestimating the fabric density of a kind of construction material,[189] or installing heating or cooling systems unsuited to a specific site, thereby exceeding demand and using too much energy (or the opposite).[190] It could also include issues not inherent in the structural design, such as a failure to take account of additional energy use by non-installed appliances, or failing to understand the impact of computers or other digital devices, which both demand power to remain functional but also generate heat, thereby adding to a building's cooling demands. Slippage can also occur when specifications change during the design development process, e.g. of insulation material or window design, but account is not taken of the potential impact on overall building energy performance.[191] Performance

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186 Most of the older literature falls into this category: Socolow (n 182). W Bordass, R Cohen and J Field, 'Energy Performance of Non-Domestic Buildings: Closing the Credibility Gap', *Building Performance Congress* (2004).

187 M Bell and others, *Low Carbon Housing: Lessons from Elm Tree Mews* (Joseph Rowntree Foundation 2010); Hong, Oreszczyn and Ridley (n 160); R Gupta and others, 'Intent and Outcomes from the Retrofit for the Future Programme: Key Lessons' (2015) 43 *Building Research & Information* 435.

188 Bordass, Cohen and Field (n 186). 3-5; Smith (n 162)196 – 200.

189 Bell and others (n 187): a lack of attention to use of timber, as well as to window type substitution, had a significant impact building fabric performance, 31 – 33.

190 Ibid 196 – 197.

191 Bordass, Cohen and Field (n 186) 3.

problems arising at design stage seem to be generated by a failure properly to understand how all elements of the dwelling work as a system. While errors can and do arise at the design stage of new or retrofit dwellings, this is particularly likely in relation to piecemeal or 'over-time' retrofit projects.[192]

Errors arising at construction stage include a failure properly to give effect to design intent, but also due to on-site changes in specifications of building material.[193] Issues such as substitution of materials - minor tweaks affecting fabric integrity – are routinely renegotiated on site without consulting the design team. If done for pragmatic or financial, cost saving reasons proper account might not be taken of the potential impact on energy performance.[194] Issues can also arise at construction stage due to failure properly to perform the work necessary for requisite energy performance. For instance, a new building or retrofit is designed with wall or floor insulation, and this is not properly or uniformly applied, the building will not achieve design intent. [195] Of course, as far as specific projects are concerned, energy performance failings will rarely be attributable to one problem or issue, and are more likely to arise from a mix of problems or shortcomings across the design, construction and handover stages.

What emerges from these deep case studies and more systemic academic work, is that the issues giving rise to the energy performance gap are both pervasive and point to deeper systemic issues in the construction industry. Very real concerns that the performance gap might undermine national

[192] Fawcett (n 161).
[193] de Wilde (n 165) says this usually involves the use of below specification materials.
[194] Bordass, Cohen and Field (n 186) 3; ZCH (n 167) 8-11
[195] Hong, Oreszczyn and Ridley (n 160) identify 20% of surface area missed by insulation materials, which creates 'thermal bridging': this undermines energy efficiency measures and causes condensation and other problems such as mould.

energy efficiency goals, in particular the (now terminated) Zero Carbon Homes) ambition [196] motivated government, industry and stakeholders to conduct further research into the causes of and solutions to the energy performance gap. The lengthy review and evidence gathering process sought to identify the reasons for the gap, identify priority areas, and identify actions for industry and government to rectify the problems. The report produced, which I discussed below, does represent a comprehensive analysis of many of the reasons why energy efficiency measures are failing. However, as I explained in the Introduction to this thesis, there is a fairly blunt layer of commentary about energy efficiency measures in the building industry that carries a somewhat different flavour to that reflected in academic writing or the Zero Carbon Hub (ZCH) report.[197]

The headline recommendations and action areas of the ZCH report are worded in fairly vague terms, and offer little clarification of what, practically, is going wrong. A plethora of issues occurring across all stages of the construction process, from planning to verification testing, is set out in detail in the first appendix to the report.[198] These largely mirror the problems identified in case studies, such as product substitution,[199] lack of integrated design, [200] product and system design issues, [201] poor installation,[202] poor modelling materials [203] and various problems with the inadequacy or misuse of the SAP assessment tool.[204] As I explained earlier in the chapter, essentially these issues occur across the design, construction and assessment stages, often all three.

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196 See Chapter Three text at n 284 and between n 326 – 340.
197 See above at n 108 and surrounding text.
198 These are listed thematically in Appendix A ZCH (n 167) 60 – 61.
199 Ibid PR3, C5.
200 Ibid D3.
201 Ibid D8.
202 Ibid C15.
203 Ibid T5, T7.
204 Ibid EMI1, EMI3, C14: "Accredited Construction Details 'tick box' culture, i.e. recorded in SAP but not built on site."

The report identifies five overarching 'areas for change'.[205] The first, energy literacy, identifies a pervasive need for improved awareness and understanding of energy performance amongst construction and design teams.[206] For instance, it would be thought that energy literacy would help construction teams understand the implications of onsite deviations from design specifications. While it is probably correct that the industry does suffer from a dearth of knowledge in relation to energy efficiency issues, it also might be unrealistic to expect that this kind of training would achieve as much as suggested. This kind of suggestion is built on an assumption that better information about energy efficiency would encourage not only better practice but also improved perceptions of its value. This seems to take current attitudes towards energy efficiency as between neutral to misinformed, and does not engage with negative or dismissive attitudes which seem quite prevalent across skill levels in the building industry. For this reason, the report does not recognise nor take account of how to counter an existing culture of 'trivialisation' of energy efficiency.[207] This culture of trivialisation devalues energy efficiency as something both unachievable, but also of relative insignificance compared to the myriad features that require attention in a construction project.[208]

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[205] The fifth 'area for change' describes a need for ongoing evidence gathering and analysis, and will not be discussed here.

[206] Ibid 20 – 25. Proposals for training in low carbon design and construction for new and existing industry professionals, seem very basic. For example, at 21: "Training of planners, architects, surveyors, engineers, building control bodies, building performance assessors, testers and commissioners needs to include energy related skills and energy modules that can impact on Performance Gap issues. This requires the involvement of the professional bodies that accredit courses…"

[207] W Pan and H Garmston, 'Building Regulations in Energy Efficiency: Compliance in England and Wales' (2012) 45 *Energy Policy* 594 discuss this in relation to building control.

[208] This view was expressed quite openly, on numerous occasions, and often at or in the context of energy performance conferences or workshops. The baldest discussion along this vein occurred at the UCL Energy Exchange: The Retrofit Challenge, a workshop hosted by Linda Siegele at UCL on 4 November 2015. A participant stated that they were aware of the performance issues, but overcoming them would not be cost-effective, and it was well accepted that this was the case. It was understood that 'no one' would undertake energy retrofit works if these became either contentious or unprofitable. Also see text to n 108 above.

Two key change areas deal with testing and assessment of energy performance. The third change area, which deals with assessment and compliance,[209] recommends improvements and changes to SAP inputs and assumptions, which if properly implemented would presumably resolve many of the accuracy issues outlined above.[210] Similarly to energy literacy recommendations, the report also recommends improved understanding in performance gap issues for SAP modellers.[211] The fourth key change area is described as 'demonstrating performance', but has as its substance the need for refinement of existing tests, focusing on the need for diagnostic tests that not only identify performance gaps, but could identify what caused or contributed to underperformance in specific developments.[212] This is clearly necessary in order to rectify existing projects that have not achieved desired or required performance.

The second key area deals with 'improving quality output', a question begging category which identifies the need for improvement at specification, design and procurement stages.[213] In this section, the report suggests work plans and gateways, coding systems and increased use of (expensive) BIM to reduce quality problems in energy performance works. Consistently with much of the other performance gap literature, the report skirts around more systemic issues that might affect quality and effectiveness in energy performance works. It fails frankly or explicitly to identify a simple culture of poor quality workmanship or lack of accountability within the construction industry, although this is implied,[214] and is specifically identified elsewhere as being both endemic and self-

[209] Discussed in Chapter Four.
[210] Ibid 41 – 42.
[211] Ibid 37 – 39: the recommendations made include training in performance gap issues, construction practice and the basic building physics underlying the modelling calculations, for U and PSI value modellers.
[212] Ibid 33 – 35.
[213] Ibid 26 – 27: notably, it reinforces the importance of whole building commissioning 33-35.
[214] In non-domestic buildings, see e.g. de Wilde (n 165) 41.

perpetuating.[215] It also fails to engage with the specific trivialisation of and lack of accountability for energy efficiency problems, that I refer to above. The report concludes that quality control measures are adequate, although this is plainly not the case. It also recommends a greater role for clients in ensuring quality, and energy performance.[216] This is an unworkable suggestion, given the ephemeral nature of performance gap issues, but also an untenable one. Not only would this create an impossible burden for naïve or vulnerable 'clients'; but, beyond dialogue with the design/construction team, even more astute clients lack any means or mechanism for ensuring or enforcing energy efficiency standards, as I shall go on to demonstrate in this thesis.[217]

Despite its flaws and some surprising issues, the ZCH report does present hopeful solutions to identified problems causing energy performance failings. Within the identified thematic areas for improvement, it distils actions for industry and government that would help parties to understand implications of decisions and actions that might affect energy performance.[218] The actions for industry centre around technical and skills improvements.[219] The report suggests immediate action by industry - addressing the swathe of identified problems - is contemplated 'in place of immediate additional regulation'.[220] Four priority actions for government include the signalling of 'clear intent' to both support industry research and development, and the strengthening of training and compliance.[221] As will be discussed further in the following chapter, while government has

[215] D Griffiths, 'Continuing Problems with Construction Performance: What's to be done?' A paper presented to the Society of Construction Lawyers, November 16, 2011; D Wallace, 'Anns Beyond Repair'' (1991) 107 *LQR* 228.
[216] ZCH (n 167) 32
[217] Regulation and contract in Chapter Four, tort in Chapter Six.
[218] ZCH (n 167) from 20; de Wilde (n 165).: "Once predicted and measured energy use are adequately matched, further work will be needed to address performance gaps in areas like thermal comfort, indoor air quality and others." Also Lovins (n 36) 'There is no megawatt university' 43
[219] Ibid 52.
[220] ZCH (n 167) 53
[221] Ibid 53 – 55.

signalled clear intent in relation to low-carbon housing, this is not in the direction envisaged in the report; if anything current policy demonstrates a complete devaluing of energy efficiency and carbon reduction in domestic buildings.[222] This is not true to the message of the report, namely that regulatory constraint should accompany serious efforts to substantively improve the quality of these measures.

It remains to be seen what impact either deep case studies and post occupancy evaluations, or overarching industry recommendations, might have on rectifying the performance gap. However, despite its shortcomings and occasional lack of ambition, the ZCH report does carry significance beyond the specifics of its findings. First, it represents a clear statement of intent, from some parties, to work on rectifying what is now a long-standing problem of the performance gap. In addition, and crucially for the research context, it documents the scale of and proposed solutions to the problem; also it does so in a manner that is both conceptually as well as practically accessible, being available online. It is inconceivable now that anyone connected to the industry could be unaware of the existence and (some of) the content of the report.

d) Unintended Consequences: overheating

A growing body of literature alerts attention to the known but unintended consequences [223] of building energy performance measures. Awareness of this problem is rapidly spreading, and it has recently been the subject of a

[222] Department of Communities and Local Government, 'Housing Standards Review: Consultation' (2013) <https://www.gov.uk/government/consultations/housing-standards-review-consultation> accessed 17 June 2015.

[223] Shrubsole and others (n 10): "[U]nintended consequences were defined as outcomes that arise unintentionally as a result of policy, development or implementation. Multiple direct and indirect consequences can occur. They can be broadly grouped into two categories: (i) an unexpected benefit or negative effect (or a combination of both), which may occur in addition to the desired effect of the policy or action; (ii) an effect contrary to the original intention that undermines the intention and even makes the problem worse." 341.

further ZCH report, which seeks to address the causes of and solutions to the overheating phenomenon.[224] The overheating phenomenon straddles issues to do with energy performance and climate change adaptation.[225] As explained above, measures taken to decrease the permeability of building fabric, and prevent draughts, are key for ensuring good energy performance in domestic buildings. Energy demand is considerably reduced if the heat is kept in during the colder winter months. It is, however, becoming noticeable [226] that buildings constructed or renovated to a high level of energy efficiency are exhibiting high temperatures when the weather is warm. Overheating problems are likely to become more extreme and more pervasive as the effects of climate change are experienced. This part of the chapter will explain what 'overheating' means, and give an account of the features of the building, and climate factors, that can cause overheating to occur. It then explains how and why overheating can create risks to human health, and what the implications are for morbidity and mortality.

The notion of 'thermal comfort' is elusive. Although it is possible to draw some generalised views based on habituation, there is no objectively measurable standard of what is meant by 'overheating'.[227] Despite the potential for overheating severely to endanger health, most attempts to impose some kind of measurable standard are based around perceptions of adaptive human thermal comfort: 'that condition of mind which expresses

[224] NHBC Foundation and ZCH, 'Overheating in New Homes: A Review of the Evidence' (2012); ZCH, 'Overheating in Homes: The Big Picture' (2015).
[225] Adaptation needs will be discussed only tangentially – see Introduction text below n 103.
[226] The earliest academic work on this is now more than a decade old, see e.g. M Orme, J Palmer, and S Irving, 'Control of Over-heating in well Insulated Housing', Proceedings CIBSE/ASHRAE Conference in Building Sustainability: Value & Profit, 2003 For an extensive industry analysis, CIBSE, 'Climate Change and the Indoor Environment: Impacts and Adaptation' (2005) TM36.
[227] A Beizaee, KJ Lomas and SK Firth, 'National Survey of Summertime Temperatures and Overheating Risk in English Homes' (2013) 65 *Building and Environmen*t 1, also see discussion which follows.

satisfaction with the thermal environment'.[228] These are also place specific, because tolerance to heat is relative to the average temperature range to which the exposed person is habituated.[229]

For example, the most recent dwelling-specific Chartered Institute of Building Services Engineers (CIBSE) guidance stipulates that a dwelling is overheated if it is at 28 degrees celcius (or over 26 degrees celcius in respect of bedrooms) for 1% or more of occupied hours.[230] A recent National House Building Council (NHBC) evidence review bemoaned the lack of clear guidance over which there is minimal risk to health, noting that the World Health Organisation had previously set the temperature range for this at 18-24 degrees celcius, yet the Heatwave Plan for England set 26 degrees as a safe limit even for vulnerable groups, in 'cool rooms' which includes bedrooms and care facilities.[231]

These, however, are generalised exterior temperatures. Indoor conditions, and particularly those of cooler places like bedrooms, nurseries or nursing homes, can be expected to be more habitable.[232] In addition, studies about the impacts of heat on health generally, show an increased mortality rate in the UK at much lower temperatures.[233] This of course would mean that the CIBSE ranges were much too high. The threshold temperatures

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228 ZCH (2015) (n 224) 31.

229 R Sari Kovats and S Hajat, 'Heat Stress and Public Health: A Critical Review' (2008) 29 *Annual Review of Public Health* 41 46.

230 The CIBSE Guide A (2006), cited in ZCH (2015) (n 224) Chapter 2 and Roberts (n 156). A more recent CIBSE report CIBSE, 'The Limits of Thermal Comfort: Avoiding Overheating in European Buildings' (2013) TM52 uses slightly different figures, suggesting that 30 degrees centigrade was the limit for overheating in non-domestic buildings.

231 NHBC Foundation and ZCH (2012) (n 224) 31; Public Health England and NHS England, 'Heatwave Plan for England: Protecting Health and Reducing Harm from Severe Heat and Heatwaves' (2015). Thermal comfort in bedrooms is at lower temperatures than living rooms. GM Huebner and others, 'Heating Patterns in English Homes: Comparing Results from a National Survey against Common Model Assumptions' (2013) 70 *Building and Environment* 298 suggests this is closer to 19 degrees.

232 NHBC Foundation and ZCH (2012) (n 224) 35.

233 KJ Lomas and T Kane, 'Summertime Temperatures and Thermal Comfort in UK Homes' (2013) 41 *Building Research & Information* 259 260-1.

produced using the SAP modelling tool, suggests that a likelihood of indoor summer temperatures exceeding 23.5 degrees celcius constitutes a high risk of overheating. It does however identify that overheating risks vary for different categories of occupant, and acknowledges ranges of safe and unsafe temperatures.[234]

i. The health consequences of building overheating

Given what follows, it is disappointing that the ZCH analysis discussed above, cites the loss of industry or developers' reputation as the key risk or consequence of building overheating. It is perhaps fairly plain that high indoor temperatures, particularly when combined with high internal humidity, could create uncomfortable internal conditions for occupants, particularly those accustomed to temperate conditions. As referred to above, thermal discomfort is complex and difficult to define, although we can understand this to be largely a function of habituation.[235] For most people, the consequences of domestic overheating are limited to stress, dehydration and discomfort, which are of course, not inconsequential. Even healthy adults and children can struggle to sleep in overheated rooms (again, this is particularly prevalent in built up urban spaces), and the consequent sleep deprivation can impact on stress levels, quality of life and work productivity.[236]

However, internal overheating can also carry more serious health consequences. High temperatures raise the body's core temperature. The human body is designed to thermoregulate, which means it employs a range of mechanisms such as perspiration, respiration, and vasodilation in order internally to lower bodily temperature. Perspiration is the body's

[234] ZCH (2015) (n 224) 32 – 34.
[235] Chappells and Shove (n113).
[236] NHBC Foundation and ZCH (2012) (n 224)13.

chief mechanism for cooling down when it is hot; airflow around the moisture on the skin helps to cool down the skin's surface temperature, regulating it.[237] Sustained high temperatures in dwelling places can have severe health impacts, including death, in vulnerable groups, which include infants, the elderly, those with obesity or other chronic health issues, but also people suffering social isolation or at risk for other reasons.[238]

If bodily overheating is not treated or properly managed, then heat stroke can result. Heat stroke occurs when the core body temperature exceeds 39 degrees celcius. It causes massive organ dysfunction, and frequently leads to death. Where death does not result, extensive organ damage affects health in numerous ways and significantly reduces longevity.[239]

Elderly people, due to physical degeneration, and children, are less able physically to thermoregulate.[240] The consequences can be fatal amongst older or ill people whose bodies may be compromised in their ability to self-regulate in the heat; they could suffer cardiac arrest, respiratory failure, pulmonary oedema or failure of other organs or bodily systems.[241] Elderly and otherwise vulnerable people, or children, are also practically less able to manage the physical symptoms of overheating (such as cooling themselves, ensuring hydration and electrolyte balance) or external factors (such as cooling their living space, including by convection fans or air-conditioning) that could support this. This is partly due to physiological factors, and partly due to socio- and economic factors, such as relative ability to

[237] Kovats and Hajat (n 229).
[238] ZCH (2012) (n 224) 9. Studies have found that people with mental health and/or substance abuse problems are more likely to die in hot weather conditions. LA Page, S Hajat and R Sari Kovats, 'Relationship between Daily Suicide Counts and Temperature in England and Wales' (2007) 191 *The British Journal of Psychiatry* 106.; LA Page and others, 'Temperature-Related Deaths in People with Psychosis, Dementia and Substance Misuse' (2012) 200 *The British Journal of Psychiatry* 485.
[239] Kovats and Hajat (n 229) 42.
[240] JB Worfolk, 'Heat Waves: Their Impact on the Health of Elders' (2000) 21 *Geriatric Nursing* 70..
[241] Worfolk (n 240).

appreciate the risk and access care.[242] Children, of course, are inherently dependent on carers.

Of course, much of the literature referenced above is generated in the context of heat wave situations and the impact on human, and particularly geriatric, health in periods when weather conditions are at a level that health problems occur.[243] Because of delays in medical treatment being available, and the physiology of death, it is documented that overheating deaths are often attributed to stroke, cardiac arrest or respiratory failure.[244] The attribution of cause of death to heat waves is circumstantial, rather than due to any clear medical markers. In similar vein, it is or would be difficult to disentangle when and to what extent a death in an overheating building was caused by building design, and to what extent this was due to exterior factors, such as a heat waves or an unusually hot summer. Intrinsic factors, such physiological effects of overheating, appear the same, but unfortunately also appear the same as health events that might affect elderly or other physically vulnerable persons in other circumstances as well.[245]

What is clear, is that the current building stock is already dangerously overheating in hot summer weather, and that hot summer weather only stands to increase in the future. Hajat et al [246] predict a dramatic increase in heat related deaths in England over the next few decades, and bodies such

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[242] Design issues implicated in overheating, such as insufficient exterior shading and poor ventilation design, are more prevalent in low cost social housing. Personal notes: R Partington, Richard Partington Architects. 'Heat loss or heat gain: are we inviting overheating problems in new housing?' UCL Energy Institute, London, 3 December 2013. Also generally Kovats and Hajat (n 229) 48.
[243] J Taylor and others, 'Mapping the Effects of Urban Heat Island, Housing, and Age on Excess Heat-Related Mortality in London' (2015) 14, Part 4 *Urban Climate* 517.
[244] World Health Organisation, 'Heat-Health Action Plans' (2008) 4.
[245] Kovats and Hajat (n 229) 46 – 8.
[246] S Hajat and others, 'Climate Change Effects on Human Health: Projections of Temperature-Related Mortality for the UK during the 2020s, 2050s and 2080s' (2014) 68 *Journal of Epidemiology and Community Health* 641.

as the Committee on Climate Change and a recent Lancet Commission have made strong recommendations for infrastructure be adapted in order to remain safe in dangerous heatwave conditions.[247] This is certainly a priority that should be considered in conjunction with mitigation strategies.

ii. Causes of overheating

The picture of building overheating is perhaps every bit as complex as the picture of energy performance problems. As with the above, although a general picture of the causes of overheating in buildings is understood, diagnosing the precise cause of overheating in a specific building is more difficult.[248] While there is some suggestion that problems could arise due to a failure properly to give effect to design intent, on site,[249] most of the overheating literature points to design or modelling issues. What seems clear, is that when buildings designed and built to a high level of energy efficiency overheat this does not necessarily mean the work is poorly conducted; on main, failures to anticipate and take steps to ameliorate overheating at design stage are more prevalent causes.

Building orientation and an absence of proper ventilation appear to be the most frequently implicated factors in building overheating. The ZCH categorises the causes of building overheating as: site context, external temperature, solar gains, internal gains and building design. [250] For my purposes it makes more sense categorise the causes of overheating in three:

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[247] See N Watts, WN Adger, P Agnolucci, J Blackstock, P Byass, W Cai, S Chaytor, T Colbourn, M Collins, A Cooper, PM Cox, J Depledge, P Drummond, P Ekins, V Galaz, D Grace, H Graham, M Grubb, A Haines, I Hamilton, A Hunter, X Jiang, M Li, I Kelman, L Liang, M Lott, R Lowe, Y Luo, G Mace, M Maslin, M Nilsson, T Oreszczyn, S Pye, T Quinn, M Svensdotter, S Venevsky, K Warner, B Xu, J Yang, Y Yin, C Yu, Q Zhang, P Gong, H Montgomery, A Costello, 'Health and Climate Change: policy responses to protect public health' (2015) The Lancet Volume 386, Issue 10006, 1861–1914; CCC (n 100) 108 – 123.

[248] ZCH (2015) (n 224) 47

[249] Ibid 80.

[250] Ibid 39: for my purposes it makes more sense to focus on features of the energy efficiency works that cause heat to accumulate, and failure to take proper countermeasures.

natural factors, features of the energy efficiency works that cause heat to accumulate, and failure to take proper countermeasures.

Various studies have confirmed that building geometry and orientation, can maximise heat gains within a building.[251] The orientation of the building is significant because it allows solar radiation to enter and heat the building, which maximises natural resource use, but heat can be trapped in well-insulated buildings.[252] In densely populated city spaces, the 'urban heat island' effect disturbs nighttime cooling processes.[253] The challenge for designers is to reduce the risk of overheating without compromising gains in energy efficiency, which seems to demand the installation of countermeasures to manage overheating problems.[254] This can be managed at design stage, simply, by positioning windows in such a way as to maximise light emission, or also by installing solar thermal storage measures in south or west facing walls.[255] Most effective, however, is proper use of appropriately applied (meaning, exterior) solar shading, meaning solar gains can be maximised in winter but managed in summer.[256]

In addition to solar gains, even when space heating is not in use, heat is generated in the use and occupation of the building by factors such as appliances and electricity, light bulbs, cooking and radiant heat from human bodies. Features of energy efficient building design such as loft and wall insulation, and window glazing, can contribute to heat gains. While

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[251] A Mavrogianni and others, 'Building Characteristics as Determinants of Propensity to High Indoor Summer Temperatures in London Dwellings' (2012) 55 *Building and Environment* 117.; also Stone and others (n 152).
[252] MR Gaterell and ME McEvoy, 'The Impact of Climate Change Uncertainties on the Performance of Energy Efficiency Measures Applied to Dwellings' (2005) 37 *Energy and Buildings* 982.
[253] E Oikonomou and others, 'Modelling the Relative Importance of the Urban Heat Island and the Thermal Quality of Dwellings for Overheating in London' (2012) 57 *Building and Environment* 223.
[254] SM Porritt and others, 'Ranking of Interventions to Reduce Dwelling Overheating during Heat Waves' (2012) 55 *Energy and Buildings* 16.
[255] Smith (n 162) 54 – 62.
[256] Porritt and others (n 254). Smith (n 162) 58: also adjustable light shading including tree planting.

appropriately selected and installed insulation materials can prevent heat gains from external sources,[257] these can trap heat inside without proper ventilation and heat loss measures.

Presently it appears that an inability properly to ventilate is a consistent factor in all instances where indoor overheating occurs.[258] British buildings traditionally have permitted natural ventilation through gaps in the building fabric.[259] In older buildings typifying (or amongst older inhabitants habituated to) old draughty windows, the leakiness of the building structure may have provided sufficient ventilation to ensure internal air quality, and allow heat to escape naturally when necessary, or at least sufficiently prevent noticeable problems. Of course, the reduction of building fabric permeability and prevention of draughts, are key for ensuring good energy performance in domestic buildings. Buildings designed to a high level of energy efficiency require innovative ventilation to ensure that heat gains can be maximised while ensuring proper airflow.[260] This is necessary for proper air exchange and internal air quality in winter, but also for cooling in summer.[261] This can achieved by installing trickle vents in double glazed window frames, extractor fans and MVHR (mechanical ventilation heat recovery) units.[262] Studies suggest that the most effective technique for managing internal summer heat gains in energy efficient buildings, is

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257 Roberts (n 156); Mavrogianni and others (n 251):of course, the positioning and features of different insulation types will have different effects. R Gupta and M Gregg, 'Preventing the Overheating of English Suburban Homes in a Warming Climate' (2013) 41 *Building Research & Informatio*n 281 291: interior insulation contributes to overheating.

258 Partington (n 242): for instance windows that are too small, poorly positioned or cannot be opened due to noise or security concerns, provide insufficient air exchange. A Mavrogianni and others, 'Urban Social Housing Resilience to Excess Summer Heat' (2015) 43 *Building Research & Information* 316.

259 NHBC Foundation and ZCH (n 167) 15 – 18.

260 P Das and others, 'Multi-Objective Methods for Determining Optimal Ventilation Rates in Dwellings' (2013) 66 *Building and Environment* 72.

261 A Woodward, 'Cutting Household Ventilation to Improve Energy Efficiency' (2014) 348 *BMJ (Clinical research ed.)* f7713.

262 Roberts (n 156). MVHR units harvest heat from the warmed indoor air while replacing this with fresh air from outside.

window opening, usually where a through draught can ensure proper air exchange.[263] This might not always be a feasible or adequate solution, due to single-aspect building design making through draughts impossible, or noise or safety factors making window opening an undesirable solution. Also, when outside temperatures are particularly high, such as during heatwaves, the air exchange solution would not work, for obvious reasons.[264]

Where other options fail or are unfeasible, indoor overheating can be managed with mechanical ventilation or cooling equipment such as fans or airconditioners. These represent poor solutions for a number of reasons. First, fan use is cautioned against when outdoor temperatures exceed 35 degrees celcius. Fast moving air can distort normal physical thermoregulation, leading to dehydration or poor perception of internal overheating.[265] In addition, the use and need for the use of electric mechanical cooling undermines energy savings goals, but also undermines incentives to install energy efficiency improvements.[266] Air conditioning also exacerbates the problem in a more immediate way, by dumping heat in exterior spaces and contributing to external heat gains, particularly in densely populated urban spaces.[267]

Recent empirical research conducted for the Zero Carbon Hub preliminary report, reports a lack of awareness in the construction industry, of the extent of overheating risk, and of both knowledge of and ability to install countermeasures. Overheating risk, like energy performance, can be

[263] Porritt and others (n 254).
[264] ZCH (2015) (n 224) 40
[265] Public Health England and NHS England (n 231).
[266] Wilkinson and others (n 156) 1178.
[267] S Gill and others, 'Adapting Cities for Climate Change: The Role of the Green Infrastructure' (2007) 33 *Built Environment* 115; Rajat Gupta and Matt Gregg, 'Preventing the Overheating of English Suburban Homes in a Warming Climate' (2013) 41 *Building Research & Information* 281.

predicted at design stage with the use of BIM, however this is often not given sufficient priority. The SAP process, which as I explained above is used to predict energy performance predominantly for compliance reasons, contains an appended modelling test, which predicts overheating risk. The report demonstrates that this is often the first time overheating risk is assessed. If countermeasures (such as solar shading) or different material choice (such as insulation type) are 'recommended' at SAP stage, the building is usually close to completion.[268] The obvious problem then, is that it might be too late to install further measures. Of course, as SAP modelling can be run even at design stage, this sounds somewhat disingenuous. It seems unlikely, certainly at this stage, that developers could be unaware of overheating risk.[269] More significantly, there might be a lack of appreciation in the industry generally, of the potential for these problems to escalate in coming years; in addition there might well be a lack of appreciation of how severe the health consequences of overheating can be in certain circumstances.

As explained earlier, even with the current climate status quo, overheating is a known problem. In the UK, this occurs predominantly in the warmer southern areas and built up urban spaces. Predicting where and to what extent this phenomenon is likely to become worse, is beset with unique

[268] ZCH (2015) (n 224) Chapter 7 generally: Failing this part of the test – Appendix P – invalidates the entire SAP process. The report describes a cavalier culture – 'no one fails Appendix P' 75 – explaining that it is easy to cheat by amending input data. A popular tweak is to amend standard assumptions to assume, for instance, that all windows will be open permanently, which is of course unrealistic, or to reduce occupation times. If background weather data never reflects hot temperatures, this also lessens the risk of overheating, according to Appendix P. Also see J Taylor and others, 'The Relative Importance of Input Weather Data for Indoor Overheating Risk Assessment in Dwellings' (2014) 76 *Building and Environment* 81.

[269] Some fairly unedifying extracts reflect a refusal to absorb the additional costs of preventing overheating: "These benefits [of resident health and wellbeing] will need to be weighed against the costs associated with implementing policies to drive reductions in overheating as the costs of designing-in or installing measures in homes will fall to Housing Providers, while the direct benefits will accrue to the occupants. However, Housing Providers should also benefit from avoided costs over the longer term, including from unexpected remedial works…" 20, and "Without a level playing field, those who invest in taking reasonable steps to safeguard the comfort and safety of occupants may find they are commercially disadvantaged…" 37.

challenges because of the uncertainties in future regional weather patterns caused by climate change.[270] Overwhelming evidence exists that surface temperatures will continue to increase in the medium near term, particularly in regions closer to the poles.[271] Increasing temperatures – both average mean temperatures as well as an increased incidence of 'heat wave' events - are considered very likely in England.[272] However, as touched on briefly in the introduction to the thesis, some of the uncertainty in predicting future regional weather patterns is due to uncertainty in choice of future scenarios, which depends on the efficacy of the mitigation response.[273] From a developer's perspective, what is needed is a modelling tool that can predict not only current risk of overheating, but what is most likely taking into account future climatic changes. It is not clear to what extent SAP modelling takes account of these future uncertainties. Thus, even without any issues or concerns about input data for SAP or the way it is used, the Appendix P calculations might not accurately predict whether the building will be safe to inhabit as the climate warms.

e) Conclusion

This concludes the first cross-disciplinary chapter of the thesis. Drawing on energy theory, and literature in the physical sciences and policy, I have discussed the means by which energy performance in domestic buildings might be achieved. I have discussed two key problems – the performance gap and overheating – explaining their implications and means to

[270] Taylor and others (n 268).
[271] B Kirtman, SB Power, JA Adedoyin, GJ Boer, R Bojariu, I Camilloni, FJ Doblas-Reyes, AM Fiore, M Kimoto, GA Meehl, M Prather, A Sarr, C Schär, R Sutton, GJ van Oldenborgh, G Vecchi and HJ Wang, 2013: Near-term Climate Change: Projections and Predictability. In: IPCC (n 3) 978 – 993.
[272] CCC (n 100); JH Christensen, K Krishna Kumar, E Aldrian, SI An, IFA Cavalcanti, M de Castro, W Dong, P Goswami, A Hall, JK Kanyanga, A Kitoh, J Kossin, NC Lau, J Renwick, DB Stephenson, SP Xie and T Zhou, 2013: Climate Phenomena and their Relevance for Future Regional Climate Change. In: IPCC (n 3) 1265-7 and 1281 – these figures are reported with high confidence.
[273] CIBSE (n 230) provides sophisticated if slightly outdated modelling of different climatic scenarios in different UK cities, predicting overheating risk in northern cities such as Glasgow by 2080.

overcome these. The issues explored in this chapter will be used as notional 'factual' data when I come to explore the potential for tort liability for these problems.[274]

First, however, I need to explain the regulatory context in which these technical works take place. The next chapter will analyse and discuss the framework that provides minimum standards for energy performance, ventilation and overheating. It also provides a more detailed account of SAP as a tool of compliance and certification.

[274] In Chapters Six (performance gap) and Seven (overheating).

THREE: REGULATION

a) Introduction

The purpose of this chapter is to provide an account of the regulatory framework in which energy performance works take place. The second half of the thesis explores how (predominantly) the common law of negligence would account for some of the problems that occur in the context of energy efficiency works. Before I can do this, I need to flesh out the context in which the doctrinal analysis takes place. The previous chapter discussed how energy performance is optimised and assessed, as well as the causes of problems or shortcomings. This chapter continues that discussion with an overview of the regulatory instruments prescribing minimum standards for energy efficiency components, and the assessment, certification and communication of energy performance.

The chapter's three main substantive sections discuss the current regulatory package designed to ensure energy efficiency in domestic buildings.[275] The first section outlines the mandatory minimum standards in the building regulations, explaining that these prescribe quality measures that support energy efficiency and the prevention of overheating. Second, I discuss energy performance certificates, explaining how energy performance is

[275] I have not included a discussion of regulatory theory, for reasons that I elaborate on in the Introduction to the thesis – see text around n 106. As such, I cannot make claims to a comprehensive review of the literature. I have conducted a cursory overview and, in addition to anything cited below, have found the following particularly useful: J Holder and M Lee, *Environmental Protection, Law and Policy: Text and Materials* (CUP 2007) generally and Chapters 8-11; B Morgan and K Yeung, *An Introduction to Law and Regulation: Text and Materials* (CUP 2007) Chapter Three; E Fisher, B Lange and E Scotford, *Environmental Law: Text, Cases, & Materials* (OUP 2013) Chapter 12; R Macrory, *Regulation, Enforcement and Governance in Environmental Law* (Hart Publishing 2009); J van der Heijden and J de Jong, 'Towards a Better Understanding of Building Regulation' 36 *Environment and Planning B: Planning and Design* 1038; J van der Heijden, 'The New Governance for Low-Carbon Buildings: Mapping, Exploring, Interrogating' (2016) *Building Research & Information* (forthcoming); J Black, 'The Emergence of Risk-Based Regulation and the New Public Risk Management in the United Kingdom' (2005) *Public Law* 512; J Black and R Baldwin, 'When Risk-Based Regulation Aims Low: Approaches and Challenges' (2012) 6 *Regulation & Governance* 2.

assessed and communicated through them. Crucially, I draw attention to the differing measures of energy efficiency reflected in the standards and performance based approaches. The third substantive section very briefly discusses the economic incentives for energy efficiency improvements, focusing on how the design of these incentives can influence the relationship between the recipient of the measures and the provider/installer team.[276] This then proceeds to a discussion of regulatory compliance and enforcement in the fourth chapter.[277]

i. Political and regulatory context

Earlier in the thesis, I referred to the challenges inherent in such a dynamic research context.[278] At this point, I think it would be helpful to make some general comments about the substantive issues presented by these fast-paced policy changes. The UK has strong domestic carbon reduction targets, the achievement of which are or should be shaped by recommendations from the CCC.[279] Despite the world leading nature of UK climate governance, and the fundamental role that energy efficiency plays in it,[280] energy efficiency policy in the UK has been subject to mixed fortunes. I am not going to set out a systematic timeline,[281] and in the main the thesis will deal with the regulations that exist at the time of writing.[282] Suffice to say that what was previously viewed with some scepticism has

[276] I do not conduct a detailed critique and evaluation of regulatory styles and instrument choice. See van der Heijden (2016) (n 275).
[277] I appreciate that this staggers the discussion of relevant regulation across two chapters. However, as the thesis is predominantly about tort, with Chapter Four explaining the limits on other methods of enforcement, it is more logical in terms of the overall structure and intention of the thesis to do this.
[278] Chapter One text around n 102.
[279] Chapter One text between n 50 – 4.
[280] Chapter One text between n 88 – 101.
[281] A useful overview of recent changes can be found in House of Commons Energy and Climate Change Committee, 'Home Energy Efficiency and Demand Reduction' (2016) Fourth Report of Session 2015–16 7-14 (HCECCC). For a longer view PS Mallaburn and N Eyre, 'Lessons from Energy Efficiency Policy and Programmes in the UK from 1973 to 2013' (2014) 7 *Energy Efficiency* 23; J Rosenow, 'Energy Savings Obligations in the UK—A History of Change' (2012) 49 *Energy Policy* 373.
[282] See discussion in Chapter One around n 102.

now been subject to extensive eradication, and it is difficult to predict what the regulatory future holds.

Since the change of government in May 2015, various key 'green' policies have been abruptly terminated, including the requirement for all new dwellings to be 'zero-carbon homes' by 2016.[283] This has been presented as a culling of failing policies in the hope of newer and more effective solutions.[284] However, the promise or tangible success of some other abruptly terminated policies support the view that the changes were motivated by ideological and/or budgetary priorities rather than a desire to strengthen and improve environmental protection.[285] The proposed new measures are problematic in various respects, and notably lack both a comprehensive scheme to incentive retrofit, or to maintain or improve energy efficiency standards in new dwellings.

As I explained in the introduction, the UK has a stated commitment to energy efficiency in domestic buildings as a key component of its carbon emission reduction strategy. This is driven in part by relevant EU regulations, particularly the Buildings Directive.[286] The directive dictates mandatory minimum standards for domestic buildings (including the net zero carbon 2020 for new-builds, which the UK previously elected to introduce this year), the application of a standardised energy performance

[283] HCECCC (n 281).

[284] Including the notoriously unsuccessful Green Deal, which I touch on below. See: HCECCC, 'Oral Evidence: DECC Priorities 2015, HC 287' (21 July 2015). One of the Secretary of State's professed three priorities is keeping energy bills low by reducing green subsidies. Also F Geels and V Johnson 'Osborne's long-game? The politics behind the downscaling of low-carbon policies' *University of Sussex Energy Group Blog* 27 July 2015 (available at: http://blogs.sussex.ac.uk/sussexenergygroup/2015/07/27/osbornes-long-game-the-politics-behind-the-down-scaling-of-low-carbon-policies/)

[285] A Vaughan and T Macalister 'The nine green policies killed off by the Tory government' *The Guardian* 24 July 2015 (available at http://www.theguardian.com/environment/2015/jul/24/the-9-green-policies-killed-off-by-tory-government)

[286] The English Building Regulations 2010/2214 ('BR') purport to transpose the European Union legislative and policy instruments that drive energy performance improvements in the built environment. As discussed above these are the Energy Efficiency Directive, the Renewable Energy Directive and the Buildings Directive.

assessment methodology and informational system of certification. The directive also prescribed that measures be devised to stimulate the renovation of existing building stock to higher levels of energy efficiency; the conversation around energy efficiency in domestic buildings has been dominated by 'patchy' and largely unsuccessful economic incentives to stimulate the uptake of retrofit measures in existing buildings.[287] Although a detailed study of the transposition of the relevant EU regulations is not my project,[288] I indicate below that few instruments not required under EU regulations persist in this context.[289]

b) Performance standards

This section of the chapter discusses prescribed minimum standards for energy efficiency in domestic buildings. Discussion of the Building Regulations tend to be neglected in the literature due to the focus on energy performance certification (discussed below) as a form of quality standard, or because of the preoccupation with incentives, financing for transformation or informational measures.[290]

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[287] Boardman, University of Oxford and ECI (n 97) Chapter One; CCC 2014 (n 98) attributes energy demand reduction improvements in recent years to economic recession and milder winters, not due to any fundamental transformation in the building stock, as is required. Even under the previous government things were moving quite slowly: R Lowe and T Oreszczyn, 'Regulatory Standards and Barriers to Improved Performance for Housing' (2008) 36 *Energy Policy* 4475 4475 – 6: the authors comment that current policy and practice is inconsistent with a pace of decarbonisation necessary to prevent the impacts of climate change warming exceeding an aggregate of 2 degrees centigrade. Also e.g. Lomas, (2010) (n 156) 1 also explains that the achievement of current targets requires a retrofit rate of 11.5 – 13.8% in the existing building stock. At his time of writing the rate was closer to 1%.

[288] Most literature accepts this, see e.g. Dawes (n 30), a somewhat outdated P Ekins and E Lees, 'The Impact of EU Policies on Energy Use in and the Evolution of the UK Built Environment' (2008) 36 *Energy Policy* 4580.

[289] See DCLG (n 222). The intention to rationalise standards and reduce these to the bare minimum required by European energy efficiency directives, comes across clearly, see e.g. Paragraph 9.

[290] Van der Heijden (2016) (n 275) starts his most recent article by stating that building codes are ill-suited to accelerate the transition to low carbon infrastructure, then eschewing further discussion. The success or otherwise of economic incentives to stimulate renovation relates to the rate of energy performance transformation, and is only tangentially relevant to the thesis subject matter.

The standards in the building regulations are a form of direct regulation [291] dictating the quality and 'effectiveness' of building works, where effectiveness is expressed as a function of per unit energy use and emissions levels. At present, these are the most pertinent regulations in relation to the 'gaps' in energy performance and the effectiveness of measures that influence internal comfort and safety levels; this is where the measure of effectiveness lies. For this reason I begin with the prescribed minimum standards in the building regulations, including a discussion of the zero-carbon homes standard.[292] I also touch on alternative assessment and certification codes, including energy performance certification ('EPC').[293] Crucially, while the latter has potential to be used a measure of minimum prescribed energy performance, it is not (with one exception) used for this purpose currently in the UK. For this reason I discuss EPC predominantly as an informational measure, as this is how it is used currently.

i. Building regulations

At the time of writing, efficiency standards in domestic buildings are predominantly governed by the Building Act 1984, the Building Regulations 2010,[294] and the Energy Performance of Buildings Regulations 2012.[295] These are fairly conventional emissions based quality standards.[296] Non-mandatory technical guidance on achieving compliance with the regulations is issued by the Secretary of State and updated every few years.

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[291] Adopting N Gunningham, 'Environment Law, Regulation and Governance: Shifting Architectures' (2009) 21 *JEL* 179 182 -3.
[292] As I explained above, although the UK commitment to achieve net zero-carbon in new domestic buildings by 2016, has been terminated, the commitments at European level remain.
[293] I have already briefly discussed this second 'layer' of assessment in Chapter Two between n 170 – 3.
[294] BR – references below are to the building regulations unless otherwise specified.
[295] The Energy Performance of Buildings (England and Wales) Regulations 2012/31118 (EPBR)
[296] Holder and Lee (n 275) 362, 367.

[297] These are performance based rather than (formally) technology based standards,[298] in respect of their focus on outcome rather than the method by which this should be achieved. However, performance is still measured as a function of specific components or features of the building; the regulations do not prescribe standards for systemic performance of the dwelling or structure as a whole.

New build (or new extension build) properties [299] are required to have a specific minimum level of performance, expressed as target carbon dioxide emissions rates and a target fabric energy efficiency value [300] (the space heating and cooling requirements per square meter of the floor area of a new dwelling).[301] New domestic buildings must comply with Part L to Schedule 1 of the Building Regulations. This requires that 'reasonable provision' be made for the conservation of fuel and power, by limiting heat loss through the building fabric and various pipes and ducts, and by providing 'fixed building services' which are energy efficient, and adequately tested and controlled. The associated technical guidance [302] suggests practice for ensuring target carbon emissions and fabric energy efficiency, specifying both the method of calculation of the respective target rate [303] and the technical parameters on achieving these.[304] While following the technical guidance is optional, this purports to specify practice of what in most instances would be accepted as compliance with

[297] Compliance with the technical guidance is voluntary – see e.g. para 1.3 HM Government, 'The Building Regulations 2010 Approved Document: L1B Conservation of Fuel and Power in Existing Dwellings'.
[298] See e.g. discussion in Neil Gunningham, 'Regulation, Economic Instruments and Sustainable Energy' (2014) REGNET RESEARCH PAPER No. 2014 / 2 9. 12
[299] There are some exemptions – specified in reg 21(3)(a)-(d) – effectively buildings that are very old and preserved, specified for religious use, temporary or very small.
[300] Regs 25 and 26A (calculated in accordance with the methodology in reg 24)
[301] Reg 8
[302] HM Government, 'The Building Regulations 2010 Approved Document: L1A Conservation of Fuel and Power in New Dwellings'. sets the standards for new domestic buildings.
[303] Ibid para 2.8 – 2.13 – both before and after work commences and is completed as specified in reg 27(2) then (3)
[304] Ibid paras 2.31 – 2.37

the Building Regulations.[305] Hence, as I stated above, while these are formally performance based standards, adhering to specified practice might be seen to be supportive of compliance, particularly in this difficult area.

In relation to existing building stock, energy efficiency requirements [306] apply when work is carried out in or in connection to the building or an extension thereof.[307] If the renovation or substitution of a defined 'thermal element'[308] is extensive,[309] then the whole element must make provision for the conservation of fuel and power by limiting heat loss and gains through the building fabric. This means that compliance is required with Part L, to the extent that this is 'technically, functionally and economically feasible'.[310] In practical terms this is, in the main, achieved by applying insulation to the thermal element. Guidance is set concerning wall permeability and pressure testing,[311] and there is a specific requirement to communicate the best method of 'operating' the building.[312]

Finally, regulation 7 of the Building Regulations contains a general requirement for all construction work to be carried with adequate and proper materials and in a workmanlike manner. This remains undefined however the technical guidance interprets this requirement to mean, use of certified or highly specified materials.[313]

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[305] Ibid para i
[306] Reg 2 of the BR 'define' these as regs 23, 26, 28, 29, 40 and Part L
[307] Reg 21(1)(c)
[308] In terms of reg 2(3) thermal element refers to a 'wall, floor or roof', excluding windows, doors or skylights, which separate thermally regulated parts of the building from outside (including the ground) or unconditioned, differently conditioned, or not in regular use.
[309] Reg 23 specifies that if a thermal element is renovated or replaced, and this is 'major' or amounts to more than 50% of the surface area of the element
[310] Regs 23(1)(b) and (2)(b)
[311] See Criterion 4 – this includes testing of samples or models of large developments
[312] S 4. I have already explained that I do not intend to discuss behaviour in any depth; see n 162 above for references to discussion about the role behaviour plays in energy use.
[313] Para 3.26 - .28

As I explained at the beginning of this section, in the most part mandatory minimum standards are prescribed by the building regulations. Recent regulations seeking to overcome the split incentives barrier to decarbonisation in the private rental sector, impose mandatory minimum energy efficiency standards on tenanted domestic buildings in the private rental sector. After 1 April 2018 all privately rented dwellings will have to have an energy performance rating of at least band 'E'.[314] This sets holistic standard for rented homes based on the EPC standards,[315] although, it must be said, not a particularly ambitious one.[316]

ii. Building codes and changing standards

The minimum standards enunciated in the Building Regulations have universal application nationally. There are a splintering of more stringent codes and standards, calculated using alternative methodologies. Until March 2015,[317] under the so-called 'Merton Rule', local authorities were empowered to require higher energy efficiency standards than specified in the building regulations.[318] I am going to briefly discuss the Department for Communities and Local Government's (DCLG) Code for Sustainable Homes (CSH).[319] Application of the CSR has effectively been terminated

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[314] Reg 23(2) of the Energy Efficiency (Private Rented Property) England and Wales Regulations 2015/962, prescribed under ss 42-44 of the Energy Act 2011. Under s 43(1) landlords will 'not be permitted' to let the property until the requisite level of energy performance has been achieved.
[315] I discuss SAP below. There is no formal equivalence, but compliance with the current Building Regulations is generally accepted to produce a Band C dwelling
[316] As an anecdotal comparator: the average for all dwellings in England and Wales is D. The writer's (rented) single brick, single glazed Georgian terraced house with no energy efficiency improvements has an E SAP rating.
[317] *Written statement to Parliament: Planning update* 25 March 2015. Available at https://www.gov.uk/government/speeches/planning-update-march-2015 (last accessed 10 August 2015)
[318] S 1(1)(c) of the Energy and Planning Act 2008 – now amended
[319] DCLG, 'Code for Sustainable Homes - Improving the Energy Efficiency of Buildings and Using Planning to Protect the Environment' (2006) <https://www.gov.uk/government/policies/improving-the-energy-efficiency-of-buildings-and-using-planning>; DCLG, 'Code for Sustainable Homes: Technical Guidance' (2010).

other than for agreed or legacy use,[320] however it is worthy of a brief mention because it exemplifies a simple yet holistic approach to healthy, low-carbon housing. In addition, the CSH was initially used, in the UK, as the basis for calculation of a 'zero-carbon building' as discussed above.

The Code establishes a 'one to six star' ratings system in terms of which new or converted buildings are allocated points for nine 'sustainable' features, and with prescribed minimum standards for each level.[321] Points in the 'Energy and Carbon Dioxide' category carry the most weight, roughly a fifth.[322] A three star rating on the Code roughly equates to compliance with Part L of the current Building Regulations, five stars to '100% energy efficiency' and six stars to a 'zero-carbon' building;[323] although because of differences in calculation methodology it is not possible to make generalised equivalences between energy performance certificate rating and the CSH star ratings.[324] The CSH also pays insufficient attention to the 'system' functioning necessary to achieve high levels of energy performance, calculating energy performance on the basis of a collection of features or components.

EU regulation requires all new buildings to be 'nearly zero-carbon' by 31

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320 DCLG (n 317) Paragraph 40

321 A McManus, MR Gaterell and LE Coates, 'The Potential of the Code for Sustainable Homes to Deliver Genuine "Sustainable Energy" in the UK Social Housing Sector' (2010) 38 *Energy Policy* 2013.

322 The CSH incorporates 'nudge' thinking by encouraging design that facilitates or defaults to low carbon choices. For instance, CSH awards points for dwellings constructed with space for line drying of clothing, cycle storage and home office space. See 'Energy and Carbon Dioxide' criteria of the DCLG (2010) (n 319) 32-77. This would make a significant contribution to the potential for Local Authorities to take energy and carbon into account when designing urban spaces: See e.g. J Adshead, 'The Quest for Sustainable Buildings: Getting It Right at the Planning Stage' in J Adshead (ed), *Green buildings and the law* (Spon 2011); H Bulkeley, *Cities and Climate Change* (Routledge 2012). On nudge thinking generally see R Baldwin, M Cave and M Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (2 edition, OUP 2011) 123 – 6.

323 DCLG (2010) (n 319).

324 DCLG, 'Code for Sustainable Homes: Technical Guidance (Addendum)' (2014).

December 2020.[325] Simply defined as buildings with 'very high energy performance', the state of current knowledge on technology and construction would demand that the building generate at least some of its own power; it is permitted for any energy used to be offset by energy from renewable sources either produced onsite [326] or locally.[327] The amended Building Regulations transposed this requirement into domestic law,[328] with a 2020 deadline in line with the EU regulations. [329] The UK government had previously committed to an earlier deadline, in terms of which all new domestic buildings would be zero-carbon by 2016.[330] Even a 'nearly zero carbon home' would represent a steep improvement on the standards current sought in new build properties.[331] While zero-carbon housing (including offsetting) is theoretically possible, [332] as discussed in the previous chapter, in practice attempts to build new domestic buildings to even half that standard are proving challenging.[333]

Regrettably, rather than investing in improvements to industry practice, government and industry sought to meet these targets by maximising possible regulatory offsetting in order to classify buildings as 'zero-carbon'.

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[325] Article 9 of the Buildings Directive: new public buildings are required to be 'nearly zero-carbon' two years earlier.
[326] Such as heat pumps or MVHR, see e.g. Boardman, University of Oxford and ECI (n 97) 31- 35.
[327] Article 2 Buildings Directive.
[328] Reg 25B: 'a building that has a very high energy performance … where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced onsite or nearby'
[329] Reg 17. This is required by Article 9 of the Buildings Directive.
[330] House of Commons Communities and Local Government Committee *Existing Housing and Climate Change; Seventh Report of Session 2007 – 8* 2 April 2008; DCLG, (2006) (n 319)– as explained above this is equivalent to CSH level 6. This is exceptionally good energy efficiency, exceeding the previous Eco Homes standard and arguably even the German Passivhaus standard: M Osmani and A O'Reilly, 'Feasibility of Zero Carbon Homes in England by 2016: A House Builder's Perspective' (2009) 44 *Building and Environment* 1917 5. Current building regulations standards are roughly equivalent to CSH level 3.
[331] Lowe and Oreszczyn (n 287).
[332] Or better than net zero, see: RJ Cole, 'Net-Zero and Net-Positive Design: A Question of Value' (2014) 43 *Building Research & Information* 1.
[333] Chapter 2 text between n 146 - 155

[334] This goes beyond the (quite sensible) offsets for the generation of renewable energy, and included discounting 'unregulated' uses of carbon [335] – which means use of appliances, including electronics, could be disregarded – and permitting 'allowable solutions' which permits the building to offset carbon reductions made offsite.[336] Legislation now permits offsite carbon abatement as an allowable solution for zero-carbon homes.[337] An implication of this, is that many so-called zero carbon new homes constructed in due course will not perform better than the new dwellings currently being constructed under the minimum standards specified by Part L of the current Building Regulations.[338] The recent evidence on priorities for the Department for Energy and Climate Change acknowledged the 2020 target, but would not contemplate an increased standard for new homes beyond Band C of the Energy Performance Certificate rating.[339] This probably does not represent an improvement on what we have now.

Cutting building energy performance standards to the bare minimum seems massively counterintuitive, given both the looming EU deadlines and domestic carbon reduction recommendations. Even prior to the scrapping of the Merton Rule and the 2016 zero carbon homes target, the perceived dilution of the standard of zero carbon brought about a great deal of

[334] RS McLeod, CJ Hopfe and Y Rezgui, 'An Investigation into Recent Proposals for a Revised Definition of Zero Carbon Homes in the UK' (2012) 46 *Energy Policy* 25 26 - 28 contains a good background summary. Also, ZCH and NHBC Foundation, 'Allowable Solutions for Tomorrow's New Homes' (2011) 7-9. The graphs on page 9 illustrate the progressive dilution of the zero carbon standard and industry and government have worked towards an achieving the standard when it becomes mandatory.

[335] DCLG (2014) (n 324). This means that the 'unregulated' use from, e.g. appliances, is not included in the energy or carbon calculations.

[336] Allowable solutions make sense, see: DCLG, 'Next Steps to Zero Carbon Homes – Allowable Solutions: Government Response and Summary of Responses to the Consultation' (2013) 6. However, also see the ZCH and NHBC Foundation (n 334) 7-9; McLeod, Hopfe and Rezgui (n 334) 27, 29 – 30.

[337] Section 37(2) Infrastructure Act 2015 inserting section 1(1A)(d) of the Building Act.

[338] McLeod, Hopfe and Rezgui (n 334). 30 - 31

[339] Energy and Climate Change Committee (n 284). As I explained earlier, there is no equivalence between Building Regulations and EPC ratings, but this is probably not more ambitious than current Building Regulations.

criticism.[340] It is arguable that without sufficiently and increasingly stringent direct mandatory standards, there would be no incentive to improve the effectiveness of energy efficiency measures.[341]

However, there is also no compelling evidence that introducing increasingly stringent performance standards and extreme targets has done anything to improve quality standards or narrow the 'performance gap'.[342] Instead, as I discuss below, the imposition of (perceived) unreachable targets appears to have affected the integrity of the compliance process. As such, increased standards would have done little to improve the quality or effectiveness of energy performance works, but instead diverted attention from making genuine improvements, and masked the extent of the shortcomings by enabling creative compliance.[343] This awareness is reflected in the recent Zero Carbon Hub enquiry and report on the performance gap discussed in the previous chapter.[344] Industry had committed to improving quality and standards in energy efficiency works in exchange for a reprieve with respect to regulations. However, as I explain in the previous chapter, the recommendations for improvement are so vague that one wonders how they could ever bring about an improvement.

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[340] Even before the deregulatory events of early 2015: McLeod, Hopfe and Rezgui (n 334) 28: 'What is most striking about the ZCH recommendations is that despite the increased severity of recent findings on climate science, the ZCH have effectively advocated a significant slackening of the key energy efficiency parameters required to achieve a 'Zero Carbon' dwelling compared to the original definition. The question remains whether such an approach is fully consistent with the energy efficiency and carbon reduction targets set out in the UK Climate Change Act, zero-carbon building policies set out in the EU Energy Performance in Buildings Directive … and current peer reviewed scientific research. Addressing these issues is fundamental to the successful delivery of legally binding national and international GHG reduction measures. Implementing a revised definition of 'zero carbon' that introduces the concept of carbon offsetting to the built environment raises a number of critical uncertainties. The choice of methodological approach, the definition of boundaries used in the reporting of emissions, and ultimately the efficacy of the chosen policy approach in responding to climate change must all be evaluated.'

[341] Osmani and O'Reilly (n 330) 11.

[342] Lowe and Oreszczyn (n 287) 4477 – 9.

[343] See discussion below at text around n 400 and 478 in this chapter, and between n 521 – 3 in Chapter Four.

[344] See Chapter Two text between n 182 – 222.

Even without onsite renewable installations, just installing energy efficiency works to a reasonable level of competence could achieve significant reduction goals, without any of the problems caused by unreachable targets.[345] While mandatory minimum standards persist, for now, it appears that the recent and abrupt termination of subsidies and other financial incentives towards retrofit have undermined the potential for good energy performance.[346]

iii. Regulations for comfort

The above discussed the mandatory, voluntary and terminated standards for achieving good energy performance in domestic buildings. I shall now consider to what extent these standards take account of the need to manage overheating risk in energy efficient buildings. As I explained in Chapter Two, an unfortunate side effect of superior energy performance is a tendency for buildings to overheat, particularly when exterior conditions are hot.[347] Consistent contributing factors in overheating cases are the absence of air permeability in the new airtight building, and an inability to manage solar ingress (useful for 'free' light and heat) during the summer months. Ventilation for air exchange and cooling has traditionally been ensured through the characteristic 'leakiness' of British building, or simply through window opening;[348] there has also historically been less exterior

[345] Lowe and Oreszczyn (n 287) 4476-7. Notably this approach would seem consistent with CCC 2014 (n 98) – see 178. Dawes (n 30) is also ambivalent about the effectiveness of stringent building regulation standards.

[346] While, disappointingly, not referring expressly to the performance gap, HCECCC (n 281) suggests that the unpredictability in the market has affected 'supply chains' and created additional challenges in ensuring quality renovations.

[347] NHBC Foundation and ZCH (2012) (n 224).'Overall, it is suggested that the long-learnt lessons of warmer regions of the world, especially Southern Europe, were not reflected in the recent changes to the UK Building Regulations.' 20.

[348] J Rudge, 'Coal Fires, Fresh Air and the Hardy British: A Historical View of Domestic Energy Efficiency and Thermal Comfort in Britain' (2012) 49 *Energy Policy* 6. 'Muthesius (1904) observed that the English preferred draughts and poor heating because they considered warm air as unhealthy, but also noted the level of warm underclothing that protected them from draughts. He compared their 'highly developed need of fresh air' with the 'tropical temperatures' often found in living rooms on the Continent. But he also found that they regarded south orientation of windows as important.' 9.

heat.

There are no direct standards or limits on internal maximum temperatures; as I discuss in the foregoing chapter, the inherent subjectivity both of perception and of physical tolerance makes the imposition of any objective standard unrealistic.[349] Instead, there are a combination of measures to reduce overheating risk, and express (but not particularly helpful) warnings of risk in the Regulations. Part F to Schedule 1 of the Building Regulations requires routinely occupied buildings to be 'adequately' ventilated.[350] There are no other direct mandatory standards in relation to the kinds of measures that would reduce overheating risk (such as exterior blinds). Strong and increasingly urgent recommendations that new standards be developed,[351] were rejected by the Housing Standards Review resisted this, preferring that industry take necessary measures.[352] As at the time of writing there are no specific direct regulations designed to reduce overheating risk, apart from the pre-existing ventilation regulations.

More work has been done in the non-mandatory technical guidance. The 'approved documents' providing technical guidance for Part F do make provision for increased ventilation need due to increased airtightness,[353] however the focus is very much on air quality and reduction of

[349] See discussion in Chapter Two text between n 231 – 234.
[350] 2.39: 'Solar gains are beneficial in winter to offset demand for heating, but can contribute to overheating in the summer. The effects of solar gain in summer can be limited by an appropriate combination of window size and orientation, solar protection through shading and other solar control measures, ventilation (day and night) and high thermal capacity. If ventilation is provided using a balanced mechanical system, consider providing a summer bypass function to use during warm weather (or allow the dwelling to operate via natural ventilation) so that the ventilation is more effective in reducing overheating.'
[351] NHBC Foundation and ZCH (2012) (n 224); DEFRA (n 100); DEFRA, 'The National Adaptation Programme: Making the Country Resilient to a Changing Climate' (2013); CCC (n 100).
[352] DCLG (n 222). The consultation document asserts that that rationale behind this because the issues can not be resolved by the development of new standards, but rather by the rationalisation of existing ones – para 241. The consultation document does concede that this approach may need to change – para 244.
[353] The approved document also includes extensive discussion of active ventilation methods such as mechanical extraction and mechanical extraction with heat recovery, which ensure proper ventilation in airtight buildings without heat loss – see e.g. Tables 5.2c and 5.2d.

pollutants.[354] Recent amendments to the 'approved documents' for Part L include some guidance for reducing heat gains in energy efficient buildings.[355] The guidance focuses on two issues: managing heat gains both from solar exposure and communal hot water pipes are manageable while not compromising the use of natural light.[356] A note to paragraph 2.40 specifies that: "Designers may want to exceed the requirements in the current Building Regulations to consider the impacts of future global warming on the risks of higher internal temperatures occurring more often. CIBSE TM 36 Climate change and the indoor environment gives guidance on this issue." The guidance suggests that SAP Appendix P is used to ascertain overheating risk in new developments, with 'appropriate' assumptions being made.[357]

While it is of course positive that this risk has been identified and steps taken to raise awareness, the approved documents only draw attention to the risk and do not provide any helpful or useful guidance as to how, practically, the problems might be avoided; the level of detail and precision compared to the energy performance measures is marked. For instance, the guidance simply refers to 'solar shading', whereas the literature makes it clear that exterior solar shading would be most effective. Reference is made to the thermal capacity of insulation materials, but without explanation.[358] Developers or parties renovating buildings for energy efficiency would have to look elsewhere for full and proper information as to how to avoid overheating risk.

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354 See discussion in Section 4.
355 The sections referred to below refer to LA1 which is the guidance for new buildings – there is a different guidance for existing buildings, LA2, which is similar but provides slightly fewer guidance points, for example, it does not mention hot water pipe insulation.
356 Paras 2.39 – 2.42, specifically paragraph 2.41 and NOTE thereto.
357 Para 2.40. Appendix P is routinely abused – see Chapter Two text around n 269.
358 Explained in Mavrogianni and others (n 251).

For now, this concludes my discussion of direct mandatory standards for energy performance and the avoidance of overheating risk.[359] There is little to add in relation to assessment; the technical means by which assessment occurs were discussed in the previous chapter.[360] I will pick up this issue again in Chapter Four, where I address the compliance and enforcement regime for the building regulations. This is important for the thesis, because achievement of minimum performance standards is of relevance, although importantly not determinative in, a tort claim. This is, of course, why I have explored the weakening of standards, and the manner in which known risks have been addressed. When I come to consider questions of reasonableness, and of breach of a duty of care in Chapter Seven,[361] a failure to take account of known dangers or risks of dangers will be significant.

c) 'Information'

The previous section explored the mandatory minimum standards for energy efficiency improvements in domestic buildings. This is direct regulation for energy efficiency standards. Energy performance certification is employed, overtly, as an instrument of information, both by informing consumers making purchase and tenancy decisions, and educating residents as to the energy efficiency measures recommended to improve their building rating. Of course, this system of performance certification can be interpreted as constituting the primary measure of direct regulation for building energy performance standards.[362] In addition, however, another perspective would suggest that the energy performance

[359] I deal with assessment of energy efficiency according to the regulations in Chapter 2 at Section b)ii; in Chapter 4 Section c) I shall explain the compliance and enforcement of these standards.
[360] Chapter 2 text between n 182 – 194.
[361] I explain in Chapter Six in text below n 797 why a discussion of breach of duty fits best with the overheating study in Chapter Seven.
[362] This is the approach preferred by van der Heijden (2016) (n 275).

certification regime as it currently exists, constitutes a form of 'command and control' regulation, to the extent that disclosure is mandatory and non-compliance is sanctioned.[363] Central to the thesis is the question of to what extent non-compliance with direct regulation, and a failure properly to comply with 'informational' measures, would result in sanctions.[364] This is an interesting example of how private law remedies affect regulation.

In this section of the chapter, I revisit the issue of assessment considered in Chapter Two. There, I approached the question of assessment from a physical or 'scientific' basis, seeking to explain practically how the different methods of assessment work. There is some variety in the prescribed assessment methodologies – the processes under the building regulations and energy performance certification measure different things. I also emphasised that the manner in which energy performance is assessed often will include minimal or no hands-on assessment of the physical structure.[365] I also explained briefly that problems in the assessment process create a second 'performance gap' where buildings are miscertified due to problematic processes of assessment.

There is little more to say about the processes of assessment that ensure compliance with Part L of the Building Regulations,[366] apart from a few observations about the different methodologies employed under each of the two tier energy efficiency assessment regime. Here, I focus predominantly on energy performance certification as conducted by energy assessors. In the next chapter, which includes a discussion of regulatory

363 K Yeung, 'Government by Publicity Management' (2005) *Public Law* 360.
364 Crucially, mandatory disclosure schemes backed by compliance, and '… supplemented by private rights by those who rely on the information that fails to meet the standard…' may constitute forms of command and control regulation: Yeung (n 275). In Chapter Six, where I suggest (in a liability area beset with problems and challenges) the best prospects for liability lie against an energy assessor for negligent misstatements made in issuing the EPC, that is relied upon by the purchaser/tenant – see Chapter Six generally and text below n 882.
365 Chapter Two text between n 162 -181.
366 Part L to Schedule 1 of the BR: Conservation of Fuel and Power

compliance and enforcement, I again consider building control and energy assessment.

i. Regulations for the assessment of comfort and energy efficiency

If the purpose of the measures is to improve 'performance' of a building, an objective mechanism for assessing this is important.[367] In the previous section, I explained practically how energy performance (and with it, comfort and safety) is assessed, and the broad problems with the approach taken. In this section of this chapter, I look in slightly more detail at the regulation underlying this double tier of assessment.

Article 3 of the Buildings Directive requires Member States to devise a national calculation methodology to provide a standardised method of assessment of energy efficiency in buildings. A variety of techniques and measures to assess and certify building energy performance exist.[368] The standard assessment procedure (SAP) is the 'approved methodology' for the assessment of energy performance in England and Wales.[369] The calculation of SAP (and issuing of energy performance certificates) must be undertaken by certified 'energy assessors' [370] who are accredited by a scheme issued by the Secretary of State. They are required to be properly trained, independent and competent to carry out assessments and calculate building energy performance.[371]

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[367] R Raslan and M Davies, 'Legislating Building Energy Performance: Putting EU Policy into Practice' (2012) 40 *Building Research & Information* 305 306.
[368] Baker and Emmanuel (n 150) Chapter 10 – notably these include the ones described in this thesis, but also details others including the assessment scale of the CSH; also see ZCH (n 167) Appendix D.
[369] DECC SAP2009 Building Research Establishment (BRE), 2010. The current edition is BREDEM (BRE Domestic Energy Model) 2012, (version 1.1 January 2015): http://www.bre.co.uk/page.jsp?id=3176 (accessed 15 July 2015)
[370] Reg 22 EPBR
[371] Reg 30(1) and (3). I explore the duties and accountability requirements on energy assessors in more detail in Chapter Four.

The SAP calculation is conducted by computer modelling.[372] As discussed already, physical testing of a specific building's attributes is minimal. The assessment is based on a range of features that contribute to good energy performance, including the quality and type of construction materials, thermal insulation, heating, hot water, ventilation and lighting, which combine to give a score between 1-100.[373] Generalised internal and external temperature assumptions are then used to calculate aggregate energy usage, with an assumption of 'standard use' by average building occupants. A Reduced SAP (RdSAP) is used to assess existing buildings where incomplete or missing information is supplemented with aggregated information from standardised data tables.[374] These energy used outcomes are measured against generalised assumptions about energy prices, to produce outcomes based on energy costs for space and water heating, expressed on a scale of 1-120, with increasing numbers indicating improved energy performance and hence, lower running costs.[375]

An addendum to SAP – 'Appendix P' – employs a similar methodology to assess the risk of overheating in buildings designed and built to a high level of energy efficiency. This assessment is based on the building's

[372] Notably, this is NOT the same as building information modeling (BIM), a design tool usually conducted before construction work starts. BIM software is expensive and certainly more sophisticated versions are not routinely used by developers – see helpful discussion in Gough (n 171).
[373] Roberts (n 156) 4483: 'Over 40% of properties built before 1919 have a SAP rating of less than 41. Two-thirds of all properties have SAP values of 41–70, irrespective of age, whereas 60% of properties built since 1990 have SAP ratings greater than 70. Hard-to-treat homes generally have features such as solid walls, no gas supply, or no loft space, or are high-rise blocks.'
[374] Reg 24 requires an approved methodology of calculation and expression of building energy performance, which is required to be done in terms of asset and operational rating, which relates to an estimate of energy consumption (as per reg 24(2)) and target CO2 emission rates (as per reg 25) – see DCLG, 'Notice of Approval of the Methodologies of Calculation of the Energy Performance of Buildings to Demonstrate Compliance with the Building Regulations 2010 in England and in Respect of Certain Buildings in Wales' https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/301453/140404_-_Notice_of_approval__Methodologies_for_energy_performance_of_buildings__final.pdf last accessed 26 May 2016; DCLG, 'Calculating the Energy Performance of Buildings: Notice of Approval of the Methodology for Expressing the Energy Performance of Buildings in England and Wales' https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/324277/Annex_A_-_Notice_of_Approval_BC.pdf last accessed 26 May 2016.
[375] Hong, Oreszczyn and Ridley (n 160) 1174.

characteristics, but also on assumptions about weather data and human behaviour.[376]

Criticisms of the SAP methodology include inherent concerns about the calculation methodology and misuse of the system. As far as the first is concerned, SAP assessments are modelled based on aggregate figures and assumptions about use; these include assumptions about use and occupation. This is conceptually and methodologically quite different to the fabric energy efficiency approach prescribed by the building regulations, discussed above. Absent any misuse, or deviations between the standardised assumptions and the characteristics of the actual building, the SAP assessment still measures energy efficiency in a very different way to that of the building regulations. A dynamic assessment of prospective energy use or performance in a building might seem a preferable model to a static assessment of a structure. However, the different 'testing' and assessment methodologies can (or more often, should but do not) lead to disparities in the assessed energy performance of buildings.

Furthermore, the absence of empirical or tested data, and underlying assumptions made in the standardised data in the model (for example, relating to occupant behaviour or exterior climatic conditions) [377] can contribute to questionable results being produced with standard application.[378] This creates potential for variance between assessment outcomes and the actual performance of the physical building, particularly as much of what is constitutive of energy performance relates to building

[376] Notably, running Appendix P with unrealistic assumptions about weather data will often guarantee a 'pass' – see n 268 and references therein.
[377] See discussion in Stone and others (n 152). The shortcomings of the modelling approach are discussed in Wilkinson and others (n 156) 1924.
[378] These are anomalies caused by the modelling system, which are distinct from gaps between the design and certification, or design and construction, of domestic buildings. These will be dealt with in the discussion of the performance gap, below.

systems, rather than the simple integrity of specific components.[379] This also means that where measures had been installed, but done so in an improper way (for instance, wall insulation poorly applied with extensive gaps and 'thermal bridging') the physical building might not live up to its as-designed SAP rating.[380] A growing body of literature argues that this form of neutralised assessment has serious shortcomings in terms of what it really tells us about a building's energy performance.[381] While some kind of standardised computerised assessment is clearly helpful as a starting point, its use in the assessment of completed buildings results in most buildings' energy certification being completed without any tested data at all. Also, because the SAP calculates energy performance as a function of energy costs and carbon emissions, the output calculations cannot take account of either fluctuating energy prices or changes in the carbon intensity of the fuel supply.[382] This to some extent distorts what is actually being measured: SAP is more a theoretical measure of cost-optimal building energy performance, than the potential energy efficiency of a specific structure. This does have implications when recommendations for future energy improvements are sought using the model: variable use of simulation models means that priority could be given to less energy efficient but more cost effective measures that optimise cost effectiveness over energy performance (as well as being potentially misleading about current performance).[383]

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[379] ZCH (n 167) 35; S Kelly, D Crawford-Brown and MG Pollitt, 'Building Performance Evaluation and Certification in the UK: Is SAP Fit for Purpose?' (2012) 16 *Renewable and Sustainable Energy Reviews* 6861 6874 suggests that the SAP measurement *de facto* represents cost effective energy measures, rather than energy efficiency, and indeed does that badly.

[380] ZCH (n 167) succinctly explains at 35: "In particular, … As-Built SAP assessments are often not reflective of the actual built dwelling; that there are issues around the use of U-value and thermal bridging calculation procedures; and that verification procedures are not sufficiently robust when it comes to energy performance."

[381] Stone and others (n 152).

[382] Kelly, Crawford-Brown and Pollitt (n 379) 6876.

[383] Kelly, Crawford-Brown and Pollitt (n 379) 6873.

Independently of its inherent methodological shortcomings, SAP also produces inaccurate or misleading results through improper use. This could stem from a poor understanding of the input materials and paucity of quality control systems.[384] However, there are strong suggestions that frequent (if not routine) 'gaming' occurs – in other words, operators select data based on knowledge that this will yield a satisfactory result, rather than whether this accurately reflects the characteristics of the building. Crucially, strategic manipulation of the SAP modelling has implications in relation to the dwelling's energy performance certification and the recommendations for future works produced as a mandatory part of the certification process. In addition, however, providing 'formal' results that ignore problems and questions about the process, entails that existing flaws either in construction or design remain masked, to be discovered by building occupants in due course, or never.

Obviously, a distinct approved calculation methodology for building energy performance has benefits beyond meeting the demands of legislation. Some objective standard of energy performance is theoretically useful to householders, and necessary for certification. Energy performance certificates could not present any objectively useful information unless a general, universal methodology was employed to conduct assessments. I do not see that expressing energy performance as a 'function' of energy prices represents a flaw; this terminology could make the calculations meaningful for consumer (provided sufficient information was given concerning prevailing assumptions).

384 ZCH, 'Carbon Compliance for Tomorrow's New Homes: A Review of Modelling Tools and Assumptions' (2010).

However, the blatant misuse and systemic gaming that appears endemic in the use of SAP models,[385] is enormously problematic, as the SAP outcomes are translated into energy performance certificates. I will now go on to discuss the energy performance certificates, possible reasons for and the implications of the accuracy issues, and their potential role in consumer decision-making.

ii. Energy performance certificates

Building energy performance calculated using the approved SAP (or RdSA) methodology is determines a dwelling's rating as reflecting in its energy performance certificate (EPCs). Article 12 of the Buildings Directive requires energy performance certificates to be issued and produced at construction, sale or tenancy. These requirements are reflected in corresponding UK legislation.[386]

Once a new or renovated building has been assessed for energy performance using the SAP or RdSAP,[387] the energy assessor issues an EPC, which certifies the building's energy performance on a declining scale of A-G. The EPC provides a performance 'benchmark'[388] which must be provided on change of ownership or occupancy,[389] and when marketing for either of these things occurs. The EPC must also include a 'recommendation report' containing recommendations as to specific or

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385 On 'gaming': Morgan and Yeung (n 275)164; also D McBarnet and C Whelan, 'The Elusive Spirit of the Law: Formalism and the Struggle for Legal Control' (1991) 54 *MLR* 848.
386 The BR require an EPC to be produced either on the erection (reg 29(1)(a) or modification (reg 29(1)(b) of a building. The EPBR requires that a valid EPC should be made available on sale or tenancy (reg 6) or the marketing for sale or tenancy (reg 7) of any buildings not exempted in reg 5.
387 This is required to be done and issued to the building owner and local authority (reg 29(2)) either upon the erection or significant modification of a building (reg 29(1)).
388 Reg 29(4)(b).
389 Regs 6 and 7 EPBR.

further energy efficiency improvements works that could further improve the dwelling's energy performance rating.[390]

The use of EPCs as a compliance tool will be considered further in the next chapter; here, my focus is on how and in what circumstances EPCs are used to convey information to prospective purchasers or tenants.[391] On the face of it, mandatory and uniform requirements for the assessment, certification and communication of building energy performance particulars can have a broad impact in terms of generally raising awareness of specific issues relating to advancing energy performance measures in domestic buildings.[392] In theory this should improve public and householder awareness about energy performance measures, including encouraging further improvements. Of course, the effect of informational measures is nuanced, and it is impossible to say to what extent these raise or improve householder energy and climate change awareness more generally.[393] There is growing evidence, however, that EPC ratings or information about energy efficiency in domestic buildings do have an effect on customer purchasing decisions,[394] and in particular have an impact on price. There is empirical evidence that good energy efficiency has little impact on saleability, because of the pressures on the housing market and the extent of other, material factors that need to be accounted for in making house purchase or letting decisions (such as availability of credit, location, overall condition, schools, etc).[395] Nevertheless it does appear

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390 Reg 29A.

391 Information as regulation in Morgan and Yeung (n 275) from 143. Dawes (n 30) discusses and evaluates smart meters as a informative measure; while relevant to energy consumption in domestic buildings the use of smart meters relates to the behavioural issues which are beyond the scope of the thesis.

392 Dawes (n 30).

393 A Ramos and others, 'The Role of Information for Energy Efficiency in the Residential Sector' (2015) 52, *Supplement 1 Energy Economics* S17.

394 Because of the potential relevance of these issues to a tort claim, particularly one based on misrepresentation.

395 European Commission, 'Energy Performance Certificates in Buildings and Their Impact on Transaction Prices and Rents in Selected EU Countries' (2013). In this study, the UK was the only

that good energy performance can have a positive impact on price,[396] with most recent studies suggesting that good energy ratings – so, over a C – can add almost £9,000 to the cost of an average house.[397]

While this validation of energy efficiency improvements is encouraging, it is also concerning given the significant known inaccuracies in SAP assessment ratings.[398] In the following chapter, I explain both how pervasive non-compliance with Part L of the Building Regulations is accompanied (and sometimes exacerbated) by the misuse and inherent shortcomings of the SAP assessment system.[399] Although there are no focused, peer-reviewed studies that specifically focus on the EPC and the extent to which EPC ratings accurately reflect the potential in-use consumption profile of a building, it is almost indisputable given the known problems with SAP that most EPC's being issued will be based on incorrect data. What the literature on both makes clear is that these miscertifications are based in part on inherent flaws in the model and confusion created by the dual assessment and compliance regime. However, there is also substantial evidence both in the academic literature

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'country' which reported a negative impact on price – although this was based on a small sample in the Oxford area.

396 F Fuerst and others, 'Final Project Report: An Investigation of the Effect of EPC Ratings on House Prices' (2013). Conversely, it has been suggested that domestic buildings fitted with microgeneration capacity (in this case solar) have reduced saleability, because the prospect of running and maintaining the equipment is more of a deterrent than cheaper energy is an incentive, see G Moore and C Morris-Marsham, 'The Impact of Solar Panels on the Price and Saleability of Domestic Properties in Oxford' (2011) 11 *Opticon1826*. It is unclear whether similar attitudes to high tech zero carbon homes, would impact saleability.

396 Boardman, University of Oxford and ECI (n 97) 18.

397 F Fuerst and others, 'Does Energy Efficiency Matter to Home-Buyers? An Investigation of EPC Ratings and Transaction Prices in England' (2015) 48 *Energy Economics* 145. Interestingly, at the start of this research project in 2012, the literature reflected no correlation between energy efficiency measures and price. Indeed, the reported statistics confirm that this connection does not predate 2010, with data sets from 2012 onwards being the first to identify market signs that homebuyers or private tenants value energy efficiency enough to pay more for it.

398 See discussion in Chapter Two especially between n 208 -212. Also: JL LaSalle and Better Buildings Partnership, 'A Tale of Two Buildings: Are EPCs a True Indicator of Energy Efficiency?' (2012). Of course, there are also compliance and assessment shortcomings in relation to the minimum standards set out in the building regulations, and there might be some overlap in the issues. The reason I am focusing more on the EPC in relation to miscertification is because this is communicated to buyers and tenants in a way that (purported) compliance with the building regulations, is not.

399 See Chapter 4 text around n 521, and Pan and Garmston (n 207).

and, for instance, the surveys conducted by the Zero Carbon Hub, that a trivialisation of energy efficiency underlies much of the reported inaccuracies, as the strategic manipulation of data to secure the appearance of compliance forms the preferred approach.[400] This, of course, reflects some of the criticism and commentary creative compliance and the SAP system, which I refer to above.

The point, for now, is that the issuing and production of EPC's, which are based on SAP modelling, is mandatory at key stages. Growing evidence confirms that this information can influence purchaser decisions about sale and tenancy, but significantly, that good energy efficiency can bear on price. In the following chapter I consider in more depth, the compliance and enforcement regimes in relation to this tiered method of assessment, and make some speculative comments about how regulatory style might contribute to the trivialisation of energy efficiency in domestic buildings.

d) Economic incentives

This, the last section in this chapter, discusses of the economic incentives developed to stimulate transformation of the existing building stock. This transformation is important for the achievement of energy efficiency goals and meeting the UK carbon budgets,[401] and also notoriously unsuccessful.[402] Barriers to energy efficiency in this context represent a complex blend of concerns about the quality and inherent value of the work, and methods

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[400] See e.g. H Garmston and W Pan, 'Non-Compliance with Building Energy Regulations: The Profile, Issues, and Implications on Practice and Policy in England and Wales' (2013) 1 *Journal of Sustainable Development of Energy, Water and Environment Systems* 340 at 345. This is the singularly most significant area where a gap appears between the literature and what is discussed openly in industry circles, as I discuss in terms of the methodological challenges in Chapter One in text around n 108. Energy efficiency is seen as unachievable, or 'rubbish' driven by European regulation, of little real consequence given the other challenges in construction, such as structural integrity and fire safety.

[401] DECC (n 8).

[402] CCC (n 8); CCC 2013 and 2014 (n 53) and virtually every report inbetween; Roberts (n 156) explains that the built stock is currently being replaced at something like 1% per year – this needs to be closer to 11% to achieve energy efficiency and carbon emission reduction targets.

of financing the work. These include a perception of risk, both in relation to the nature of the installations and the uncertainness of cost savings; imperfect or untrusted information; 'hidden' costs including the expenditure of time and effort overseeing or managing work; access to capital, even if the cost benefits of energy efficiency works are apparent; split incentives, where the property owner does not stand to benefit from the energy works; and general consumer inertia due to the relative invisibility and perceived unattractiveness of energy efficiency 'improvements'.[403] Overcoming these multiple and complex barriers requires nuanced and careful thinking about regulatory design, which appears to have been absent. Government policy has focused on financial barriers [404] and cost-effectiveness;[405] while of course some progress has been achieved, the results have not been as desired. Of course, the rate of transformation is important for the decarbonisation of the built environment generally but is not central to this thesis. The relevance of the economic incentives to the thesis lies in their potential to dictate terms of the relationship between the owner or occupier of the property, and design/construction or assessors.

At the time of writing, apart from the extended ECO scheme funded by energy supply companies, there are no specific regulatory incentives for take up of energy efficiency measures in domestic buildings. Despite what has apparently been an extensive review of the regulation governing energy efficiency works, there has been no clear indication how the ongoing need

[403] S Sorrell, 'Understanding Barriers to Energy Efficiency' in S Sorrell (ed), *The economics of energy efficiency: barriers to cost-effective investment.* (Edward Elgar Publishing Limited 2004).
[404] Energy Efficiency Deployment Office, DECC, 'Energy Efficiency Strategy', November 2012 18 – 21 identifies four key barriers to energy efficiency, including underdeveloped markets, undervaluing of energy efficiency and the problem of split incentives. It also recognises that 'information' might be a barrier. DECC, 'UK National Energy Efficiency Action Plan' (NEEAP) (required under Article 24 of the Energy Efficiency Directive) and Reg 5 of The Energy Efficiency (Building Renovation and Reporting) Regulations 2014 also isolates market based barriers to energy efficiency changes.
[405] Energy Efficiency Deployment Office, DECC (n 404) 20 – also see the NEEAP – in reality there is little distinction between these documents in terms of strategy. See Chapter Four to Annex B

for retrofit will be met in future, apart from vague and much criticised proposals for the renovation of social and hard to access housing.[406] As discussed above, the recent past has featured the near eradication of energy efficiency policy.[407] This includes the termination of the much-pilloried Green Deal; given its lack of success, it seems undesirable that a replacement would be modelled along similar lines. However, because of the potential for legacy disputes, and I shall briefly consider the relationships created under it.

The Green Deal [408] was a subsidy scheme devised to overcome barriers to energy efficiency improvements in domestic property. Although the term became shorthand for the now-defunct loan scheme, Green Deal assessments were prescribed for other, more generous and successful, subsidies and buy-back incentive schemes. The scheme prescribed Green Deal assessments, conducted by a certified assessor, [409] using SAP methodology to produce a 'recommendation report'.[410] Recommendation reports detail projected first year savings on energy bills, which could be achieved with recommended schedules of works,[411] conducted by a Green Deal installer. The calculations of the projected savings would be based on assumptions about the occupation and use of the property,[412] the stability of energy bills and maintenance costs of the retrofit works.[413] Where a

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406 The proposed measures source funding for energy efficiency improvements partly from energy supply companies and partly from the residents of the targeted properties – who by the selection criteria would be those experiencing fuel poverty. This has rightly been labeled 'regressive' – see HCECCC (n 281) 35.

407 Chapter Three text below n 283.

408 Created under Chapter 1 of the Energy Act 2011.

409 Parts 2-4 of Chapter Two to the Green Deal Framework (Disclosure, Acknowledgement, Redress, etc) Regulations 2012 (GDFR).

410 Defined in Regulation 4 of the Energy Performance of Buildings (Certificates & Inspections) Regulations 2012 – it is notable that the definition of recommendation reports is much more restrictive than that contained in the previous Energy Performance of Buildings (Certificates & Inspections) Regulations 2007, placing a lot more emphasis on 'technical feasibility' and 'cost effectiveness' than the original regulations.

411 Reg 27 of the GDFR. The projected repayment period must also be communicated.

412 Reg 27(2)(a) and (b) GDFR

413 Reg 28(2) and (3) GDFR

quotation and recommendations were attractive, the parties would commit to a 'Green Deal Plan'.[414] This purports contractually to bind the owner or tenant to pay the agreed instalments for the duration of their occupation; only required explicit guarantee concerns the 'functioning' of the improvements, and a repair warranty in relation to potential 'damage to the property … caused by the improvements'.[415] Payment instalments are not permitted to exceed estimated first year savings.[416]

Where improvements were funded by a Green Deal loan, the intention was that the capital amount, interest and installation fees would be repaid gradually by means of a supplement on the energy bills.[417] This was intended to ensure that whoever benefited from more affordable bills would pay for the measures.[418] The so-called 'golden rule' – that loan repayments do not exceed savings – was a mandatory requirement for approval.[419] The revised EPC[420] would include information about the loan account,[421] and specify the 'first year savings' and the assumptions behind their calculation.[422] This loan attached to the property, not the individual, so of course on change of occupation the debt would be repayable by an individual who had not incurred it.[423]

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414 Chapter 2 of the GDFR. Nowhere in the regulations is this described as a contract. The provider guide (DECC *Green Deal Provider Guide* April 2012) does however.
415 Reg 35 GDFR.
416 Reg 30 GDFR.
417 Paid to the 'energy provider' defined in s 4(4) of the Energy Act 2011 and reg 5 of the GDFR
418 'Bill payers' - s1(6)(a) Energy Act 2011 and, where no electricity, in reg 6 of the GDFR – refers to an owner occupier or lessee.
419 GDFR: loan repayment period must not exceed projected savings period - reg 30(2) - and first year loan installments but not exceed bill savings – reg 30(1). Interest rates must be fixed – reg 32. The only explicit written clause which requires consent is from the 'bill payer' for the repayment instalments – reg 36.
420 Reg 29(4)(e) and Schedule 4A GDFR
421 Paras 4-5 of Schedule 4A includes details about interest rates, monthly instalments and expected increases – Para 15 – 17.
422 Para 19.
423 Many potential concerns about the Green Deal, including that improper information about charges might be supplied at transfer of occupation: Consumer Focus *The Green Deal: misselling* June 2010 (available at: http://www.consumerfocus.org.uk/files/2010/12/Green-Deal-misselling-v1.0.pdf)

Direct subsidies and cashback schemes were also available under the Green Deal Scheme. Eligibility for these was conditional on a Green Deal assessment having been conducted, and the work had to be done by approved installers. Direct subsidies were released (and swiftly exhausted) in three separate tranches over the final two years.[424] In addition, schemes to encourage the installation of technology for the microgeneration of renewable energy in domestic properties, are also linked to the Green Deal scheme, eligibility being dependent on basic recommended energy efficiency measures having been undertaken.[425] The overwhelming demand for direct subsidies for energy efficiency improvements suggests that the pricing structure of the loan scheme significantly contributed to its lack of success. Reports in the press mainly relate to the scheme's failure, and consumer dissatisfaction with the quality of the installations.[426]

The Energy Company Obligation (ECO)[427] places an obligation on energy suppliers to undertake improvement works in properties, with a strong focus on affordable warmth and the alleviation of fuel poverty, particularly

[424] The Cashback Scheme ended in June 2014 and enjoyed moderate success: CCC 2014 (n 98) 169. The Home Improvement Fund, launched in May 2014, was exhausted in two months: E Gosden and J Winch, 'Green Deal Cashback Scheme Shuts with Immediate Effect as Homeowners Exhaust £120m Fund' *The Daily Telegraph* 24 July 2014. A further release in March 2015 ran until the fund was exhausted: H Knapman ' Green Deal cashback fund to be given £70mil boost' *MSENews* 15 March 2015 (available at http://www.moneysavingexpert.com/news/utilities/2015/03/green-deal-cashback-fund-to-be-given-70m-boost)

[425] DECC, 'UK National Renewable Energy Action Plan' (2010) 72 – 74. Includes 'FiT Scheme' where electricity suppliers pay householders for clean energy sold back to the grid: The Feed-in Tariffs (Specified Maximum Capacity and Functions) Order 2010. The Domestic Renewable Heat Incentive, created under 100 of the Energy Act 2008, and Renewable Heat Incentive Scheme Regulations 2011, commenced in 2014. Householders are subsidised for generating their own renewable heat, but there is no buyback provision - Regulation 18 and Schedule 3 of the Domestic Renewable Heat Incentive Regulations.

[426] See e.g. J Howell 'A Green Deal disaster area' *The Daily Telegraph* 6 April 2015 (available at http://www.telegraph.co.uk/finance/property/11518115/A-Green-Deal-disaster-area.html), K Palmer 'Green Deal nightmares: British Gas botched our insulation – then offered £50 Nando's meal' *The Daily Telegraph* 10 January 2015 (available at http://www.telegraph.co.uk/finance/personalfinance/energy-bills/11287233/Green-Deal-nightmares-British-Gas-botched-our-insulation-then-offered-50-Nandos-meal.html)

[427] Launched under The Electricity and Gas (Energy Companies Obligation) Order 2012. The empowering legislative instruments are the Gas Act 1986, the Electricity Act 1989 and the Utilities Act 2000. This ran from June 2012, originally to March 2015 - see 12(1), 13(1) and 15(1) of the Order – and was extended to March 2017 in April 2015 under the Electricity and Gas (Energy Company Obligation) Order 2014.

in hard to reach or vulnerable households. This is meant to be funded from their profits.[428] The ECO specifies three distinct obligations aimed at energy efficiency/carbon reduction [429] or provision for the use of low carbon heat [430] in domestic buildings. The ECO seeks to provide 'affordable warmth' to disadvantaged households, and is designed to support energy efficiency measures in properties where householders or occupants cannot afford to undertake measures themselves.[431] This is of course, tremendously positive, as it reaches those who might not be in a position to effect energy improvements through other means and has potential to lift vulnerable people out of fuel poverty. The ECO is structured in such a way that energy companies are required to find suitable properties for ECO funding and fund the measures they install.

In essence, because of this model, there are no prescribed contractual arrangements between ECO providers and building occupants. It would appear that, for improvements done *en masse* in housing developments, which is typical, the providers would contract with the local authority or housing association.[432] In a recent Consultation on the future of ECO, it was effectively determined that because the recipients of the 'improvements' were not investing in the measures, it would not be necessary to create consumer protection mechanisms.[433] Of course, it is regrettable that bulk work done for vulnerable 'consumers' who are not paying, is probably more likely to be substandard than average. This makes both energy performance problems – including of course, the possibility

[428] Although a recent review has sought to pass the costs to the consumer or energy customers: DECC *The Future of the Energy Company Obligation: Consultation Document* 2014.
[429] Article 12(4)(a) – (c) and article 13(6)(a) – article 12 in the 2014 Order.
[430] Article 12(4)(d) and article 13(6)(b)
[431] Additional provisions in Electricity Suppliers Licence standard condition 3, also see e.g. JF Garner and others (n 41) 6C.20.
[432] See e.g. British Gas *Energy Company Obligation: How Local Authorities can unlock the benefits for their communities* October 2012
[433] HCECCC (n 281) 42.

that bills could increase – and unintended consequences such as overheating, probably more likely than average. As none of these consumers have a contractual relationship with the ECO providers, as with those who 'inherit' substandard Green Deal renovations, the only remedy they might have, would lie in tort.

e) Conclusion

This concludes the second chapter in this part of the thesis. Developing from the notional 'factual' information explored in the previous chapter, I have outlined and discussed the regulatory context in which energy performance improvement works – and problems – take place. I have focused mainly on the minimum legislated standards for energy performance and the prevention of unintended consequences, mindful that a failure to achieve these standards would be strongly influential in private law litigation. I also considered the informational measures used to communicate energy performance status, interrogating whether and to what extent energy performance information influences purchasing/leasing decisions or price. Finally, I considered two of the economic incentives that have been used to stimulate improvements in the existing stock; my focus in relation to these was to point to how the legislative context of these measures influenced the legal relationship between the installer team and the householder.

As I have said, most of what is found in these first two chapters goes to form the substance for the putative tort claims that I consider in later chapters. But of course, it also raises questions about the relevance of tort, given that in some instances, householders would have a contractual relationship with provider/installer teams. Also, as I have said, this chapter

has not considered regulatory compliance and enforcement. The next chapter will address the more obvious forms of recourse available to consumers – regulatory enforcement, contract and (briefly) insurance.

FOUR: THE LIMITS OF THE OBVIOUS

a) Introduction

The first part of the thesis aimed to outline and contextualise problems with potential to give rise to tort liability in domestic buildings, specifically energy performance and overheating problems. It has established the research within the broader context of energy and climate change law. Also, by explaining the technical issues that bring about these problems, and the regulatory standards and drivers underlying these, it has developed the groundwork and substance for the doctrinal analysis. In the second half of the thesis, I explore the potential and limitations of tort liability in relation to the identified problems.

This chapter serves several functions; structurally it provides a bridge between the contextual material and the discussion and exploration of tort. With the focus very much on the first perspective taken in the thesis – recourse for problems caused by energy efficiency improvements - it examines the more obvious remedies that might be sought in relation to these problems, particularly the performance gap. This is necessary in order for the first approach properly to be fulfilled, but also, it is necessary to explain the relevance of tort.[434] It does so by briefly discussing the potential and limitations of regulatory controls, insurance and contractual protection, exposing the ineffectiveness of traditional consumer safeguards in this context. Of course, tort is a more obvious solution for overheating problems, particularly when these result personal injury, but it is less so in relation to performance issues. Because of this, the discussion in the chapter will be slightly inclined towards performance issues, making

[434] See Chapter One text above n 6.

reference to discomfort or financial loss caused by overheating where appropriate.

This chapter also serves a 'clearing the way' function, both by (as above) explaining why the obvious avenues of recourse are not adequate, but also by establishing categorisations that apply in this and subsequent chapters. The chapter clarifies whom the putative claimants and defendants are, and what their relationship to one another might be. I also make some comments about loss, and draw some distinctions about the relative significance of the defects giving rise to energy efficiency shortcomings in different kinds of projects. Throughout, a key theme emerges: that energy efficiency is perceived as a trivial issue, given low priority in amongst myriad other issues arising in the construction context. As I explained in the first chapter, although an explicit acknowledgement of this is difficult to pin down in the peer-reviewed literature, colloquially it is expressed blatantly.[435] This discussion will continue in my discussion of the conceptualisation of the performance gap claimant's loss as 'purely economic' in Chapter Six.

The chapter starts by outlining the parties and discussing the nature of any defects, explaining how loss might be conceptualised, then moving on to discuss regulatory controls, contractual remedies and insurance, in turn.

b) Parties, defects and loss

i. Parties

In the thesis I will tend to speak of 'claimants' in generic terms, however there is a range of possible claimant/defendant relationships and

[435] Chapter One text around n 108.

ownership scenarios that can be determinative. 'Claimants' means the owners of or tenants in a building with poor energy performance (by which I mean non-compliant with the minimum standards in the Building Regulations, falling short of any other minimum standard prescribed by regulation,[436] or other higher standard as agreed between the parties) or suffering unintended consequences caused by such 'improvements'.

The most obvious claimants would have purchased new build properties with energy performance measures (hopefully) incorporated in the build, and hold first title. Secondary title-holders (of the same) would have no relationship with the design/construction team, would still reasonably expect that their building was compliant with the building regulations, as well as with its advertised energy status.[437]

Other claimants would have commissioned energy retrofit works in an existing building that they own, and as such have first "title" to the retrofit works, and some relationship with the installers, whether or not they are primary title holders of the original building. Such claimants would be best placed to detect energy performance shortcomings or changes in thermal comfort (compared with their previous experience in the property). They would also be able to place a clear value on their loss, knowing the cost of the energy efficiency measures and also the difference in energy use. Claimants who commissioned the retrofit will have had some relationship with the design/construction team, which as discussed below might or might not be contractual. A further category of potential claimants purchase a property that has previously been retrofitted. Where the

[436] See dicussion of minimum standards in Chapter Three Section (b)i.
[437] The EPC on transfer: Chapter Three n 505.

retrofit was funded under the Green Deal the secondary titleholder would also take transfer of the loan that funded the works.[438]

Distinct issues arise in the context of tenanted buildings, because the owner would not necessarily be responsible for paying the energy bills. This 'split incentives' barrier to energy retrofit is one significant factor impeding the *rate* of transformation of the built stock.[439] This split raises further issues when it comes to calculating and allocating loss. Where a building is leased to a (private or local authority) tenant, the tenant would have some contractual relationship with the landlord (whether private or housing association), but not with the construction/design team, even in case of new developments/retrofits. The landlord would be in the same position as the parties described in the previous paragraph. This would include local authority landlords, more likely to have social or mixed-social housing renovated under ECO funding, paid for by energy companies.[440]

There are three broad categories of defendants, the design/construction team, building control and energy assessors. The descriptor 'design/construction' essentially refers to parties responsible for constructing a dwelling or development, or installing a retrofit, and as such, in a position to remediate any such works if circumstances allowed. This generic descriptor masks a fairly broad range of arrangements, often contractual, determining which players assume responsibility for which elements of a construction project. The content of this team (it could, indeed, be one person) could be very different depending on the size and scale of the project, and could include both professional parties such as

[438] Chapter Three, see n 423 and text above. Arguably this goes beyond the Green Deal, and may be reflected in a more subtle and informal way as well – owners expecting more on sale for energy efficiency improvements whether effective or not.
[439] Barton (n 90) 64 and generally Lovins (n 96).
[440] ECO, Chapter Three text below n 427.

architects, engineers, but also tradespeople and non-professional contractors, builders and all varieties of subcontractors.

From a liability perspective, two key distinctions can be made within this broad category – 'design/construction team' - that I will deliberately not pursue in this thesis. First, construction contracting tends towards a complex proliferation of arrangements, and, depending on the scale of the project, the client/building owner might or might not have separate relationships with this 'team'.[441] Second, distinctions could be made between professional and non-professional members of the construction/design team, certainly in relation to tort liability.[442] Even within the speculative nature of this thesis material, unpacking these relationships could uncover endless unhelpful factual variances.[443] Such distinctions are not particularly material to the thesis, and will not be explored further, although it is acknowledged that these could determine outcomes in live litigation.

The second broad category of defendants includes parties not responsible for creating the problematic structure in a direct way, but responsible for the assessment and certification of the building. In previous chapters, I outlined the minimum standards to which buildings must adhere,[444] and

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441 J Uff, *Construction Law* (11th edn, Sweet & Maxwell (Thomson Reuters) 2013) condenses the main standard forms of contract at 341 - 376.

442 The significance of professional status in determining duty has become eroded. In *Murphy v Brentwood District Council* [1991] 1 AC 398, Lord Keith thought an architect could be liable in tort, as well as contractually, for defects causing pure economic loss, 466. More recent decisions made less of this distinction: see e.g. *Bellefield Computer Services Ltd v E Turner and Sons Ltd; Unigate UK Ltd v E Turner and Sons Ltd* [2000] BLR 97; *Payne & Ors v John Setchell Ltd* [2001] EWHC 457 (TCC). Suggestions in *Robinson v Jones (Contractors) Ltd* [2011] EWCA Civ 9 that such distinctions should be restored is one of many features of that decision, that make little sense. Also see S Steel, 'Building Contracts: A Concurrent Claim in Tort?' (2011) 27 *Professional Negligence* 226.

443 For example, differences in as built and design/build contract (the architect retains liability in the latter but not the former), where the relevant defects might be in the construction not in the plans, and vice versa, etc.

444 Chapter Three Section b)i.

explained how adherence with these standards is assessed and certified.[445] This category includes the parties responsible for this process – essentially, building control. Although the defendant conduct and behaviour looks very different to that of the design/construction team, they (at least in theory) bear some control over the building, because they are empowered to order compliance (see below). When I discuss tort liability in Chapter Six, I will explain that the courts have tended not to make much of differences between building control and construction in the leading cases, even though the conduct and degree of control of the parties is quite different. [446]

A third category of defendant is also responsible for assessing the energy status of the building, but this is for energy assessment and certification of the dwelling the feeds into the issuing of energy performance certificates. I explore the relationship and distinctions between this kind of energy performance assessment, and the assessment of compliance with energy efficiency criteria as part of the building control function, in the previous chapters. Here, I have in contemplation energy assessors who issue incorrect or misleading energy performance certificates, which may induce or at least reassure claimants who seek to purchase or rent a property.[447]

ii. Defects

Errors in design or construction are significantly implicated in energy performance shortcomings.[448] The reasons for energy performance failings (as with building overheating) are complex and the real causes of problems

[445] Chapter Three Section c)i.
[446] This occurs in terms of the standard process of building control; traditionally the courts have not made any substantial distinctions between liability arising as a consequence of local authority failings in building control and faulty construction work. Most notably, in *Murphy v Brentwood* (n 442). Also, these roles can overlap – see e.g. Uff (n 441) 298-9.
[447] Chapter Three see text between n 394 – 397.
[448] Bordass, Cohen and Field (n 186); Socolow (n 182); Wilkinson and others (n 156).

would vary from case to case. Significantly, it seems that often problems are caused due to systematic errors rather than (necessarily) faults or quality flaws in the construction,[449] what might be considered defects in the lay sense. The word 'defect' is not a term of art; construction lawyers use the term 'defect' to describe faulty or somehow qualitatively unsatisfactory work, but there is no precise objective definition of 'defect'.[450] This encompasses everything from significant flaws and bad workmanship, to failures in supply that nevertheless retain functional utility,[451] and might be of objectively acceptable quality but fall short of specification,[452] or presumably, required standards. What is both clear and important for my purposes, is that a dwelling can be useful and habitable, but nevertheless defective. Energy performance failings do not necessitate that a building would be inadequate in any other respect.[453]

Earlier I alluded to distinctions between energy efficiency measures incorporated in a new development, and those added to an existing building by means of 'retrofit'. This distinction is relevant because of the relative significance of the energy efficiency 'improvements' to the project as a whole. Depending on the 'facts', defects could constitute one aspect of what could be a substantial development, but in retrofit works, the energy works might be the entire project.

It is also necessary to give some thought to how these defects are characterised; this is important for limitation purposes. For perhaps

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[449] Discussed in Chapter Two see specifically text between n 191 – 192.

[450] J Bailey, *Construction Law* (Informa Law from Routledge 2011) 1080 defnes this as " …an element in the design and/or construction of a structure (or other asset) … which in qualitative terms falls short of what should have been supplied…" Notably the Defective Premises Act 1972 does not define 'defect'.

[451] *Ruxley Electronics and Construction Ltd v Forsyth* [1995] UKHL 8.

[452] Bailey (n 450) 1080 – 1085.

[453] A claimant would rely on negligence rather than the Defective Premises Act 1972 – in most cases the building will be fit for habitation. See *Bole v Huntsbuild* [2009] EWCA Civ 1146.

obvious reasons most construction disputes seem to engage with latent defects, not discoverable or normally perceptible.[454] Defects are patent if they could have been discovered following reasonable examination by a competent or skilled person.[455]

The very specific nature of energy efficiency problems and the subtle ways in which they manifest makes this categorisation difficult in these cases. Because of the peculiar nature of defects causing energy performance problems, or indeed building overheating, these cannot be said to the latent in the sense that they are not available to be discovered. However, they are often are not obvious to a lay owner/occupier. Because of factors to do with the occupation and use that might make the structural energy efficiency of a building difficult to assess on the prevailing methodologies,[456] and layers of accuracy shortcomings in assessment and certification,[457] might make detection and identification of the problems particularly difficult.

The characterisation of the defect is relevant because of limitation. Any contractual claim would have to be brought within six years of the work being completed,[458] but the particular nature of the problem might make it particularly unlikely to have come to notice by this point.[459] Claims in negligence, of course, are actionable within six years,[460] or a longer period if the defect did not come to notice immediately whether because the

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454 Bailey (n 450) 1107: for instance, the authoritative line of cases dealing with defective premises in tort, deal with latent defects – not normally perceptible - which came about in the process of construction – see generally Chapter Six Section d)i.
455 *Clay v Crump* [1964] 1 QB 533; Bailey (n 450) 1107 – 1109.
456 Chapter Two see text between n 174 – 181.
457 See generally Chapter Two Section b)ii and Chapter Three Section c)i.
458 S 5 Limitation Act 1980 – *Leicester Wholesale Fruit Market v Grundy* [1990] 53 BLR 1 10 and 20. Although a claimant would not be taken to be aware when he had been reassured that no problem or defect existed – s 32 Limitation Act *Fallis v Elliot* [2006] NIQB 121 20.
459 Of course, if buildings are routinely wrongly assessed and miscertified then these subtle problems will be concealed.
460 S 2 Limitation Act.

claimant's right of action had been 'deliberately concealed' from him by the defendant, or where the action is for 'relief from the consequences of a mistake'.[461] Again, this is not to say that contractual claims would not be of value, but to underline the relevance of tort claims in this particular context.

iii. Losses

Finally, before moving on to the 'obvious' enforcement mechanisms for these problems, I should make some notes about how the claimant(s) would categorise her loss. Of course, the personal injury (and in some instances) property damage aspects of the unintended consequences type cases are not particularly difficult. However, the loss incurred by claimants in cases of poor energy performance (or indeed, the energy overuse aspects of overheating cases) is not so obvious. As I have explained above, my focus here is on the formal aspects of the claimant's loss – in Chapter Six I explore the inadequacy of an approach that only accommodates the financial aspects of the claimant's loss.[462]

In relation to energy performance problems, the position the claimant would be in, absent the defendant's breach,[463] is residence in an energy efficient property. Under the present regulatory regime, the claimant's loss would be commensurable with the difference between the energy performance of the claimant's own property, and what this would be had the building been energy efficient – whether this is measured as compliance with the minimum energy performance standards prescribed in the Building Regulations, other such standard or as agreed between the

[461] S 32(1)(b) and (c) Limitation Act respectively.
[462] Chapter Six text below n 909.
[463] *Lim Poh Choo v Camden & Islington Area Health Authority* [1980] AC 174 187.

parties.[464] There are different ways in which loss could be quantified. When the claimant's property is *damaged*, the 'broad rule' is that the claimant's loss is the reduction in its value.[465] It now appears that energy efficiency does have an impact on property sale prices, at least.[466] Alternatively, the claimant's loss could represent the cost of reasonable repair. However, often the defects in a building that cause poor energy performance may be such that only meticulous restoration can make good the loss,[467] and a claimant is not entitled to damages for the 'fine tuning' kinds of work necessary to repair poor energy performance.[468]

An alternative way of framing loss could be in terms of the excessive energy consumption. Energy retrofits are incentivised by a reduction in energy usage and hence more affordable energy bills, so as a third alternative the claimant might seek compensation for the difference.[469] This would also apply if extra energy were required to run mechanical cooling equipment in overheating buildings, assuming a claimant had access to and could afford this. This would seem the likely route certainly, for a tenant who had no continuing interest in the building. If however energy shortcomings were reflected in rent reductions, a landlord might choose to frame her loss in terms of the cost to her of reduced rental yields.

Of course, as I discussed in the previous chapter, the regulatory regime

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[464] See e.g. discussion in Chapter Three Section b)i and ii.
[465] See S Deakin, A Johnston and BS Markesinis, *Markesinis and Deakin's Tort Law* (Clarendon Press 2013) 863. In *Murphy*, the claimant's damages were calculated on the basis of the reduction in the market value of the property.
[466] Chapter Three text between n 391 – 397.
[467] In any event the claimant's damages must be fair and reasonable, and accordingly, if extensive works are required to achieve necessary energy status, the claimant is unlikely to recover these damages in full: *Rowley v London and North Western Co* [1873] LR 8 Exch 221 231.
[468] *Darbishire v Warran* [1963] 1 WLR 1067
[469] Average 'household' savings from even a successful energy retrofit are under £300 a year - R Anderson and D Kahya 'Saving money through energy efficiency' *BBC Online* 16 November 2011. Of course, in a larger development the potential energy savings would be greater.

governing this area is currently in a state of flux. New or proposed new regulation has potential to create new categories of loss by creating financial penalties or incentives around energy performance ratings. For instance, as I explained in the previous chapter, recent regulation requires privately tenanted properties to have a minimum energy performance level (currently band E) by 2018.[470] When in force, rental of a property below this (unambitious) energy rating will be prohibited,[471] and non-compliance can result in financial penalties.[472] Poor renovation works resulting in a performance gap or incorrect certification could result in significant losses for a private landlord, whether in respect of lost rental revenue, renovation works and/or fines.[473]

Conversely, there are also proposals for direct financial incentives (often in the form of tax exemptions) for good energy efficiency in domestic buildings. One mooted possibility is that of direct financial incentives where dwellings reach a certain level of energy efficiency, for instances through stamp duty or council tax exemptions.[474] A performance gap claimant paying a higher rate of stamp duty or council tax, would seek the difference in the preferential rate, as well as other loss as I discuss above.

c) Regulatory compliance and enforcement

As I explained in the introduction, this chapter seeks to clear the ground for the tort analysis that follows in the second half of the thesis. The first section of the chapter sought to do this by clarifying some general issues

[470] Reg 22(b) The Energy Efficiency (Private Rented Property) Regulation 2015
[471] Reg 23 ibid.
[472] Reg 38 ibid.
[473] As above, but this seems unlikely at present, given the unambitious minimum standard – SAP E - in these regulations.
[474] See e.g. HCECCC (n 281).

relevant to all the liability discussion in the thesis: the identity of the parties, the claimant's loss, and how we might understand 'defect'. I will now turn my attention to some preliminary issues from a liability perspective, essentially undertaking the enquiry that the claimant would, in seeking recourse for (particularly energy performance) problems. I will start with the role of regulatory enforcement in ensuring quality, effectiveness and safety in energy performance works.

Regulation suffers from major limitations in terms of ensuring the implementation and enforcement of safe, effective and accurate energy performance and informational measures. As I explained in the previous chapter, energy performance is subject to two tiers of regulation – direct mandatory standards and informational/certification measures - each of which assesses and certifies 'good' energy performance in slightly different ways, which is unhelpful and confusing.[475] However, translating this into an absence of recourse for claimants has less to do with the letter of the regulation, and more to do with the culture of compliance and enforcement. In earlier chapters, I outlined the minimum energy efficiency standards to which new and renovated buildings are required to adhere,[476] and explained the assessment and certification processes, which include both generalised building control and energy performance assessment. I also explained that significant systemic and (increasingly) known problems exist both in achieving these standards, and in reflecting these accurately through certification. The obvious question this raises, is why these problems are not identified and rectified before handover. While of course, there are some assessment and compliance processes that are conducted in exemplary fashion, what emerges is an all too pervasive

[475] Chapter Three Section b)i. and c).
[476] As above.

culture of 'creative compliance', with a background perception of energy efficiency as a trivial issue.

The first layer of regulatory enforcement is standardised building control. In England, this comprises an assessment and certification process in terms of which inspectors certify that building work is compliant with the mandatory minimum standards specified in the Building Regulations. Here, building work includes both new developments and renovations bringing about a change in the building's energy status.[477] This assessment and compliance process may be conducted either through Local Authority Building Control,[478] or a private Approved Inspector.[479]

Local Authorities have a multistage compliance and enforcement process in relation to new buildings, and some kinds of building renovation, which would include retrofit. Their compliance involvement occurs at the outset [480] and completion of works, [481] and includes certification that the construction is compliant with the Building Regulations. [482] A local authority has broad discretion to relax the application of any requirement of the Building Regulations;[483] the limited exceptions to this all relate to energy efficiency. [484]

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477 Reg 22, 23 and 28
478 S 16 Building Act 1984.
479 Ss 17 and 49 Building Act.
480 Reg 16(1) BR. Reg 12(1)(b)(c) requires notice when replacing thermal elements or the building's energy status.
481 Reg 16(4).
482 Specifically, Schedule 1 to the Building Regulations, which of course includes the requirements of Part F (ventilation) and Part L (conservation of fuel and power), and regs 25A, 26, 29, 36 and 38, as covered in Chapter Three. The Local Authority may commission specialist advice under s 33.
483 S 8 Building Act
484 Specifically BR 23(1)(a), 25A, 25B, 26, 29 and 29A. These include 'energy efficiency requirements' discussed in Chapter Three around n 306 and cover the renovation of buildings, carbon dioxide emission rates, zero carbon buildings and energy cerification.

At any stage from the commencement of work, up to a year after completion, the Local Authority is empowered to issue a notice in relation to any work which contravenes the requirements of the Building Regulations, requiring alteration or removal within 28 days.[485] Persons responsible for such contraventions are subject to statutory penalties, resulting in a fine.[486] There are no other direct penalties for breaching the regulations. The Building Act contains a still-inactive provision that creates a statutory civil penalty, actionable per se, for breaches of the building regulations.[487] In any event the penalty did not extend to breaches of the provisions governing energy efficiency measures.

Building control can also be exercised by an Approved Inspector, a private individual who enters into a contractual arrangement with, presumably, a developer or building owner, to provide building control services. Some minor variations exist in the process. Initial notification of the use of an insured private inspector must be lodged with the Local Authority with the building work plans,[488] and this gives the Approved Inspector full supervisory power over the project.[489] The Approved Inspector is empowered to certify plans[490] and completed work[491] as compliant with the Building Regulations but lacks power to bring enforcement action if any work completed under his supervision contravenes the regulations. If the offending party does not comply with a compliance notice within the prescribed time,[492] the Approved Inspector is required to cancel the initial

485 S 36(1). Section 40: right to appeal to a magistrates court. S40 – 4: procedures for further appeal to Crown or the High Court. While important, these provisions are not relevant for the chapter – the problem here is one of under- not overenforcement.
486 S 35
487 Ss 38(1)(a) and 38(4) of the Building Act. See WVH Rogers, *Winfield and Jolowicz on Tort* (18th Revised, Sweet & Maxwell 2010) 433 - citing *Worlock v SAWS* [1982] 26 EG and *Perry v Tendring District Council* [1984] Build LR 118.
488 S 47.
489 S 48(1).
490 S 50 – 'plans certificate'.
491 S 51 – 'final certificate'.
492 S 52(2).

notice of supervision to enable the Local Authority to take enforcement action.[493] There are also provisions for public bodies to supervise their own building work, which largely resemble the notice and supervision arrangements for Approved Inspectors.[494]

There is also broad scope for a great deal of construction work to be self-regulated, or in other words, completed and certified without any formal oversight. Two self-certification schemes enable "competent" persons to certify their own building work as compliant with relevant sections of the Building Regulations. A qualified person registered with her trade organisation, carrying out specified works within a scope of work or scheme membership,[495] is not required to provide any notice or plans of work, but may self-certify her own work as compliant with the Building Regulations on completion.[496] In addition, any person carrying out minor works,[497] is not required to provide notice [498] or any certificate of compliance [499] to a regulatory body at any stage.

The self-certification schemes hold particular significance in relation to energy performance in domestic buildings, due to the nature of the works included in the relevant schedules. The contemplated works include the installation of heating equipment, ventilation and cooling measures, cavity wall, floor and loft insulation, and replacement of doors, windows and skylights.[500] This means that many of the works that would be included in a

[493] S 52(1)(c).
[494] S 4.
[495] Reg 12(6)(a), Schedule 3 to BR.
[496] S 20(3).
[497] Schedule 4.
[498] Reg 12(6)(b).
[499] Reg 20(4).
[500] All references are to items in column 1, to Schedule 3: 1. – 7. various heating systems; 8. – 9. installation of mechanical ventilation or air conditioning system or associated; 13. replacement of windows, rooflights, roof window or doors; 17. installation of microgeneration or renewable source generation of electricity, heat or cooling; 18. cavity wall installation. Schedule 4 includes 1(g)

comprehensive or (particularly piecemeal) building retrofit can be completed without any exterior regulatory oversight.

Part 8 of the Green Deal Framework Regulations contain additional assessment and enforcement criteria. Sanctions (or the alternative provision of an enforcement undertaking[501]) are permitted in relation to a narrow range of infractions, relating to the obtaining of relevant consents and permissions;[502] for breach of the disclosure and acknowledgement provisions;[503] or for failure to comply with the Green Deal code of practice.[504] Most of these requirements, however, regulate the credit control arrangements of the Green Deal, and do not provide any additional qualitative assessment of the works than those already offered under the existing regulations.

The second layer of regulatory control is the process of energy assessment and certification. While these are distinct processes using different methodologies, they are not entirely independent. Information from the building control compliance process is fed into the SAP calculation. I explained earlier in the thesis that at key stages [505] dwellings are subjected to

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mechanical ventilation; 1(h) external doors; 1(i) fixed internal lighting; 1(l) hot water storage and 1(m) roof or loft insulation; 3A timber floor insulation.

501 Regs 54 and 82 – 85.

502 Regs 52(2)(a) GDFR and Reg 1 consent provision.

503 These provisions require the GD works and debt to be disclosed, then acknowledged, in specific terms on the transfer of title or tenancy of the GD property – ss 12 and 14 of the Energy Act 2011, the Green Deal (Disclosure) Regulations 2012 and the Green Deal (Acknowledgement) Regulations 2012 and Chapter 2 to Part 7 of the GDFR.

504 Called the 'relevant requirements', reg 52(2)(c) GDFR permits a penalty when a green deal certification body fails to keep information up to date or comply with its code of practice (reg 19); if a green deal assessor or installer fail to comply with their code of practice (regs 22, 23); if a green deal provider fails to comply with its code of practice or fails properly to set the GD plans or installments due under it (regs 24 – 26) or if anyone fails to provide information concerning compliance with the regulations to the Secretary of State (reg 86).

505 Notably either on construction or when specified work which could affect energy performance is undertaken – reg 29(1) BR, and from the EPBR: to provide EPCs on sale or rent (reg 6), on marketing (reg 7), to display energy certificates (reg 14 – this does not apply to domestic buildings), after inspecting an air conditioning system (reg 18), on providing or exchange records of EPCs (regs 20, 21), to produce an EPC or related documents when asked (reg 35).

a standardised assessment procedure,[506] then certified by accredited 'energy assessors'[507] with an Energy Performance Certificate (EPC). EPC's are mandatory and the authorised officer of an enforcement authority [508] 'may' issue a penalty charge notice in the event that an EPC is not produced when required, and displayed.[509] In their current incarnation these measures are predominantly intended to provide information about the building's energy use and potential for improvement in that regard: these are intended to raise consumer awareness, and to play a role in contributing to energy performance by improving transparency and accountability in the industry.[510] However, I explained earlier that there does seem to be potential for new regulation to create financial penalties or rewards based on the EPC status. This is problematic because of what we know the low accuracy rate in EPCs, which might be expected due to the lack of integrity in the issuing process, but in any event is borne out by empirical studies confirming that compliance rates between SAP scores and actual buildings are low. The scheme has, however, not achieved its potential due to errors and uncertainties in the assessment process, and an absence of regulatory consequences for that. Commentators report that the EPC scheme is 'poorly enforced'[511] and unpopular with consumers and industry players.[512] A lack of clear distinction between assessment criteria,[513] and extensive and quite significant inaccuracies in EPC ratings [514] undermine its value.[515]

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[506] Reg 24 of the BR requires an approved methodology of calculation and expression of building energy performance – see Kelly, Crawford-Brown and Pollitt (n 379) 6683 – 8.
[507] Reg 30(1) and (3).
[508] Defined in reg 34(1).
[509] Reg 36(1) EPBR.
[510] R Cohen and B Bordass, 'Mandating Transparency about Building Energy Performance in Use' (2015) 43 *Building Research & Information* 534. This article is a discussion of the failure of display energy certificate scheme for commercial buildings, but can be generalised to include all informational measures in this context.
[511] Boardman, University of Oxford and ECI (n 97)18.
[512] Kelly, Crawford-Brown and Pollitt (n 379) 6872.
[513] Kelly, Crawford-Brown and Pollitt (n 379) 6876.
[514] Pan and Garmston (n 207); JL LaSalle and Better Buildings Partnership (n 398).
[515] Energy Efficiency Deployment Office, DECC (n 404) notes at 20: 'Financing of energy efficiency projects can be undermined by the absence of standardised monitoring and verification processes which means that the benefits of energy efficiency investments are not trusted.'

However, while there is a requirement that energy assessments be carried out with 'care and skill', there is no specific regulatory penalty for issuing an incorrect or inaccurate EPC.[516]

i. Problems

Arguably this presents a robust system of building control, which monitors development through the life of a project, recording compliance, backed up by adequate mechanisms for enforcement in the event that energy efficiency is not achieved. As explained, absolutely no derogation from the energy efficiency standards is permitted under the formal regulations. Yet although the letter of regulation seems sensible, the prevalence of performance gap (and overheating) problems indicates that it has not been effective in ensuring standards. Recent and compelling literature suggests that true compliance can only be shown in roughly 30% of cases.[517]

To some extent, this is indicative of a problem with building control generally. I explained above that building control is routinely privatised and that the party performing building control functions will routinely function in terms of an agreement with the design/build team.[518] As always, it can make sense having highly qualified and specialised private parties exercising these functions.[519] However, despite this there is still evidence that building control approves buildings without sufficient

[516] Reg 32(1) BR creates a duty to carry out energy assessments with 'reasonable care and skill' which duty extends to the owner, tenants and subsequent purchasers. This is not a duty directly actionable in tort (reg 32(3)).
[517] Pan and Garmston (n 207); Garmston and Pan (n 400). I would argue that this figure might be even lower. The true compliance figure used by the authors are based on the 'as built' SAP assessment, however as I explain in Chapter Two Section b)ii, is it possible to produce an as-built SAP with little or minimal physical testing of the building.
[518] Phillip Britton, 'THE STATE, THE BUILDING CODE AND THE COURTS: PREVENTION OR CURE?' (Society of Construction Law New Zealand, 1 May 2012).
[519] See e.g. Carolyn Abbot, 'Bridging the Gap – Non-State Actors and the Challenges of Regulating New Technology' (2012) 39 Journal of Law and Society 329. 330

evidence of compliance, often through mistaken assumptions about the significance of SAP ratings.[520] However competition for instruction (or re-instruction) combined with close relationships (and interchanges) between inspectors and industry, creates high potential for creative compliance and capture.[521] Privatising building control appears to have discouraged strong enforcement action being taken in relation to all but the most serious infractions, due to the competitive nature of a privatised industry.[522] The solution to difficulties and uncertainties in achieving good energy performance, combined with ever more stringent regulation, appears to be a tacitly acknowledged culture of 'creative compliance' where the compliance tools are operated to achieve a specific result.[523]

The empirical literature posits that a generalised trivialisation of energy efficiency goals and measures might undermine compliance and enforcement strategy.[524] As I explain earlier in the thesis, this is consistent with the colloquial message I have received about the lack of importance (or on some occasions, outright contempt) attributed to energy efficiency in some sectors of the industry. What is clear, is that although there is an appearance of adequate regulatory control of the quality and effectiveness of building energy efficiency, the practice does not live up to the letter. This is not a question of a failure to enforce the relevant regulations, but rather of this not being required, due to compliance having been achieved by creative means.

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520 Pan and Garmston (n 207).
521 See generally Morgan and Yeung (n 275) 54 – 56.
522 R Imrie 'The Role of the Building Regulations in Achieving Housing Quality' (2004) 31 *Environment and Planning B: Planning and Design* 419. Also van der Heijden and de Jong (n 275).
523 Chapter Three see text around and n 385.
524 Pan and Garmston (n 207); Boardman, University of Oxford and ECI (n 97) especially Chapters 1 and 2.

There are several conceivable reasons why construction professionals (or persons in general) might view the achievement of energy efficiency as a trivial issue, of course not all of them well founded.[525] It might be, however, that reasons why enforcement of energy efficiency standards is done so poorly, are distinct or additional issues. It can be instructive to think about the immediate implications of poor energy efficiency (or indeed, thermal discomfort); such observations to some extent mirror my later observations about the 'invisibility' of carbon emissions or other climate change issues in private litigation.

Viewed in the context of a broad regulatory context, the UK approach is largely risk-based approach in terms of which enforcement approach is driven by the perceived risk presented by the behaviour of the regulated party.[526] This approach is an effective method of environmental regulation because it prioritises potential dangers and maximises the cost effectiveness of measures taken.[527] However, because of its tendency to focus on sites of risk, one of the criticisms of this regulatory approach has been its slowness to come to terms with 'systemic and cumulating'[528] risks. Of course, building control sits uncomfortably with some of the kinds of environmental regulation discussed by Gunningham,[529] and there is no evidence that local authorities have adopted an express risk-based enforcement policy in relation to the building regulations.[530] However, as Black points out, even before formal approaches based around risk were adopted, regulators would have had to prioritise certain areas for inspection and enforcement activities,[531] or indeed make tactical choices as to how

[525] See Introduction text to n 108.
[526] Black (n 275).
[527] N Gunningham, 'Enforcing Environmental Regulation' (2011) 23 *JEL* 169.
[528] Baldwin, Cave and Lodge (n 322) 283.
[529] Gunningham, 'Enforcing Environmental Regulation' (n 527).
[530] Indeed, they would not have discretion to do so – see text between n 482 – 482.
[531] Black (n 275) 542.

they would enforce regulation. Of course, the issue at hand is not that of a choice not to take enforcement action in relation to low-risk breaches, but rather collective assent to construct compliance where necessary, in order that enforcement action never becomes necessary. It is inconceivable to imagine liberties being taken with mandatory minimum standards for fire safety or structural issues – certainly not at scale – because of course the implications of non-compliance, the *risk* of something going wrong, is high and consequence severe. As I highlighted earlier in the thesis,[532] both energy underperformance and a marginal excess of carbon emissions present no real or immediate risk or danger; indeed, they are imperceptible.[533] In addition to the slightly more collusive approaches taken above, this could go some way towards explaining regulatory shortcomings in energy efficiency quality control and enforcement. If the consequences of non-compliance are reflected in (perhaps relatively insignificant) financial loss for consumers, then it is fairly plain why compliance with energy efficiency standards might be seen as less important in the greater scheme of things. Indeed, the knowledge that this compliance approach is routinely followed with impunity could only contribute to an existing perception of that energy efficiency is trivial.

d) Contracts

It is not possible to make the same generalised comments about contractual remedies because of the infinite range of potential agreements between the parties. It is far from accurate to say that contract or remedies under contract play no role. However, there are limited instances in which

[532] See e.g. Chapter One text below n 15.
[533] Of course, thermal discomfort does have consequences, and severe ones at extremes. As explored above and in Chapter Three Section b)iii, the assessment and compliance processes that determine overheating risk are subjected to the same 'gaming' approach that typifies the use of SAP for energy performance measurements.

parties to a dispute would actually be parties to a contract, and partly because of the way in which any such contracts are framed.

The vast majority of construction work in England is conducted without any formal written contract, [534] and agreement concerning energy performance is probably a casualty of this approach in many instances. This tendency towards informality appears to have been replicated in retrofit works,[535] and of course, in the absence of clearly expressed and recorded contractual terms, it would be very difficult to establish what the terms of any agreement were, particularly in relation to the subtleties of energy performance.

It is also conceivable that the construction or renovation works might be completed under a contract, but where it is not possible to bring an action under or seek to enforce any interests under that contract. This could occur due to limitation, or because the parties suffering loss are not in privity with (some or all) defendants. As I explained previously, the nature of energy performance problems (difficult to detect yet present from the outset, and in a durable building) means that the six-year contractual limitation period could have expired by the time they come to notice.[536] Also, any contractual warranties would not protect successors in title, who due to the above reasons might be the first parties to notice or take issue with the performance problems.[537] In addition, tenants would not be able

534 Bailey (n 450) 71: '… the practice of entering into written contracts is by no means widespread, especially for smaller building works…' at ftn 194.
535 Personal notes from public lecture by Russell Smith, Parity Projects "Is the Green Deal a Red Herring" UCL Energy Institute 3 April 2012.
536 S 5 Limitation Act 1980 – although this could turn on the characterisation of the defects as discussed Section b)ii above. A prudent claimant would certainly plead a claim in tort.
537 In addition, of course, the problems might only become apparent in a changing climate – I explore this possibility in relation to projected overheating in parts of the country not normally associated with high temperatures, in Chapter Two text between n 270 – 273. Tort is a more obvious place for personal injury/death actions.

to pursue a claim in contract, even if the landlord could.[538]

In instances where the party suffering the loss had entered into a contract with the defendant, and contractual claims were still viable, the scope of the contractual warranties might not cover energy performance. It is commonplace for construction/design team expressly to refuse warranty or exclude liability for energy performance, even where the project at hand includes energy efficiency improvements (indeed, with respect to new build properties it is difficult to see how these would not include energy efficiency requirements).

Since tortious duties are restricted, parties to construction agreements have tended to regulate their own agreements with a series of warranties or 'deeds of duty'.[539] Compliance with the Building Regulations is probably at least implied in most construction contracts.[540] There is, however, a trend emerging of restricting warranties [541] for energy performance, even where outcomes are specified.[542] Where such warranties exist in relation to retrofit/renovation work, they are generally confined to guarantee the

[538] There might be an action against the landlord under a tenancy agreement however based on the EPC – this is outside the range of discussion.
[539] Deakin, Johnston and Markesinis (n 465) 23.
[540] Uff (n 441) – however in *Jewson v Kelly* [2003] CILL 2042 the defendant was not liable contractually for installing boilers that fell short of the energy efficiency requirements in the relevant building regulations. Bailey (n 450) finds no case law asserting that there is any implied contractual duty to comply with the BR, although parties can make this an express term of any contract – 1222.
[541] L Patterson and F Rossitter 'Is there any bite to BREEAM?' *RIBAonline* 31 May 2012. The suggestion is that larger construction companies will only guarantee energy performance in circumstances where they are engaged in long term energy performance monitoring. As I mention above in Chapter One n 108 and text thereto, issues around guarantees/warranties in energy performance contracting was one area where I found a significant gap between what was confirmed to me colloquially and what I found in the literature (with some weak exceptions, see the following note).
[542] The construction industry in general is adverse to performance based contracting: see e.g. S Gruneberg, W Hughes and D Ancell, 'Risk under Performance-based Contracting in the UK Construction Sector' (2007) 25 *Construction Management and Economics* 691; E Mills and others, 'From Volatility to Value: Analysing and Managing Financial and Performance Risk in Energy Savings Projects' (2006) 34 *Energy Policy* 188. As discussed above GD 'contracts' only guarantees savings for the first year after the renovation – see Chapter Three text to n 410 - 426.

structural integrity of the works, not any performance outcome.[543]

What this shows, is that even in the very narrow set of circumstances where a party suffering loss did have a contractual relationship with the construction/design team, the potential for a viable contractual claim for energy performance problems is severely circumscribed. In the apparently unlikely event that the parties had entered into a contract that guaranteed a level of energy performance, it is not axiomatic that not achieving these outcomes could be found to constitute a breach. As I explained above, this depends on how significant the defects giving rise to energy performance problems are in the context of the construction project as a whole. If energy performance was the only unsatisfactory aspect in an otherwise successful project, the defendant will probably have made substantial performance.[544] A failure to deliver on energy performance 'promises' is more likely to constitute a breach of contract in relation to retrofit projects, but smaller projects are more likely to suffer from contractual uncertainty as discussed above, and in relation to large ECO-funded retrofits,[545] the party suffering the loss would not be in privity.

Later in the thesis [546] I shall explore more fully the implications of permissible remedies in negligence for addressing climate change issues. Of key importance is the fact that even a successful action will not result in the defects being repaired, but usually in financial compensation for the claimant. A successful claimant in contract may be limited to recovery in

[543] Personal notes from public lecture by Tim Forman, Cardiff University "Solid wall and hard-to-treat cavity wall insulation in existing UK dwellings: Drivers and hindrances of consistent quality in installation and delivery" UCL Energy Institute 6 November 2013
[544] E.g. *Bolton v Mahedeva* [1972] 2 All ER 1322
[545] Energy Company Obligation (ECO) funding for energy retrofit discussed in Chapter Three text to n 427 - 431.
[546] Chapter Six Section f).

damages for financial or amenity losses,[547] as there is very restricted scope for an order of specific performance.[548]

e) Insurance

Finally, the arrangements above will all take place in the broader context of insurance, and understandings about insurance.[549] It is difficult to imagine the parties engaging in the multiple contractual cross-arrangements detailed above - including the agreements implicit in these arrangements but into which I do not delve, such as contractor or employment agreements – in the absence of insurance cover. Each party to a construction contract or transfer is likely to seek cover for various contingencies; while again this will vary with circumstance, it is sensible to conceptualise contracts as working synergistically with insurance to establish the accepted allocation of risk in relation to each particular transaction.[550] Indeed, the claimant's capacity to insure against his own losses caused by defective buildings, does emerge in the tort literature fairly frequently.[551]

The capacity for parties to assume responsibility for, or insure against their

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547 Particularly where the claimant did not intend to seek rectification of the works, as in *Ruxley v Forsyth* (n 451).

548 Bailey (n 450) 674 – 677 explains the general rule that English courts will not make an order of specific performance in contracts for services, as such, construction contracts. While not a matter of specific performance, but certainly of rectification, most construction projects undergo a 'snagging' process towards the end, during which period any defects or problems that have come to light are normally resolved – the potential for this to be effective when energy performance (or overheating) problems are masked by the regulatory issues outlined above, are of course quite limited.

549 R Merkin and J Steele, 'Introduction: Insurance in the Law of Obligations', *Insurance and the Law of Obligations* (OUP 2013).

550 R Merkin and J Steele, 'Allocation of Risk in Voluntary Arrangements', *Insurance and the Law of Obligations* (OUP 2013). This volume makes considerable advances in terms of general understanding of the role of insurance in the liability process. While interesting and informative, the complexity this portrays in the interplay between insurance and the law of obligations goes beyond the subsidiary role insurance plays in this thesis. My somewhat simplistic use of this deep, detailed and innovative account should not be interpreted as an attempt to do violence to it.

551 For example, RL Abel, 'Should Tort Law Protect Property against Accidental Loss' (1986) 23 *San Diego Law Review* 79. 117; contrasted with R Cooke, 'An Impossible Distinction' [1991] *LQR* 46.

own losses, underpins understanding about the allocation of risk in contracting. Construction contracts for domestic buildings must therefore be understood as operating in the context of broad general home warranty insurance. Exclusions of liability or absence of warranty must be understood in the same context. As Merkin and Steele explain, exclusions of liability in contracting are a common way to allocate loss in the event of a breach. Such exclusions are often accompanied with insuring obligations, and hence absence of effective insurance would expressly or implicitly allocate responsibility for the risk of breach to the claimant. Of course, it might not be clear to what extent those risks and the implications of the claimant's assumption of them, is made clear.[552]

Building work in England is insurable under the BUILD (Building Users Insurance against Latent Defects) Scheme, or similar warranty arrangements. This provides assignable warranties of insurance to cover "damage" incurred as a consequence of building defects, which usually run for ten years from the date of construction.[553] The major limitation on these policies is that cover is usually limited to major elements such as the structure and fireproofing.[554]

Generally, minor functional defects would not be covered, and as I explained above, this is in all likelihood how the defects that give rise to energy performance problems (or unintended consequences falling short of damage) would be characterised. Thus the overall picture is of contractual arrangements, which provide limited warranties or outright exclusion of liability for poor energy performance; in the same context the available

[552] Merkin and Steele (n 549) 189 and generally.
[553] Up to 80% of cover is provided by the National House Building Council: http://www.nhbc.co.uk/Warrantiesandcover/.
[554] Uff (n 441) 244, also the Buildmark Warranty: http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Homewarranties/Buildmark/BuildmarkPolicyDocuments/filedownload,55572,en.pdf (accessed 22 May 2015).

insurance cover in all probability does not extend to the (financial) losses incurred as a consequence. Particularly in the case of retrofit, it is not clear whether a claimant would freely accept such an allocation of risk, were it communicated expressly. Indeed, it seems implausible that a claimant would freely agree to bear the risk of failure of retrofit works, but this might agree to accept energy performance shortcomings as one of many issues in a construction project. This, and the foregoing, illustrates again how the shortcomings of more obvious routes of compensation make the role of tort more appealing and likely.

f) Conclusion

The main purpose of this chapter was to create a bridge from the discussion of the context and content of the case study problems, to the detailed analysis and discussion of the potential and limitations of tort, in its second half. It did so in two ways.

The first part of this chapter provided necessary clarification as to precisely what the details of any litigation about these problems would be – defining parties, making clear what loss is in contemplation and how this is calculated, and establishing the nature of a defect. The second part was devoted to a discussion and explanation of the limits of the more obvious solutions to (particularly) energy performance problems. The chapter aimed to explain these limits, and make some tentative suggestions as to why they exist. What emerges more or less in each instance, is that the enforcement or compensation potential for energy efficiency problems (or problems caused by energy efficiency) are severely constrained; I have also alluded to the fact that the ephemeral or (perceived as) trivial nature of wasted energy could well underlie the approach taken. The absence of

remedies under the above, and the fact that construction problems persist in the built stock, are factors that motivate for tort to play a role in this context.

FIVE: STRUCTURE AND FUNCTIONS OF TORT

a) Introduction

The thesis explores the limits and potential of tort, to address problems arising from measures taken to improve domestic energy performance. It specifically examines shortcomings in energy performance and the manifestation of one unintended consequence of energy efficiency, overheating. It seeks to analyse both how tort remedies can meet the challenges of these problems, but also what this application reveals about the common law per se, and the common law in a climate change context. The first part of the thesis explores the studied problems from a practical and regulatory perspective, highlighting the shortcomings of more obvious remedies that make tort an important contributor. This is the first chapter in the second part, which explores the limits and potential of tort to address these problems. As I explain below, in undertaking these doctrinal enquiries I am not purporting to predict outcomes;[555] rather my aim is to explore compatibility and mismatches between tort remedies and the demands of climate change problems. Of course, to properly understand tort's limits and potential in a specific context,[556] it is necessary to examine what might be expected from tort more generally. This is the aim of this chapter.

The literature exploring the characteristics of tort (or private law more generally) is vast; much of the debate is as fervent as apparently irresolvable. The field is currently dominated by reiterations of and disputes concerning unitary explanatory theories of private law. The currently prevailing unitary theories of tort can be classified into law and

[555] Many tort decisions 'turn on the facts' and it is not really my project to construct fictional tort claims – see Chapter One text above n 107.
[556] Both the context of the specific problems, and the broader context of climate change mitigation.

economics' deterrence theory, theories based on versions of corrective justice and their descendants, and contemporary rights theorists.[557] All three purport to strong normative underpinnings.[558] In contrast, the discussion in this chapter and the rest of the thesis reflects a 'pluralistic' understanding of the structure and the implicit and explicit functions of tort.[559] In order for this to be a meaningful endeavour, I have had to examine the leading explanatory theories of tort, as an appreciation of the substance of this debate helps to illustrate tort's strongly pluralistic nature. So, while I do not adopt any unitary theory, I consider them all to be helpful and instructive, each with their chief limitation in their purported universal application. Different theories emphasise different aspects of tort or private law structure and functions that are interesting or relevant; throughout the chapter I draw on these to illustrate the theoretical richness that supports a structural understanding of negligence actions. It is not intended to do any violence to the theories; I consider most tort theory to be instructive and helpful, in the most part failing only due to the extent of its ambition.

Perhaps unsurprisingly, most theorists have as their starting point the conception of tort as a mechanism of or for corrective justice, the pair of the Aristotelian mean of justice governing transactional equality.[560] A succinct definition is that "… corrective justice … concerns making good

[557] See B Zipursky, 'Civil Recourse, Not Corrective Justice' (2002) *91 Geo. LJ* 695.
[558] S Hedley, 'Is Private Law Meaningless?' (2011) 64 *CLP* 89 classifies the morally driven theorists together, but also notes other projects exist e.g. taxonomists.
[559] On multi-pluralism generally see e.g. B Shmueli, 'Legal Pluralism in Tort Law Theory: Balancing Instrumental Theories and Corrective Justice' (2014) 48 *University of Michigan Journal of Law Reform* 745.
[560] A Beever, *Rediscovering the Law of Negligence* (Hart Publishing 2007); J Coleman, 'The Practice of Corrective Justice' in DG Owen (ed), *The Philosophical Foundations of Tort Law* (Oxford University Press 1997; EJ Weinrib, 'Corrective Justice', *The Idea of Private Law* (OUP 2013). Weirib depends quite heavily on Kant, to fill out Aristotle's empty version of equality. For Aristotle, corrective justice lies as an intermediate point between gain and loss; it consists in having an equal amount before or after the transaction: Aristotle, *The Nicomachean Ethics* (Lesley Brown ed, David Ross tr, Revised, OUP 2009) Book V. The subtraction of an unjust gain off a party to make up for the loss of another, is corrective justice: V.2.1130b30 – 1131a1.

certain alterations to the distribution of wealth or benefits in society." [561] Corrective justice is conceptually so available to us, that it is often referred to without any examination of its true content; [562] and in reality its true content is fairly empty. I should emphasise that apart from its instructive value, I prefer to avoid too much reference to principles of corrective and distributive justice. These concepts are woven throughout the literature, with particularly theorists such as Weinrib asserting that the concept of corrective justice explains all the functions of tort.[563] Aristotle's 'golden means' of virtuous life were devised at a high level of abstraction, and probably never intended to have an instrumental or administrative effect. [564] The emptiness of the conceptions of equality, and of loss and gain, probably make it attractive as an explanatory account because the explainer can flesh out those categories to suit her own normative choice; so Weinrib 'pads out' the Aristotelian notion of equality with a Kantian conception. [565] Posner insists that law and economics is consistent with principles of corrective justice,[566] an assertion which would not garner support from other tort scholars. While it is impossible to avoid these concepts due to their entrenchment in the literature, I prefer to discuss tort in simple language: speaking of compensation, the parties' interests, and who bears his own loss. Tort is meant to deal with everyday problems, and I think it is helpful in as much as is possible, to work with everyday concepts and

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561 P Cane, *The Anatomy of Tort Law* (Hart Publishing 1997) 17.

562 R Lee, 'From the Individual to the Environmental: Tort Law in Turbulence' in John Lowry and Rod Edmunds (eds), *Environmental protection and the common law* (Hart 2000) 90 calls upon courts to dispense 'corrective justice' in tort.

563 Aristotle (n 560) Book IV.

564 See P Benson, 'The Basis of Corrective Justice and Its Relation to Distributive Justice' (1991) 77 *Iowa Law Review* 515 – he explains that the Nicomachean Ethics were intended to be a guide to living a virtuous life. Most of the virtues – or 'golden means' of moderation described, focus on personal qualities. Justice is the only virtue that looks 'outside' the individual.

565 Z Sinel, 'Understanding Private Law's Remedies' (A thesis submitted for the degree of Doctor of Juridical Science, University of Toronto 2013) <https://tspace.library.utoronto.ca/handle/1807/35999> last accessed 26 May 2016, argues that Weinrib relies so heavily on Kant and Hegel to provide the content and structure of corrective justice, that his resulting understanding of remedial action no longer requires corrective justice, see e.g. 160.

566 RA Posner, 'The Concept of Corrective Justice in Recent Theories of Tort Law' (1981) 10 *Journal of Legal Studies* 187 - this seems preposterous but his case is well argued.

language.

I have also examined a wealth of literature exploring the limits and potential of private law, and specifically tort, as a tool of environmental protection. For a long period of our legal history, tort was environmental law. [567] The question of tort's efficacy in an environmental context has been subject to fairly extensive criticism, and its role is increasingly marginalised in a broad law and policy area increasingly dominated by a complex framework of regulation. [568] However the relevance of tort as an instrument of environmental protection, continues. [569] Over the last decade or so, this has expanded to encompass a discussion of the limits and potential of tort and other remedies to compensate victims for the harms of climate change. In the introduction to this thesis, I discussed how the particularly complex – 'superwicked' – nature of the climate change problem, combined with the need for a coherent mitigation response across scales, means that the potential for and effect of litigation takes on a greater significance.[570] Here, I focus more on the theoretical detail of environmental or climate change problems, highlighting the compatibilities and mismatches between my pluralistic working model of tort, and environmental problems. This creates space to examine the extent to which it supports or undermines decarbonisation or climate change mitigation priorities.

Of course, none of the legal explorations contained in this thesis precisely mirror a 'classic' environmental protection tort claim: a dispute between an

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[567] K Stanton and C Willmore, 'Tort and Environmental Pluralism' in J Lowry and R Edmunds (eds), *Environmental protection and the common law* (Hart 2000) 93. Also see e.g. J Wightman, 'Nuisance. The Environmental Tort? Hunter v Canary Wharf in the House of Lords' (1998) 61 *MLR* 870.
[568] R Macrory, 'The Scope of Environmental Law' in R Macrory (ed), *Regulation, Enforcement and Governance in Environmental Law* (Hart Publishing 2009).
[569] Fisher, Lange and Scotford (n 275) characterise the role of private law in environmental protection as 'marginal but important', at 92.
[570] Chapter One Section c)

aggrieved claimant and a defendant polluter, with the claimant seeking damages (and/or an injunction), usually in nuisance.[571] My focus here is to consider how tort operates within an environmental or climate change context, or, in protecting environmental interests, not as an instrument of environmental protection per se.[572] I will do this by examining how environmental concerns fit within the characteristics of tort I have identified above, and the extent to which tort is capable of encompassing 'climate consciousness' within its application. Similarly, there are topical criticisms rehearsed in the literature that are not discussed in any depth here because they are particular to the 'classic' environmental problems; the elements of tort's environmental functioning that are discussed are those which are required to understand the subject matter of the thesis. [573]

I will draw on these ideas when considering the substantive operation of the law in the remainder of the thesis. So, in Chapter Six, when I examine how the current formulation of a duty of care in negligence could determine (non)liability for poor energy performance, my explanatory analysis will not be restricted to the claimant's protected interests, but will include the exclusion of 'the environment' both from the range of protected interests and the claimant/defendant relationship of mutuality. I will contrast this situation with that of the compensable claimant in Chapter Seven, who suffers an affect on his protected interests. I will argue that these outcomes as not random or the outcome of judicial 'policy'

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571 As above, the prevalence of nuisance in environmental protection dictates that much of the scholarship surrounds the operation of the law of nuisance, which is relevant in terms of its illustrative potential but of course not for the analysis in this thesis, which is constructed around the common law of negligence. The material is treated accordingly. As such, if the treatment of nuisance seems thin, this is because it is treated as a 'generic' tort, rather than itself, for the purposes of this thesis.

572 e.g. ADK Abelkop, 'Tort Law as an Environmental Policy Instrument' (2013) 92 *Oregon Law Review*.

573 For instance, S Bell, D McGillivray and OW Pedersen, *Environmental Law* (OUP 2013) 371 – 385 contrasted with D Howarth, 'Muddying the Waters: Tort Law and the Environment from an English Perspective' (2001) 41 *Washburn Law Journal* 469.

measures, but reflective of the deeper structure of tort, but that in both cases, often more subtle interests relevant to climate change issues, are left out.

The chapter is in two main parts: the first focuses on the underlying structure of an action in tort, or more specifically negligence, and the second on tort's functions, more specifically tort's instrumental roles. In the first, relying heavily on Cane's 'anatomy' of tort, I argue that there is great explanatory force in analysing tort (or negligence) actions as based on variably protected interests and the nature of the correlative relationship between the parties. In so doing, I draw on the illuminating features of extant tort theories, so for instance, I examine writings on distributive justice, and rights theory, when exploring protected interests. I conclude the first section of the chapter by rehearsing the well-established scholarly insights concerning the limited compatibility of tort with environmental problems, bringing this within the language of protected interests and correlativity.[574]

Of course, an appreciation of tort's foundational and structural components are fundamental for a full understanding of the subject area. However, tort does not exist in a vacuum, and so a working understanding of tort must include an appreciation of how tort interacts with society and other strands of law. The second part of the chapter focuses on tort's instrumental role. I identify compensation as tort's primary function, also discussing the nuanced ways in which tort can impact on the distribution of loss and risk. I also examine tort's so-called deterrence function, a function apparently more nuanced and less peremptory than its title would suggest,

[574] Environmental litigation must encompass climate change. C Hilson, 'Let's Get Physical: Civil Liability and the Perception of Risk' (2009) 21 *JEL* 33 asserts that this can include litigation that is climate blind, where neither judge nor representatives consider or argue this as an issue. Also see H Woolf, 'Are the Judiciary Environmentally Miopic?' (1992) 4 *JEL* 1.

noting the particular power imparted on claimants when tort is used in this regulatory way. As above, in my pluralistic discussion, I draw on some of the illuminating aspects of one-pointed unitary theories. In addition, throughout, mindful of the protected interests and the priorities of the research, the second part considers some of the shortcomings or constraints that typify tort's operation as an instrument of environmental protection in general, and in relation to climate change in particular. I consider the instrumental role of tort within this context, with a particular focus on tort's deterrent effect, and its implications. Finally, I tentatively conclude that, contrary to its reputation as a broad and flexible remedy, the scope and operation of negligence is narrow and specific. I argue that paying insufficient attention to such issues in delicate policy areas is problematic, because negligence could undermine policy initiatives or regulation across scales.

b) Structure of tort

A vigorous debate seeks to define the theoretical boundaries and content of tort law. One of the sites of debate concerns the relative validity of internally or externally focused approaches. A pluralistic perspective seeks to make sense of both. Closed accounts of tort can no longer account for the complexity of the law - if they ever could – given the obvious visibility of tort in public life. [575] Another recurring (and in my view particularly cogent) criticism concerns the grand theorists' obsession with the unitary nature of their own account. Stapleton for instance questions the value of an account that encounters strain in seeking to explain an entire body of law within one or two concepts. [576] It is more fruitful to seek some

[575] Hedley (n 558). EJ Weinrib, 'Understanding Private Law', *The Idea of Private Law* (OUP 2013) at 20 insists that his closed theory can take account of the phenomenon of motor vehicle accident law.
[576] 'Evaluating Goldberg and Zipursky's Civil Recourse Theory' (2006) *Fordham Law Review* 1529 1537, S Hedley, 'Looking Outward or Looking Inward? Obligations Scholarship in the Early 21st

working understanding of tort's components, that can help us understand tort some or most of the time, than to construct an additional layer of analysis that strains to fit the doctrine. As I explain above, I do not intend to join or even provide an exposition of the debate.[577] Instead, I draw on aspects of this rich discussion to inform and explain their compatibility with elements of my pluralistic working model. It seems to me that all the theories accurately reflect aspects or elements of tort law, and that the selection of or focus on those aspects is largely informed by the proponents' ideological background or instrumental priorities.[578] In that sense, I would not dream to suggest that any of these were 'wrong', but that each is more or less helpful in relation to different kinds of tort problem.

My working conception of tort centres on a key idea: most of tort is underpinned by the interplay between the protected interests underlying each tort and the correlative relationship between the parties. It is essentially a structural aid, which relies heavily on Cane's account of tort's 'anatomy'; an organising structure underpinned entirely by the notion of protected interests, protected variably by a set of rules and principles, and supported by sanctions.[579] This is *not* to argue that tort could be entirely explained by the structural model,[580] and indeed this account retains the substance of the doctrinal rules and principles constructed (primarily) through caselaw. This account approaches tort from the perspectives of tendencies of application [581] or basic characteristics, and can provide some

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Century' in A Robertson and HW Tang (eds), *The Goals of Private Law* (Hart Publishing 2009) 211. Or, as in the case of the recent revival of Aristotelian concepts of justice, to adopt fairly neutral concepts and use these as a basis for an ideation of justice never contemplated in the Ethics.

577 Interestingly, few or no accounts do. Most advance either another iteration of the existing theory or offer critiques or comparisons.

578 See e.g. J Stapleton, 'Tort, Insurance and Ideology' (1995) 58 *MLR* 820; D Priel, 'Torts, Rights, and Right-Wing Ideology' (2011) 19 *Torts Law Journal* 1.

579 Cane (n 561) 22

580 P Cane, 'Corrective Justice and Correlativity in Private Law' (1996) 16 *OJLS* 471.

581 Cane does not say this; this is my interpretation

useful insights into doctrinal anomalies [582] or the limits of future actions. Because the demands of climate change (and climate scholarship) push the boundaries, or disrupt,[583] existing legal forms, identifying what underlies these can be valuable.

I shall now go on to draw this structural account of tort in more detail. In so doing I shall explain in relation to the two elements – protected interests and correlativity – what the meaning of these concepts might be. In relation to each I shall seek to illustrate how these might be understood, highlighting the strength of this model in comparison to other dominant theories.

i. Protected interests

In his account of tort's anatomy Cane identifies a hierarchy [584] of interests afforded protection by tort, outlined as personal (physical and dignitary) interests, property and contractual interests, then loosely defined non-contractual expectancies and wealth.[585] Notably 'interests' are not unitary in character and do not necessarily refer to legal entities or rights or equate to the same. Cane explains that claimant's interests might include resources, assets, claims or rights to something [586] - elsewhere, acknowledging the elusive nature of these 'interests' he describes them as 'entitlements'. [587] Countervailing factors in the public and private interest span immunities, defences and other entitlements – similarly loosely

[582] For instance, in Chapter Six, below, I seek to explain how the concept of correlativity can explain the seemingly at odd decisions with respect to the recovery of pure economic loss arising from defects in domestic buildings.
[583] Personal notes of a presentation by E Fisher (with E Scotford and E Barritt) 'Climate Change and Legal Disruption' at Adjudicating the Future, a conference hosted by King's College London, 17 – 19 September 2015.
[584] P Cane, *Tort Law and Economic Interests* (2nd Revised edition, Clarendon Press 1996) 90.
[585] Cane (n 561) 67
[586] Countervailing interests include societal or public interest – ibid.
[587] P Cane, 'Rights in Private Law' in D Nolan and A Robertson (eds), *Rights and Private Law* (Hart Publishing 2011).

defined - to circumscribe another party's protected interest. I do not think that these definitional challenges undermine, but rather are a feature of, the model. It is unexceptional for obligations lawyers to refer to loosely or non-defined 'interests' as an explanatory tool both in judicial writing [588] and scholarship.[589] Cane's account depends heavily on the relationship between the parties' respective interests and one another, which I shall return to later.

A dominant strand of obligations theory asserts that tort can be explained as a system of the parties' corresponding rights and duties. On this analysis, torts are wrongs. The wrong lies in the breach of the defendant's duty and each corresponds with the claimant's underlying right.[590] A "rights model" of tort is attractive for many reasons, not least because it avoids the morass of 'policy' by attaching limitations on liability to a concrete unit of analysis. This analysis does help to make sense of tort and, importantly, is reassuring to the scholar because it insulates tort from judicial whimsy, most significantly providing some basis for 'policy' decisions. But of course, this also entails some limitations on tort's capacity to develop on 'policy' grounds too.[591] Rights theorists reject interest-based theories for lacking explanatory force, and, as Stevens says, and failing to make sufficient distinction between different kinds of infringement on an

[588] Just one example, Lord Justice Dyson in *Google v Vidal-Hall and others* [2015] EWCA Civ 311 "… there are problems with an analysis which fails to distinguish between a breach of confidentiality and an infringement of privacy rights protected by article 8, not least because the concepts of confidence and privacy are not the same and protect different interests…" para 22

[589] The point is that the notion of 'interests' is pluralistic and as such resists narrow definition. J Raz, 'On the Nature of Rights' (1984) 93 *Mind* 194; J Steele, *Tort Law: Text, Cases, and Materials* (3rd Edition, OUP 2014) 7-12 uses Cane's account to demonstrate how tort is underpinned by protected interests, while being frank about the shortcomings of this account; Deakin, Johnston and Markesinis (n 465) explain the relevance of this concept in negligence: '… The issue of *duty* … helps demarcate the range of people, relationships and interests that receive the protection of the law from the effects of negligently caused harm…" 102; M Lee, 'The Public Interest in Private Nuisance: Collectives and Communities in Tort' (2015) 74 *CLJ* 329 examines how collective or public interests appear in nuisance actions.

[590] R Stevens, *Torts and Rights* (OUP Oxford 2009) 2.

[591] Stevens (n 590) generally and Chapter 14.

interest.[592] However an understanding of tort as based on protected interests rather than rights, can present a similarly structural account without requiring an additional layer of analysis.[593] Of course, an analysis based solely around an identification and protection of the claimant's protected interests, would correctly be subject to this criticism. However, this is not a valid criticism of the interests based approach Cane develops, wherein the claimant's and countervailing interests are balanced in a correlative relationship between the parties. The distinction in kinds of infringement of an interest, then, are based in the correlative relationship between the parties, so the distinction is clear and non-arbitrary. Indeed, by the refusal to acknowledge 'loss-based' negligence liability as an element of tort [594] arguably exposes rights theorists to the same criticism. It is easier to accept that the deeper structure of tort is revealed in its protected interests, [595] combined with an understanding of the relationship between the parties.

As I mention above, one of the attractive features of both the rights and interest based accounts, is their explanation of limits on liability as inherent in tort's structure, dispensing with unpredictable and perplexing 'policy' justifications. The question that then arises, of course, is why are those interests protected and in that hierarchical order?[596]

I mentioned in the introduction to this chapter, that I think an overemphasis on Aristotelian mean of corrective and distributive justice,

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[592] Ibid 289-90.
[593] Cane (n 587).
[594] Stevens (n 590) 302 excludes negligence all together. Beever (n 560)'s rights based analysis does seek to account for negligence.
[595] e.g. Cane, *Tort Law and Economic Interests* (n 584) 10.
[596] Or as Stevens' says, why do we have the rights we do? (n 590) 329 – 340. Neo-Aristotelian accounts based on human flourishing, such as that of McBride, seek to advance alternative approaches based on values, but McBride also acknowledges the underlying role played by the parties' competing interests in his account – see e.g. NJ McBride, 'Tort Law and Human Flourishing' in E Chamberlain, J Neyers and S Pitel (eds), *Challenging Orthodoxy in Tort Law* (Hart Publishing 2013).

can be a little unhelpful, however the scant scholarship considering tort from a distributive justice perspective, can be useful when we start asking these questions. Distributive justice is more usually conceived of as an end with the allocation of real property 'pre-tort' distribution of wealth and benefits is a function of distributive justice. On this analysis, tort has little to do with the gross distribution of societal goods; even tort decisions that redistribute losses cannot make immediate or radical changes to the overall distribution of property and wealth,[597] although tort outcomes certainly contribute to the overall distribution of societal wealth.[598] There are other theoretical strands that conceptualise enforceable rights themselves as a societal good or resource; then the very existence of rights in tort can be seen as function of distributive justice. [599] Thus while the structure of tortious remedies may be interpreted in accordance with corrective justice, the rights underlying them and the very fact of their existence, is a function of distributive justice. [600] This is compatible with Cane's explanation of the 'choices' of protected interest and their relative strength in the tort hierarchy; the simple explanation that the societal choices about when the invasion of certain interests in a certain way leads to a remedy, and when it does not, are a function of societal patterns of distribution. Here, the distribution is not of wealth but of the right to a remedy in respect of the invasion of one's interests. What tort may do, however, is reinforce existing patterns of distributions, by, for example, calculating damages awards to take account of the claimant's pre-existing level of privilege. [601] So on this analysis tort's serves to preserve pre-existing social inequalities.

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[597] RL Abel, 'A Critique of Torts' (1989) 37 *UCLA Law Review* 785. – although tort can make a meaningful contribution when it comes to deciding who should bear the costs of dangerous or otherwise wrongful behaviour. I discuss this more fully below.
[598] P Cane, 'Distributive Justice and Tort Law' (2001) *New Zealand Law Review* 401.
[599] J Gardner, 'What Is Tort Law For? Part 2. The Place of Distributive Justice' in J Oberdiek (ed), *Philosophical Foundations of the Law of Torts* (OUP 2014).
[600] Beever (n 560) Chapter 2.
[601] See T Keren-Paz, *Torts, Egalitarianism, and Distributive Justice* (Ashgate Publishing, Ltd 2007) 19.

[602] From some perspectives this may be far fetched, and an appreciation of the point probably depends on an acceptance that not only are society's goods not fairly distributed, but that this state of affairs is structural.

Viewing interests and the extent of their protection as allocated social goods, illuminates how the protection of these particular interests (and in this hierarchical order) is a function of societal patterns of distribution. This structural embedment is ingrained with the choice of protected interests reflecting a very specific societal experience.[603] Later in the chapter and thesis, I argue that the embedded nature of the protection of interests restricts the potential for private law to develop due to decisions about policy that challenge existing distributive norms. This is not to say that these interests could not change and develop over time, but that this must happen as a consequence of broader social changes or developing conceptions about social goods and values. [604]

ii. Correlativity

I explained above that a justifiable criticism of interest-based theories is their failure properly to distinguish between different kinds of intrusion on an interest.[605] The account I use depends on the interplay between

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[602] RL Abel, 'Torts' in D Kairys (ed), *The Politics of Law: A Progressive Critique* (Basic Books 1998) 454 – 5; P Cane, 'Retribution, Proportionality, and Moral Luck in Tort Law' in P Cane and J Stapleton (eds), *The Law of Obligations: Essays in Celebration of John Fleming* (Clarendon Press 1998) 159 and 165. For example, Cane observes that strict liability in nuisance, can be seen to preserve property rights.

[603] M Chamallas and JB Wriggins, *The Measure of Injury: Race, Gender, and Tort Law* (NYU Press 2010) Chapter 1. Also J Conaghan and W Mansell, *The Wrongs of Tort* (2nd edn, Pluto Press 1998) 138 – 140 concerning the class and race assumptions implicit in Lord Denning's discussion of cricket in *Miller v Jackson* 1977 3 All ER 338, contrasted with the sport's happy inclusion as a value in McBride (n 596).

[604] For instance, the examples given by D Nolan, 'New Forms of Damage in Negligence' (2007) 70 *MLR* 59 do reflect a progression in the law, but this is not reflected in any progression in recognition of the claimant's protected interests, simply that these are now protected in circumstances where the correlative relationship between the parties differs from what has gone before.

[605] Steele, *Tort Law* (n 589) 7 for instance argues that the account does not differentiate between degrees of intrusion on a interest.

protected interests in the context of a relationship of correlativity between the parties, which determines the degree of protection of those interests.[606] Cane pairs correlativity with sanctioned conduct and sanctions, combined with the protected interests discussed above. This outlines what he describes as an 'ethical system of personal responsibility'.[607] As he implicitly acknowledges, his summary description of sanctioned conduct and sanctions becomes a derivative restatement of the common law; the distinctiveness of tort law lies in the nature of the interests protected.[608] But in essence what he develops in this code is a two-way connection between the parties which roughly establishes how closely interwoven the relationship between the claimant and defendant is relative to the claimant's protected (and other countervailing) interests.

The idea of correlativity or 'bipolarity' is a common feature in principled accounts of tort law, and particularly in the strongly normative 'grand theories' that seek to explain private law as "immanently intelligible … distinctive and coherent" [609] (often due to distaste at instrumental accounts, specifically law and economics scholarship).[610] What is interesting is that different accounts seem to conceptualise bipolarity slightly differently.[611] For Weinrib, the internal coherence of corrective justice explains all functions of tort including the underlying duty and the requirement to alter or make corrections. The bipolarity of the restorative function (Aristotle's reciprocity) [612] of the account of corrective justice is attractive to Weinrib for its potential to capture the correlativity of rights and obligations in

606 Cane, (n 561) Chapter 1.
607 Ibid.
608 Ibid 181.
609 Weinrib (n 560) 18.
610 Stevens (n 590) 325 holds this general assertion about the nature of private law as "counter-intuitive and implausible", but believes it to be true in relation to tort(s).
611 A good account of the broad and narrow accounts of correlativity can be found in D Nolan and A Robertson, 'Rights and Private Law' in D Nolan and A Robertson (eds), *Rights and Private Law* (Hart Publishing 2011).
612 Aristotle (n 560) Book IV.

private law. For him, the corrective justice notion of rectification exemplifies private law's solutions to transfers of loss and gain. [613] Some corrective justice accounts however cannot reconcile the defendant's underlying duty with his subsequent duty to make repair; the latter or remedial obligations is seen as separate, if continuing. [614]

For civil recourse theorists the right to take action is separate from the original relational duty. Thus while the theories proponents argue that their conception of the relationship between the parties is one of 'bipolarity', following Weinrib, the theory triangulates under strain to provide an account of how recourse should be made and in essence adds little to other corrective justice accounts. [615]

For rights theorists, the tort is the wrong and is situated in a correlation of rights and duties between two individuals; [616] but there is little space for recourse in the account. [617] One site of the proliferation of theory is the question of separation of the underlying right/duty and duty to correct. Most rights theorists prefer to separate the duty owed (based on a right)

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[613] Others would disagree. Zipursky (n 551); JCP Goldberg and BC Zipursky, *Rights and Responsibility in the Law of Torts* (D Nolan and A Robertson eds, Hart Publishing 2011) prefer a system of civil recourse that they find to elaborate on and improve aspects of private law recourse that they assert can not be accounted for by Aristotle's form. Stapleton (n 576). in her through analysis of their thesis expresses concerns about the impact both of their critique of corrective justice and the potential of their own theory. M Rustad, 'Twenty-First-Century Tort Theories: The Internalist/Externalist Debate' (2013) Research Paper 13-12 <http://papers.ssrn.com/abstract=2246494> accessed 21 April 2015.) has done likewise and also expresses concern about the practical relevance of civil recourse theory given its strongly abstract nature.

[614] J Gardner, 'What Is Tort Law for? Part 1: The Place of Corrective Justice' (2011) 30 *Law and Philosophy* 1.

[615] Goldberg and Zipursky (n 613); Stapleton, 'Evaluating Goldberg and Zipursky's Civil Recourse Theory' (n 576) 1560 – 1562 argues that it if were possible to construct a grand explanatory account of tort, then the civil recourse theorists have not done so, but at best have constructed a normative description of some aspects of tort.

[616] Stevens (n 590) 291.

[617] R Stevens 'Contracts, Virtues and Rights', a paper delivered to Philosophical Foundations of Contract Law Conference, UCL, 11 May 2013

and the second order obligation that flows from its breach. [618] Keating for example distinguishes orders of duty: duties based on rights are 'omnilateral', in that they are owed to the whole world. It is only if this duty is not fulfilled, and two parties become engaged in a tortious dispute, that second order bilateral duties arise. [619] Coleman by contrast would argue that corrective justice is a second order duty, however, rights in tort are not.[620]

While presenting endless intellectual rewards, efforts aimed at forcing rights and duties into a unitary theory will never explain all of the law. Tort liability arises in different ways and between differently connected parties, and so these bilateral relationships will never be the same. Cane's pluralistic account does not separate the enforcement or outcome of tort litigation from his conception of a tort (so he manages to avoid the rights/recourse triangle and tangles about first and second order rights, and to whom they are owed). Cane also sees 'bipolarity' in the relations between tort parties, but the correlative rights are as between the players in the tort field, the claimant/victim and defendant/tortfeaser. [621] If the relationship is between the players in the tort field then the mutuality is not confined to legal duties and obligations but can encompass any pre-tort relationships, the conduct which gives rise to the tort, as well as including recourse or sanctions.

iii. Negligence

[618] On which, see e.g. R Bagshaw, 'The Edges of Tort Law's Rights' in D Nolan and A Robertson (eds), *Rights and Private Law* (Hart Publishing 2011). Stevens also sees recourse as a second order obligation, not as part of the right/duty itself.
[619] G Keating, 'Is the Role of Tort to Repair Wrongful Losses?' in D Nolan and A Robertson (eds), *Rights and Private Law* (Hart Publishing 2011).
[620] Coleman (n 560).
[621] The distinction between Cane's conception of correlativity and Weinrib's is highlighted by J Steele, *Tort Law: Text, Cases, and Materials* (2nd edn, OUP 2010) 4.

This is not the place for a general exposition of negligence, but account needs to be taken of how it 'fits' with the above. This is necessary not only because of negligence's overwhelming dominance within tort, [622] and the unpredictability and incoherence [623] in its application and areas of limitation of liability. But also, the predominant focus of this thesis is on negligence, and my view is that the two key working tools I have identified above – that a tort must be founded on protected interests, and reflect a mutuality or correlativity of relationship between the parties – can help us make sense of tort outcomes and elements as much as any grand or more all-encompassing theory.

Negligence can be described as a broad basis of liability stemming from behaviour that is either careless in the colloquial sense, or falls below a standard of care, sometime encroaching on the terrain of other torts. [624] It encompasses a broad range of interests. These underlying protected interests inform the idea of damage - the 'gist' of actionable negligence -- typically restricted to interests in property and the safety of the human body.[625] Doctrinally, the framing of the duty of care in negligence is usually considered a policy-based 'control device' to limit the proliferation of claims. It is argued that this is in fact an element, not of principle, but in the structure of tort liability based around the interplay between the protected interests and the parties' relationship of correlativity. I do not find too much difficulty in the fact that a feature of tort is that the parties can have been strangers prior to the wrongful conduct occurring; [626] doctrinally a duty of care in negligence is owed to 'neighbours', not specific

[622] T Weir, 'The Staggering March of Negligence' in P Cane and J Stapleton (eds), *The Law of Obligations: Essays in Celebration of John Fleming* (Clarendon Press 1998). The 'march of the law of negligence' as the overwhelmingly predominant cause of action in tort claims, is laid on a foundation of mistakes, lapses of concentration or momentary errors of judgement.
[623] B Hepple, 'Negligence: The Search for Coherence' (1997) 50 *CLP* 69.
[624] Cane (n 561) 8 – 10.
[625] J Stapleton, 'The Gist of Negligence: Part 1 Minimum Actionable Damage' (1998) 104 *LQR* 213.
[626] Stapleton (n 576).

identified individuals, and I can not see that this affects the mutuality of the relationship between the parties.[627] It does seem that the quality or closeness of the relationship between the parties has some bearing on way in which interests are protected under different torts. Essentially my assertion is the exclusions and extensions of liability overtly justified by conflicting and baffling 'policy' reasons, could also bear explanation by looking at the underlying structure of those claims. The interplay between the protection of the parties' interests and the closeness or nature of their relationship could be determinative of whether it should created a close enough bond to support a tort claim.

This pluralistic, structural framework for conceptualising tort also provides some interesting insights in relation to developments in tort, and specifically negligence.[628] It is obvious and acknowledged that most of the tort developments this century have occurred within the framework of negligence, and in recent years this is typified by an expansion of its principles to cover kinds of damage not previously protected and in less restricted circumstances.[629] Some modest scholarship analyses these developments in terms of negligence's openness to new forms of damage.[630] Similarly, years of complex industrial disease litigation has also enriched tort with pragmatic causal tests that support findings of liability and accommodate breaks or disruptions in the relationship of mutuality between the two parties;[631] which could generate enthusiasm for the flexibility and potential of tort to develop in the face of doctrinal challenges. However, it is marked that protected interests remain those

[627] Also Beever (n 560) 50.
[628] As society develops and our experiences of existence become more refined, compensatory remedies are available in relation to wrongs that previously would not have attracted liability. Deakin, Johnston and Markesinis (n 465) 8 – 10.
[629] Weir (n 622).
[630] Nolan (n 604).
[631] E.g. *Fairchild v Glenhaven Funeral Services Ltd* [2002] UKHL 22.

already protected, [632] or are constructed to resemble protected interests where justice seems to demand so. [633] However one notable feature of all the instances examined is that (even in cases with an environmental aspect to them) the interests protected still fell comfortably within those protected by tort. While these cases may represent developments or even improvements in the law of tort, they certainly did not bring about any fundamental structural changes. For example, when Steele [634] illustrates the more parochial success of tort law through the decision in *Margereson v JW Roberts*: [635] she explains how the close relationship (bipolarity) between the claimant and defendant supported the finding of liability against the defendant. Of course, the personal injury nature of the claim means it is established in the claimant's protected interests. This would suggest that the progression in the need for recognition of underlying duties lies more in the parties' correlative relationship.[636]

Later in the thesis I make some tentative comments about the potential for climate change to force changes to the law of tort. This seems to sit uncomfortably with what I have argued above, that the interests protected in tort, and the circumstances in which these are protected, represent something deeply embedded in the structure of the law. The key issue is that tort is underpinned by a fairly rigid structure that reflects the priorities of the society it operates in (or did, some time ago). I shall argue below and later in the thesis,[637] that bringing about changes in the structure of the

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632 K Amirthalingam, 'The Changing Face of the Gist of Negligence' in J Neyers and others (eds), *Emerging Issues in Tort Law* (Hart Publishing 2007).
633 Nolan (n 604).
634 J Steele, 'Assessing the Past: Tort Law and Environmental Risk' in T Jewell and J Steele (eds), *Law in Environmental Decision-Making: National, European, and International Perspectives* (OUP 1998) 125.
635 *Margereson & Hancock v JW Roberts Ltd* [1996] PIQR 154.
636 For instance, using the examples in Nolan (n 604) it could be argued that less close relationships now give rise to a duty not to infringe liberty or infringe the range of protected interests, presumably physical and economic, that would be affected in having an unwanted child.
637 See my discussion in Chapter Six Section e).

law is not impossible.[638] However, these sorts of changes would not come about on the basis of a decision of a single judge; like all legal changes these would happen progressively through a series of 'conversations' between the parties who wield influence in the law in different ways.[639]

A final comment: I have framed the limits of liability in tort, and specifically negligence, as a function of the structure of tort, rather than an arbitrary policy choice. This should not be interpreted as an assertion that the hierarchy of protected interests or our understanding of how a relationship of correlativity develops, is doctrinally pure or somehow politically neutral.[640] As discussed above, if tortious remedies are based in corrective justice, then these remedies and the protected interests that underlie them, are functions of distributive justice.[641] But these reflect the priorities, values and power relationships that underlie distributive patterns in society as a whole, which are not neutral and may disadvantage some groups and entrench privilege for others.[642] However, questions about either policy or doctrinal choice to extend liability in some instances but not in others, is a critique that should be situated at the level of tort's deep structure, and not simply at policy decisions made in courtrooms.

iv. Some comments on the compatibility of environmental harms with tort's deep structure

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638 Arguably even such significant legislation as the Human Rights Act 1998 has had a slow and modest impact on the development of tort law. J Wright, *Tort Law & Human Rights* (Hart Publishing 2001); Lord Bingham of Cornhill, 'Tort and Human Rights' in P Cane and J Stapleton (eds), *The Law of Obligations: Essays in Celebration of John Fleming* (Clarendon Press 1998); Lady Justice Arden, 'Human Rights and Civil Wrongs: Tort Law under the Spotlight' (2010) Public Law 140. It is still unclear what an 'indirect horizontal application' of human rights, actually is – see AL Young, 'Mapping Horizontal Effect' in D Hoffman (ed), *The impact of the UK Human Rights Act on private law* (CUP 2011).

639 P Mitchell, 'Patterns of Legal Change' (2012) 65 *CLP* 177.

640 Priel (n 578).

641 Beever (n 560) asserts the same in relation to liability in negligence, 69 – 71.

642 There are established strands of scholarship that urging acknowledgement of the very specific life view and experience that appears to be represented through and prioritized in a tort claim: see e.g. my comment in n 603.

The discussion above highlighted strongly how tightly tort's operation is bound to the type of interest it seeks to protect. Specifically, our 'working conception' of tort is framed around an understanding of the mutuality of relationship between the claimant and the defendant, such that the claimant should have a cause of action in relation to the invasion of his protected interests. A fairly well-worn body of scholarship emphasises tort's potential and shortcomings in relation to environmental problems.[643] This is fairly easy to conceptualise as representing a structural incompatibility between tort and the nature of environmental harms; the latter are only actionable in tort to the extent they are co-extensive with a claimant's protected interests, and recoverable from the defendant only to the extent that there is some mutuality in relationship between the parties vis-à-vis those interests.[644]

Nuisance is overwhelmingly the 'environmental tort' and much of the scholarship examining the constraints on tort's application to environmental problems centres on nuisance. Not only does nuisance's restricted availability to title-holders in property restrict possible recoverable harm.[645] Even when the claimant could find a remedy for his own losses, harm to the environment would only be compensated to the extent that it was co-extensive with the claimant's losses.[646] Of course,

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643 Summarised e .g. Bell, McGillivray and Pedersen (n 573) 381.

644 That there are two barriers has been implicit from the get-go: CD Stone, *Should Trees Have Standing?: Law, Morality, and the Environment* (OUP 2010) seeks both legally protected rights (interests) and a right to assert them against those who infringe them, for natural objects.

645 M Lee, 'Hunter v Canary Wharf Ltd (1997)' in C Mitchell and P Mitchell (eds), *Landmark Cases in the Law of Tort* (2010).; also Wightman (n 405).

646 This tendency is particularly pronounced because nuisance, the environmental tort, protects the interests of property owners. For instance, in *Dennis & Anor v Ministry of Defence* [2003] EWHC 793 the claimant's success did not result in environmental improvements. Conaghan and Mansell (n 603) 114 describe the challenges for recovery of egregious environmental damage not co-extensive with the claimant's interests in *St Helens v Tipping* [1865] 11 HL Cas 642, 11 ER 1483. Arguably, the softening of the *Shelfer* criteria following *Coventry v Lawrence* [2014] UKSC 15 most likely entails that fewer environmental harms would be prevented through nuisance claims, if damages becomes a more usual remedy for nuisance claims.

negligence has potential to be a more ubiquitous remedy as it lacks the same standing requirements [647] - it is not restricted to claimants suffering an infringement of a property interest - however other barriers exist to using negligence to remedy environmental harm. Property not sufficiently impaired to meet tort's 'damage' requirement; health risks not sufficiently severe to be characterised as 'injury' or damage, [648] under a tort that does not protect amenity rights less than damage, [649] will not give rise to a cause of action. A critique of tort's efficacy as a tool for environmental protection highlights the mismatch between these harms and the doctrinal requirements of remedies like negligence. [650] The requirements of fault, foreseeability [651] and causation [652] create evidential problems for claimants, because they tend not to correspond easily with the diffuse nature of environmental harms, or the way in which environmental harms come about. [653]

This reveals two potential key mismatches in relation to environmental harms and tort/private law claims to compensate for that harm. First, there are of course instances where environmental problems will arise, but will not form the subject matter of any tort/private law proceedings, either because the environmental harm does not constitute an infringement on the interests of a specific claimant, or because there is not a sufficiently

[647] Bell, McGillivray and Pedersen (n 573) 344 do explain that proceedings in negligence encounter other doctrinal challenges.
[648] S Coyle and K Morrow, *The Philosophical Foundations of Environmental Law: Property, Rights and Nature* (Hart Publishing 2004) Chapter 4.
[649] J Lowry and R Edmunds, 'Stigma Damages Amenity and the Margins of Economic Loss: Quantifying Perceptions and Fears' in J Lowry and R Edmunds (eds), *Environmental protection and the common law* (Hart 2000).and M Lee, 'Civil Liability of the Nuclear Industry' (2000) 12 *JEL* 317 also discuss judicial difficulty in reconciling nuclear contamination within the range of protected interests.
[650] e.g. M Lee, 'Tort, Regulation and Environmental Liability' (2002) 22 *Legal Studies* 33 37-40.
[651] e.g. Steele (n 634) 128. Steele also discusses the demands presented by retrospective assertions of foreseeability, particularly where the regulatory landscape does not make such issues clear.
[652] Or multiple parties: Bell, McGillivray and Pedersen (n 573) at 382 use the example of low-level pollution from motor vehicles. The other obvious example of this is anthropogenic climate change, in which we are all implicated.
[653] On the unfairness of strict liability: Bell, McGillivray and Pedersen (n 573) 383 and 371-2 . Conversely Howarth (n 573).

close (or any) relationship of correlativity between the claimant and the defendant to justify protecting the claimant's interests. In the second species of mismatches the environmental issues are more subtle; these are the kinds of disputes where tort does permit a sanction in relation to the invasion of the claimant's protected interests. However, the private law claim will not entirely encompass the environmental issue – either the environmental wrongs will exceed tort's protection in relation to the claimant's interest, or, for instance, the remedies permitted will only compensate the claimant's harm, and not rectify the environmental harms.[654]

These are not incidental shortcomings; they reflect our deep and pervasive understanding of what the 'environment' is and how we relate to it. '[P]attern[s] of interpersonal relationships of entitlement' [655] have come to dominate our understanding of our relationship with property in land, and hence the field we identify as environmental law. [656] The implicit conception of the content of environmental interests is that they are not deep or inherently vested in the environment. [657] Our utilitarian and anthropocentric [658] conceptions of what the environment is for, centre around our own interests and entitlements.[659]

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654 There are too many possible permutations of this to explore in any depth here – and of course I should acknowledge that these mismatches or gaps in recovery occur routinely in civil litigation – I am not asserting that this problem is unique to environmental tort claims.
655 Coyle and Morrow (n 648)10.
656 Coyle and Morrow (n 648) particularly Chapter 4.
657 P Cane, 'Are Environmental Harms Special?' (2001) 13 *JEL* 3 argues that unless the environmental harm caused could cause further harm to other protected interests, that it might be better not to remediate it, and leave it as it is. In his view, the money could be better spent serving social purposes, and natural resources damages generally are a bad idea.
658 Although it is conceivable that these conceptions of ownership can be 'anthropocentric without inevitably falling prey to considerations of utility': Coyle and Morrow (n 648)155.
659 WNR Lucy and C Mitchell, 'Replacing Private Property: The Case for Stewardship' (1996) 55 *CLJ* 566 597-8: broader conceptualisations of our relationship with property are instrumental, and have to be compatible with an account of human needs. Also see E Barritt, 'Conceptualising Stewardship in Environmental Law' (2014) 26 *JEL* 1.

This explains why, on one level, raising concerns about tort's failing to protect 'environmental interests' is misconceived.[660] The framing of environmental harm often reflects 'some kind of non-economic harm, 'purely aesthetic, recreational or intellectual harms resulting from damage to the environment' or humankind's own interest in a clean and healthy environment, such as clean water for drinking, consistent food supply or beautiful landscape for us to enjoy.[661] This anthropocentric approach[662] informs way we frame environmental harms; usually as a menu of impacts to human health and property that constitute our codified conception what a healthy environment means to our interests.[663] So the loss we experience when the environment is damaged or destroyed, is either the loss of use we might have from those resources, or an emotional pain or 'regret' that something valuable to us (on some level) has been destroyed: a loss of self-concept. Cane argues that the restriction of compensable harm to property damage is appropriate;[664] I would add invasions of physical and other interests occasioned by environmental harm. In other words, there can and should be no recovery for harm that is not aligned with the claimant's protected interests. This seems counterintuitive (certainly to this project) because it appears to be motivating for a devaluation of environmental protection. However, unless the money paid were to be invested in remediation (which I will refer to in more detail in my discussion of tort's instrumental role, below) the recipient would be overcompensated, as damages would be received for losses not truly hers.[665]

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[660] Cane (n 657).
[661] Hilson (n 574) adopts this conception of environmental harm as well.
[662] See discussion in A Philippopoulos-Mihalopoulos, 'Looking for the Space between Law and Ecology' in Philippopoulos-Mihalopoulos (ed), *Law and Ecology: New Environmental Foundations* (Taylor & Francis 2011).; also Holder and Lee (n 275) Chapter 1.
[663] e.g Fisher, Lange and Scotford (n 275) 212 and 985 draw on the definitions in Environmental Protection Act 1990 to illustrate how harm is framed in terms of human health and property interests.
[664] Cane (n 657).
[665] Cane (n 561) 218.

Tort's correlative nature also constrains its usefulness with respect to environmental concerns which are not self-contained or relational. It is unarguable that tort works best in a local context when damage is 'contained' in time and space,[666] and attributable or chiefly attributable to one defendant and manifests in kinds of damage recognised by tort. Criticisms about how exactly the interests of the environment are taken into account or conceptualised aside, tort continues to support these to its best capability, in local or domestic cases. [667] This can be explained by a lack of diffusion in the subject matter making it easier to locate the parties in a relationship of correlativity, and the more contained subject matter facilitating the location of harm in recognised actionable damage. These challenges are exemplified by the broad and 'long tail' problems of climate change. Even scholars who see a place for tort or other private law remedies to compensate for the harms of climate change, are forced to concede that its nature – including the diffuseness of 'damage' and indeterminable claimant/defendant roles [668] - frustrates almost every single element of tort doctrine. [669]

Of course, one of the unique features of climate change is the potential universality of the problem: critique concerning problems of broad scale pollution, specifically that this is often permitted or done in the service of some social function, are of application here as well. [670] In the case of climate change, not only is the burning of fossil fuels particularly

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[666] M Latham, V Schwartz and C Appel, 'The Intersection of Tort and Environmental Law: Where the Twains Should Meet and Depart' (2011) 80 *Fordham Law Review* 737 753.
[667] *Barr & Ors v Biffa Waste Services Ltd* [2012] EWCA Civ 312.
[668] And the fact that their roles in any event may only be an exacerbating factor: see e.g. M Allen, 'The Scientific Basis for Climate Change Liability' in R Lord QC and others (eds), *Climate Change Liability: Transnational Law and Practice* (CUP 2011).
[669] Kysar (n 75) 10; also G Kaminskaite-Salters, 'Climate Change Litigation in the UK: It's Feasibility and Prospects' in M Faure and M Peeters (eds), *Climate Change Liability* (Edward Elgar Publishing Limited 2011. Also generally my discussion in Chapter One in text between n 75 - 82 concerning the potential for and challenges of climate change litigation, and recent triumphs.
[670] RG Lee, 'Compliance with Environmental Permit as a Defence in Nuisance' (2012) 14 *Environmental Law Review* 219.

widespread, but often these activities were permitted and conducted in the course of services afforded by the defendant, of which the claimant made use, and probably continues to make use. [671] (It should be acknowledged, of course, that the universality of this situation is questionable when the histories and experiences of developing countries are taken into account.[672]) Yet, many environmental harms are inherently irreversible over the long term, sometimes only manifesting in time to affect future generations. [673]

As above, these complexities and the extent to which they frustrate our 'normal' experiences are given a clear airing than in real or anticipated judicial treatment of tort actions arising from climate change. [674] Restraints in the need for a relationship of mutuality between claimant and defendant are pushed to their limits, when the interests of future generations are considered: an increasingly familiar preoccupation as the body of literature concerning climate change and in particular, legal responses to climate change, grows. Critics [675] strenuously question any consideration of the rights of future generations, arguing that questions of environmental remediation damages and compensation are already unresolvable, and taking account of the interest of future generations – with their unknown values and priorities – involves a projection of factual circumstances that becomes little more than speculation. [676] Other concerns include representational ones, [677] and concerns about the anthropocentric values

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671 Howarth (n 573) 504. Such arguments are of course easily adapted to suit an analysis of climate change related tort analysis.
672 See e.g. P Cullet, 'Liability and Redress for Human-Induced Global Warming: Towards an International Regime' (2007) 26 A *Stanford Environmental Law Journal* 99 111.
673 Cane (n 657) Section 3.1.
674 DA Grossman, 'Warming up to a Not-So-Radical Idea: Tort-Based Climate Change Litigation' (2003) 28 *Columbia Journal of Environmental Law* 1 commented early on that tort is not suited to climate change for these reasons – esp 109.
675 Howarth (n 573).
676 J Murphy, 'Noxious Emissions and Common Law Liability' in J Lowry and R Edmunds (eds), *Environmental protection and the common law* (Hart 2000) at 73 notes the complications involved in the recognition of the interests of future generations.
677 *Native Village of Kivalina v Exxonmobil Corporation, et al* 663 F Supp 2d 863 (ND Cal Sept 30, 2009) sought to bring the interests of future generations within the ambit of the action; the US

that would need to be prioritised in order to make such claims viable. [678] The plurality of ways in which both the impacts of climate change and our contribution to it are weaved through our lives, illustrate why 'rules' about the way it climate change issues should be taken into account would always be limited. A constant focused awareness of how climate issues might appear in 'normal' life is what is required for a meaningful response.

It is arguable that if tort can yield under pressures of multiple claimants, complex diseases or new forms of injury, then perhaps it could yield under climate change.[679] In the same way that cases such as Fairchild can make tort lawyers think differently about causation, then it is argued that the pressure or 'internal dissonance' placed on tort by challenges such as those posed by climate change, could not only support corrective justice for the problems of climate change, but also bring about general changes in the law of tort. [680] The hope for this is that it would occur in terms of tort doctrine, but also that the individualistic and property-focused nature of torts legally protected interests would yield to a more 'collective' or 'environmental' understanding. [681] Problems of mutuality in relationship are not explicitly addressed, but I would argue that 'climate consciousness' forces changes to our idea of relationship and mutual responsibility that has potential to transform structural institutions like private law.

I argued above that the protected interests underlying remedies in tort are deeply entrenched in the structure of tort. This is significant because it

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Supreme Court refused to hear it, inter alia, on grounds of standing.

[678] BH Weston and D Bollier, *Green Governance: Ecological Survival, Human Rights, and the Law of the Commons* (CUP 2013) 68 – 76

[679] Kysar (n 75).

[680] Ibid. Almost without exception, analysis of the prospects for tort litigation relating to climate change require considerable doctrinal relaxation – see e.g. MB Gerrard, 'What Litigation of a Climate Nuisance Suit Might Look Like' (2011) 121 *Yale LJ Online* 135.

[681] Lee (n 562) shares this hope in relation to complex scientific and environmental problems, which presumably could include climate change.

provides an indication as to the depth of conceptions of both tort and environmental law, the objections made and purported solutions to them represent little more than 'tinkering at the edges' of the problem. The changes that would be required to bring an end to these problems are as deep as they are unfeasible.

But as explored above in this section, and the first part of the chapter, tort doctrine admits of flexibility when it holds within its deeper structure. Following Weinrib,[682] tort, like other elements of private law, depends on bipolarity. Similarly, tort is designed around the protection of protected interests, which informs how it understands harm. So, even if the pace of tort reform moved beyond the pace of the achingly incremental, [683] the expectation of a change to the reciprocal nature of tort, and the very interests it protects, represents a fundamental change to the entire structure of tort. [684] While this is not unachievable, the significance – and difficulty - of this as an endeavour should be acknowledged. From the opposite perspective, if we consider what would be required in order to obtain a proper remedy for environmental harms, using tort, it becomes clear why tort is unsuited to this task. This examination exposes the mismatch between environmental problems and tort's potential.

c) The functions of tort

The first part of this chapter made out an internally focused, structural account of tort, aiming for insights into the potential and limitations of tort in a climate change context. The second part of the chapter explores tort from an externally focused perspective, examining the public role of tort.

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[682] Weinrib (n 560).
[683] JM Anderson, 'Comment on Doug Kysar's "What Climate Change Can Do About Tort Law"' (2012) 42 *Environmental Law Reporter* 10745; also see Bell, McGillivray and Pedersen (n 573) 385.
[684] Anderson ibid comments that Kysar, while possibly not appreciating the depth of the changes he suggests, certainly does not seem to appreciate the (un)constitutional demands this would place on the courts.

As I allude to above, this instrumental focus bears controversy on both sides of the debate.[685] My pluralist approach is not only entirely consistent with an acceptance that tort plays a public role, but is an assertion that tort's engagement with issues is likely to have some kind of public impact. Refuting this due to an obsession with tort's inner workings is to turn a blind eye to liability findings or defaults that have potential to reinforce or undermine existing policy. In similar vein, although a purist doctrinal approach would assert the independence of tort liability from the parties' insurance arrangements, recent scholarship illuminates the nuanced and complex interrelationships between the various kinds of insurance cover and relationships in the law of obligations.[686]

As before, my perspective and discussion focuses very much on tort's instrumental potential in relation to environmental issues, specifically climate change. As explained previously,[687] because of the nature of the issues I examine, I do not just consider the potential of tort claims 'for' climate change problems. Here and in the chapters that follow, my focus is very much on the use of tort (specifically negligence) *in the context of* climate change. This is because climate change issues have potential to engage with many public and private disputes. The climate change problem needs a response across scales; this means that the potential implications of even small liability outcomes should be scrutinised for their effects in the key climate change areas of mitigation and adaptation.

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[685] Of course there are arguments both that it is inappropriate to view tort from an externalist perspective (see n 575 and surrounding text) and that if tort serves this function, it does not do so well: see Conaghan and Mansell (n 603). For a lengthy critique from various perspectives: J Richardson and E Rackley (eds), *Feminist Perspectives on Tort Law* (Routledge 2012) for a feminist perspective and Abel (n 597) for a socialist critique.

[686] Merkin and Steele (n 549). In the Introduction in text surrounding n 107, I explain that one of the limits of my thesis is its inability properly to explore the particularities of 'live' tort litigation in which the explicit or implicit allocation of risk to which Merkin and Steele allude would be crucial to our understanding of what was intended. It is not so easy to do so, at this level of abstraction, however I shall refer more generally to the potential of insurance arrangements to bear on the impact of tort where appropriate.

[687] Chapter One text between n 75 – 82.

Environmental law scholarship [688] bears testament to the increasing subsidiarity of tort as a mechanism for environmental protection.[689] Tort can not be said to play second fiddle in the regulatory arsenal,[690] but its primary function remains compensation for wrongfully caused harm.[691] My discussion focuses on compensation, [692] then loss distribution, [693] and deterrence,[694] considering in relation to each how well tort might fulfil its assigned functions, particularly in an environmental, then climate, context.

i. Compensation

If the aims of tort can be defined as compensating victims of wrongful conduct, with damages usually equivalent to loss, [695] then tort's compensatory function is implicit in its very definition. This is aligned with lay understandings of the function of tort and consistent with corrective justice.[696]

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688 E Fisher and others, 'Maturity and Methodology: Starting a Debate about Environmental Law Scholarship' (2009) *JEL* 213; C Carlarne, 'Exploring Methodological Challenges within the Context of Climate Change Law and Policy' (2011) 105 *American Society of International Law Proceedings* 255.

689 Karen Morrow, 'Tort and Regulatory Law in England and Wales' in Willem H van Boom, Meinhard Lukas and Christa Kissling (eds), *Tort and Regulatory Law* (Springer 2007).

690 Neil Gunningham, *Smart Regulation : Designing Environmental Policy* (Clarendon Press 1998) 78 – 79.

691 The seminal work on this is G Williams, 'The Aims of the Law of Tort' (1951) 4 *CLP* 137. At 140 Williams speaks of 'aims', which suggests an element of design. My focus is on the advertent or inadvertent effects of tort, which does not necessarily require an element of design. Williams also identifies that accounts of tort's functions are interdependently sociological, doctrinal and normative; my account embraces all three.

692 Ibid: Williams outlines both ethical and reparative compensatory functions of tort, and throughout the literature this compensatory function reappears with relatively varied ethical or normative content (often as 'corrective justice') or sometimes as a functional outcome. Williams notes this distinction and asserts that ethical compensation is one of the primary functions of tort – my assertion is that due to tort's pluralistic nature this compensatory function will manifest differently in relation to different causes of action.

693 This is closely tied to tort's compensatory function: see Hedley (n 558). Williams' entrepreneur theory questions who should bear the risk of new ventures.

694 Williams acknowledges the ethical compensation and deterrence are the key functions of tort: GL Williams and BA Hepple, *Foundations of the Law of Tort* (2r.e, Butterworth 1984) 2, 30.

695 Ibid 3, then 27.

696 This is 'fundamental to an understanding of tort law' – P Cane and P Atiyah, *Atiyah's Accidents, Compensation and the Law* (8th edn, CUP 2013) 416.

If tort can be said to serve an external function, then its *raison d'etre* is to compensate victims of wrongful conduct. This seems axiomatic, as does that the measure of compensation paid should be that it restores the claimant to his pre-tort position by compensating his loss.[697] Some commentators find financial compensation for general damages uncomfortable, arguing the tort system 'monetises intangibles', and that pain and suffering can not be 'made whole' with money;[698] similarly when I speak about introducing different kinds of damages or remedies to account for future environmental harms, it is difficult to think of how to accommodate these within the existing structures. However the availability for financial compensation for harms not commensurate with money, can illustrate to a claimant that the harm done to her has been taken seriously, because of the value our society places on money.[699] On a pluralistic account this purpose is not negated by non-compensatory remedies, or rare alternative measures of damages.[700] It is also not undermined by concerns that arbitrary lines around fault[701] mean that the defendant's degree of wrongfulness in no way determines the extent of his liability (absent fault on part of the claimant) and that the compensation of similarly positioned claimants might seem at the mercy of arbitrary rules and judgements.[702]

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[697] J Goldberg, 'Ten Half-Truths About Tort Law' (2008) 42 *Valparaiso University Law Review* 1221 discusses 'make-whole' damages.
[698] Abel, (n 602) 455.
[699] J Waldron, 'Moments of Carelessness and Massive Loss' in David G Owen (ed), *The Philosophical Foundations of Tort Law* (Oxford University Press 1997).
[700] NJ McBride and RBagshaw, *Tort Law* (4th edn, Pearson 2012) 14.
[701] Cane (n 602): coining dispositional and circumstantial luck. Stevens (n 590) notes at 2, that the etymology of tort, is based on wrongfulness. Williams (n 691) 151 does identify a form of reparative compensation which lacks the ethical or 'wrong righting' demands, and distinguishes justice and compensation in his foundational analysis, but finds the lack of an ethical underpinning to a shortcoming.
[702] In the same way similarly affected claimants might not both be compensated depending on their respective defendants' wrongfulness. Cane (n 561) 416, and Cane and Atiyah (n 696) 174 – 176. He also observes that the insistence on personal responsibility blurs the boundaries between tort's compensatory and retributive functions; of course insurance would dilute this effect as well. I would argue that the real cause of the disparity between the levels of tort damages for 'wrongfully' injured claimants, and welfare provision for others, is purely distributive.

Whether commentators consider the underlying basis of tort to be corrective justice, [703] choose a multi-pluralistic account, [704] or use their own refined conception of how tort operates: [705] none can overcome the anomaly between what environmental lawyers would wish to achieve with tort, and what tort can deliver. An environmental lawyer looking to tort for solutions without properly examining tort's limitations, may have demands (or simultaneous demands) of tort that exceed its capabilities for delivery.[706]

As explored above, there are structural disjunctures between environmental harms and tort; even when the harms overlap with the claimant's interests, there are more efficient ways of compensating claimants than a fault-based system of civil litigation.[707] A perhaps obvious point that also emerges from the structural discussion above, is the question of whether compensation is ever made 'in full' in circumstances where harm is done to the environment that is not co-extensive with the claimant's harm, and thus unrecoverable. [708]

I explored above how tort litigation about climate change might be challenged by a lack of alignment between climate change harms (which can be intangible), and the parties protected interests; in addition often the relationship between parties to any prospective litigation about climate

[703] See e.g. Latham, Schwartz and Appel (n 666) at 754. Lee (n 562) at 83 characterises Peter Cane's understanding of tort's structure as based in corrective justice, but I do not think this really does justice to Cane's understanding of the 'anatomy' of tort, certainly not any more.
[704] Shmueli (n 559).
[705] P Cane, 'Using Tort Law to Enforce Environmental Regulations' (2001) 41 *Washburn Law Journal* 427 of course prefers his own theory of tort as a system of personal responsibility for his analysis.
[706] For example, of the six 'functions' of tort listed by Bell et al, only one is compensation for harm, which by including people, property and "'the environment' in some way" already sets a fairly wide margin in terms of what tort can deliver, other than coincidentally. Bell, McGillivray and Pedersen (n 573) 357.
[707] See Lee (n 650).
[708] Lee (n 562) 91 looks to courts to dispense corrective justice, in environmental cases, while acknowledging that scientific complexity and doctrinal incompatibility makes this very difficult. "To stand aside, and deny competence, to retract rather than maintain private law remedies may provoke a crisis of confidence by those ultimately dependent on the courts for environmental protection."

change is hardly correlative. Where wrongful or harmful behaviour cannot be encompassed in a tort structure, then a claimant might struggle to obtain compensation, even if the defendant's conduct possibly falls below a standard of care and has harmed him. This illustrates to some extent, the narrowness the compensatory function of tort: the claimant might recover her loss only when it fits within tort's structure, or might recover her loss only to the extent that it fits within tort's structure. Similarly, even where apparently successful litigation does or could result, where climate change issues interface with private law litigation, there might well be climate change issues that are unacknowledged, or invisible, in the litigation. This is arguably, more problematic, because the issue would have been adjudicated yet key issues, losses or problems might not have been aired.

ii. Distribution (or: who bears the risk)

There are several perspectives that might be taken on the idea of tort's distributive function. Despite a tiny re-allocation through tax, insurance and liability rules,[709] I have argued that the pre-tort distribution of societal goods is not the province of tort law.[710] Instead, the availability of tort remedies (via the deep structural protection of specific interests) is one such societal good. The social goods distributed are not only a right to compensation for claimants, but also certainty for defendants, and a shaping (or reinforcement) of a sense of what is valuable for society. From a forward looking perspective, if the availability of legal remedies could be seen as a societal good or resource,[711] when courts determine new liability rules, or extend existing causes of action, they can be seen as redistributing

[709] Cane and Atiyah (n 696) 412-3.
[710] Keren-Paz (n 601) aims to interrogate how principles of equality and distributive justice can account for the manner in which the principles of tort law distribute societal goods. Neither of these truly reflect a distributive function of tort; these are explorations of how tort could operate in a context where pre-tort distributions are at issue.
[711] Gardner (n 599).

new sets of rights and duties to potential future litigants. The allocation of these remedies is a function of distributive justice.[712]

The third perspective on what might be called the distributive function of tort is the one I employ in this thesis when I refer to distribution. In essence this is a broader conception of the 'entrepreneur' function identified by Williams.[713] Most writers acknowledge this as a theoretical function or capability of tort, whether or not they agree that it does or should serve this function,[714] and despite concerns that an obsession with 'loss-spreading' is both reductive, and ignores tort's normative role,[715] and its interpersonal nature. Tort litigation and decisions implicitly (or explicitly) determine whom should carry the risk in relation to new technologies or forms of enterprise; in addition, these can determine where the loss or risk of loss should fall in specific situations.[716] Thus, tort decisions determine when and to what extent loss occasioned by a defendant's conduct should be borne by him or absorbed by the claimant group.

When defending the role of tort as an instrument of environmental protection - particularly due to the enthusiasm engendered by the potential this holds for claimants – there is a temptation to conceive of standards created by tort as somehow 'on the side' of claimants and hence environment (with all the qualifications noted above). As Steele observes, when standards are set, or not set, this will not always tend towards greater

712 See above Section b)i.
713 Williams (n 691).
714 Even EJ Weinrib, *The Idea of Private Law* (OUP 2012) appears to accept this as a theoretical function, although he argues that accepting this into the conceptual framework creates incoherence – see 19 and generally. Also see Stapleton (n 578).
715 Goldberg (n 697)1238.
716 This brief statement only scratches the surface on the deep analysis of the nuanced and complex interplay between different mechanisms for the allocation of risk in Merkin and Steele (n 550). Also see the volume generally.

protection for the environment; it is also a manner of permitting risk.[717] While private law litigation will always be at the claimant's initiative, the defendant can choose to (and usually, better afford to) follow it through to a favourable outcome, and more often does.[718]

It is arguable that where no decision is made or a tort action is not viable, a court allows risky behaviour by default or makes a determination that the claimant should bear her own loss.[719] Of course, in the climate context, the outcomes of litigation implicitly make determines about where the costs and risks of climate change should fall. As I refer to in the conclusion, climate blindness in litigation entails that these distributions of climate risk will happen without awareness.

iii. Deterrence

A basic deterrence model of tort is that tort liability serves a forward looking function by improving safety, as members of the defendant group or potential defendants will exercise caution in order to avoid incurring liability. Tort's deterrent effect supports compliance where penalties for certain kinds of behaviour are created; by its converse where tort provides no penalty, a perception of impunity could be created. A more nuanced conception of how deterrence works is set out below.

The deterrence conception of tort is championed in law and economics scholarship. Unlike most instrumental approaches, law and economics is

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[717] Steele (n 634) 134.

[718] B Hatton, P Castle and M Day, 'The Environment and the Law - Does Our Legal System Deliver Access to Justice - A Review' (2004) 6 *Environmental Law Review* 240 242.

[719] I refer in the Introduction to high profile United States climate change tort cases, where a refusal on various grounds to hear claims against large scale polluters for reasons of procedure and matters of standing had the consequence of allocating their losses to the claimants themselves.*Native Villiage of Kivalina v Exxonmobil Corp* (n 677) and then *Comer v Murphy Oil USA, Inc* 607 F.3d 1049 (5th Cir.2010).

also unitary and claims universal applicability.[720] It asserts that '[t]he dominant function of the fault system is to generate rules of liability that if followed will bring about, at least approximately, the efficient-the cost-justified-level of accidents and safety.'[721] This can be seen as an entirely externally focused account of tort in which efficiency is the ultimate social goal: the focus is on decisions taken and an understanding that these can improve social and economic efficiency,[722] rather than tort's doctrinal constituents. Concerns about these implicit assumptions about human decision-making,[723] as well as its normative shortcomings [724] have tainted perceptions of tort's deterrence/regulatory function.[725] Approaches that reduce law and economics to its deterrent function perhaps do not take sufficient account of its broader theoretical basis and (arguably) normative underpinnings – proponents insist that its principles are consistent with principles of corrective justice. [726] A cogent criticism of the theory is that it takes no account of some necessary explanatory components of tort law, such as its basis in the claimant's protected interests, and only account for some of the doctrinal aspects of tort law (such as causation) while ignoring other elements such as the duty of care or notion of actionable damage.[727] Rejecting the deterrence principle because of discomfort with the normative aspects of law and economics scholarship, however, is to ignore an important function of tort liability.

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[720] Hedley (n 576).
[721] RA Posner, 'A Theory of Negligence' (1972) 1 *Journal of Legal Studies* 29. "The dominant function of the fault system is to generate rules of liability that if followed will bring about, at least approximately, the efficient-the cost-justified-level of accidents and safety." 33.
[722] RH Coase, 'The Problem of Social Cost' (1960) 3 *JL & econ*. 1.
[723] The so-called Learned Hand Formula, crystallized in *United States v Carroll Towing Co* 159 F.2d 169 1947
[724] W Lucy, 'What's Private About Private Law?' in A Robertson and HW Tang (eds), *The Goals of Private Law* (Hart Publishing 2009) 51 describe law and economics scholarship as 'heretical'. Also Abel (n 602).
[725] Conflating the functional and 'grand theory' aspects of this theory are not helpful: GT Schwartz, 'Mixed Theories of Tort Law: Affirming Both Deterrence and Corrective Justice' (1996) 75 *Texas Law Review* 1801 1806 – 1809. Williams (n 691) seminal work discussed deterrence as a function of tort and precedes the prevalence of law and economics scholarship.
[726] RA Posner (n 566).
[727] These concerns are summarised by Cane (n 561) 221- 223

Sceptics also argue that any behaviour modifying potential of tort is undermined by the growing prevalence of both first party and third party insurance. The rationale for this, is that either his own or the claimant's insurance insulates the defendant from the financial consequences of his wrongful conduct.[728] The countering position is that the interplay between tort and insurance is much more complex than the provision of a complete indemnity. First, new but significant scholarship suggests that that formal position: that parties' insurance positions hold little weight with regards to the substantive outcome of litigation, does not reflect the profound complexities of the role insurance plays.[729] But more significant for my current purposes, is the growing understanding that constraints related to the insurance provision and cover might itself serve this function.[730] Simple examples include financial penalties persist in the form of claims excess and the loss of 'no-claims bonuses'.[731] In addition where the insurer's own risk assessments and safety or conduct specifications are a condition of third-party cover, risky behaviour that might otherwise attract liability is reduced.[732] Arguing that the deterrence then is created by insurance, not tort (or other forms of liability) is to ignore the significance of liability risk in encouraging insurance cover.[733]

A further counterargument to the notion that tort functions as a deterrent, is that it does not; that the prospect of liability is usually not a factor when

[728] Ibid Chapter 7. The prevalence of liability insurance does, however, support tort's compensatory function; the defendant's means or lack thereof will not be a barrier to a claimant recovering damages in full. Stapleton, (n 578) argues that this would undermine tort doctrine and its scope to meet its own ends. She also asserts that insurance companies are poorly positioned to assess and manage risk; I would expect that they are better positioned to do so than individual defendants and possibly than courts, after the fact.
[729] Merkin and Steele (n 549).
[730] Ibid
[731] Stevens (n 590) 322.
[732] Cane and Atiyah (n 696) 429; Williams (n 691).
[733] Merkin and Steele (n 549).

actors make decisions or behave in certain ways. The argument goes that a complex variety of social pressures and influences is such that the prospect of tort liability is unlikely to impress on human activity.[734] This might be true of some individual persons, however there is some empirical evidence to suggest the contrary. It seems that rather than simply avoiding behaviour that may incur liability, liability risks are actively and proactively managed along with others,[735] with firms reducing risky behaviour to avoid litigation in narrow instances where it was anticipated liability could be proven.[736] Admittedly, the deterrent effect was found to be weakest in environmental claims, arguably because of the misalignment between environmental harm and the claimant's protected interests, or a relationship of reciprocity between the parties. However, in others it did have an impact, at the very least, there was an awareness of it.[737] What this suggests is that the deterrent effect of tort can actually be more suggestive, than the peremptory function the name suggests. References in the literature to a 'social construction' function, [738] or radiating social effects [739] of tort, may not be as fantastical as they sound. A deterrent effect of tort as a basic function of awareness of acceptable norms of behaviour, rather than assuming a lay insight into the basis of negligence, seems not only a more believable, but also a more nuanced understanding as to how tort (twinned with insurance) has potential to shape and inform behaviour, [740] without the adjudicator necessarily being aware of these impacts. [741]

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[734] *Coventry v Lawrence* (n 646) 322.
[735] S Halliday, J Ilan and C Scott, 'The Public Management of Liability Risks' (2011) 31 *OJLS* 527.
[736] D Dewees and M Trebilcock, 'The Efficacy of the Tort System and Its Alternatives: A Review of Empirical Evidence' (1992) 30 *Osgoode Hall Law Journal* 57 112; also WJ Cardi, RD Penfield and AH Yoon, 'Does Tort Law Deter Individuals? A Behavioral Science Study' (2012) 9 *Journal of Empirical Legal Studies* 567.
[737] Dewees and Trebilcock (n 736) 108 – 110. Interestingly the study found that claims restricted to a smaller area, without multiple defendants and where the loss manifested in property damage, were most likely to be successful – this is in concord with the academic literature.
[738] F du Bois, 'Social Purposes, Fundamental Rights and the Judicial Development of Private Law' in D Nolan and A Robertson (eds), *Rights and Private Law* (Hart Publishing 2011).
[739] A Bloom, 'The Radiating Effects of Torts' (2013) 62 *DePaul Law Review* 229.
[740] Merkin and Steele (n 550).
[741] J Stapleton, 'Regulating torts' in C Parker and others (eds) *Regulating Law* (OUP 2004)

As above, this regulatory understanding of tort's potential impact on behaviour is complex and nuanced, potentially including a variety of standard-defining and compliance or enforcement functions,[742] but also framing a narrative or providing information about problems or issues.[743]

So, when courts define standards by making a finding for one or other party in particular litigation, clarifying legislative duties or enforcing a duty imposed by statute, then tort serves a compliance function, in that it may deter non-compliance with the regulation. This then has a behaviour forcing effect, as the defendant would have to modify his practices to avoid incurring liability. Complexities arise when the duties or standards held up as (for example) reasonable in a tort claim challenge the prevailing or orthodox position on an issue.[744] This provides claimants with unique power to control standard setting or challenge orthodox positions on matters of science (or policy disguised as science) [745] in the process of vindicating harms. [746] However, the potential of this is not limited to an assertion of fact or science; the position put forward could be one of values or a different way of balancing interests, that was not considered or rejected when standards were set previously. [747] It also permits a role for claimants to take the initiative when other forms of regulation lag behind.[748]

[742] Steele (n 634) 109.
[743] Cane (n 705) 451
[744] Steele (n 634) 130 – 133
[745] Stanton and Willmore (n 567) 93 – 109.
[746] Lee (n 650); L Vanhala, 'Legal Opportunity Structures and the Paradox of Legal Mobilization by the Environmental Movement in the UK' (2012) 46 *Law & Society Review* 523.
[747] Fisher, Lange and Scotford (n 275) 40 explain how value laden the conception of scientific evidence is, in environmental law.
[748] Murphy (n 676) 53 explains how standards set through nuisance litigation can supplement lax regulation; Latham, Schwartz and Appel (n 666) 752 more generally.

An unexamined expectation that in conflict private rights might be extinguished by legislative standards,[749] belies the potential complexity and unpredictability of this process. [750] This means tort can not only deter behaviour but define what that behaviour should be; it also heralds tremendous potential for tort standards to inform and supplement lax regulation.[751] Having said that, and with the acknowledgement that tort can serve a complex regulatory function, allocating a mainstream regulatory role to tort is unrealistic. Tort's strongly casuistic and fact dependent nature arguably creates as many uncertainties as it clarifies. As such the standards set by tort are exposed as haphazard, indeterminate or imprecise; and standard setting by court decision as inefficient and unsystematic.[752] Furthermore, given the phenomenal (and growing) barriers to litigation, [753] and the extremely small percentage of tort actions that actually terminate in a decision (not least a reportable and publicised decision) the charges of haphazardness do not seem unreasonable. [754] Of course, short of reportable decisions, presumably there will always be significant decisions or compromises that are not formally reported, but circulated within an industry as guidance for operators. Such standards could be charged with accusations of a lack of universality. By contrast, standards set by means of public regulation are a product of much more evidentiary material, requiring a weighing up of scientific and economic evidence, and a full evaluation of regulatory possibilities. [755] Where decisions with regulatory

[749] Bell, McGillivray and Pedersen (n 573) 385.
[750] See generally: M Lee, 'Tort Law and Regulation: Planning and Nuisance' (2011) *Journal of Planning & Environment Law* 4; also see Cane (n 705) 429. Obvious recent examples are *Barr v Biffa* (n 667), *Coventry v Lawrence* (n 646), and also see Lee (n 670).
[751] Murphy (n 676) 53.
[752] Howarth (n 573) 480 and 507-8.
[753] Hatton, Castle, and Day (n 718); Environmental Law Foundation, 'Costs Barriers to Environmental Justice' (2009). Also see the recent litigation on the recoverability of success fees following *Coventry v Lawrence No 3* [2015] UKSC 50.
[754] Cane and Atiyah (n 696) generally how few 'pure' tort claims culminate in a court decision.
[755] Royal Commission on Environmental Pollution, 'Environmental Standards and Public Values' (1998) 21.

effect are made around particular issues, without the benefit of such a process, significant issues or factors might be neglected.

Later in the thesis, I will show the relevance of the potential or absence of tort liability (twinned with insurance) in the climate change context. All of the factors highlighted above are of relevance; I will explore where the possibility or otherwise of tort liability might support or undermine regulation intended to support climate change mitigation policy. Rather than a simple deterrence function, however, I will demonstrate further where potential exists for tort decisions to contribute to the discourse in poorly regulated areas.

d) Conclusion

This thesis explores the operation of tort law within the context of the decarbonisation of domestic buildings; its substance lies in a doctrinal analysis of the circumstances in which a remedy in tort might be sought. In doing so it explores both what recourse might be available to individuals affected by these problems, but also asks broader questions about tort's potential in relation to climate change problems. It resists specific expectations of tort, because tort's range is narrow, the interests it protects, particular in nature. Unsatisfactory outcomes demand changes, but I argue that whether anticipating judicial outcomes or designing new legislation, a failure properly to understand the rigidity underlying the common law can lead to a shallow or mistaken conception of how the law could change to accommodate excluded interests.

As the aim of the thesis is to examine the limits and potential of tort, this chapter has had two main priorities: to establish a working concept of what

tort is, and to examine how both these theoretical areas operate when tort is used in an environmental, then specifically climate change, context. To do so I have examined the literature concerning the limits and potential of tort, generally.

I have argued that the protection offered by tort is very specific and limited both to a defined range of claimant's interests, and in relation to very specific relationships between the claimant and defendant(s).[756] More loosely defined interests either do not find a forum, or do not achieve resolution when co-existing interests are adjudicated in relation to the same issue. Thus, although tort can be effective in achieving instrumental goals, its potential to do so is restricted to the narrow instances where it aligns with protected interests. I also argued that these gaps or mismatches create areas of impunity where no liability risk exists. This explains how some strain or unsatisfactory outcomes can appear when tort remedies are sought in a climate change context. I reiterate at this point that it is important that both aspects of tort be examined. If it is accepted that liability (or no liability) must have some public impact in relevant policy areas, then it is essential to examine tort's role and potential vis-à-vis existing policies. Likewise, making assumptions about the potential of private law to adapt to developing or challenging areas is not helpful without a proper grasp of tort's potential.

The examination of the law contained in the following two chapters will draw on this theoretical analysis, using it not only to enrich a comprehension of the doctrinal law, but also supporting our realistic expectations of what we could expect tort to deliver. Finally, a certainty about what can be achieved with tort aids us in resisting suggestions that

[756] I have focused on these elements. Cane's account includes countervailing interests and the basic account of what he calls 'sanctioned conduct', which is in essence the bones of tort doctrine.

tort be 'replaced' with other remedies in its entirety; suggestions of this nature seek policy solutions. It is suggested rather that an awareness and acceptance of the limitations of tort can also support our appreciation of tort's potential, while giving a clear picture of the interests tort can not protect. Once this picture is clear, the choice whether to cater to these interests through legislation, or leave them unprotected, is clear and deliberate, rather than accidental.

SIX: TORT AND PERFORMANCE GAP

a) Introduction

This is the first of two doctrinal chapters exploring the potential and limitations of liability in tort, in relation to the problems I discuss in the first two parts of the thesis. This chapter discusses the limitations and potential of an action in negligence arising from the losses and harms occasioned by poor energy performance in domestic buildings. For reasons I have touched on earlier in the thesis,[757] and as I shall explore below, negligence is not an obvious or certainly the go-to solution to performance gap issues. However, the elusive nature of the harm in these instances, and the complexities surrounding issues of contractual warranties and regulatory compliance,[758] necessitates that in due course claimant parties would look to remedies in tort if desired energy performance was not achieved.

The parties to these notional proceedings are as clarified in Chapter Four.[759] Briefly, these could include secondary titleholders, lessees, or any other party not in privity with the design/construction team, or (depending on developments in the area of concurrent liability)[760] parties in privity where contractual remedies are somehow excluded, or as a concurrent claim in contract and tort. As explained above, I shall refer to all such parties as 'claimants', making distinctions where necessary. It is not my project to construct a fictional tort claim and I do not seek to make any definitive determinations as to outcomes. Rather, as my argument is that

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757 Chapter Four, The Limits of the Obvious, explores the more intuitively appropriate remedies in relation to performance gap issues, specifically focusing on the scope for regulatory enforcement and the limits of contractual remedies.
758 I explore these issues in Chapter Four Sections d) and c) respectively.
759 At Chapter Four Section b)i.
760 Discussed below in text between n 818 – 838.

tort liability in relation to such problems is unlikely, I seek rather to identify the barriers to liability, and to interrogate their implications and susceptibility to change. I explore these issues from two key perspectives. I contemplate the position of the titleholder of a property with poor energy performance, and what recourse she might have in relation to this. I also ask some deeper questions about what this issue tells us about tort's role in a climate change context. I question to what extent climate change issues would be 'invisible' in putative litigation of this nature and what the implications of this are. This includes both the extent to which the harms would be unacknowledged even in successful litigation, but also the instrumental role that tort and other private law remedies (or the lack thereof) might play in this complex and challenging policy area.

The first part of the thesis has laid the groundwork for the discussion in this chapter. In the first two chapters, I explored practically how energy efficiency in domestic buildings might be achieved, how this is measured,[761]and how performance shortcomings are likely to arise.[762] I explained that the relevant regulations prescribe mandatory minimum standards for installed features that contribute to energy efficiency,[763] and how these are enforced.[764] This chapter brings me to explore when and in what circumstances a party might contemplate tort in response to shortcomings in in the quality and effectiveness of energy efficiency measures. I use the pluralistic model of tort discussed in the previous chapter to shed light on these explorations; this includes examining to what extent the problem can be encompassed within what I call tort's structural framework. I also ask questions about to what extent the climate context of the problem might or should influence outcomes, and what any such

[761] Chapter Two Section b)ii and Chapter Three Section c)i.
[762] See Chapter Two Section c).
[763] Chapter Three Section b)i and ii.
[764] Chapter Four Section c).

outcomes might mean instrumentally given the climate and energy policy context of the problem.

The ordering of the chapter is slightly counterintuitive,[765] but (as I explain below) the structure I have used is more helpful because of the elusive nature of loss. I start the chapter with a discussion of how the losses suffered by a claimant in this context might be conceptualised within the requirements of damage for negligence, arguing that these constitute defective product pure economic loss. Next, I engage in a fairly lengthy discussion of the duty of care in negligence, questioning whether there might ever be sufficient justification to deviate from the 'orthodox' no-duty position. I discuss the explanatory force offered by a deep structural model of tort based on the claimant's protected interests in the context of her correlative relationship with the defendant.

I then move directly to remedies, commenting on their constraints in relation to the claimant's protected interests, from where I move into a discussion of the instrumental effects of negligence in this context. I discuss the implications of tort's potential to compensate the claimant, and what this means in terms of the common law's allocation of both the costs of climate change mitigation strategies, and the risks of these failing. I also consider the regulatory potential and limits of the liability position in such cases, considering issues such as the implications of impunity for energy performance failings, and missed opportunities for shared learning. I question the extent to which the limits of liability in this area might undermine climate mitigation policy goals.

[765] Or perhaps, intuitive but unorthodox.

I do not engage in any detailed discussion of breach of duty, causation or defences. In part this is a pragmatic decision; these issues are unlikely to be aired due to the likely difficulties establishing a duty of care, and I am, of course, subject to space constraints. As I explained in the introductory chapter, there are some issues in which I have not gone into much depth, that I appreciate might be hard fought in 'live' litigation. However, I make these seeming omissions in areas where I expect that particular cases would turn on their facts, or where they present no interesting theoretical issues, or where I have discussed similar issues in depth elsewhere. So for instance, in 'live' litigation about the performance gap there may well be questions about the content of the defendant's duty of care, including questions about the standard of performance to which his product would be held, or the steps he would be required to take in assessing performance. Because of the fact dependent nature of these issues I have not gone into this in any depth; in addition the following chapter demands a thorough discussion of breach, particularly with regards to how a climate conscious approach might influence the framing of the content of care. In relation to causation, in actions with multiple defendants and particularly in larger projects, there may well be disputes about causation; however again this would be proven by expert evidence, and the convention in construction law is to apply a material contribution test.[766] With the exception of mitigation of loss, no particular issues arise in relation to defences. As I explained in earlier chapters,[767] occupant use can contribute to performance gap issues in many instances but is unlikely to contribute in relation to structural or systemic defects that give rise to such problems.

b) Excluding other torts

[766] I discuss this in more depth in Chapter Seven n 1015 and 1016 and text thereto.
[767] E.g. Introduction text to n 111-113.

In Chapter Four, I explained that the more 'obvious' places that performance gap claimants would look for a remedy – contract, regulation and insurance – do not offer satisfactory mechanisms for compensation or enforcement. This is the case even when the claimant holds first title to the property or works; this explains the relevance and importance of the position in tort. I have also said that most of my discussion relates to negligence. Before proceeding with this however it is necessary briefly to explain the absence of other remedies in tort.

In Chapter Four I also explained that no direct statutory remedy exists for non-compliance with the Building Regulations.[768] In any event, as I explain earlier, it is quite possible for a building to achieve formal compliance with the Building Regulations yet still not have good energy performance for various reasons.[769] As such, even if a statutory tort were active, a performance gap claimant might look to negligence in any event.[770]

The duties in the Defective Premises Act 1972 are unlikely to be helpful to a performance gap claimant. The section 1 duty requires, *inter alia,* that work for the 'provision' of the building to be completed to a standard that ensures the completed product is habitable.[771] This does not encompass a duty to ensure the building is free of minor functional defects, [772] and as I

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[768] See my discussion of how regulatory enforcement is deemed not to 'apply': Chapter Four Section c).

[769] This issue is discussed broadly across Chapters Two – Four.

[770] It is now well-established that formal compliance with regulation does not necessitate that a defendant has met the standard of care required of him: see M Lee, 'Safety, Regulation and Tort: Fault in Context' (2011) 74 *MLR* 555.

[771] 'Section 1(1) A person taking on work for or in connection with the provision of a dwelling (whether the dwelling is provided by the erection or by the conversion or enlargement of a building) owes a duty— (a) if the dwelling is provided to the order of any person, to that person; and (b) without prejudice to paragraph (a) above, to every person who acquires an interest (whether legal or equitable) in the dwelling; to see that the work which he takes on is done in a workmanlike or, as the case may be, professional manner, with proper materials and so that as regards that work the dwelling will be fit for habitation when completed. ' I explore the nature of the section 1 duties in more depth, in the following chapter, in Section e).

[772] Authorities pronouncing on the Act have interpreted the notion of 'habitability' strictly. *Bole v Huntsbuild Ltd* (n 453).

explained in the first part of the thesis, this is the likely characterisation of 'defects' giving rise to energy performance deficit. In addition, the Act seems applicable only to design/construction teams, and would not apply to the categories of prospective defendants responsible for compliance or certification works. This is certainly unlikely to extend to Local Authority negligence.[773]

As a final point, I have encountered suggestions, outside of the peer-reviewed literature, that in some instances performance gap issues have arisen as a consequence of deliberate or wilful obfuscation or miscertification, or 'greenwashing'.[774] There is still a dearth of information on this issue, and in any event such a discussion lies beyond the scope of the thesis. There might be scope for other torts should firmer empirical evidence of 'greenwashing' claims emerge. For now I shall focus on the common law of negligence, beginning with a discussion of the claimant's damage.

c) Damage

At present there is no or little obvious presentation of loss flowing from the performance gap problem. Factually, two strands of loss or harm flow from energy performance shortcomings: the financial costs of the additional energy use and the environmental harms caused by the small continuing carbon emissions. Neither is easily accommodated within tort.

[773] Steele (n 589) 357.
[774] Consumer Focus Report 2010 Green Deal: Misselling Available at: http://www.consumerfocus.org.uk/files/2010/12/Green-Deal-misselling-v1.0.pdf

Earlier I explained that 'defects'[775] in the property cause the claimant's loss, and explained the various ways in which her loss might be evaluated. At present, this is best conceptualised either as a reduction in her expected value of the building, a reimbursement of retrofit costs or the reasonable costs of repair/restoration. Alternatively or in addition – because the claimant will continue to use more energy than desired to achieve the same level of interior comfort[776] - she might seek to recover the ongoing additional expense occasioned by inefficient energy use.[777] Depending on what becomes of regulation supporting incentives to retrofit, going forward, in the future there might be direct losses either due to financial penalties, or forfeited subsidies or rental revenue.[778]

There being no injury [779] or damage to property in any conventional sense, these losses might be characterised as purely economic for the purposes of a tort claim. Below I discuss the leading cases establishing no duty of care for defective building pure economic loss, seeking to establish the extent to which these decisions are likely to be authority in performance gap cases, and whether there would be any basis on which to make exceptions from this orthodox [780] approach of no duty.

Key to the establishment of the dominant line of case law was the conceptualisation of the claimant's loss flowing from defects in her

[775] I explain in Chapter Four the rough-and-ready complexity that underlies the idea of 'defect' in construction cases – see Section b)ii.
[776] I briefly mentioned in Introduction (in text between n 111 – 116) that the achievement of thermal comfort can mask energy efficiency gains – this is true in all cases where improvements in thermal comfort are desirable, but is particularly stark in relation to fuel poverty.
[777] I explain losses in Chapter Four Section b)iii.
[778] Chapter Four see text between n 470 – 473.
[779] Again, this is not to disregard the implications of poor energy efficiency on human health. Cold homes are strongly implicated in increased numbers of winter deaths in some social contexts; C Liddell and C Morris, 'Fuel Poverty and Human Health: A Review of Recent Evidence' (2010) 38 *Energy Policy* 2987 2988.
[780] WE Peel and J Goudkamp, *Winfield and Jolowicz on Tort* (19th Edition, Sweet & Maxwell 2014) 284.

building as purely economic. While there is some variation in the factual basis of the cases, in *Murphy* the latent, literally foundational, defects had potential to cause physical deterioration in the building, and ultimately, danger to occupants.[781] Other decisions arose from circumstances where the nature of the defects was such that damage to the building was worse than it otherwise would have been,[782] where the defects caused an ongoing intangible danger to occupants but would not affect the fabric of the building, or where resulting deterioration required repair but there was no issue of danger to occupants or threat to the integrity of the building as a whole. The conceptual strain in these cases arises in part from the characterisation of what intuitively appears to be damaged property as a freestanding financial loss.[783]

It has been put to me that energy performance shortcomings are not a comfortable fit with the line of cases on defective product pure economic loss.[784] If anything, buildings with non-dangerous and (usually) non-deteriorating energy efficiency shortcomings sit more comfortably with loss defined as purely economic than do many of the leading cases in this area. There is no question of injury and the property cannot be characterised as damaged or dangerous in the conventional sense.[785] The absence of any

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781 In England the potential of the defects to cause danger or harm to the occupants if uncorrected makes little difference – for instance in *D&F Estates Ltd v Church Commissioners for England* [1989] AC 177.

782 *Bellefield Computer Services Ltd & Ors v E Turner & Sons Ltd* [2000] EWHC Admin 284.

783 The court in *Murphy* relied heavily on the dicta in Australian case of *Council of the Shire of Sutherland v Heyman* [1985] HCA 41 at 60-1 that a property could not be said to be damaged by its own latent defects – 468 in *Murphy*.

784 This was raised by a discussant in response to an early version of the paper: K Bouwer, 'When Gist Is Mist: Mismatches in Small Scale Climate Change Litigation' (2015) 27 *Environmental Law and Management* 11. It was suggested that this problem would be better conceptualised as 'loss of a chance', in respect of which, of course, pure economic loss is recoverable – *Allied Maples v Simmonds & Simmonds* [1995] 4 All ER 907. Having examined the authorities in this area I have discounted this as being more of a semantic than a conceptual match – the loss of a chance for energy efficiency. The underlying factual matrix is distinct, and, as I explain above, there would be quantifiable loss in most performance gap cases.

785 Although this can happen, see: M Davies and T Oreszczyn, 'The Unintended Consequences of Decarbonising the Built Environment: A UK Case Study' (2012) 46 *Energy and Buildings* 80.

'imminent danger to health and safety' [786] means that the intellectual acrobatics and seemingly incongruous results typified by some of the *Murphy* line of cases would not be at issue here.

Thus, the loss the claimant suffers as a consequence of the energy performance shortcomings is recognised in tort as purely economic. In the structural model of tort I outline in the previous chapter, I explained that interests underlying freestanding financial losses are fairly low in the hierarchy of protected interests.[787] The implications of this are that these losses are not normally recoverable other than in very specific circumstances, usually when a close relationship exists with the defendant. However, despite the limitations on liability in relation to pure economic loss, these losses are at least recognised and visible in the structure of a tort claim. The reasons for the denial of a duty of care are at least overt, if incoherent.

There are other kinds of injury or harm that arise through ineffective energy efficiency measures. This happens at two stages of removal. First, absent any significant changes in fuel supply, the claimant's property will continue to emit greenhouse gases. The surplus emissions from each discrete property are negligible in terms of their contribution to the national greenhouse gas/carbon emissions, and probably even in terms of local pollution. This type of harm raises apparently insurmountable problems for the law of tort.[788] Simply contributing to the atmospheric

[786] Per Lord Bridge in *Murphy v Brentwood DC* (n 442). So: If a builder erects a structure containing a latent defect which renders it dangerous to persons or property, he will be liable in tort for injury to persons or damage to property resulting from that dangerous defect. But if the defect becomes apparent before any injury or damage has been caused, the loss sustained by the building owner is purely economic. If the defect can be repaired at economic cost, that is the measure of the loss. If the building cannot be repaired, it may have to be abandoned as unfit for occupation and therefore valueless.

[787] Cane (n 561) Chapter Three.

[788] In the US context this is neatly captured by Kysar (n 75) quoting from Judge Cardozo's controversial judgment in *Palsgraf v Long Island Railroad Company* 162 N.E. 99 "…negligence is

carbon load cannot, on an orthodox approach, constitute actionable damage in negligence.[789] The lack of alignment with the claimant's protected interests means that these issues are 'invisible' in a tort claim. I argue below that it seems unlikely that the defendant will owe a duty of care not to cause the claimant's loss. However, if he could, the environmental implications of energy efficiency shortcomings would in all likelihood, be 'invisible' in the litigation because of their lack of alignment with the claimant's protected interests.

As I have explained, excess or unnecessary greenhouse gas emissions do not in themselves constitute actionable damage or even harm. However, in every such instance these excess emissions make a marginal contribution to a global phenomenon that does and *will* cause significant damage and harm.[790] For the avoidance of doubt, I am not envisaging litigation seeking to hold defendants liable for contributing to climate change by reason of their underperforming construction work. However, if we are to acknowledge climate change as a multiscalar problem, the importance of addressing mitigation efforts on every level becomes apparent.[791] This is the context within which energy efficiency improvements are situated and in which any litigation concerning their deficiencies will occur (or not).

d) Duty

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not actionable unless it involves the invasion of a legally protected interest, the violation of a right… negligence in the air… will not do…"

[789] I discuss this more explicitly in Bouwer (n 764) 14 – 15.

[790] Of course, damage is not the only issue: doctrinal strain in respect of every other element of a negligence claim is predictable in relation to both the above. See my discussion at n 75 – 76 in Chapter One and text to n 654 - 706 in Chapter Five.

[791] I explain this in Section c) in the Introduction, drawing heavily on the work of Hari Osofsky. See HM Osofsky, 'Adjudicating Climate Change across Scales' in WCG Burns and HM Osofsky (eds), *Adjudicating Climate Change* (CUP 2009) and J Peel, L Godden and RJ Keenan, 'Climate Change Law in an Era of Multi-Level Governance' (2012) 1 *Transnational Environmental Law* 245 249 & 272.

Having established the likely categorisation of the claimant's damage for the purposes of tort, I will turn to examine when a defendant owes a common law duty to the claimant in respect of that damage. The orthodox position lies in a general exclusion of a common law duty of care not to cause pure economic loss, in tort, to which specific exceptions are allowed. Scholarly analysis of this contradictory area is divided between a preference for a categorisation or 'pockets' approach,[792] and broader concerns that categorising loss based on arbitrary criteria could obscure the express and implicit considerations underlying the different decisions.[793] A practical way to reconcile these seemingly polarised approaches is to accept the categorisation approach as useful while appreciating that deeper analysis of the implicit and explicit is required.[794] To this I would add, that in addition to doctrinal analysis, an appreciation of the deep structural underpinnings of this area can help to make sense of the seemingly chaotic 'policy' considerations that inform the conflicting decisions.

The resolution of these issues is of direct relevance to the subject matter of the thesis. In relation to poor energy performance in domestic buildings, the claimant's routes to liability are not predetermined: either she must accept the absence of liability or place herself within an exception created by *Murphy*[795] and its descendants. Alternatively she could seek to establish a duty of care based on the defendant's assumption of responsibility towards her,[796] either by virtue of a provision of services or with respect to her representations concerning the condition of the property. The recent

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792 C Witting, 'Duty of Care: An Analytical Approach' (2005) 25 *Oxford Journal of Legal Studies* 33; P Benson, 'The Basis for Excluding Liability for Economic Loss in Tort Law' in DG Owen (ed), *Philosophical Foundations of Tort Law* (OUP 1997) makes the latter point. Also B Feldthusen, *Economic Negligence: The Recovery of Pure Economic Loss* (Carswell 1984).
793 J Stapleton, 'Duty of Care and Economic Loss: A Wider Agenda' (1991) *LQR* 249.
794 Steele, *Tort Law* (n 589) 339 – 340.
795 *Murphy v Brentwood* (n 442).
796 C.f. Lord Goff in *Henderson v Merrett Syndicates Limited* [1995] 2 AC 145 – 'an assumption of responsibility akin to contract'.

decision seeking to reconcile these strands of case law has done so poorly and with little regard for alternative authorities.[797]

I shall now consider these different routes to liability in the context of the thesis area. I shall consider the leading authorities in relation to the alternative strands, examining the lack of attention on the different underlying contexts of some of these cases and the nature of the duties owed. I question whether the subsequent confusion in the case law was 'resolved' with their unhelpful conflation in *Robinson v Jones*.[798] After that, I look at the covert and overt policy reasons for the duty positions in this area, and consider how a deep structural approach to tort can be informative about what we consider valuable in this context, and under what circumstances. I consider to what extent climate change issues could demand or compel changes to these deep structural priorities. Throughout the discussion I draw comparators between likely performance gap disputes and the factual matrices reflected in the case law.

i. Leading cases

While it might be somewhat fallacious to speak of a blanket denial of liability in areas of pure economic loss the leading authorities in defective product economic loss cases do seem to have adopted such an approach. In *Murphy*,[799] the House of Lords reversed previous authority [800] to deny that a local authority has a duty of care [801] not to cause pure economic loss

[797] *Robinson v Jones* (n 442).
[798] Ibid.
[799] *Murphy v Brentwood* (n 442) - *inter alia* because the Lords would not find a Local Authority's liability to extend beyond that of a builder - and *D&F Estates v Church Commissioners* (n 781).
[800] *Anns v Merton London Borough Council* [1977] UKHL 4.
[801] Lord Bridge would not contemplate tortious liability for pure economic loss in respect of defective buildings that did or did not put occupants at risk, unless arising "in the absence of a special relationship of proximity … sufficiently akin to contract as to introduce the element of reliance.' He echoed the language of "transmissible warranty of quality", used by Lord Keith.

in the exercise of its duties as building controller,[802] in the absence of a 'special relationship' between the parties. Simultaneously *D&F Estates* found no duty of care on the part of the design/construction team,[803] and equivalent liability was found in relation to commercial properties.[804] Much of the expressed rationale for the decision in *D&F Estates* was the logical need to ensure that the builder's liability did not extend beyond that of the local authority. But in *Murphy* little attention was genuinely afforded to the public authority aspects of the decision; much of the judges' reasoning centres on the questions of liability in relation to the creation of the structure, rather than the compliance function played by the local authority agent.[805]

As discussed above, despite the potential for danger posed by these defects in each case loss was characterised as purely economic. It seems to me that the exclusion of liability in relation to defective product pure economic loss would be the default position or starting point either against a design/build team, or a local authority exercising its powers as building control, in any litigation arising from performance gap issues. The absence of any overt or immediate danger to either the building or its occupants, if anything make this position a more comfortable fit, as I shall discuss further below.

Under the contemporaneous *Smith v Bush,*[806] however, the defendant surveyor was under a duty not to cause the claimant pure economic loss by virtue of his negligent provision of services. The basis of his liability was

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802 As I explained in Chapter Four n 442, while the distinction between professional/non-professional defendants may be relevant in 'live' litigation, this is too fact-specific to explore in the thesis. In any event the caselaw suggests this distinction is being eroded.
803 *D&F Estates v Church Commissioners* (n 781).
804 *Department of the Environment v Thomas Bates and Son Ltd* [1990] 3 WLR 457.
805 There is also, presumably due to the decision on duty, no guidance as to whether the nature of the local authority's conduct made any difference, as presumably liability in relation to a simple omission would be less, not more likely than the agent's failings in *Murphy*.
806 *Smith v Eric S Bush (A Firm)* [1990] UKHL 1.

the claimant's reliance on what is now deemed to be the surveyor's assumption of responsibility. His disclaimer was held to be unlawful.[807] Despite some contention as to whether this was an instance of extended *Hedley Byrne* liability,[808] its scholastic reinterpretation has placed it firmly within the ambit of an assumption of responsibility.[809] Certainly post-*Barclays*,[810] there is little question that an assumption of responsibility on the part of the defendant can establish a duty of care not to cause pure economic loss.[811] Much has been made of the illogical absence of liability for the construction of the unsafe building juxtaposed with the potential for a duty of care in relation to negligent misstatements as to its condition. Little has been made of the fact that the defendant's conduct in *Murphy* – the provision of assurances as to the durability of the property – bears more resemblance to the provision of a surveyor's report in *Smith* than the sub-contractor's plastering work in *D&F Estates* and could have as easily been dealt with under the exception for negligent misstatements.

Subsequent to this, prudent claimants sought to protect their position by means of the imposition of 'duty of care deeds' with additional tort-like

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807 Under ss 11(3) and 13(1) of the Unfair Contract Terms Act 1977, the former of which emphasises reliance. Lord Griffiths took account of the relative bargaining power of the parties, the ease (and expense) with which the claimant would have been able to obtain the advice elsewhere, the degree of difficulty of the task being undertaken and the practical consequences of the decision on the question of reasonableness, basically, which party should bear the loss.

808 *Hedley Byrne & Co Ltd v Heller & Partners Ltd* [1963] UKHL 4. Lord Griffiths expresses doubt as to the usefulness of the assumption of responsibility test, but does not explicitly reject it; McBride and Bagshaw (n 700) at 217 note that Lord Griffiths had to find the *Hedley* test to be nonsense or he could not have made the finding that he did. Lord Bridge in *Caparo* believes the court in Smith rejected the Hedley 'assumption of responsibility' test – asserting that this is implicit in the judgement, which focuses predominantly on reliance in circumstances 'akin to contract' (per Lord Templeman) but states that there is never an explicit rejection of the assumption of responsibility test. Lord Jauncey in *Smith* specifically states that he does not believe the parties' relation to be akin to contract. Lord Justice May in *Merrett v Babb* [2001] EWCA Civ 214 resists a defendant's claim that *Smith* was a descendant of *Anns* and therefore questionable, asserts it to be a precursor of *Caparo,* at para 30.

809 M Lunney and K Oliphant, *Tort Law: Text and Materials* (5th edn, OUP 2013) categorise *Smith* as a natural extension of *Hedley Byrne* principles, see 407 – 413; Steele (n 589) treats this as an assumption of resonsibility case while also noting the contention around the decsion, at 364 – 7. Alternatively.e.g. K Barker, 'Wielding Occam's Razor: Pruning Strategies for Economic Loss' (2006) 26 *OJLS* 289.

810 *Her Majesty's Commissioners of Customs and Excise v Barclays Bank plc* [2006] UKHL 28.

811 Even if *Caparo Industries pIc v Dickman & Ors* [1990] UKHL 2. is not satisfied.

duties into contractual arrangements.[812] Of course, the potential for any remedy in tort was severely circumscribed following these blanket exclusions, and claimants sought either to bring themselves within the narrow exceptions created by *Murphy* or to seek to establish an assumption of responsibility on the part of the defendant in relation to the provision of services. Five years later *Henderson v Merrett* extended the circumstances in which a defendant could be found liable on the basis of his assumption of responsibility, to include the provision of services.[813] This should have created space for liability against the design/construction team arising from their construction services, potentially running concurrently with contractual liability.[814] The remaining potential for a duty of care existed in the elusive 'special relationship' discussed in *Murphy*.[815] This challenged litigants to establish when a defendant might be said to have assumed responsibility, and when and whether this was equivalent to a *Murphy* special relationship, and what the effect of contractual privity might be on either. It would be some time until the first issue was clarified in *Barclays*,[816] assuming that the *Murphy* 'special relationship of proximity' bears resemblance to the *Caparo* 'relationship of proximity'.

The subsequent decisions in the lower courts reflect the uncertainty created by these conflicting decisions combined, perhaps, with uncertainty as to the status of the assumption of responsibility test.[817] The obvious questions seemed to be to when *Murphy* or *Henderson* might be applicable, and how

[812] Deakin, Johnston and Markesinis (n 465) 23.
[813] *Henderson v Merrett* (n 796).
[814] See text to n 817 – 831 below.
[815] Lord Keith's obiter comments leaving this open, concerned *Pirelli General Cable Works Ltd v Oscar Faber & Partners* [1983] 1 All ER 65 and *Junior Books Ltd v Veitchi Co Ltd* [1982] UKHL 4 which he reinterpreted as instances of assumption of responsibility by the defendant. General discomfiture with this decision, even during the reign of *Anns,* eventually led to its being accepted as a unique decision made on its own facts, due to very specific representations made by the defendant during negotiations, until it was absorbed into the *Hedley* family by Lord Keith. See e.g. discussion in McBride and Bagshaw (n 700); A Rodger, 'Some Reflections on Junior Books' in P Birks (ed), *Frontiers of Liability Vol. 2* (OUP 1994) gives a less sympathetic view.
[816] *Commissioners of Customs and Excise v Barclays* (n 610) particularly by Lord Bingham (5-8)
[817] S Hedley, 'Negligence. Pure Economic Loss. Goodbye Privity, Hello Contorts' (1995) 54 *CLJ* 27.

and in what circumstances a defendant might be said to have assumed responsibility, or be in a 'special relationship' with the claimant (particularly when the latter was a secondary title holder). A further significant issue would be when a contract might found concurrent liability in tort, and what the extent of that liability might be – specifically, whether this extended to a duty not to cause pure economic loss. A simple solution would seem to be for claimants (certainly those with first title) to seek to bring their action within *Henderson* liability. It is unclear to what extent questions about the use and utility of the assumption of responsibility test to establish a duty of care in relation to pure economic loss, pre-*Barclays*, might have discouraged litigants from relying entirely on Henderson.[818]

The authorities that follow reflect the uncertainty created by these two contrasting decisions.[819] The secondary-title holder claimant in the *Bellefield* litigation failed to establish that the construction team owed him a duty; here the design defects (which constituted a breach of the building regulations) caused a fire, which damaged the building.[820] The architect, however, owed a duty to the construction team on the basis of his assumption of responsibility.[821] Likewise in *Payne v Setchell*[822] (a subsidence claim) the judge was confined to *Murphy and DF Estates,* in finding no tort duty concurrent with contract could encompass a duty not to cause the claimant pure economic loss. In *Tesco v Costain*[823] the building contractor defendant did owe duties not to cause pure economic loss to the claimant

[818] *Customs and Excise v Barclays* (n 610).
[819] It should be noted that all of the above disputes related to defects in commercial properties, and I suggest below that there might be distinct policy considerations in relation to domestic and commercial premises. Specifically, these 'defects' might bring about dangers to the claimant's family or the eventual destruction of her home. Whether the non-domestic properties at the heart of most of the subsequent authorities was of significance in the decision, is not expressed.
[820] *Bellefield v Turner* (n 442). Lord Justice Schiemann acknowledged this to be 'odd' and unsatisfactory, but found himself bound by precedent.
[821] *Bellefield Computer Services Ltd v E Turner and Sons Limited*, also known as *Bellefield Computer Services Ltd v Watkins* [2002] EWCA Civ 1823.
[822] *Payne v Setchell* (n 442).
[823] *Tesco Stores Limited v Costain Construction Limited, Costain Limited, Peter Hing and Jones (A Firm), Vale (UK) Limited, Whitelight Industries Limited* [2003] EWHC 1487 (TCC)

both by virtue of the provision of his design/construction services and the onsite inspections of the property; however that duty did not extend to the fire damage exacerbated by non-compliance with the building regulations. In *HOW Engineering Services Ltd v Southern Insulation (Medway) Ltd*, [824] an interlocutory application related to the Linklaters litigation [825] Judge Akenhead was content to accommodate *Henderson* concurrency principles within the general *Murphy* principle. In essence the subsequent authorities resolved matters satisfactorily or otherwise on a piecemeal basis but little has been achieved in terms of clarifying when and in what circumstances a duty of care might arise, despite calls for clarification from leading commentators. [826]

The court in *Robinson v Jones* [827] acknowledged this need for clarification but did not provide it. It sought to establish when and in what circumstances a building contractor might owe a duty of care in tort, concurrently with his contractual duties, where an express contractual disclaimer excluded this. The claimant was a primary title-holder and the defect in question (faulty gas flues) not only fell below the minimum standard prescribed in the building regulations, but also had potential to endanger the safety of the claimant's family. [828] The standard form contract excluded liability for defects in equipment or fittings, or arising in the execution of the work, to

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[824] *HOW Engineering Services Ltd v Southern Insulation (Medway) Ltd* [2010] EWHC 1878 (TCC).
[825] *Linklaters Business Services v Sir Robert Mcalpine Limited, Sir Robert Mcalpine (Holdings) Limited* [2010] EWHC 2931 (TCC). The litigation subsequently went against the claimant on the facts: *Linklaters Business Services (formerly Hackwood Services Company) v Sir Robert McAlpine Limited, Sir Robert McAlpine (Holdings) Limited* [2010] EWHC 1145 (TCC).
[826] Cited in the judgment at paragraph 54, the 2006 edition of Keating on Construction Contracts pleaded as follows: "It is difficult to disagree with the view that a contract which stipulates that the contracting party will perform certain services involves an assumption of responsibility which will normally be relied upon by the other contracting party. On the other hand it is true that the authorities prior to *Henderson v Merrett*, and in particular *Murphy,* did not envisage a builder (or possibly a builder-designer or a pure designer and supervisor of work) owing duties of care in respect of economic loss. This difference of view requires a reconciliation of these two different streams of authority which will have to await a decision from the Court of Appeal or the House of Lords."
[827] (n 442).
[828] In addition, minimal loss of amenity damages were claimed due to the period in which the fires were not used.

the extent that cover was not provided by the National House Building Council's protective scheme.[829] The overwhelming focus on and basis of the decision is the narrow approach to concurrency of duties in contract and tort. Lord Justice Jackson accepted that the existence of a contract 'would not prevent' duties in tort arising in the construction context, but was reluctant to find any but the most rudimentary duties - not to cause personal injury or property damage – in the absence of an assumption of responsibility.[830] The decision suggests that tortious duties not to cause pure economic loss in the context of defective buildings could arise where the defendant has assumed responsibility in relation to the retainer for provision of their professional services.[831]

Perhaps regrettably, there was no appeal of this decision. From one perspective, it has shown a restrained approach to the encroachment of tort onto the sanctity of contract.[832] It is clear both from the decision and extra-judicial writing that theoretical and conceptual concerns about the separation of contract and tort were influential.[833] It might have been open to the court to find that the contractual relationship evidenced a sufficiently close bond between the parties to create a duty of care in tort;[834] the court instead found this to exclude additional duties that resembled a additional warranties of quality beyond those already contained in the contract. This implicitly suggests that the claimant would willingly purchase a property

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829 The court found that this exclusion was satisfactory for the purposes of the Unfair Contract Terms Act 1977 – this despite the fact that the NHBC cover had in any event expired a few years previously. I briefly cover this householders warranty insurance cover briefly in Chapter Four at Section e) emphasising that even when a valid policy exists, this would not help the performance gap claimant.

830 Para 68 and 81. Echoed by Lord Justice Stanley Burton, stating the duties are 'not identical'.

831 Paras 75 – 80. I refer to this in Chapter Four at n 442: this distinction had steadily become eroded but the decision only seems to contemplate the existence of a professional retainer as capable of forming the basis of an assumption of responsibility.

832 J O'Sullivan, 'Building Contracts - Is There Concurrent Liability in Tort?' (2011) 70 *CLJ* 291.

833 Lord Justice Jackson, 'Concurrent Liability: Where Have Things Gone Wrong?' (Technology & Construction Bar Association and the Society of Construction Law, 30 October 2014).

834 This seems logical to the writer and is the view expressed in Keating (n 826).

without any generalised quality assurances, which does not make sense.[835] This approach could be more easily justified were the parties on equal standing both in status and knowledge, and in a strong position to negotiate terms, which was not the case in *Robinson.*[836] Significantly, the decision does not follow the guidance given concerning the establishment of a duty of care for pure economic loss, in *Barclays*,[837] nor indeed even mention the case in either judgment.

Concurrency issues aside, the decision recognises the uncertainty created by the dual strands of case law and the express need for clarification and guidance for litigants. It would have been open to the court to find that the existence of the contract created a special relationship of proximity as contemplated in *Murphy*, or, that an assumption of responsibility existed concurrently with the contractual obligations. Of course, even with the restrictive approach taken, it was open to the court to provide guidance as to the use of the two conflicting strands of authority. Arguably guidance along the lines of *Barclays*,[838] which was not mentioned, could have provided a workable reconciliation of the two approaches even in a general context of no duty. The decision purports to resolve this issue with the declaration that absent any assumption of responsibility, there is no duty not to cause pure economic loss.[839] In finding without discussion that this position fits with *Murphy,* it is unclear whether the intention was to eradicate any scope for residual liability to exist after *Murphy,*[840] or whether

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835 McBride and Bagshaw (n 700) describe this as 'heretical'.

836 The parties entered into a standard form construction contract. The builder's disclaimer which limited protection to that provided under the NHBC's scheme was found to be sufficiently protective, and pass the muster of the Unfair Contract Terms Act 1977.

837 *Customs and Excise v Barclays* (n 610).

838 Per Lord Bingham at para 4.

839 Para 66 – 68.

840 With the exception of complex structure theory (if this even survives) which is expressly excluded at paragraph 45. In discussion of an early version of Bouwer (764) it was put to me that the solution to the no-liability problem in relation to energy efficiency in buildings – particularly retrofit – might lie in complex structure theory. Having considered this, it seems that this is appealing for semantic reasons alone. The issue remains, as I discuss above in relation to damage, the absence of actionable

this was an assertion of equivalence in the two tests, effectively collapsing the *Murphy* 'special relationship of proximity' into the assumption of responsibility test. This severely restricts the potential for a claimant ever to be owed a duty not to cause pure economic loss in these circumstances; after *Robinson* there is little scope for co-extensive duties in contract and tort in the buildings context, and none to secondary title-holders who can hardly be said to be in a 'relationship akin to contract' with an unknown design/build team. The residual liability lies against professional defendants or in contexts where no formal contract exists.[841] Of course, while the decision is not unassailable, it has probably curtailed litigation on the question of whether tortious duties of care not to cause pure economic loss, are owed in the buildings context. It seems likely that it would also have motivated construction professionals to ensure robust warranty exclusion clauses were in place before commencing work.

Coming back to the points sought to be clarified in this thesis: when and in what circumstances any of the categories of defendant discussed in Chapter Four,[842] might have a duty not to cause the claimant pure economic loss by his provision of a property that is substandard from an energy perspective. As I discussed in Chapter Four, it appears that industry practice is either to limit warranties to the quality of the installation works, or expressly exclude liability for energy performance.[843] Prior to *Robinson,* it might have been arguable that the defendant had co-extensive duties in tort in relation to energy performance (or indeed that any express exclusion clauses breach

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damage for the purposes of a tort claim, not the question of whether one part of a building could 'damage' another.

841 This sits oddly both with previous authorities, and with the facts in *Robinson*, where the design/build contract included various design decisions. P Harris, 'Economic Loss after Robinson v Jones' (A paper presented to the Society of Construction Lawyers, Oxford, 17 November 2011) however points out that given the practicalities of construction and the differing requirements on design and construction personnel – respectively feasibility and buildability – that the distinction makes sense.

842 At Section b)ii. between n 440 – 7.

843 See text to n 541 – 3, and n 108.

the terms of UCTA) by means of his assumption of responsibility. As explained in Chapter Three, the design of the building regulations is not suited to the concept of 'performance outcome' required for the purposes of SAP measurement and householder expectations.[844] Either wilful or careless communication as to what realistically can be achieved with energy efficiency improvements, does appear fairly usual in this context. It seems that a first-title claimant might well assert that a defendant had assumed responsibility in relation to a degree of energy performance, and that the claimant had relied upon that in engaging (and paying for) his services. It seems to me that in relation to energy retrofit projects - where the sole purpose of the project is to ensure improved energy performance – and particularly where the claimant has incurred debt for the purposes of the works, there would be compelling reason to find that the parties had a relationship 'akin to contract'. It seems likely that there would be an assumption of responsibility with reliance sufficient for *Barclays,*[845] however post-*Robinson* this seems unlikely unless very specific policy arguments were made. This leaves open all sorts of questions about when a claimant might be said to be in a special relationship of proximity with the defendant, particularly where that claimant was a secondary-title holder or had no direct dealings with him (for example, as a local authority tenant). There appears to be little scope left to find any duty in tort arising from the provision of a building or building works, not to cause pure economic loss arising from poor energy performance.

Of course, liability for negligent misstatements under *Smith v Bush,* remains untouched. There is still potential for an assessor or surveyor to owe a duty not to cause pure economic loss in negligently miscertifying the property, where the claimant relied on the advice given in making

844 See Chapter Three b)i and c)i.
845 *Customs and Excise v Barclays* (n 610): this is assessed objectively: 5. 73, 86.

purchasing, tenancy or renovation decisions. While in the current domestic property market it seems almost inconceivable that issues like energy efficiency would impact on purchasing decisions overall (although less so concerning retrofit) there is growing evidence that home energy ratings influence purchasing decisions and price.[846] At the very least, a claimant should be able to argue that the advice given (even if simply in the form of an EPC) had an impact on price. Accordingly, a defendant energy assessor is likely to have a duty of care in communicating to the claimant what the energy performance of a building might be, but the circumstances in which any local authority assessor or agent, or member of the design or construction team might be held liable are extremely limited. Both in relation to energy efficiency in domestic buildings, and buildings context generally, this does not make sense, because it imposes liability on the party least closely connected to the defects, while granting (effectively) blanket impunity to the party responsible for creating the defects.

A further strange distinction arises in relation to regulatory compliance. I explained above that in *Murphy,* the Lords found that that a local authority owes no duty in the exercise of its private functions, but the discussion reflects liability as against the construction/design team. No distinction in the nature of the duties owed, or distinct policy factors, including any discussion of the allocation of resources,[847] comes out in the judgement. I explained above that space does not permit a detailed discussion of the public authority aspects of the duty of care in this context, and in any event there is little overt treatment of this in the authorities, so to some extent this point is made lightly. In any event the compliance and enforcement function exercised by the local authority building control is, as I explained in Chapter Four, now almost invariably privatised and conducted for

[846] Chapter Three text between n 391 – 397.
[847] See discussion of liability for pure economic loss generally in Peel and Goudkamp (n 780) 116.

profit,[848] as was the case in *Murphy*. In relation to energy efficiency compliance, the energy assessor would probably have a duty of care not to cause pure economic loss arising from his incorrect and negligent certification of the building's energy status; however the private building controller would owe no such duty where he negligently stated that the building complied with the building regulations, including Part L. Apart from the historical development of these two lines of case law (which has to some extent involved a reinterpretation of the basis of liability under *Smith*) there seems little reason for this.

ii. Policy

The preceding section explains the messy authorities in relation to the question of when a possible defendant – designer, construction team, local authority building controller, private or local authority lessor, or energy assessor – might owe a claimant a duty of care not to cause his pure economic loss flowing from defects in his building. The purpose of this was to explore the prospects of a claim in tort, for a performance gap claimant. I have explained that, save for some very narrow exceptions, there is no duty not to cause a claimant pure economic loss in these circumstances. This has been asserted as the orthodox position, and consistent with *Donoghue* liability,[849] but as stated in one leading textbook, 'it is not clear why this should be so'.[850] These exclusions are more commonly thought to be based on policy.

Of course, if the decisions excluding liability were simply based on policy then alternative policy reasons of overriding importance – including the urgent need to reduce our carbon emissions to mitigate climate change -

[848] See text to n 849 and below.
[849] *Robinson v Jones* (n 442) para 69.
[850] Peel and Goudkamp (n 780) 284.

should be sufficient to justify there being a duty. As discussed earlier, the environmental 'harms' or potential for environmental harms created by the resulting unnecessary carbon emissions, are invisible in the tort claim. However, despite not being visible in the litigation in the direct sense, it is compelling to argue for justifications for further changes based on the social or environmental context, specifically the urgent need for climate change mitigation measures to be implemented across scales.[851] In the next part of the chapter, I challenge the idea that the complex doctrine underlying the denial of liability for pure economic loss admits of such immediate flexibility. I suggest that, while alternative outcomes are not impossible, they represent more profound and structural changes then a simple policy change. First, I shall examine the overt and 'covert' reasons for the limitations on the duty of care for pure economic loss in the buildings context. Then, drawing on the working model of tort that I outlined in the previous chapter, I shall raise some questions about how incidental the overt policy factors are, and whether the denial of the duty of care can be interpreted as consistent with tort's deep structure. In short, I shall consider liability as requiring a close correlative bond where the underlying protected interests are weak. This can be a useful explanatory tool for the slightly odd outcomes discussed above. In addition, this structural understanding of tort is also illuminating of the interests we have collectively chosen to protect, but also raises questions about what it would mean for these to change. I suggest that any deviation from the orthodox position is not incidental or accidental, and would come about as reflective of the true nature of those interests.

Trying to find some meaningful coherence in the overt policy reasons for the denial of a duty of care not to cause pure economic loss is a baffling

[851] As previously explained, I rely heavily on Osofsky e.g. (n 791) who argues that climate change demands a multiscalar response – I explain this in the Introduction at Section c).

and frustrating exercise. Judges frequently voice concerns about indeterminate liability,[852] but of course were this the definitive test, it would explain poorly why exceptions were made in some circumstances.[853] If, as has been argued, a proper understanding of the limits of liability in this area is only possible by means of a proper analysis and distillation of the true policy factors underlying liability, then this requires an examination of both the express and implicit factors weighing on the judges' minds when making their decisions. Stapleton's extensive analysis reveals that judicial anxiety about indeterminacy, both in volume or value (to which I would add, time, as explained in more depth in the following paragraph), is only one such factor.[854] She identifies other legitimate concerns, which either expressly or implicitly constrain liability in these circumstances.[855] These include an aversion to judicial 'legislation', the possibility of alternative protection against the risk, as well as the relative socio-economic position of the parties. Of course, the latter two issues seem arbitrary factors on which to base the finding of a legal duty; however as I explain below recognising such concerns could reflect some nuance in the understanding of the issues at stake. There is also respect for the sanctity of contract: that liability rules should not be seen as circumventing either a contractual bargain between the claimant or defendant, or a clearly understood allocation of risk as between the parties. This could be seen as effectively imposing quasi-contractual obligations between parties having already sought to exclude these.[856] With the exception of the last issue, which I have already discussed because of its dominance in *Robinson v Jones*, I shall examine these in turn and in the research context.

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852 Cardozo J in *Ultramares Corp v Touche* (1931) 255 N.Y. 170.
853 As I mention above in the text around n 792, why 'pockets' of liability exist.
854 Stapleton (n 793), summarised at 284: she restates the policy factors that she considers to have informed decisions.
855 Stapleton explains that often the 'real' reasons for the decisions are not express, and vice versa.
856 Deakin, Johnston and Markesinis (n 465) 120.

A reluctance to impose 'indefinitely transmissible warranties of quality', on construction teams was prevalent in the speeches in *Murphy*.[857] While there are very good reasons to manage indeterminate liability [858] there does not seem to be a genuine risk of this in the buildings context. There is certainly no danger of an indeterminate number of claimants or spiralling amounts of money being claimed as in some relational economic loss cases. Even with temporal indeterminacy, it is unlikely that the issue would arise more than once. Of course, the judiciary would have social concerns about increased litigation generally, and indeed jurisdictions that have retained *Anns* have noticed increased an increase in litigation arising from building defects.[859] However because the materiality of the subject matter restricts the proliferation of disputes this cannot logically be equated to a bursting of the floodgates; instead this suggests that claimants with genuine grievances have found a remedy in tort.

Another key policy factor is the availability of other remedies or means of protection against the risk; specifically, the relative ease with which the claimants could have or did engage first party insurance to cover their losses. [860] While an argument that the existence or otherwise of insurance for either party is hardly a principled doctrinal reason for extending or denying liability, its presence is apparent in the leading decisions, and its prevalence in pre-determining the allocation of risk in transactions must be accepted.[861] The *Murphy* claimant, for instance, was in effect the insurance company exercising its right of subrogation. While householder insurance

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857 Per e.g. Lord Bridge 481, Lord Keith 469. T Weir, 'Errare Humanum Est' in Peter Birks (ed), *Frontiers of Liability Vol. 2* (OUP 1994): 'a failure to protect a stranger from a bad bargain'.
858 Cardozo J *Ultramares v Touche* (n 852).
859 S Todd, 'Policy Issues in Defective Building Cases' in J Neyers and others (eds), *Emerging Issues in Tort Law* (Hart Publishing 2007) emphasises that all jurisdictions which permit claims for pure economic loss arising from defective buildings, experienced a dramatic upswing in defective building cases. This would suggest that it was appropriate to find a duty, rather than the opposite.
860 Cooke (n 551).
861 Merkin and Steele (n 549).

is ubiquitous in Britain, there is no absolute guarantee that, in particular, minor cosmetic defects would attract cover, that cover would be comprehensive and that claiming on insurance would not have some costs either for the claimant individually or in relation to the cost or availability of householder insurance in general.[862] In *Robinson* the Court of Appeal considered the protection conferred under the National House Building Council's scheme to be adequate, however, the operation of this scheme has been quietly limited by agreement with the government, and so may well not confer any or adequate protection. [863] It is also unlikely that it would have offered any solace to the claimant in *Robinson* – it confers protection for ten years after completion, and the insurance offered under the Scheme only covers 'major damage' resulting from structural defects or subsidence, and only in some cases, failure to comply with the building regulations which results in danger to the occupants. [864] Whilst it is obviously important that a claimant would have some recourse,[865] the role of tort remains specific.[866] As I explore in Chapter Four, because of the likely characterisation of defects causing energy efficiency failings as minor functional defects, it is unlikely that parties could insure against them.[867]

By the same token, the relative social and financial position of the parties should also not be determinative in a 'policy' sense. It is fairly commonly accepted that the claimants in *D & F Estates* and *Murphy* were not exactly penurious. [868] Stapleton argues that the decision in *Smith v Bush* was granted

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862 BS Markesinis and S Deakin, 'The Random Element of Their Lordships' Infallible Judgment: An Economic and Comparative Analysis of the Tort of Negligence from Anns to Murphy' (1992) 55 *MLR* 619 – we are reminded that Mr Murphy's neighbour was unable to persuade his insurance company to accept liability, and that Norwich Union although covering Mr Murphy's loss would not cover comprehensively; he had to fund his own removal costs.
863 Wallace (n 215).
864 Cane, *Tort Law and Economic Interests* (n 584) 200, 420 also Wallace (n 215).
865 Which presumably boils down to whether the defendant is either insured or has sufficient assets to meet a judgment, a factor which would be determined preaction.
866 Stapleton, 'Tort, Insurance and Ideology' (n 578).
867 See Chapter Four Section e) – also the NHBC scheme is unlikely to apply.
868 Weir (n 857) sums this up bluntly but much of the factual context comes across in the judgments.

with a plain desire to protect the claimant purchaser of a 'modest dwelling', considered of relatively humble means.[869] It has been suggested that sensitivity to the differing socio-economic conditions and the desire to afford protection to relatively vulnerable homeowners as a class, explains why other common law countries have deviated from *Murphy* as this applies to dangerous defects in domestic properties.[870] While this is commendable and understandable, it is an arbitrary consideration to determine general duties of care in tort.[871]

As far as defective buildings in general are concerned, both the stated and Stapleton's distilled policy reasons are not very convincing reasons for a denial of liability in this context. There were and are, however, pressing reasons to extend (or retain) a duty of care in defective buildings cases, most specifically social need to discourage shoddy building work by forcing accountability for serious defects through the tort system.[872] These issues were comprehensively aired in the Law Commission's *Civil Liability of Vendors and Lessors for Defective Premises.*[873] This deep study of the implications of effective impunity or 'capricious'[874] distinctions in the pre-*Anns* common law[875] recommended radical changes not limited to legislative measures.[876] Perversely in the leading authorities the Lords

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869 Stapleton (n 793).
870 E Quill 'Consumer Protection in respect of defective buildings' (2006) 14 *Tort Law Review* 105.
871 Although, as I explain in the Introduction between n 114 - 6, poorer claimants in poor housing might suffer no financial loss as a consequence of performance failings, as their energy efficiency improvements could stand to be reflected in thermal comfort.
872 I discuss tort's deterrent effect more comprehensively in the text to n 918 - 929 below.
873 Law Commission, 'Civil Liability of Vendors and Lessors for Defective Premises (Report)' [1970] EWLC 40.
874 Para 45.
875 *Dutton v Bognor Regis Urban District Council* [1972] 1 QB 373. The *Anns* litigation was commenced a few months before the Act came into force, and of course the relevant building was constructed some time prior to that.
876 Paragraph 7: 'capable of causing injustice to innocent persons who suffer injury and damage'. The changes included a duty of care not to cause loss arising from for defects of quality, that would be transmissible to subsequent titleholders: Paragraph 27. The Defective Premises Act 1972 came about as a consequence of this report and is attached, in Bill form, to it. It was never explained why the Bill drafted did not give effect to the recommended measures. Cooke (n 551) expresses doubt that confining liability was the true intention of the Act, pointing out that section 6(2) provides that any

assume that any further extensions to the common law would be illegitimate given that the legislature had already enacted the Defective Premises Act 1972.[877] However arguably in so doing their Lordships were in fact not honouring the very policy considerations that prompted Parliament thus to legislate.[878] What comes across strongly in the Commission report and more favourable decisions is that protection against defects (particularly dangerous defects) in domestic property is not simply a measure for the preservation of asset value. Domestic property forms the basis of family homes and communities. There are clear social benefits to ensuring safe and durable infrastructure. This back-and-forth may seem perplexing. As I explain in Chapter Five, if we can conceptualise legal change as developing from a conversation between the legal fraternity,[879] we can see this exchange as a conversational compromise between a broad expansion recommended by some parties, and restraint exercised by others.

Of course, even were the existing common law to be brought in line with the Commission recommendations or to extend the duty of care in relation to dangerous defects, buildings with poor energy performance might still be excluded as bearing non-dangerous or insignificant defects.[880] As I

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duty imposed or enforceable by virtue of the Act is in addition to any duty a person may owe apart from that provision. Para 73 recommends that the common law be allowed to develop to extend liability. I discuss the Defective Premises Act in the following chapter, in Section e).

[877] Per Lord Bridge *D&F Estates* (n 781); Per Lord Bridge and Lord Keith *Murphy* (n 442)

[878] Wallace (n 215)

[879] See discussion between n 636 – 9.

[880] The decisions differ. Canada: *Winnipeg Condominium Corporation No 6 v Bird Construction Co* [1995] 1 SCR 85: duty not to cause defects representing a 'real and substantial danger' per LaForest J. New Zealand: *Invercargill CC v Hamlin* [1994] 3 NZLR 513 (affirmed [1996] AC 624): duty not to cause minor non-dangerous defects (e.g. cracks, poorly fitting doors) in residential property and *Body Corporate No 207627 v North Shore City Council* [2012] NZSC 83 duty of reasonable care not to cause non-dangerous defects in commercial property. Australia: *Bryan v Maloney* [1995] 182 CLR 609: non-dangerous defects in residential property, contrast with *Woolcock Street Investments Pty Ltd v CDG Pty Ltd* (2004) 216 CLR 515; [2004] HCA 16: no duty not to cause latent defects in commercial property, and *Brookfield Multiplex Ltd v Owners Corporation Strata Plan* 61288 [2014] HCA 36: no duty not to cause latent defects in commercially owned residential property, distinguished from *Maloney* on basis of underlying contractual arrangements.

discuss above and earlier in the thesis, failing in our climate change mitigation measures will have serious implications for both human health and safety, and property, therefore in some senses might accurately be said to be dangerous. However there is no immediacy in these impacts, and the environmental implications of any individual failure do seem quite negligible. I have argued above that it is likely that the claimant's loss would simply be conceptualised as purely economic, and the complicating factor of the additional emissions either ignored entirely or disregarded as representing no loss to the claimant. In as much as the basis for denying liability in relation to building defects seems arbitrary or artificial, these reasons have been sufficient to deny liability in circumstances where the claimant has potential to experience immediate difficulties. Approaching this purely from a doctrinal or policy based perspective, it is difficult to imagine circumstances where the courts would find the impact on the claimant sufficiently compelling to deviate from orthodoxy (if, indeed, this were possible). As I explore across the first few chapters of the thesis, energy efficiency confounds us because of its seeming unimportance combined with its potential to contribute in numerous ways to accepted societal goals. Energy efficiency measures are often treated as dispensable, or trivial, particularly in the context of other pressing concerns. The refusal to extend liability even when faced with the potential for (or actuality of) immediate and serious consequences does not bode well for exceptions to be made in relation to energy efficiency failings, which would probably be seen as quite arbitrary. As I explain above, there might be some limited scope to find a duty based on an assumption of responsibility, although this is curtailed quite heavily following *Robinson.*

e) Deep structures in tort

In the previous section, I explained that the policy reasons for the absence of a duty not to cause pure economic loss arising from building defects, seemed odd and arbitrary, and any exceptions, poorly explained. However the given reasons have shaped the law despite strong countervailing reasons to find a duty. The purpose of this was to draw out both the potential for finding a duty in relation to energy efficiency shortcomings (which is, of course, extremely limited) but also to demonstrate the extent of the rigidity in the given approach. In turn, the purpose of that was to raise questions as to how likely and feasible it would be for courts to make exceptions to the prevailing position. There is a lack of immediacy in the contribution that energy efficiency failings could make to climate change harms, which means on one level the problems created would be of lower priority than the 'dangerous' defects seen in some of the authorities. On the other hand, as I explain in the Introduction,[881] given the urgency and importance of climate change mitigation goals, there are compelling reasons why we should allow this to force legal change: in duty cases a court might deviate from precedent and find that the defendant owed a duty to a performance gap claimant, in these circumstances.

In Chapter Five, I set out and explained a working model of tort from a structural perspective. I explained that viewing tort as underpinned by protected interests, variously protected depending on the relationship between the parties, can be illuminating both of the role of interests and individuals in society, but also with respect to the limits set on tort liability.[882] As I explained, rather than straining to fit the pastiche of tort doctrine within a single theory, this approach rather helps us to understand how much liability tort can accommodate (beyond the semantics of 'policy') and how those restrictions help us to understand how our

881 Introduction Section c).
882 Chapter Five b)i, also Cane (n 561) 95.

common law reflects our interests and priorities as individuals. I reiterate that this is not a mechanical or universally applicable approach, but rather a tool through which to gain insights. Based on the previous section, I would suggest it is unlikely that there is a duty of care not to cause pure economic loss occasioned by a performance gap in domestic buildings, unless policy factors are considered sufficiently compelling to justify a deviation from precedent. In this sub-section of the chapter, I shall use the working framework to explain the importance of the correlative relationship of the parties in determining how we would choose to protect a claimant's interests, I shall suggest that the previous line of cases can be explained by the need for a close correlative relationship between the claimant and defendant, in order for the claimant's economic interests are recoverable in tort. I shall also make some comments about the limited range of interests that we choose as a society to protect in such circumstances, arguing that it is unlikely that the climate change context of these cases would result in a deviation from existing rules.

From this perspective, the formation of 'pockets' of liability in non-recovery territory can be understood not as exceptions formed on express or implicit policy considerations, but rather reflective of both the parties' correlative relationship, as well as the specific interests underlying the substance of their connection.[883] Where the interest is afforded relatively weak protection, as with the current conceptualisation of the claimant's loss in defective building cases, the quality and intensity of the correlative

[883] Stapleton (n 625) acknowledges that the relationship between the parties can not only found liability, but also (in defective buildings cases) be determinative of when shoddy workmanship can be conceptualised as loss. 228, 230. This arguably could extend to subsequent owners as well: 237 Even pre-*Anns,* the majority in *Candler v Crane, Christmas and Co* 1951 2 KB 164 found the relationship between the parties to be insufficiently close to found a duty of care to avoid causing financial loss.

bond is probably determinative of whether the protection of the interest is such as to found a duty of care. [884]

For example, the *Hedley Byrne* [885] exception for pure economic loss is explicable because of the quasi-contractual bond shared with the defendant.[886] This can explain why *Smith v Bush* could be brought so easily within the assumption of responsibility framework – even though the claimant's interests were not strongly protected, the defendant's assurances and claimant's reliance on these created a sufficient bond between the parties as to justify the imposition of a duty of care. Arguably this could extend to *Henderson* liability where the relationship between the parties was 'akin to contract' with respect to the provision of building services. This should have been acknowledged in *Robinson.*

With respect to the defective building pure economic loss cases, the claimant's recognised interests and corresponding loss are in essence the same, but not the parties' mutual understanding in relation to those interests.[887] Lord Keith acknowledged that no duty of care existed not to cause pure economic loss in the buildings context, where this relationship was a little looser; however his acknowledgement that a 'special relationship' would found a duty of care, was an intuitive expression of these constitutive elements of tort.[888] Similarly, it is arguable that a reluctance to create transmissible warranties of quality reflects discomfort with protecting interests not encompassed within a relationship of mutuality. It could well have been open to later courts to find a 'special

884 This provides one explanation for the value of basing tort liability on interests, e.g. Stevens (n 590) 289.
885 *Hedley Byrne v Heller* (n 808).
886 Benson (n 792).
887 SR Perry, 'Protected Interests and Undertakings in the Law of Negligence' (1992) 42 *University of Toronto Law Journal* 247.
888 At 78. Also per Lord Bridge at 82.

relationship of proximity' between the development team and a primary or even secondary titleholder, where no assumption of responsibility existed.[889] What is important is that the two elements are mutually dependent. Stapleton acknowledges that the relationship between the parties can not only found liability, but also (in defective buildings cases) be determinative when shoddy workmanship can be conceptualised as loss.[890] This arguably could extend to subsequent owners as well.[891] This seems to reflect the underlying structure of a claim in tort.

An appreciation of what underpins private law and tort liability not only helps us to make sense of existing decisions, but it can also provide some insight into the prospects of extending liability to bring private law outcomes into line with climate change mitigation policy. This would require significant liberties to be taken with elements of tort doctrine.[892] But tort doctrine admits flexibility when it holds within its deeper structure, specifically, when the interests that are sought to be protected are the same as those that are usually protected, and so within the parties' bilateral relationship. Extensions of liability are not simple technical adjustments, or whimsical policy decisions; any kind of change to tort's reciprocal nature and the very interests it protects, represents a fundamental change to the entire structure of tort.[893] A change or extension in liability rules often requires an explicit or implicit examination of our societal priorities and mutual expectations. As I have said before, this is not a litmus test, and certainly not a replacement for careful and deep analysis of doctrine,[894] but

[889] This could mean that *Robinson v Jones* is simply wrong.
[890] Stapleton (n 625) 228 and 230
[891] Ibid 237.
[892] Kysar (n75).
[893] Anderson (n 683) asserts that Kysar does not seem to appreciate the (un)constitutional demands this would place on the courts.
[894] See Stapleton (n 793).

can serve as some kind of indicator as to what is happening beneath the doctrine.

Earlier in the thesis and chapter I clarified that the claimant's loss would be characterised as purely economic. This would not satisfy the requirement of actionable damage necessary to found an action in negligence. The categories of actionable damage have their foundation in the claimant's protected interests. Hierarchies of kinds of damage flow from bodily injury through levels of property damage.[895] So in the case of property interests, real property, chattels then intangible damage in property (including consumer protection for defects in buildings) are progressively less protected.[896] A performance gap claimant suffers a financial loss, either in the ongoing cost of running her premises, or though an expected diminution in the value of her asset, or in the cost of restoration.

However as I explain above, particularly domestic properties are unlikely to represent a mere financial asset to most people. If the law were to truly reflect the social and emotional investment that most people experience in their homes, we would be seeking to introduce other layers of interests into our conception of the purely economic. In addition is the growing recognition that infrastructure – at building and city scale – contributes to our self-conception, including by shaping ways of life consistent with the need to mitigate climate change.[897] Of course, this raises all sorts of questions about how these equally ephemeral interests could be solidified into actionable damage, how these would sound in damages, et cetera. Answering these questions is beyond the role of the thesis; I mention this

[895] Stapleton (n 625) 216. Also Cane (n 561) 67 puts the underlying interests in the person, property and contractual interests, non-contractual expectancies, trade values and 'wealth', in hierarchies of importance. Steele (n589) 5.
[896] Cane (n 561) 139 – 149.
[897] See Introduction text between n 56 – 68.

to illustrate that even absent the research context of building energy performance, tort's recognition of protected interests in this area has been framed as narrowly as possible.

In the climate/energy efficiency context, further 'disfavo[u]red' interests lie beyond what tort conceives as actionable damage.[898] This is a referent to the other kinds of harm I discussed above – the negligible amount of additional carbon emissions – are either considered irrelevant or not considered at all, until they manifest in physical or bodily damage.[899] The loss flowing from this state of affairs is conceptualised as belonging solely to the claimant; the implications for the environment or in relation to climate change, are left out. Where these are not underpinned by or co-extensive with a claimant's protected interests, they have no place in tort.

Of course, as I explore in Chapter Five, there is still potential for climate harms and the need for environmental protection to be included in the concept of the claimant's interests. As realistically there is no question that the environment can take part in proceedings or be brought into a relationship of correlativity with the defendant, it is conceivable the claimant's priorities of climate awareness could be acknowledged within the hierarchy of her interests. This would, of course, be limited to some kind of interest in her own self-concept,[900] and in all likelihood not feature highly on a hierarchy of interests. As such, it might not have any bearing on the outcome of the litigation, but by acknowledging that other issues and priorities weigh on the need for these measures in this case, the climate change issues would not longer be invisible in the claimant's dispute. In

[898] Kysar (n 75) 65.
[899] Similar observations could be made about civil litigation arising from nuclear contamination – that economic recovery (whether available or not) for the claimants in no way reflected the true extent of the damage – see Lowry and Edmunds (n 649); Lee (n 649), also discuss judicial difficulty in reconciling nuclear contamination within the range of protected interests.
[900] Cane (657).

essence a 'climate conscious' approach in private litigation has potential to force our conception of the content of our 'protected interests' to incorporate an understanding of our collective role in meeting the challenges of climate change. It also raises all sorts of questions about, were climate issues to make changes in litigation, how this could affect remedies (which I consider below).

f) Remedies

This chapter of the thesis aims to explore the limits and potential of liability in tort, in relation to the problems created by energy efficiency shortcomings in domestic buildings. As I explained in the introductions both to the thesis and this chapter, I am approaching this issue from two broad perspectives. The first is a claimant-focused interest in the extent to which the common law provides recourse for or could prevent these problems arising. The second asks questions about incompatibility and invisibility of climate change issues as they interface with private law, even when the substance of the dispute is relevant to climate change. The discussion above has centred on the difficulties establishing a duty of care in negligence. I explained that one way of understanding this is that given the weak protection afforded to the claimant's protected interests, the parties must be in a closely mutual relationship in order for a duty to arise. I also explained the limits on the extent to which the harm caused is visible within a tort action. I have explained that our circumscribed conception of the relative value of our own interests has contributed to this invisibility. These limitations are also reflected in the remedial aspects of a negligence action, where even in the unlikely event of success, climate change harms remain invisible. However in addition, the remedial aspects of negligence

betray a limit in possibility in terms of how to extend remedial action beyond the correlative relationship of tort.

The principle underlying compensatory damages is to restore the claimant to her position absent the defendant's wrongful conduct.[901] Her damages would reflect the cost to her of living in a property that fell short of the prescribed, expected or agreed standard of energy performance. In Chapter Four I explained that this would probably be calculated as the differential in the value of her property, the ongoing additional energy supply costs, or the costs of reasonable repair.[902] Regardless of the method of calculation the claimant will only be compensated for her economic loss. I argued above that there might be scope for the claimant's interests underlying such an action to be perceived more broadly, and the social and environmental importance of the nature of her property to be acknowledged. However, if this were possible, it would be difficult to argue how having taken account of these contextual factors for the purposes of conceptualising damage, they could be ignored when assessing quantum. Both of these approaches only compensate the claimant's financial loss. An award of damages for loss of amenity or mental distress[903] would be inappropriate, because it would not take account of the true nature of this loss. Additional compensation to the claimant for this loss of 'self-concept' seems somehow illegitimate, as it would compensate her for damage and harm done to others by her building. There are two main difficulties with an approach that simply enhances damages awards payable to the claimant: first, they do not take account of the problem persisting for the life of the building and the ongoing losses both to successors in title

[901] *Lim v Camden* (n 463) 187
[902] Chapter Four Section b)iii discussses how the claimant would frame her loss – not discussed here is the possibility of losses based on statutory financial penalties that I speculate on earlier in the thesis, as this remains speculation.
[903] *Watts v Morrow* [1991] 4 All ER 937; or damages for a loss of self-concept: see Cane (n 657) para 3.2.

or the environment. Second, they do not take account of the diffuse and long term nature of climate change harms and the negligible role that energy efficiency failings play in this. In essence, it is not the claimant who will experience these harms. However, there is no mechanism in negligence to compensate those who will, who are beyond the correlative structure of the claim in negligence.

The only meaningful way in which the environmental and climate change harms caused by the excess greenhouse gas emissions from the underperforming building could be properly be accounted for within a tort claim would be by means of an order or settlement that brought about the repair of the defects and restored the property to the desired level of energy performance. As explained in Chapter Four, damages for repair can only extend to what is reasonable in the circumstances.[904] In addition, of course, it is up to the claimant to decide whether to spend these damages.[905] There is no mechanism in negligence for a coercive order.[906] Even if there were,[907] as I explained earlier in the chapter, the most likely duty of care lies against an energy assessor for miscertifying the property.

In short, even in the unlikely event that the claimant would succeed, the remedies in the action would benefit the claimant financially, rather than improving or preventing harm to the environment.[908] Even if a duty of care did exist in this context, and claimants were permitted to recover damages for poor energy performance, this is not to say that the cause of the problem would be corrected (or correctable). Unless corrected (which,

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[904] Chapter Four see text to n 466 – 468.
[905] Following *Ruxley v Forsyth* (n 451), if the claimant did not intend to indulge in any or any further energy efficiency works, her loss may not be quantifiable on this basis in any event.
[906] Cane (n 561)101, 131-2. Also see Lord Denning MR in *Miller v Jackson* (n 603) at 980.
[907] It is notable that a recent analysis of the potential for mandatory injunctions in negligence does not conceive of their scope expanding to the kinds of cases discussed here – see J Murphy, 'Rethinking Injunctions in Tort Law' (2007) 27 *OJLS* 509.
[908] Nuisance injunctions are the obvious exception to this.

as explained above, would be unlikely) the environmental harm caused by the excessive carbon emissions would continue. This is as a direct consequence of the way in which tort's perception of harm is informed by a narrow range of protected interests.

g) Instrumental effects of tort

This chapter has considered the limits and potential of liability in tort in relation to energy efficiency measures in domestic buildings. So far this chapter has considered why the common law of negligence would be the most appropriate avenue under tort, and then questioned whether and in what circumstances the claimant would have good prospects for a claim in negligence. I sought to make sense of these doctrinal rules by viewing tort as constituted by protected interests, and what these are, and the correlative relationship between the parties. I also questioned the limited extent to which the available remedies can ever rectify the loss. What is important and needs to be considered, is the possible impact both of liability and no-liability.[909] In the previous chapter, I explained that I would focus primarily on three aspects of tort's instrumental impact: compensation, how tort distributes the costs or risks associated with climate change issues, and the complexity of the deterrent effect.[910]

Questions about compensation cannot be considered out of context with questions about the value and purpose of energy efficiency measures. These complex benefits include geopolitical and environmental benefits, as well as financial and comfort/health benefits to the claimant.[911] This is why, as I explain above, the calculation of the claimant's loss for the

[909] Of course, I accept that the existence of a duty of care does not entail liability, but sometimes exploring things from an instrumental perspective requires some assumptions or liberties; also see my comments below n 68 in the Introduction.
[910] Chapter Five Section c)
[911] Barton (n 90).

purposes of tort seems so unsatisfactory; it fails to take account of the multiple benefits that are lost when energy efficiency measures fail. Of course, as I argue above and in the previous chapters, it is unlikely that the claimant would have a private law remedy for her loss, unless the way we conceptualised her interests in this context changed. This would to some extent need to be driven by societal changes.

Above I argue that the compensation paid to an environmental tort claimant should not extend beyond his or her protected interests. Unless the money paid were to be invested in remediation, the recipient would be overcompensated, as damages would be received for losses not truly hers;[912] these might be best seen as belonging to future generations. The claimant should not be able to claim direct compensatory damages for the environmental harms caused.[913] Despite the contribution made by poor energy performance to eventual climate change damage, these would manifest elsewhere in time and space. The resulting damage is not the claimant's.

However, I also argue above that the compensation payable to the claimant is closely connected to choices about the distribution of the costs and risks of change and technological innovation. As I have argued in this chapter, the problem of a performance gap claimant is not simply whether she should be compensated for shoddy building. Indeed, the claimant has either explicitly or implicitly taken steps to fulfil her civic duty by installing measures to support the mitigation of climate change in her property, at

[912] Cane (561) 218

[913] Elsewhere Cane argues that unless the environmental harm caused could cause further harm to other protected interests, that it might be better not to remediate it, and leave it as it is. In his view, the money could be better spent serving social purposes and natural resources damages generally are a bad idea: Cane (n 657).

her own cost.[914] Or, perhaps she has relied on an EPC rating when making decisions about tenancy or purchase. Not only does the claimant carry the cost of these measures, she also bears any costs occasioned by their failure. Of course, sometimes the claimant will not bear the costs of the measures directly. Where the claimant is a tenant, a private landlord might bear upfront costs, but these would be passed on through rental increases or other means.[915] In cases where the properties were renovated at the cost of energy companies,[916] the claimants might not suffer any specific financial losses, as they have not paid for the renovation and are not responsible for the repair. Claimants in fuel poverty might not stand to make any financial savings in any event, 'only' significant improvements in thermal comfort. For the most vulnerable claimants, their ongoing losses would not be financial in any event, and they might not incur additional or ongoing unwanted expense for that reason. Most significantly, a failed renovation that is not recognised as such, and where no incentive exists for repair or restoration, robs those tenants of the opportunity to be lifted from fuel poverty.

Turning to distribution, strong arguments can be made that climate change is a collective responsibility and that each and every member of society who can bear these costs, should. These can be logically extended to a need for the costs and risks of innovations for climate change mitigation should be distributed across society. Thus, part of the rationale that entrepreneurs should not bear the risk of their 'inventions',[917] is to allow space for innovation and technological developments by distributing their

[914] This would either be the cost of the works themselves or the uplift on the purchase price charged by the vendor – on the latter see text between n 395 – 397.
[915] Such as the Green Deal or any successor to it – discussed briefly in Chapter Three Section d).
[916] These measures were undertaken to support energy efficiency transformation in social housing, and particularly in areas likely to be affected by fuel poverty. I mention this in Chapter Three Section d).
[917] Williams (n 691).

costs. This cannot be equated with a generalised culture of impunity for subpar building work, or for cavalier 'assessments' that bear little relationship to reality, and particularly not where generally a fairly cavalier attitude towards training and development, existed.

On that note I shall now go on to discuss what potential there is in tort's deterrent effect, in these circumstances. In previous work,[918] I argue that permitting a duty of care to exist in such circumstances, and allowing recovery, has potential to benefit both claimants, and the environment directly.[919] As I acknowledge there, this is complex issue. The assumption that the imposition of liability for substandard work would correct the problem is perhaps overly simplistic. Given the layers of barriers to accountability for energy efficiency failings that I explore in Chapters Three and Four, the implications of both liability and continued non-liability could be more involved than simple deterrence.

It is of course arguable that the absence of a duty of care not to cause loss through poor energy performance (combined with the carefully designed exclusion of any contractual remedy)[920] could do nothing to incentivise quality and accuracy improvements either in relation to construction or certification. There might be some basis for this, as an impression that impunity existed for 'defects' or underperformance could contribute to the extant trivialisation of energy efficiency measures, and undermine any incentive to achieve quality in this area. The absence of liability could reinforce perceptions both of the lack of importance of energy efficiency measures, but also of smaller scale measures for the mitigation of climate

[918] Bouwer (n 612).
[919] This is an important issue – tort undoubtedly serves a regulatory function and a positive liability outcome would support the policy objectives despite remedial shortcoming: Osofsky (n 69); Stanton and Willmore (n 567). Regrettably the converse applies.
[920] I explain in Chapter Four that it seems likely that contracts for or including energy efficiency works exclude liability for energy performance – see text between n 540 - 543.

change more generally. If the regulation that prescribes these measures was seen as overly intrusive or illegitimate, the absence of consequences for shortcomings in these measures in the domestic sphere could be seen as indicative of their 'true' value. This could undermine both energy efficiency and broader climate change mitigation policy.

Of course, as I alluded to above in my discussion of the risks and costs of technological innovation, solid arguments can be made that a moratorium on liability can create space for learning and improvement on an industry wide and individual level. The literature reflects an understanding that proper post-occupancy assessment and feedback processes are key to supporting these processes,[921] and it is understandable that concerns about liability might impede the open discussions and transparency that such learning processes might require. This could even include the beginnings of more open conversations between householders and industry/regulators concerning the limits of the EPC certification. However, impunity for loss caused by building defects has coincided historically with the performance gap in energy efficiency measures,[922] and there is scant evidence that this non-liability space has been used for learning or open communication.

Of course, this is not to assert that an about-face in the law would bring about a sea-change in the quality and effectiveness of energy efficiency installations and construction. The deterrent effect might operate in a perverse or obtuse manner. I explained earlier that even unwarranted concerns about liability (or other perceived penalties such as financial consequences or the need for revision work) could deter post-occupancy assessment and contribute to a culture of concealment of problems.[923]

[921] Stevenson and Leaman (n 162).
[922] Both since the 1970's - Lovins (n 96).
[923] Baldwin, Cave and Lodge (n 322) 241.

This includes 'creative compliance' and miscertification issues that appear endemic.[924]

A change in the law, were it to have a positive impact, would be more likely to yield subtle results that tended towards the recognition of energy efficiency measures as important in and of themselves, as important to the claimant. This would be indicative of the 'radiating' effects of tort,[925] its subtle potential to inform and influence social values and our understanding of the 'interests' it deems worthy of recognition and protection. Therefore, a climate conscious approach to such litigation would recognise both the importance of and the broader implications of energy efficiency measures. Of course, there is something of a chicken and egg quality to these propositions; the willingness of a court to recognise these broader values and allow them to enrich their conception of the claimant's financial interests, might in any event be associated with a broader recognition in society of the importance and need for these measures. In other words, a recognition of the multi-layered quality of the claimant's interests might reflect a broader growing impatience with both the trivialisation of energy efficiency measures, and progress towards climate change mitigation goals.[926]

Of course, the above paragraph takes a positive view of the potential impacts of liability. In as much as arguments can be made that an absence of liability undermines regulation that prescribes minimum quality standards of these works; the imposition of a duty of care might not deter poor quality or ineffective works. Rather, it might deter the undertaking of any energy efficiency improvements that are not mandatory, specifically

924 Garmston and Pan (n 400).
925 Bloom (n 739).
926 Chapter Five text between n 665 – 681.

retrofits, but arguably any measures in new builds that went beyond the prescribed minimum standards. Bluntly put, construction professionals would not undertake these works if they ceased to be profitable, by reason of the need for expensive post-occupancy assessment, or carried potentially expensive or uninsurable risk.[927]

In essence, it is not possible to predict with absolute accuracy what the effect might be, of imposing a duty of care on a defendant not to cause defective building pure economic loss, either generally, or just in respect of carbon mitigation measures such as energy efficiency improvements. As I explain above, because of the complexity of the issue and the different overt and covert attitudes towards these measures, it is difficult to imagine any satisfactory role for private law in these circumstances. Broadly, while there is potential for tort to play a nuanced role, there is regrettably greater potential for it to operate as a blunt instrument. As I argue elsewhere, it might be that the best solution to these conflicting priorities lies in regulation.[928] Regrettably as I discuss above,[929] at present we lack the political will to undertake the kind of regulatory redesign that would be required.

h) Conclusion

Earlier in the thesis, I explained that conceptualising tort liability as structurally based around the claimant's protected interests and the correlative relationship between the parties, can provide insight into the limits of liability in this area. This chapter has focused on the prospects for liability in tort for energy performance failings in domestic buildings. This

[927] This point was made strenuously at The Retrofit Exchange Workshop at UCL in November 2015 to which I refer in my Acknowledgements and n 208.
[928] Bouwer (n 764).
[929] Chapter Three Section a)i.

is a continuation of the discussion in Chapter Four, where I explored the potential for contractual liability or enforcement by the regulator; the constraints on these pave the way for tort liability to play a significant role.

This chapter sought to explore the barriers to liability presented by the awkward matches between some of the problems presented in the performance gap, and the structure and doctrine of tort law. In so doing, I argued that it would be not impossible, but very unlikely that a claimant could establish tort liability with respect to her underperforming building. I also pointed out some uncomfortable mismatches between tort and climate change issues, including the potential invisibility of the climate change mitigation policy issue in this problem. As I explored in the chapter, the manner in which the claimant's loss is conceptualised in such a case, reflects the hierarchy of protected interests in tort liability. These reflect our societal priorities and form the deep structural basis of our common law.[930] I argued that when interests are afforded weak protection, these often require a strong correlative bond between the parties to found a duty of care. They also accommodate the harms of climate change poorly.

I questioned what the effect or instrumental impact of these constraints on liability might be. In doing so I drew on the pluralistic working model of tort that I set out in the previous chapter, in which I concentrated on tort's compensatory, regulatory and distributive impacts. I explained that the invisibility of climate change issues when contrasted with the prioritisation of protected interests within a private law framework, can contribute to outcomes that undermine climate change policy. In the research context, I explained that private law's (likely) failure to afford any remedy to the claimant not only leaves the claimant uncompensated but also implicitly

[930] Chapter Five Section a)i.

allocates the cost of climate change mitigation measures to the claimant personally. The absence of liability means that not only is there no mechanism for accountability for energy performance failings in the common law, but also the absence of a duty of care contributes to the extant absence of dialogue or learning conversations that have potential to improve the quality of these works in a real sense.

There clearly need to be some mechanism for claimants (including secondary title holders) to benefit from reliable and accurate assessment, with an accessible mechanism for revisions, in cases of failings. This seems imperative both for the benefit of claimants but also because of the implications of energy performance shortcomings for broader climate change mitigation goals.

To conclude: a wealth of literature discusses tort's potential and limitations in litigation 'about' climate change. Tort is underpinned by a relationship of mutual personal responsibility between the parties in relation to their respective interests. The choices made about the interests we choose to protect determine how we understand a claimant's loss or harm for the purposes of a tort claim, and in turn the extent of this protection.

SEVEN: TORT AND OVERHEATING

a) Introduction

The previous chapter discussed the potential and limitations of the common law of negligence in relation to energy performance shortcomings. This chapter examines the role of tort in relation to the unintended consequences of building energy efficiency measures, specifically, overheating. Here again, I discuss the common law of negligence, but also some statutory provisions that extend the scope of protection under negligence.

In contrast to the performance gap, negligence is a more immediately obvious remedy for claimants suffering bodily harm in overheating buildings. But several unique features of these putative actions – not least the various ways in which they intersect with issues to do with climate change and energy use – make them an interesting area of study. An interrogation of when and to what extent issues to do with climate change should be brought into private litigation – 'climate consciousness' – is woven through the chapter. Consistently with the previous chapter, I have two broad perspectives in discussing the potential for tort liability in this context. First, from a purely doctrinal perspective, I examine when and in what circumstances a remedy in tort is available for claimants experiencing these problems, and when any damages might be reduced. Second, using the pluralistic working conception of tort that I discuss in Chapter Five, I discuss how an understanding of tort based in protected interests and correlativity can illuminate the outcomes I discuss, and question how well tort serves its functions of compensation, deterrence and distribution of risk, in these instances.

The first part of the thesis has laid the groundwork for the discussion in this chapter. Chapter Two explained the measures that can be taken to make a building energy efficient, and how this can bring about overheating problems. In that chapter, I explained that overheating occurs in the context of exterior conditions [931] - happening during hot summers or 'heatwaves' - and that characteristics of the building make this more likely. [932] To make some very broad distinctions, these characteristics include 'shoddy work' which can include poorly executed building work, but probably more usually, exemplary energy efficiency work done to a design that creates a tendency for a building to overheat.[933] A prevalent example includes insufficient attention to the increased need for ventilation in an energy efficient building.[934] Also implicated in building overheating, is a failure to install 'countermeasures', distinct features installed to reduce the risk of overheating.[935] In Chapter Three, I discussed where and how the mandatory minimum standards prescribed in the building regulations dictate which measures that might prevent or guard against overheating, arguing that these mandatory standards are relatively lean given the state of knowledge about overheating.[936] The risk of overheating, but not the severity of its potential consequences, is dealt with in more detail in compliance guidance for the regulations.[937]

In addition to dealing with both the causes of overheating and the measures in place to prevent these, I also outlined the effects of

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931 Chapter Two Section d) generally.
932 Chapter Two Section d)ii.
933 Ibid. For instance, this includes installing insulation materials with high thermal density, that does not let heat out, or introducing large south-facing windows to maximize solar gains without adding solar shading.
934 I have not included ventilation in my rough category of countermeasures, because ventilation in the building is necessary anyway. As I explain, countermeasures are installed mainly to mitigate the risk of overheating, such as external blinds and large eaves for shading.
935 Chapter Two text between n 254 – 264.
936 Chapter Three Section b)iii text between n 347 – 352.
937 Chapter Three Section b)iii text between n 353 – 358.

overheating on building occupants. These start with a variety of subclinical symptoms I will call heat related 'discomfort'.[938] I explained how a combination of physical or psycho-social vulnerability, and insufficient care, can contribute to these symptoms escalating sufficiently to cause overheating related deaths.[939]

The parties to these notional proceedings are as clarified in Chapter Four, adding of course, executors of the claimant's estate, in relation to death claims.[940] As in the preceding chapters, for clarity of expression I shall refer to parties in the singular, however as I explain above, there could be a variety of parties on each side, who might or might not still exist and be involved in litigation.[941] Also, as I discussed in Chapter Four,[942] I will not make specific distinctions between professional and non-professional parties.

It is not my project to construct a fictional tort claim. As before, what follows does not purport to predict outcomes but rather to explore certain key issues likely to be determinative in this context. Tort turns on its facts, and the factual stages of a negligence enquiry will always admit to a level of particularity specific to a set of factual circumstances. It is impossible to explore all of these and accordingly the discussion will centre on the generic issues identified in the literature. At key stages specific issues, often relating to the climate change context of the problem, challenge the concept of a relationship of mutual responsibility between the parties, which in turn determines whether a finding of liability is consistent with

938 Chapter Two text between n 235 – 236.
939 Chapter Two Section d)i after the above.
940 Chapter Four Section b)i.
941 As explained in the Introduction text around n 107, I do not consider access to justice issues, which includes costs, funding or the significance of cost-benefit ratios in funding litigation. I would add, however, that progressive erosions access to justice necessitates that actions contemplated in this chapter might not be conceivable unless brought by multiple parties.
942 At n 442.

the tort's overall structure. Trying to get a sense of what mutual personal responsibility, conceived in the climate context, is the goal of this chapter.[943] I suggest that where issues relating to both the mitigation of and adaptation to climate change are at issue, these have to be acknowledged properly to give effect to a relationship of mutuality. While tort must retain its structure or collapse into meaninglessness, there is space to require parties to exercise their mutual duties and responsibilities towards one another in a climate context.

To some extent, the chapter follows the logical structure of a negligence claim. First, I discuss the orthodox position under the duty of care in negligence. The next section discusses breach of duty, focusing on questions of foreseeability and reasonableness in the context of a warming climate, asking what 'climate consciousness' demands. I then turn to causation, questioning whether and to what extent any innovative approach to factual causation is required, emphasising that our understanding of factual and legal causation should be informed by climate consciousness in the context of a relationship of mutual responsibility. I then consider how this position is changed by statutory protection afforded by the Defective Premises Act 1972 ('the DPA); I have placed the statutory tort somewhat counter-intuitively because, as my thesis is predominantly about negligence, my interest in the DPA is how it changes the common law protection afforded by negligence. The next section substitutes a discussion of defences with a more generalised interrogation of the claimant's conduct, both in contributing to building overheating and her own health, questioning to what extent we can require older and more vulnerable claimants to be climate conscious too. In relation to remedies, I make some

[943] As I explain in Chapter Five, much of what Cane (n 561) discusses in *The Anatomy of Tort* are distilled elements of doctrine. Such a relationship must be one of mutual personal responsibility and must also be 'climate conscious'.

brief comments about their availability and likely quantum of damages. I conclude with a discussion of how a climate conscious approach to negligence helps tort fulfil its roles of compensating claimants, deterring harmful behaviour and distributing the costs and risks of climate change.

b) Duty of care

This chapter moves on from the kind of harms focused on in the previous chapter, specifically economic and environmental harms created by energy performance problems. I explained that the first step towards understanding why the common law of negligence does not impose a duty on the defendant to avoid causing these kinds of losses, is through an appreciation of the protected interests underlying the kinds of damage caused. These are afforded much weaker protection than, for instance, the protected interests underlying the kinds of damage and loss considered in this chapter.

The current chapter examines liability in negligence for physical injury and death, as well as considering the protection afforded for subclinical physical and other discomfort under statute.[944] I shall deal with each cause of action separately. The *kind* of damage suffered (particularly death) is 'catered for' by common law tort doctrine because the interests that are impinged upon are strongly protected in tort.[945] Discomfort' that impacts on wellbeing but cannot be categorised as 'injury' is not actionable damage and so the

[944] Of course, overheating claimants could suffer losses that are purely economic. Example include financial loss due to plants, animals or foodstuffs perishing in the heat, or perhaps more significantly, increased energy costs due to the need for mechanical cooling. As I discuss below, mechanical solutions could prevent the kinds of loss and damage discussed in this chapter, but is by no means a neutral solution. I am not going to discuss pure economic loss due to increased energy expenses in any detail in this chapter, as it represents to some extent a duplication of what went before. I do however touch on the issue of mitigation of loss, in the 'claimant's conduct' section, below.
[945] Cane (n 561) 67 – 71.

defendant has no common law duty of care not to cause these;[946] but there is a remedy in statute.

c) Duty of Care in Negligence

Common law liability in negligence is grounded on the conception of the duty owed by the defendant to the claimant.[947] The existence of a duty is heavily determined by the characterisation of the claimant's loss as actionable in negligence.[948] As I explained in the previous chapter, one way of making sense of the chaotic and contradictory doctrinal rules in this area is to understand the interplay between the strength of the protection afforded to the claimant's interests combined with the relationship of mutual personal responsibility between the parties.[949]

It is uncontroversial that wrongfully produced defects causing personal injury to the occupants, are actionable in negligence.[950] This is where my focus is in relation to the negligence aspects of this chapter. Flowing from the discussion of the duty of care in the previous chapter, is our understanding that there is no duty of care even in relation to dangerous defects unless the danger had in fact materialised.[951] Some issues similar to the ones discussed in the previous chapter, arise in relation to overheating, for example, the claimant might have higher power bills due to the use of cooling devices.

Questions about foreseeability recur throughout the negligence enquiry. The most interesting issues occur in relation to the content of the

[946] Stapleton (n 625).
[947] See e.g. Cane and Atiyah (n 696) 67.
[948] Stapleton (n 625).; D Nolan, 'Damage in the English Law of Negligence' (2013) 4 *Journal of European Tort Law* 259.
[949] Chapter Five Section b) generally and summary at text between n 576 – 583.
[950] *Targett v Torfaen Borough Council* [1992] 3 All ER 27; *Otto v Bolton* [1936] 2 KB 46.
[951] *Murphy v Brentwood* (n 442).

defendant's duty of care, which I discuss below under breach of duty. However, it is necessary to make some brief comments about whether the particular claimant is foreseeable, because a duty is owed only to a foreseeable claimant.[952] This is because, as I explain above, only persons at extremes of age or with pre-existing physical vulnerabilities are likely to die due to extreme heat.

As I explained in the previous chapter, the enduring nature of the built environment is a reason why tort has such relevance in the problems discussed in this thesis. In the built environment context it is not possible to predict who the future potential claimants would be. Most buildings are intended to endure and it is entirely normal for occupants to move out, have children, grow old or sick, die etc. while the building stands around them. The primary titleholders might occupy the building for a very small fraction of time. Given the proportion of the population likely to be vulnerable to serious health consequences as a result of overheating, and the (hopeful) longevity of building stock, it must be reasonably foreseeable that at some point any domestic building will house someone vulnerable to extreme heat.[953] This means that the defendant has a duty to ensure that the building will be safe for persons vulnerable to heat even if he builds it for a healthy person in mid-life, who probably is not.

d) Breach of Duty in Negligence

The next element in the negligence action is proving the defendant's fault. This is encapsulated by Alderson's classic formulation:

[952] *Bourhill v Young* [1943] AC 92.
[953] Following an approach similar to that in *Haley v London Electricity Board* [1965] AC 778. This is consistent with the objective nature of the test.

> Negligence is the omission to do something which a reasonable man, guided upon those considerations which ordinarily regulate the conduct of human affairs, would do, or doing something which a prudent and reasonable man would not do.[954]

Establishing whether the defendant has breached his duty requires a balance to be reached between the risk and gravity of harm on the one hand, and the cost to the defendant of avoiding it, on the other.[955] This requires us to establish the risks foreseeable to the defendant at the time, and to determine the steps a reasonable person in his position would have taken to prevent these materialising. These are areas of legal enquiry. [956] As such it is useful here to ask generic questions about the factors that would be relevant in determining the content of the defendant's duty of care. I look at two key issues. First, ask questions about what risks and dangers might be foreseeable to defendants, now and in the future. Next I question what we might expect a reasonable person to do about this, and the relationship between the tort duty and the relevant regulatory guidance and standards. Determining the content of the defendant's duty is an important component in shaping our understanding of the parties' relationship of mutual responsibility.

i. Foreseeability

The defendant is not required to take steps to avoid any harm or injury, only those that he should have foreseen. The claimant would need to establish that overheating problems and the damage they cause are

954 *Blyth v Birmingham Waterworks* (1856) 11 Ex 781.
955 Deakin, Johnston and Markesinis (n 465) 200.
956 These are legal enquiries: Peel and Goudkamp (n 780) 6-06, 6-19. As it is not my project to construct a fictional tort claim, I shall not devote any time to the factual question of whether the defendant discharged her duty.

foreseeable.[957] This is not a particularly troublesome requirement; a good proportion of energy efficient new build or retrofitted domestic buildings overheat. Both in academia and industry, the likelihood of overheating occurring in energy efficient buildings has been known for over a decade.[958] This information is not preserved in academia; it is 'common knowledge'. In 'live' litigation, particularly in relation to construction taking place decades previously, it would be for the court to determine what knowledge a specific defendant had both of the risks of overheating and the measures to be taken to prevent these. In the most part, I would suggest that most defendants could have made themselves aware of the risk of overheating in London and the South East by 2005.[959] Knowledge and information about these risks is also implicit in the regulatory tools that support compliance with building standards and energy performance standards, thereby supporting the construction of knowledge about this problem.[960] Specifically, the SAP Appendix P makes modelling of overheating risk routinely available, and the compliance guidance to the Building Regulations also warns of the increasing risk and severity of overheating problems.[961] I shall return to whether these warnings are adequate in the following section.

It is also widely known that extreme temperatures, both hot and cold, cause deaths in old or otherwise vulnerable persons. There is no absolute or uniform threshold at which excessive heat becomes uncomfortable then

[957] I am not suggesting that foreseeability is the sole criterion in determining the standard of care (per Deakin, Johnston and Markesinis (n 465) but it is the most interesting issue in this study. The risk – death – is substantial, and there is little more to say about that.
[958] See Orme, Palmer and Irving (n 226).
[959] With the publication of CIBSE 2005 (n 226) or at the very least by 2013 with CIBSE 2013 (n 230) defendants in parts of the country not currently associated with excess heat should have been aware of the risk, and those in the South East of the increasing prevalence and severity of the risk.
[960] Regulation's role in in the epistemic construction of norms: Lee, 'Safety, Regulation and Tort' (n 770).
[961] Chapter Two n 268 and Three text to n 353 – 357.

dangerous to building residents.[962] Heat is not a toxin, and its hazardousness is only a matter of degree. This is probably less significant than it intuitively seems: claimants wrongfully injured through excessive exposure to noise, vibrations etc are routinely compensated via the law of tort.[963] Here, again, the SAP calculations provide a useful epistemic measure, in warning of overheating risk when indoor temperatures exceed 26 degrees celcius.

As I have said, there is little magic in foresight of a known problem. However, as things stand at present, internal overheating problems tend to happen only when the exterior conditions are also very hot. This is why, for instance, overheating problems are becoming prevalent in London but are still relatively unknown in northern cities.[964] However, because of the intended longevity of the building stock, whatever is constructed now must be safe [965] for residents into the future. It is expected that climate change will produce longer and hotter summers, with an increased frequency and duration of heatwaves.[966] Because exterior conditions are strongly implicated in overheating problems, this means overheating is likely to occur in areas of the country where overheating problems are not currently prevalent.[967] This also suggests that this problem could become more severe across the board. Buildings that do not overheat in the current climate probably will in the future, or those that do overheat now will reach even higher temperatures, and be more difficult to cool down or keep within a safe range, than they are now.

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962 E.g. World Health Organisation (n 244).
963 Specifically workers compensation claims for e.g. vibration white finger and noise induced deafness caused by an employers negligence or breach of statutory duty.
964 CIBSE 2013 (n 230). records the growing problems in London at present, as against virtually nonexistent problems in Manchester and Glasgow, which have cooler climates and a less pronounced heat island effect.
965 And, arguably, comfortable – although I discuss the statutory provisions that require comfort in dwellings below.
966 IPCC, 2013 (n 9).
967 CIBSE 2013 (n 230).

What complicates matters still further is the absence of definitive predictions of the extent of future warming. As I explained in the Introduction to the thesis, there is uncertainty and unpredictability in future climate models.[968] We can be sure that temperatures will increase in the near term,[969] but not by how much. This of course raises questions about what is reasonably foreseeable and how much investigation we can expect the defendant to make into the 'superwicked'[970] problem of climate change, in addition to keeping abreast of risks inherent in her own industry, particularly when the public dialogue about the problem is so unhelpful. A climate conscious defendant would certainly be aware of future risks, but arguably not more than climate modellers can predict.

ii. The reasonable person

So much for the defendant's foresight of the risks created by energy efficiency improvements. The defendant avoids negligence in how he measures up against the steps a reasonable person in his position would have taken to prevent risks materialising. Whether or not a particular defendant discharged his duty, the steps that he would have and did take, are questions of fact. However, it is useful to consider some of the broader theoretical issues that would be relevant in determining the standard of care. In this section I make some general observations about whether a defendant could be required to take steps beyond the minimum measures

968 This is to some extent due to variability in the models, but predominantly because it is not possible to predict how good we will be at mitigating greenhouse gas emissions and as such, how bad climate change impacts will be. The compounding of problems in these two climate change response areas – energy efficiency and the adaptation of infrastructure – illustrates the need for a polycentric and multiscalar response to climate change. See discussion in the Introduction at Section b) and c).
969 The CIBSE report models the likely exterior conditions in each city across the medium near term, based on low and high emission scenarios (bluntly, failure to reduce our emissions will most likely result in soaring temperatures; some reduction in our emissions will most likely result in moderately increased temperatures) and reported a significant increase in the risk of overheating in energy efficient domestic buildings *in the context of* soaring exterior temperatures.
970 Lazarus (n 1).

prescribed by regulation. Second, I ask some broader questions about how we might frame the standard of care, and what this means for the parties' correlative relationship.

A reasonable person would weigh up the risks and gravity of harm, and the cost of taking precautions, against the utility of his conduct. It is settled that 'in measuring care you must balance the risk against the measures taken to eliminate the risk… as well as against the end to be achieved'.[971] This is not a rigid cost-benefit analysis, but a more nuanced and intuitive evaluation of priorities in context.[972] Of course, the multiple benefits of energy efficiency include financial and health benefits to occupants, as well as broader societal goods such as energy security.[973] The potential harm – death or serious injury – is of course considerable. However, implementing energy efficiency does necessarily mean that a building will overheat, either now or in the future. Taking appropriate choices and measures can ensure that buildings remain safe in hot weather, with no or little additional cost. Earlier in the thesis I discussed in practical terms what might be done to avoid overheating; I distinguished between choices – such as of materials – that could be made by well-informed defendants to ameliorate the potential to retain heat in the buildings, and the addition of features to the buildings – such as exterior blinds – which would guard further against heat gains.[974] The significance of this is that avoiding risk is less a question of weighing up of priorities; it is more an issue of information and skills deficit – or as I argue in Chapter Three, an incentive deficit - as to how to achieve both simultaneously.

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971 Per Denning LJ in *Watt v Hertfordshire* [1954] 1 WLR 835
972 Lee, 'Safety, Regulation and Tort' (n 770).
973 Barton (n 90).
974 Chapter Two text between n 255 – 264.

When applying the standard of the reasonable person, the defendant is judged taking the skills or expertise of the reasonable person in his position, into account.[975] This is determined with reference to the knowledge available through his professional or trade body.[976] He is expected to keep his skills and knowledge reasonably up to date.[977] There is a growing recognition that determinations of the scope of duty in tort occur within a regulated space.[978] Paradoxically, the informational and compliance tools I referred to above both warn of the dangers both of overheating, and of worsening problems with climate change;[979] however they do not prescribe standards or provide any incentives for measures necessary to guard against overheating. The non-mandatory technical guidance and use of the SAP modelling provides some cursory or de facto advice, but could go a lot further. The question is whether the defendant could be expected to go beyond the mandatory minimum standards, and then the non-mandatory guidance, in order to comply with his duty.

iii. Regulation

A defendant designing, constructing or retrofitting a domestic building has to comply with prescribed minimum standards of energy efficiency. She has stringent measures to meet and substantial technical guidance on how to do so, both formally via the regulations but also implicitly by means of

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975 As explained in n 442 above, it is arguable that professional/non-professional distinction in relation to the duty of care in this context, has been eroded. The defendant's qualifications will be relevant when determining the standard of care however. E.g. *Wilsher v Essex Area Health Authority* [1987] QB 730 and in the buildings context *Adams v Rhymney Valley District Council* [2001] 33 HLR 41.

976 For example, the RIBA website contains a 'sustainability hub' section, which includes 'design strategies' and case studies concerning challenges in sustainable design: http://www.architecture.com/RIBA/Aboutus/ SustainabilityHub/Designstrategies/Designstrategies-launchpage.aspx (last accessed 25 August 2015).

977 *Stokes v Guest Keen & Nettlefold (Nuts and Bolts) Ltd* [1968] 1 WLR 1776; *Thompson v Smiths Ships Repairers* [1960] AC 145.

978 Deakin, Johnston and Markesinis (n 465) 205 – 208.

979 Chapter Three Section b)ii – I refer to the reference to overheating in the Approved Documents technical guidance as well as the use of Appendix P to SAP.

the variable criteria that can be manipulated using the SAP.[980] Implementing these measures is either mandatory (in new builds) or encouraged through economic incentives, albeit not very well (in existing buildings). The only measure with potential to mitigate the risk of overheating that is reflected in the mandatory minimum standards is ventilation[981], which is of course primarily necessary for air exchange. As I explained in Chapter Two, while inadequate ventilation is consistently implicated in overheating problems, passive ventilation would be insufficient to counter overheating problems, particularly as exterior conditions become hotter, in the absence of other measures. Even in cases of model compliance with the Building Regulations, a defendant could still produce a building that overheats dangerously, or comes to overheat dangerously, in hot weather. Of course, a failure to meet the minimum standards of ventilation could be indicative of a breach of the defendant's duty,[982] but given the context it seems unlikely that regulatory non-compliance would be particularly at issue in determining the standard of care. What is more likely to be at issue is the question of whether the defendant had met the standard required of her in a context where she achieved adherence to the statutory minimum standards but nevertheless created a dangerous situation.[983] The question therefore is whether the defendant would be expected to do more than that to which she is guided by regulation, and if so, how much more.[984]

At first blush, this raises questions about the extent to which the defendant will be held responsible for making his own enquiries and seeking

[980] Chapter Two text between n 267 – 273.
[981] Mavrogianni and others (n 251): at 127 the authors strongly recommend that the specifications as to the thermal mass of insulation materials be improved – this is also mentioned in CIBSE 2013 (n 230).
[982] Lee (n 770).
[983] *Budden v BP Oil Ltd and Shell Oil Ltd* [1980] JPL 586.
[984] Lee (n 770) 556, 563. Additional steps discussed as countermeasures in Chapter Two text between n 253 – 264.

information about risk and precautions, beyond what is in the regulations. I explained above that knowledge and information about the extent of the risks and dangers are available; there too is a wealth of information detailing practical steps to avoid risk.[985] Much of this has been co-produced with professional or industry bodies and is available free online.[986] The defendant is hardly required to 'plough a lone furrow'[987] or conduct his own investigations to find out how to avoid the risk. There is now a wealth of information available about overheating risk, and means to avoid it. Of course, this to some extent expresses the situation as at the time of writing. Furthermore correct use of Appendix P of the SAP – a mandatory step for the production of an EPC - would provide an invaluable tool to provide guidance concerning measures and countermeasures to be taken to avoid overheating; this of course depends on its correct use, not the 'gaming' approach to Appendix P that is apparently endemic.[988] As such it seems likely that a reasonable person in the defendant's position would do more than comply with the very minimal requirements in the Building Regulations.

Although determinations of breach of duty are not conducted by means of a simple cost-benefit analysis, in English law, it is nevertheless useful to take note of the circumstances where the defendant could guard against overheating without incurring any or significant additional costs. This is because industry-wide research confirms that these could easily be incorporated in the 'normal' construction of the building. These measures would not be introduced through simple compliance with the Building Regulations but they could easily be incorporated in the energy efficiency

985 Even if distinctions between average and more than average employers are made along the lines of *Baker v Quantum Clothing* [2011] UKSC 17 it would be difficult to maintain that the risk and means of avoiding it are unknown.
986 Most recently ZCH (n 224).
987 *Thompsons v Smiths Shiprepairers* (n 799) at 415.
988 Chapter Three n 268 and text thereto.

measures. The taking of such measures hardly has a flavour of 'beyond compliance' – it is simply a question of the defendant making sensible choices. If he does so in a way that causes harm, when he knows or ought to know that another way exists which would not, it is hard to see how he would not be found negligent.

A court might take quite a different view as to whether a reasonable person in the defendant's position would take what I have called 'countermeasures' - specific steps to prevent heat accumulating in the building, that might serve no other purpose.[989] Of course, taking these steps would probably have specific costs, and possibly design, implications beyond those entailed by simply complying with the mandatory minimum standards of energy efficiency in a specific way. Given the severity of the potential damage, and the uncertainty in future climate predictions, a reasonable person in the defendant's position might well add some additional features to guard against overheating.

iv. Climate consciousness

Determining what is required of the defendant depends very much on how we frame the content of the duty. Approaching this element of the enquiry as a technical or pragmatic evaluation of the defendant's possible conduct, and its costs, is to miss the implicit normativity in these 'factual' enquiries. When the matter interfaces with climate change issues, failing to

[989] Here, there could be room to make distinctions between new build and retrofitted properties. In relation to new constructions (or arguably extensive retrofits) it is easier to hold the defendant to a standard of care that requires him to construct a safe dwelling. If the defendant has just been employed to install a retrofit or one or two specific pieces of technology rather than construct a whole property then questions of foresight and reasonableness in relation to entirely separate measures to address overheating risk, are very different. For example, if the defendant is contracted to insulate exterior walls, add double glazing, and loft and floor insulation, could he be negligent for failing to add exterior blinds and insulate interior pipes in an old airing cupboard. Who will pay for the additional works? If the defendant recommends these and the claimant declines, can the defendant still be liable to subsequent titleholders?

acknowledge the demands this context places on the parties, is to miss the opportunity to construct and interpret what is required in a relationship of mutual responsibility, in the climate context.

So in this case, fulfilling the defendant's duty to take reasonable care would include taking measures which cause the building to overheat. A climate conscious defendant, however, will retain an awareness of the context in which he carries out his instructions, and the content of his duty of care – what a reasonable person in his position would do – must be framed in that context. An active and engaged defendant cannot but be climate conscious, given that the mitigation of climate change through energy efficiency is key to the reason for the work he is doing. In creating or renovating an energy efficient building, the climate conscious defendant is simultaneously mindful both of the risks of the technology he is installing, and the need for buildings to be adapted to suit the changing climate. Thus, content of the defendant's duty must extend to ensuring that the building remains safe for the claimant in hot weather. This is not because he has any kind of duty to adapt the building, but because the reasonable and climate conscious defendant does not actively undermine one climate change goal while seeking to advance another.

In addition, a climate conscious defendant must accept that problems might be more severe in the future. Not least, this is logically consistent with the idea of change. This means that a reasonable person in the defendant's position would take steps to guard against levels of exterior overheating that are unprecedented in his existing local climate. The correlative relationship he has with the claimant (present and future residents) demands that he thinks of her safety now and in the future.

Taking this kind of active contextual approach to the content of the defendant's duty of care is not only important for determining breach. This also ensures that the defendant's conduct retains its necessity in the causation enquiry, which I discuss after I consider liability under the DPA.

e) Liability in statute

The previous parts of this chapter have considered liability in negligence for injury and death suffered in an overheating building designed to be energy efficient. I have discussed the potential for liability in tort to arise when residents suffer personal injury as a consequence of dangerous overheating. Liability under the common law is restricted to cases of injury, which limits potential recovery in tort, but has potential to extend tort's protection to a number of subsequent titleholders. Negligence falls short in the above because only parties who have been injured may claim compensation. Under the common law, secondary title holders in an overheating building have no recourse against the design/construction team unless they suffer injury, and thus have no way to pre-empt the problem.

The Defective Premises Act 1972 ('the DPA') sought to meet some of the limitations of negligence.[990] This brief piece of legislation creates a right of action for residents of domestic buildings rendered uninhabitable due to construction defects. The first section creates a statutory tort:

> 1— Duty to build dwellings properly
> (1) A person taking on work for or in connection with the provision of a dwelling (whether the dwelling is provided by the erection or by the conversion or enlargement of a building) owes a duty—
> (a) if the dwelling is provided to the order of any person, to that person; and

[990] Also see discussion of the DPA's background in Chapter Six text between n 872 – 879.

> (b) without prejudice to paragraph (a) above, to every person who acquires an interest (whether legal or equitable) in the dwelling;
> to see that the work which he takes on is done in a workmanlike or, as the case may be, professional manner, with proper materials and so that as regards that work the dwelling will be fit for habitation when completed. [991]

A modest amount of caselaw clarifies the nature of this duty, and defines what is meant by 'fit for habitation'. Clarifying the duty was necessary because it was not clear whether the section created three distinct or one composite duty. The Court of Appeal determined that the first section comprised a single duty, and that the habitability requirement represents the standard of the duty, breach of which is essential to found a cause of action. [992] This test is strict, [993] and is transferrable to subsequent titleholders.[994]

The opposite approach, [995] interprets the section as creating three duties, of a different character:[996] - to perform work in a workmanlike manner, to use proper materials and to ensure that the structure is habitable when completed. This better accommodates design flaws that affect the building even if the construction work is exemplary. This would be a more desirable approach for this study, where the building might be uncomfortable or uninhabitable, but due to design flaws and a failure to appreciate future

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[991] Ss (2) – (4) specifies who and in what circumstances can be said to have 'taken on work', and prescribes how the said duties may be said to have been discharged.
[992] *Alexander v Mercouris* [1979] 1 WLR 1270; *Thompson v Clive Alexander and Partners* [1992] 59 BLR 77.
[993] *Bole v Huntsbuild* (n 453) 163 – 6.
[994] Section 1(1)(b): to any person subsequently requiring an 'interest' in the premises – clearly this is designed to protect secondary title holders and any party not in privity with the construction team.
[995] Judge Ramsay in *Harrison v Shepherd Homes Limited* [2011] EWHC 1811 (TCC) preferred the three part test but found himself bound by *Thompson v Clive Alexander and Partners* (n 992)'s single test: 125 – 153. *Harrison* was appealed but not on this point.
[996] *Bole v Huntsbuild Limited* [2009] EWHC 483 (TCC). Judge Toumlin placed much emphasis on the report of the Law Commission, 'Civil Liability of Vendors and Lessors for Defective Premises (Report)', noting the observation: "34. It may be that proper work with good materials will usually produce a house which is fit for habitation but it is possible to imagine cases in which, however skillful the work and however good the materials, there is some defect of design or lay-out which makes the resulting dwelling unsuitable for its purpose." 20 - 22.

risk, rather than bad work per se. It might be possible to overcome this by interpreting the first element of the test sufficiently broadly to accommodate design and professional services.

The main significance of the DPA is that it might provide a prospective claim in tort for claimants who could not satisfy any or all of the elements in a negligence claim. The short answer is that the DPA provides very strong protection to a narrow category of claimants, for a limited time. I shall look at scope of this protection in slightly more detail before briefly commenting on the implications of this.

Understanding what is meant by habitability is crucial in order to determine when the duty has been breached. In *Bole v Huntsbuild* the Court of Appeal construed the notion of habitability in a broad way.[997] The court relied on the definition of fitness for habitation the Housing Act 1985,[998] to determine a list of criteria or factors that could be used to judge whether a dwelling was habitable. As follows:

> i) The finding of unfitness for habitation when built is a matter of fact in each case.
> ii) Unfitness for habitation extends to what Lord Bridge described as "defects of quality" rendering the dwelling unsuitable for its purpose as well as to "dangerous defects".
> iii) Unfitness for habitation relates to defects rendering the dwelling dangerous or unsuitable for its purpose and not to minor defects.
> ….
> v) The Act will apply to such defects even if the effects of the defect were not evident at the time when the dwelling was completed.

[997] Ibid at 38.
[998] S 604(1)

vi) In considering whether or not a dwelling is unfit for habitation as built one must consider the effect of the defects as a whole. [999]

This means that 'habitability' extends to unpleasant living conditions, provided these are not minor.[1000] This requirement could encompass dangerous dwellings, but had not yet manifested in injury, and presumably also cases where injury had resulted. Notably this also takes account of defects that only become evident in the future – such as when exterior conditions warm up. It remains to be seen whether a court would consider thermal discomfort to render a building unfit for habitation; and indeed many of the questions that I ask below relating to the claimant's conduct in managing the building's interior, apply here as well. Interestingly, there is also some authority that the DPA applies in cases of standalone economic loss occasioned by the need to undertake remedial works.[1001] Thus, a claimant who can bring her claim within the DPA has a right of action even if she has suffered no damage and is unable to prove fault on the part of the defendant. Interestingly because of the strict nature of liability and the broad *Bole* criteria outlined above, the claimant would not have to resort to contortions to prove breach, or causation. It is sufficient that (due to poor 'workmanship' and materials) the building is not habitable at that time. The question of whether the habitability requirement can be breached in relation to structural or design problems causing overheating has already been before the Technology and Construction Court, and lists a series of fairly appalling defects including summer overheating.[1002]

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[999] The terminology used by the learned Judge created some confusion. This approach was in any event approved in the Court of Appeal *Bole v Huntsbuild (CA)* (n 453).
[1000] It is used by claimants suffering damp and mould infestations: see e.g. *Bayoumi v Protim Services* [1996] 1 WLR 785. *Alderson v Beetham* [2003] 1 WLR 1686.
[1001] *Andrews v Schooling* [1991] 3 All ER 723 – although in *Alderson* (ibid) the court would not permit remedial works that it thought amounted to an improvement in the property. One wonders what else remedial works are for. I will discuss this further in relation to remedies, below.
[1002] *Millharbour Management Ltd v Weston Homes Ltd* [2011] EWHC 661 (TCC) – this is an interlocutory application which quotes extensively from the details listed in the claimant's particulars of claim. The action was compromised on the substantive issues.

However, the applicability of the DPA is restricted in two key ways. It seems unlikely that it covers dwellings that have had an energy retrofit. While on its face the DPA expressly applies to 'erection, conversion and enlargement' of existing spaces, [1003] the Court of Appeal has restricted the application of this section to exclude comprehensively or significantly altered buildings, where the work done has the effect of fashioning a new building.[1004] The DPA would therefore not apply to transformative or deep retrofits.[1005]

The limitation period for DPA claims is also rather short. Section 1(5) restricts this to six years from the date of construction (or repair). This somewhat undermines the protection it affords both to transferees and where the claimant is not able to show foreseeability of harm and therefore fault. Unless ownership or occupancy changes in this relatively short space of time, the DPA likely affords little more protection than under the claimant's contract with the development team. The short limitation period also means that, while the framing of the duty is such that the claimant can avoid having to prove fault, she will not have a cause of action when the harm in respect of the proof of fault is challenging, materialises. This might be useful if sudden and dramatic changes occur in a short space of time, but would not help the claimant in the scenario that I describe above.[1006]

I explained earlier in the chapter, that my interest in the DPA is the extent to which this modifies the position under the common law, and what this tells us about the relationship between the claimant and the defendant.

[1003] S 1(1).
[1004] *Jenson & Anor v Faux (Rev 1)* [2011] EWCA Civ 423.
[1005] It may well still apply to piecemeal or ad hoc retrofits.
[1006] See Section d)i. above.

The DPA affords additional protection to claimants in overheating buildings, but that this protection is very constrained. Giving a claimant a right of action against uninhabitable living conditions arguably represents a development of the claimant's 'economic' interests through legislation.[1007] Claims for discomfort or subclinical health problems (falling short of injury and the 'damage' of negligence) could be seen as an assertion of the claimant's physical interests as well. This could be seen as a change towards acknowledging more subtle manifestations of the claimant's interests in her dwelling place – the requirement of 'habitability' acknowledges the claimant's need for comfort and security in her home.

As before, I would argue that liability in tort depends on a relationship of correlativity between the parties, and the need for this bond to be tighter or closer when the relevant interests are not that strongly protected. This is one way of explaining limits on liability. So in this instance, the law has developed via the legislature to acknowledge new facets to the claimant's economic interests in her domestic property, but this has been done with restricted application in terms of who is bound to this relationship of mutuality. So, only primary title-holders, and only for very limited period of time (avoiding the 'transmissible warranty of quality' concerns that so troubled the court in *Murphy).*[1008] Also, arguably this developing and nuancing of the claimant's interests have been constrained by the courts, with their lack of generosity in interpreting the requirement of habitability.

e) Causation

[1007] Cane, *The Anatomy of Tort Law* (n 561) 67 – 71, J Steele and TT Arvind (eds), *Tort Law and the Legislature : Common Law, Statute and the Dynamics of Legal Change* (Hart 2013) 6.
[1008] *Murphy v Brentwood* (n 442). See my discussion of the temporal constraints on the parties' relationship of mutuality in Chapter Six at text between n 853 – 4.

The next stage of the enquiry is to establish whether the breach of duty caused the claimant's loss. Establishing causation is formally a two-stage enquiry.[1009] The first stage examines whether the defendant's conduct factually brought about the claimant's loss. The orthodox approach is that this is a factual or scientific matter. The second stage – 'legal causation' - is a normative determination of the extent to which the harm might be attributed to the defendant's breach of duty (on account of the remoteness of damage, specific policy reasons, or – previously - intervening causes). I explain below what the relevant legal causation issues are for this study. First I examine how a negligent defendant's conduct might contribute to the claimant's injury or death, asserting that this 'factual' enquiry is not a simple technical assessment.

i. Factual causation

The claimant would have to prove on a balance of probabilities that the defendant's wrongful conduct in fact brought about her loss. This means she must show both that the defendant's conduct brought about the structural problems in the building that cause it to overheat, and (in negligence claims) that the defendant's conduct caused the illness or death. I will deal with these in turn. I do not have any separate discussion about causation in relation to the statutory tort, as I have assumed a level of equivalence. Most of what follows will be generalisable to claims brought under the DPA.[1010]

In relation to structural defects causing overheating, proof of factual causation may be satisfied using the 'but for' test.[1011] Where a building begins overheating after a retrofit proving this would present few

[1009] Steele (n 589) 167.
[1010] Deakin, Johnston and Markesinis (n 465) 306-7.
[1011] *Barnett v Chelsea and Kensington HMC* [1969] 1 QB 428.

difficulties. The application of the 'but for' test might yield less helpful results if the building overheating arose from multiple defects, not all of which might be tortious, not all of which might have come about due to wrongful behaviour.[1012] Structural problems in buildings arising as a consequence of flaws in design or engineering have been characterised as 'indivisible' harm.[1013] Courts in construction cases routinely apply a plausible 'material contribution'[1014] test in instances where a 'but for' analysis yields unhelpful or counterintuitive results.[1015] It is unlikely that any 'picking apart' of the construction and design process would be necessary, in order to identify which features contributed to the overheating problems, and who was responsible.[1016]

Where deaths occur, the claimant would have to prove both that overheating can cause death, and that it did in the specific instance. This requires both generalised epidemiological evidence to confirm a correlation between the heat and the illness in question,[1017] as well as specific medical evidence linking excessive heat to the illness or death. This is superficially counterintuitive because we tend not to think of heat as noxious or dangerous. However many 'toxic tort' or industrial disease actions are

[1012] I make some notes about the claimant's use of the building, below.
[1013] Andrew Burrows *Understanding the Law of Obligations* (Bloomsbury Publishing, 2000) 175.
[1014] *Bonnington v Wardlaw* [1956] AC 613. While uncertainty as to the extent or content of the test remains, particularly in the context of exposure cases causing divisible injury, it does seem clear that in cases of concurrent cumulative causes, it is the appropriate and suitable test to use – see Steele (n 589) 250-1 and SE Wood, R Cooper, and C Walton (eds) *Charlesworth and Percy on Negligence* (13th Revised edition. Sweet & Maxwell 2014) 6.06 – 6.18. But see S Bailey 'Causation in negligence: what is a material contribution?' (2010) 30 *Legal Studies* 167–185.
[1015] The material contribution test is commonly used to establish that a particular defendant's conduct may be called a factual or historical cause of structural defects in property: see the practically focused discussion in The Honourable Mr Justice Akenhead, 'Causation, Loss and Damage: the Challenge of Change' A paper based on a talk given to a meeting of the Society of Construction Law in London on 7 December 2010
[1016] 'The test is what an informed person in the building industry (not the man in the street) would take to be the cause without too microscopic analysis but on a broad view…' Per Judge Bowsher in *P & O Developments Ltd v Guy's & St Thomas' National Health Service Trust* [1999] BLR 3 at 9. The language varies between dominant, effective and substantial cause, but the test employed usually resembles the material contribution test. – see e.g. *Loftus-Brigham v Ealing LBC* [2004] 20 Const LJ 82; *Plater v Sonatrach* [2004] CILL 2073.
[1017] A Kobyasheva, 'Using Epidemiological Evidence in Tort Law: A Practical Guide' (2014) 30 *Professional Negligence* 125.

contingent on the extent or degree of exposure to a substance which might not be dangerous at all, or in smaller doses.[1018] The evidence that excessive heat can cause illness and death is well established.[1019]

Proving that overheating caused the *claimant's* death is more challenging. As I explained in Chapter Two, heat related fatalities tend to occur as a consequence of heart failure, aneurism, or other organ failure that might very well occur naturally in an old and vulnerable claimant – there is no signature marker or indicator for an overheating death. The absence of distinct markers, social isolation and the effect of extreme heat on the body could combine to create significant evidential barriers. The medical literature suggests that at present many overheating deaths are classified as such because of recorded weather patterns at the time of death.[1020] While this approach might be adequate for an academic or coronial enquiry it remains to be seen whether this kind of generalised approach would be sufficient to prove on a balance of probabilities that a death was caused by overheating, much less the defendant's breach of duty.[1021]

Background weather conditions and the relative toxicity of heat present greater challenges for a claimant seeking to prove that defects in the building caused her loss. Of course, background or environmental exposure to a toxic substance does not necessarily negative a finding that the defendant's breach of duty materially contributed to the claimant's illness.[1022] As I explained in Chapter Two, overheating in energy efficient buildings happens during hot summer weather, including heatwaves, and particularly in 'urban heat islands', where heat is trapped in urban spaces.

[1018] Specifically workers compensation claims for e.g. vibration white finger and noise induced deafness caused by an employers negligence or breach of statutory duty.
[1019] Chapter Two Section d)i.
[1020] Taylor (n 243).
[1021] This might be easier, however, in relation to infants, than geriatric or ill persons.
[1022] *Sienkiewicz v Grief (UK) Ltd* [2009] EWCA Civ 1159.

To some extent it seems sensible to think of the process of overheating as a cumulative one, where more exposure makes the problem worse. It is also very difficult to make sensible judgements about the relative contributions of the weather and the design of the building over any period of time. This is partly because exterior conditions fluctuate over the course of a day, but also because of the differing and very relative nature of what are considered comfortable and safe indoor and outdoor temperatures. It is questionable how we would frame overheating as in any way caused by defects in the building, when exterior conditions exceed comfortable or safe limits. This is probably best illustrated with examples: if daytime exterior conditions are 35 degrees celcius and interior conditions are the same, it is arguable that nothing to do with the building caused internal discomfort or danger. If the building next door, which is not designed to a high level of energy efficiency, is 30 degrees inside at the same time, can we attribute 5 'extra' degrees to building design? If by midnight it has cooled to 25 degrees outside, but it is still over 30 degrees inside,[1023] then can we argue that the building contributed to the overheating?[1024] If an occupant died during a day of fluctuating high temperatures, would the time of death be indicative of whether any features of the building caused the death or not?[1025] It is impossible to say either that 'but for' the defendant's breach of duty the claimant would suffer discomfort or illness/death due to excessive heat, or even to say that the defendant's breach materially contributed to that state of affairs. The defendant's breach of duty is not necessary to cause the claimant's death.[1026] Of course, if the claimant could

[1023] Chapter Two text between n 231 – 234.
[1024] As I discuss in Chapter Two, all these temperatures are considered above the comfortable range for England, and notably comfortable bedroom temperatures are probably below 22 degrees – see n 231. Of course, night time overheating is typical in built-up areas where night time temperatures do not reduce significantly, see e.g. Gupta and Gregg (n 267).
[1025] As I explain in Chapter Two, factors such as social isolation and the effects of extreme heat on the dead body can make precise postmortem results impossible – see text to n 243 – 245.
[1026] T Honore, 'Necessary and Sufficient Conditions in Tort Law' in DG Owen (ed), *The Philosophical Foundations of Tort Law* (OUP 1997); G Turton, 'Using NESS to Overcome the

not prove on a balance of probabilities that the defendant's conduct had been a factual or scientific cause of her loss, that would be the end of the matter.

Orthodoxy situates normative enquiries, as well as questions about the impact of naturally occurring events [1027] in the second stage of the causal enquiry. However, neutral 'technical or scientific' findings of factual causation mask a value-laden process within which the parameters of the causal relationship are determined.[1028] The causal enquiry, particularly when it comes to deaths, is one area where a decontextualised or 'climate blind' approach will see the incidence of hot weather as a background factor rendering the defendant's breach 'unnecessary' or irrelevant to the claimant's loss. This is at marked variance with one that acknowledges and seeks to take responsibility for the way in which the defendant has performed his work.

As I discuss in Chapter Five, climate consciousness in litigation requires that the relationship of mutuality between the parties be interpreted consistently with conduct that meets the challenges of climate change in a constructive way.[1029] Circumstances like these expose instances where the purportedly factual causative enquiries are underpinned by a normative consideration as to which factors to consider and how conceptions of duty, breach and causation are framed. [1030] 'Unnecessary' factors which nevertheless impact upon events, are only causally irrelevant if we are

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Confusion Created by the "Material Contribution to Harm" Test for Causation in Negligence' (2014) 30(1) *Professional Negligence* 50.

[1027] Per Lord Hoffman in *Empress Car Company (Abertillery) Ltd v National Rivers Authority* [1998] UKHL 5.

[1028] D Hamer, '"Factual Causation" and "Scope of Liability": What's the Difference' (2014) 77 *MLR* 156.

[1029] Chapter Five Section b)ii.

[1030] J Stapleton, 'Cause-in-Fact and the Scope of Liability for Consequences' (2003) 119 *LQR* 388 in an earlier discussion, explores the potential for a normative reframing of the understanding of the defendant's conduct to yield differing results to an enquiry for factual causation.

climate blind when determining the scope of the defendant's duty.[1031] Thus, if the defendant's duty of care extends to creating a building in which the claimant can live safely, in extreme but foreseeable climatic conditions (or, under the DPA, is habitable) the causal enquiry changes. Here, the defendant is required to take a holistic approach when implementing mitigation strategies.[1032]

If the defendant's duty of care to the claimant is framed in a 'climate conscious' way – such that the scope of his duty includes taking steps to ensure that the building is habitable or not dangerous even when it is very warm outside – then proving factual causation would not present exceptional challenges. This could be met using the 'but for' analysis, or if multiple defendants were involved, the material contribution test.

ii. Legal causation

There are no generalised issues to do with remoteness or the scope of liability that present themselves in relation to overheating problems in energy efficient buildings. For the claimant's injury to fall within the scope of the defendant's liability the kind of harm caused must be reasonably foreseeable;[1033] I have dealt with foreseeability of harm when discussing breach. Of course, at causation stage the foreseeability enquiry narrows to a question of whether a specific 'kind' of harm occurred in a specific way.[1034]

1031 J Stapleton, 'Unnecessary Causes' (2013) 129 *LQR*; Honore (n 1026).
1032 J Howe Cullen, 'Buildings' in MB Gerrard and K Fischer Kuh (eds), *The Law of Adaptation to Climate Change* (ABA Publishing 2012).
1033 *Overseas Tankship (UK) Ltd v Morts Dock and Engineering Co Ltd (Wagon Mound No 1)* [1961] UKPC 1.
1034 Crucially J Steele (n 589) explains how this test of reasonable foresight – the viewpoint of the reasonable person in the position of the defendant at the time of the breach – illuminates the normative character of the legal causation enquiry.

This presents few points of discussion in this thesis, which considers the known causes and consequences of overheating.[1035]

Of course, as I explained in Chapter Two,[1036] in many cases the conduct of the claimant plays a role managing the conditions in the building, or otherwise. The claimant has some control over the internal conditions in the property: if any mechanisms or countermeasures to control heat ingress exist, she could operate them. This of course includes window opening. She could also use mechanical cooling, if installed, or use her own devices. She also, at least in theory, has some agency in relation to managing the impact of overheating on her health and wellbeing.

The claimant's failure either to manage to internal environment or her own wellbeing may contribute to the harm she suffers, whether thermal discomfort or more serious impacts of injury and death. It is perhaps arguable that the claimant's conduct might constitute a *novus actus interveniens,* breaking the chain of causation and absolving the defendant.[1037] However, on balance, my view is that it would rather be dealt with as a question of contributory negligence, as discussed in the next section. As Steele explains, cases such as *Spencer v Wincanton,* where a claimant's poor decisions contributed to his own harm or injury, are no longer conceptualised to break the chain of causation.[1038] These are instances of cases where '…the initial negligence of the defendant provides the conditions for another party to cause more extensive damage.'[1039]

[1035] Of course, in life as in 'live' litigation, the harm to claimant could occur in other ways both foreseeable and otherwise.
[1036] Chapter Two text to n 258 – 267.
[1037] S Green, *Causation in Negligence,* (Hart Publishing 2015) 48 – 9.
[1038] *Spencer v Wincanton Holdings* [2009] EWCA Civ 1404. In *Corr v IBC Vehicles* [2008] UKHL 13 even the 'intended' acts of the claimant did not obliterate the defendant's wrongdoing, and it was not necessary that the claimant's conduct be reasonably foreseeable, where the claimant's acts could be seen as a consequence of the defendant's breach. Also Green (n 1037).
[1039] Steele (n 589) 195 citing *Knightley v Johns* [1982] 1 WLR 349.

Following As Steele explains, this essentially boils down to an issue of fairness, in circumstances where the claimant's failings are not 'coincidental', but where the conditions for this are created by the defendant's tort.[1040] The claimant's role in his own harm is dealt with as an issue of contributory negligence.[1041] I discuss this further in relation to the claimant's conduct, below.

g) Conduct of the claimant

However, plainly in some respects the claimant's behaviour might contribute either in causing her loss, or by failing to manage the extent of her loss, or both. These issues might arise either at the defences or remedies stage, either through allegations that the claimant's negligence contributed to the damage or that she failed to mitigate her own loss.[1042] Both require that the claimant acted unreasonably with regards to her own interests, and that this behaviour caused or contributed to her loss. As there are no defences other than contributory negligence that are likely to raise particular issues, and to avoid repetition, I will discuss the impact of the claimant's behaviour on the quantification and reduction of damages more generally. The issues are whether the claimant has taken steps to manage the interior environment of her dwelling, and the claimant's management of her own health in the overheating property.

[1040] Steele (n 389) 205.

[1041] Explored in depth in J Steele, 'Law Reform (Contributory Negligence) Act 1945: Collisions of a Different Sort' in TT Arvind and J Steele (eds), *Tort Law and the Legislature* (Hart 2013).

[1042] These two mechanisms are distinct, but the line between then is unclear and uncertain. In factual enquiries J Goudkamp, 'Rethinking Contributory Negligence' in E Chamberlain, J Neyers and S Pitel (eds), *Challenging Orthodoxy in Tort Law* (Hart Publishing 2013) explains that the regularly used 'pre-tort/post-tort' distinction does not make sense or describe the full effect of each doctrine. For the purposes of this thesis similar issues could arise at either stage: for instance, in claims for death, the claimant's failure to open windows and use proper cooling methods might be factors in contributory negligence, but once she has heat stroke (and is injured) these might also be factors in a failure to mitigate the loss in her subsequent death. I adopt the approach suggested by Goudkamp.

First I look at the extent to which the claimant has control over the interior conditions of her dwelling. The absence of adequate ventilation is routinely implicated in overheating problems, [1043] and it is, of course, open for the claimant to undertake her own measures in ventilating or cooling the property, either by window opening or with the use of mechanical air conditioning or electric fans. In some instances – most likely when air conditioning is used [1044] - the steps taken would be successful and the uncomfortable or dangerous conditions avoided. This raises the question of whether the claimant could be criticised, or her damages reduced, for failing to take these simple steps. [1045]

The claimant is required to take reasonable care of her own safety, and may not recover damages in respect of any part of her loss that would have been avoidable by steps on her part. [1046] The test for contributory negligence is an objective one, however, the claimant is never required to do more than she reasonably can. The standard of care would be adjusted in certain instances to take account of the claimant's capacity for self-care. [1047] Most of the pertinent authorities relate to the contributory negligence of children, however on a principled basis I would argue that a lower standard of (self)care would be applicable in respect to most of the demographic groups likely to experience indoor overheating – children with vulnerable parents in low cost housing, elderly people, and those with

[1043] See discussion above and in Chapter Two n 268. I referred to the potential to 'rig' the test in Appendix P to the SAP, a post-construction energy performance evaluation, by adding unrealistic assumptions about constant window opening and unlikely exterior temperatures.
[1044] In Chapter Two I explain that where exterior conditions are very hot, even substantial natural ventilation through window opening might not help, and that over certain temperatures (probably 35 degrees) fan use might increase dangers to health – see text to and notes 264 – 267.
[1045] Under Remedies below I make some brief comments as to how the claimant's loss would be classified in such cases.
[1046] Depending on whether a reduction of damages was sought by way of a plea of contributory negligence or mitigation of loss – Goudkamp (n 1042).
[1047] Much as with questions of negligence, the claimant will be held to a standard of reasonable care for her own safety. Deakin, Johnston and Markesinis (n 465) 755; *Gough v Thorne* [1966] 1 WLR 1387

existing mental and/or physical health conditions. These more vulnerable groups would be challenged both in appreciating the risks of and need for health management in extreme heat, as well as the practical capacity to take steps to counter those risks. As such the objective standard of the reasonable claimant must take account of the vulnerability of these affected groups.

Determining which steps a reasonable claimant might take, and which she would not, is again a question of fact that would be determined on a casuistic basis. Clearly window opening is often effective, particularly if all the windows are open and can generate a through draught.[1048] However, resident concerns about security, pollution, noise and other issues could disincentivise doing so, and it does seem likely that all these concerns are more likely to affect more vulnerable or less affluent claimants.[1049] It is not difficult to imagine that developers are less likely to install countermeasures on low-cost housing, or that issues like the above might prevail in less affluent areas. It is difficult to imagine, however, that a claimant who understands the dangers of overheating, not to take this very basic step, even if other risks were involved.

Some complexities arise in relation both to efficacy and neutrality, with the question of mechanical cooling. Electric fans, but more so air conditioning, usually alleviate any discomfort and health risks associated with overheating, although as explored above these can contribute to dangers over certain temperatures.[1050] Doing this would eliminate both discomfort and health risks, but would increase energy demand at a traditionally

[1048] I discuss in more depth in Chapter Two the steps available to residents to ameliorate overheating – see n 263 and surrounding text.
[1049] As I mentioned in Chapter Two, although there is very little in the literature on this, it has been suggested that cheaper housing in any event is more likely to overheat – Partington (n 242).
[1050] Chapter Two text to n 264 – 267.

'offpeak' time of year, in Britain. This undermines the financial incentives for energy efficiency: using more energy will have cost implications for the claimant, if she can afford to install and run expensive mechanical cooling at all. This is particularly problematic for persons previously in fuel poverty, or who have financed energy efficiency works through loans.[1051] While it seems unlikely that a claimant who cannot afford to run mechanical cooling would be deemed not to have taken reasonable care to minimise her losses, or protect her health,[1052] what of a claimant who reasonably could have done so but chose not to? There are many reasons why mechanical cooling, particularly air conditioning, might be an unattractive choice even in an overheating building. Increased energy use undermines energy efficiency's decarbonisation purpose, thereby undermining climate change mitigation goals. This is particularly ludicrous given the purpose of the measures. However, mechanical cooling also has local environmental effects; the use of air-conditioning generates heat. While this cannot be said to undermine climate adaptation, this has potential to contribute to localised hot weather conditions, compounding the problem.[1053]

Insofar as injury and death is concerned, the claimant's damages will be reduced if he failed to take reasonable care of his own safety, and if these failures contributed to the damage. A finding of contributory negligence can reduce the claimant's recoverable damages both in respect of negligence and statutory torts.[1054] I explained in Chapter Two, that death is

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1051 In Chapter Three, I explained that a portion of ECO funding was allocated for poor or vulnerable households. Also, retrofits or improvements conducted under the now-defunct Green Deal, where the repayment of the loan depends on sufficient energy savings to cover the loan repayments and interest, might not be able to service their loans – see generally Chapter Three Section d). Of course this applies to any other kind of credit or loan financing used to fund energy efficiency improvements.
1052 *Lagden v O'Connor* [2003] UKHL 64.
1053 Chapter Two n 267 and text thereto.
1054 S 4 Law Reform (Contributory Negligence) Act 1945.

not inevitable either from heat exhaustion or even heatstroke.[1055] Both can be attended to without the need for medical intervention, as long as the claimant understands the reasons for and nature of his discomfiture, appreciates the risks, and has the knowledge and ability for appropriate self-care. All aspects of this are more difficult for elderly or otherwise vulnerable people; as I assert above the objectively assessed standard of the claimant's care should be assessed taking her diminished capacity into account.

The above betrays various climate blind spots and warns of the dangers of treating certain aspects of the claimant's conduct or behaviour as neutral. While the use of mechanical cooling might be a logical precaution against dangerous overheating, approaching this as an adequate solution to overheating problems would exemplify a climate blind approach to mitigation of loss. It is very difficult, however, to predict what approach a court would or should take, if a claimant has access to airconditioning but chose not to use for it for reasons of environmental conscience. Tort prioritises the protection of the claimant's physical interests, certainly over any outsider 'environmental' interests.[1056] It might be argued that the claimant should do the same.

There are however further questions about the claimant's contribution to or failure to mitigate her own loss. In as much as the defendant could quite possibly be found to have been negligent if he fails to appreciate the extent of future overheating risk, a climate conscious claimant must also educate herself as to the health dangers associated with a warming world, and understand how best to manage interior conditions and her health, in hot

[1055] Chapter Two, see text between n 237 – 239.
[1056] See discussion in Chapter Five Section b)iv.

weather.[1057] Because the claimant's correlative relationship with the defendant is one of mutual personal responsibility, she too may be expected to manage known risks *as well as she can*. Within a tort structure that depends on relationships of personal responsibility, issues such as these raise interesting questions about how we might understand the claimant's relationship of mutuality with the defendant. One might argue that we cannot require the defendant to be conscious of the risks and dangers of living in a changing climate, if the claimant is not. However where the claimant is vulnerable and the defendant is a professional person, it would seem unjust to expect the degree of responsibility taken to be equivalent.

This is also an area where climate conscious litigators would need to be conscious of the potential instrumental effects of tort. Approaching the use of mechanical cooling as neutral sends a distinct message regarding emissions reduction and energy usage.[1058] The message is that they could avoid liability, not through educating themselves on careful design or the use of countermeasures, but by installing, or recommending the installation of, cheap air-conditioning units,[1059] the operation of which would be paid for by the claimants. This would be particularly problematic, not just for individual claimants. In addition this would actively disincentise creating buildings adapted for extreme heat, and also lock each building into higher energy use by installing cooling which increases the building's energy demand. However, once the defective building exists, failing to install, approve or operate air conditioning could put claimant lives at risk.

[1057] Referring back to n 1044, for instance it would be her responsibility to educate herself on the safe temperature boundaries for fan use.

[1058] Chapter Five c)iii. generally and under n 755

[1059] This approach also sidesteps the potential for problems to arise if good and appropriate measures are taken, and temperature increases are extreme, but within the scenarios modeled by the IPCC, and hence are foreseeable. The great advantage of airconditioning is that there is no risk that the measures be taken but still not be able to bring the temperature to within a safe range.

h) Remedies

I shall now briefly consider the remedies that would be sought by a successful or partially successful claimant. For obvious reasons I shall not look at quantum, just at heads of claim and any unique or particular issues that might arise. I have considered above how certain elements of tort might be managed by adjudicators; of course if the claimant is successful in all the elements of the tort, he will recover some damages. The purpose of the discussion of remedies is to conclude the elements of a tort claim, and by questioning what any possible actions would be 'worth' and hence what the weight of any incentive would be. With one exception, all the possible remedies discussed below, sound in money. In the previous chapter, I discussed how the absence of mandatory orders in negligence, means that a defendant cannot be compelled to repair defects in the building causing poor performance, even if he is found liable.[1060] Most of that discussion, applies here, with respect to overheating and associated increased carbon emissions through cooling measures.

First I look at claims for the discomfort caused by living in an 'uninhabitable' building, under the Defective Premises Act. Overheating discomfort would yield fairly small damages, perhaps on a par with the low-end of loss of amenity damages in a nuisance claim, or equivalent to awards made under the DPA for damp or disrepair.[1061] If a proactive claimant was so successful in countering overheating that none persists, and incurred costs in doing so, then his loss would be purely economic.

[1060] Chapter Six text between n 904 – 908.
[1061] *Bayoumi v Protim Services* (n 1000) £1,500 per year for four years of water ingress.

There is some authority that damages for pure economic loss are recoverable under the DPA,[1062] but of course, not under negligence.

The DPA also contains a provision for an order to be made for the property to be repaired.[1063] Where the tenancy agreement in any event puts on the landlord an obligation to maintain or repair the premises, he has a duty to ensure that the premises are reasonably safe.[1064] This section only applies to landlords, which means that the tenant of an overheating building could look to his landlord to make repairs, but an owner/occupier could not exercise the same remedy against the developer. This is the only means that the problem can be rectified under tort.

In a negligence claim, the claimant would claim damages for personal injury and loss incurred as a result of the defendant's negligence. The claimant's general damages for pain and suffering, and loss of amenities of life,[1065] would be quantified in accordance with normal principles.[1066] Health problems tend either to be negligible, or very serious, usually resulting in death. In rare cases where heat stroke resulted in organ damage but the claimant did not die, she would be awarded general damages corresponding with the latest edition of the Judicial Studies Board Guidelines, and compensation for "lost years".[1067] She might also incur special damages, such as loss of earnings or medical expenses. Where the overheating resulted in death, the claimant's estate/dependents could claim any pre-

1062 *Andrews v Schooling* (n 1001).
1063 S 4 specifically provides for remediation of the defect, but only in relation to tenanted properties. The courts have refused to interpret this to require any works that might be construed to be an improvement – *Dunn v Bradford Metropolitan Borough Council* [2002] EWCA Civ 1137.
1064 S 4(1) DPA.
1065 Per Lord Scarman in *Lim v Camden* (n 463).
1066 *Heil v Rankin* [2000] EWCA Civ 18; *Simmons v Castle* [2012] EWCA Civ 1039.
1067 *Pickett v British Rail Engineering Ltd* [1980] AC 136

death general and special damages, funeral expenses [1068] and damages for bereavement[1069] and loss of dependency,[1070] as appropriate.[1071]

As referenced above, the costs of mitigating the claimant's loss (presumably the purchase of appliances, and past and future losses for the increase in energy bills) are themselves recoverable as an item of consequential loss.[1072] The defects in the building would be an item of pure economic loss, and most of the discussion in Chapter Six would apply.

I have expressly resisted making specific or particular claims about any of the hypotheticals discussed in this chapter, on the basis that the range of issues is so broad that speculating about factual details is futile. However, overheating problems and to an even more pronounced extent, overheating deaths, are restricted to a particular demographic. These deaths are predominantly to be anticipated amongst elderly or otherwise vulnerable people, and particularly in the context of social isolation, and economic deprivation. This is because, particularly in relation to energy efficient buildings, some evidence suggests that the low value or destined for social housing developments are less likely to have measures taken that would make heat ingress manageable.[1073] This means that the likely victims would not fall within a category eligible for bereavement damages,[1074] and also means dependency damages would be very low or unlikely for similar reasons. Loss of earnings special damages, and indeed family care claims, are unlikely to be brought on behalf of elderly and isolated persons, simply

[1068] S 3(1)(5) Fatal Accidents Act 1976
[1069] S 1A
[1070] S 1
[1071] S 1A(3)
[1072] Peel and Goudkamp (n 780) 332.
[1073] Above, and Partington (n 242).
[1074] Here I allude to the fact that the social isolation and age issues that are likely to be present in overheating deaths mean the deceased is unlikely to be the minor child or spouse whose death enlivens this head of claim.

because it would be difficult to substantiate them. These combined issues mean that damages, even for deaths, in overheating buildings, are likely to be low. In many cases a reduction might be made for contributory negligence. In Chapter Six, when I discussed the complexities of tort's deterrent effect,[1075] I explained the complexities of interplay between defendants and insurers impact on, but often reinforce, this instrumental impact of tort.

However, how and to what extent a finding for the claimant would give effect the priorities outlined above, is another story. There might be an issue that the claimant's modest damages might either have little bearing on the defendant's conduct (unless many claimants brought proceedings together) but there is also a concern that the low level of damages might prohibit proceedings being brought altogether, if the costs are likely to be disproportionate to the claimant's damages.[1076]

i) Conclusions

Earlier in the thesis, I explained that in many instances an understanding of tort as reflective of an interplay between the claimant's protected interests, and a correlative relationship between the parties, which is characterised by interpersonal responsibility.[1077] I explained that these concepts resist exact definition because they are inherently pluralistic, but that this provides a useful framework for understanding what we might and might not expect

[1075] Chapter Six Section g) text between n 918 – 927.

[1076] Specifically, the requirement that litigated matters meet a specific cost-benefit ratio – this in implicit in the 'overriding objective' set out Rule 1 of the Civil Procedure Rules 1998.

[1077] I explained that assertion is that the limits on tort liability the kinds of damage that tend to be recognized by tort, are those that represent an interference with interests which tort protected within the context of a specific degree of correlative relationship – see Cane, *The Anatomy of Tort Law* (n 561) especially at 95. In my view, an approach demonstrating an appreciation of tort from its underlying basic characteristics is useful and instructive. Released from doctrine, the plurality of a foundational approach holds more explanatory force than a unitary account, where the law 'must' fit the theory. A pluralistic account can explain the tendencies of application in tort, without requiring uniformity in application.

from tort. In the previous chapter, I sought to analyse the financial losses suffered by owners of poorly performing buildings as representing an instance of defective products pure economic loss. I explained how using the conceptual tools of protected interests twinned with correlativity, can provide insight into the limits of liability in this area.

This chapter has looked at the physical injury and deaths that might be suffered due to the manifestation of unintended consequences of energy performance improvements in domestic buildings. In this case, the physical interests at stake are uncontroversially, strongly protected.[1078] I have focused predominantly on the relationship of mutuality between the parties, arguing that determining this relationship in a 'climate blind' way, cannot realistically reflect relationships of mutual responsibility between the parties. I have argued that mutuality in the parties' relationship does not demand equivalence or even perfection, but a conscious reconsideration of the harms and dangers of climate change, what is required to meet these, and an appreciation of where others are rendered particularly vulnerable as a consequence. I have questioned how negligence's elements of breach and causation, and the claimant's contribution to her own loss, could be framed very differently depending on whether the climate context is acknowledged in the litigation.

It is also necessary to consider the instrumental impact of tort liability, and what outcomes would mean in this context. As I explained at the outset, my project is not to construct a notional tort claim, or to try to predict a generic outcome. The significance of factual context in the 'infinitely variable'[1079] range of human relationships means this is a fruitless task. In the chapter, I have emphasised in relation to each element of the

[1078] Cane (n 561) Chapter 3.
[1079] Per Lord Bridge in *Caparo v Dickman* (n 611).

negligence enquiry, what the potential impacts of a climate blind or climate conscious approach, might be. This constructs the narrative of what is means to be in a relationship of mutuality, shaping our understanding of what it means to exercise interpersonal responsibility. I will however make some broad comments about how possible outcomes will fulfil the functions and objectives of tort claims. As I explained earlier in the thesis, these are to compensate the claimant, deter harmful future conduct and distribute the costs of harmful or dangerous behaviour.

To receive compensation the claimant has to prove all the elements of negligence (or the statutory tort). It is unlikely that she would be able to do so, unless determinations of breach and causation are approached in a climate conscious rather than a mechanistic way. Because of the climate context, a decision about compensation to the claimant is also an implicit decision about who should bear the costs of climate change.[1080] One of tort's functions is distributing the risks of new and innovative technologies, and in this case, tort liability will distribute the costs of these risks in the context of a broader phenomenon. By compensating the claimant, or finding the defendant liable, or otherwise, a court distributes the costs both of climate change and the measures to mitigate climate change. A court might well think that this penalty exceeds the extent of the wrongdoing of the defendant construction company or its insurers, given the 'superwicked' nature of the climate problem. But as I explain in the introduction, this superwicked problem requires a multiscalar response,[1081] and that shortcomings in meeting the challenges of climate change must be met in all instances and at all levels. The defendant is not being asked to absorb all the costs of climate change but simply those of his own shortcomings – his shortcomings in relation to his responsibilities to the

[1080] See Chapter Five Section c)ii.
[1081] Introduction text between n 56 – 63.

claimant - in a particular instance. However if the claimant is uncompensated all these costs fall on society's most vulnerable. In my view, it is preferable that this choice not be made, but if it is, it should be made overtly.

An adverse tort decision against the defendant could deter risky behaviour. However, as I explore earlier in the thesis, while tort clearly does have some deterrent or regulatory effect, this is not always the obvious, and sometimes operates in perverse ways. It should not be assumed that liability or the risk of liability in such cases would encourage defendants to apply themselves to ensuring the problem does not happen. Work is already underway to explore and overcome some of the worst cases of overheating, and it is clear that the awareness of increasing future risk is fairly high. Yet there seems to be a genuine lack of will to improve.[1082] As discussed above, it seems likely that liability risk might encourage shortcut measures, such as the installation of cheap airconditioning units, which solve the problem, but add all sorts of other ones. In addition of course, liability risk for unintended consequences could undermine the broader energy efficiency project, by discouraging elective retrofits through pricing. Of course, new buildings are subject to mandatory energy efficiency standards, but as I explain earlier in the thesis, this area is already rife with compliance problems and wild discrepancies in energy certification.[1083] A defendant's liability in tort for unintended consequences could further undermine this already trivialised area, encourage 'creative compliance' with the regulations and a devaluation of energy efficiency in general. This would undermine climate change mitigation strategy.

[1082] ZCH (n 224).
[1083] Chapter Three Section b)i. and c)i.

To conclude: a wealth of literature discusses tort's potential and limitations in litigation 'about' climate change. Tort is underpinned by a relationship of mutual personal responsibility between the parties in relation to their respective interests. Meeting the multiple demands of climate change require our prevailing awareness as to whether our behaviour contributes to or undermines our response to it. Failing to incorporate 'climate consciousness' into our understanding of this relationship, stands to do undercompensate claimants, produce perverse incentives, and distribute the costs of climate change in the least deserving places.

EIGHT: CONCLUSION

a) Introduction

This thesis explores the limitations and potential of liability in tort, for problems in domestic buildings intended to have a high level of energy efficiency. It represents the start of a conversation about small and mundane concerns that interface with climate change mitigation issues. Central to the thesis is an understanding that, because of magnitude of the climate problem, it is easy to neglect unglamorous, or seemingly insignificant issues, that nevertheless have potential to contribute to the mitigation of climate change.

I approach the problems in the thesis from two perspectives. Taking the multiple potential benefits of domestic energy efficiency improvements into account, my upfront focus is on the impact or potential cost that the failure of these measures might have on consumers or residents. My examination of the current regulatory framework reveals that, despite these measures being mandated or (poorly) incentivised for implementation in domestic spaces, there is scant or no recourse in the event of these measures failing. This of course has implications both for individual consumers, and the policy area as a whole. Energy efficiency in buildings has potential to make a significant contribution in the reduction of emissions of greenhouse gases, a key element of climate change mitigation policy. Shortcomings in quality enforcement have obvious negative implications for the achievement of emission reductions.

The climate change context is of crucial importance in relation to the second perspective on the research. Here, I frame the potential disputes arising in the research context as instances of climate change litigation

because they interface with policy areas that respond to the demands of climate change. Central to this understanding is a conception of climate change as a broad phenomenon requiring a multiscalar or polycentric response.[1084] I argue that the resolution of (or absence of recourse for) small private disputes has potential to support or undermine climate change responses at all levels of governance. However, because of the dominance of the parties' interests, climate issues are often invisible or neglected in tort (or other private liability) claims. I argue that an overtly climate conscious approach, where parties and adjudicators recognise these factors, is necessary. This is because the pervasive, subtle yet sometimes invisible features of climate change are such, that approaching these issues without proper reflection could mean that relevant issues are obscured.

The structure of this concluding chapter is as follows. First I provide a retrospective overview of the thesis, emphasising the purpose of each chapter in the progression of the argument. Then I discuss the overall conclusions and implications of the research in relation to the two key research themes discussed above: the regulation and enforcement of home energy efficiency measures, and the need for climate consciousness in the resolution of private disputes. Finally, I discuss and acknowledge the research limitations, and briefly elaborate on the future potential of the research area, before making some final concluding statements.

b) Overview of thesis

The thesis is in two parts. The first part establishes the background and context of the research, explaining both the potential for energy efficiency in domestic buildings and exploring how problems arise. The second part

[1084] Introduction, text between n 54 - 63 also see generally Osofsky (n 57).

uses that detailed contextual analysis to explore the limitations and potential of tort in relation to the two problems considered.

Chapter One introduces and contextualises the research. The research engages with complex conceptual areas and I use this introductory chapter to define these concepts and explain their significance. Crucially, this requires an explanation of the importance and urgency of home energy efficiency, and its potential in climate change mitigation. I explain the conception of climate change as a phenomenon requiring a response across scales; this justifies the relevance of this seemingly parochial and unglamorous issue to the global challenge of climate change mitigation. I also contextualise my research within burgeoning climate liability scholarship, arguing for the recognition of climate change issues within disputes not overtly 'about' climate change harms.

In the second chapter I discuss how building energy efficiency might technically be achieved. I examine how failures in the design or construction process can bring about shortcomings in energy performance. I also explain how much-criticised methods of performance assessment can contribute to the performance gap problem. I explore one unintended consequence of energy efficiency improvements, specifically: energy efficient buildings that overheat in hot weather. I explore the implications of this for human health, emphasising the potential for this problem to become more widespread as warming occurs. The purpose of this chapter is factually to explain the nature and origin of these problems; this informs the tort analysis that takes place later in the thesis. This is to explain that energy efficiency improvements are not the 'low hanging fruit' of greenhouse gas emission reduction they were thought to be.

Chapter Three covers the regulatory measures that govern energy performance in domestic buildings. This required a discussion of the mandatory minimum standards for energy efficiency installations prescribed by the Building Regulations, including the treatment of unintended consequences. The quality standards in the regulations are contrasted with the standard assessment procedure (SAP) used to generate energy performance certificates, and I discuss the compliance processes of each. The chapter illustrates that these two layers of energy efficiency regulation are not designed to achieve the same outcome (roughly, component integrity and system performance), and that even if optimal energy performance could be achieved using the SAP, which is questionable, this process can occur too late to influence construction and design processes. The purpose of the chapter for the thesis is to explain the regulatory framework that governs the desired outcomes and problems framed in the previous chapter; it also forms the substance for the doctrinal tort enquiry in the second half of the thesis. However, this chapter also makes a freestanding contribution in its analysis and discussion of the regulation governing energy efficiency improvements and the lack of coherency between the two layers of regulation.[1085]

The final chapter in the first part of the thesis continues the above discussion by addressing the dearth of regulatory options available for enforcement. It also explains why contractual remedies are often not available to performance gap claimants, and explores the limits of insurance and statutory housebuilder protection policies. In addition to providing some key conceptual clarification, this short chapter contributes to the thesis in three key ways. First, it continues the discussion of regulation, further illustrating the shortcomings both in design and application of the

[1085] While not central to the thesis, it also exposes the vulnerability of energy efficiency standards, however flawed these might be, in the current political climate.

regulation governing energy efficiency. Second, it explains why the more obvious forms of recourse – contract, regulation and statutory insurance – might not assist a performance gap claimant. Third, in so doing it explains the relevance of the tort enquiry, which follows in the second part of the thesis.[1086]

The groundwork laid, the second part of the thesis explores the limitations and potential of tort in relation to the problems discussed in the thesis. Chapter Five presents a theoretical account of tort. Observing that the field of tort theory is dominated by a vigorous debate concerning the applicability of any 'grand theory', I respectfully eschew all such theories, preferring a pluralistic account. My account examines tort (and specifically negligence) from the perspective of its underlying structure, specifically the relationship between the claimant's protected interests underlying each action, and the nature and closeness of the relationship between the parties. I argue that examining tort through that framework can provide insights into the limits of liability in tort, but also the relative flexibility or rigidity of these limits. In addition, I argue that the prospect or actuality of both liability and non-liability, and the dialogues surrounding the same, have broad potential impacts in the policy areas of energy efficiency and climate change mitigation. Due to the urgent and crucial necessity of an appropriate response to climate change, and the potential for these impacts to reinforce or undermine this response, I argue for a 'climate conscious' approach. This means that these impacts must be recognised. This is not a call for climate impacts always to 'trump' private rights and interests in the adjudication of private disputes. Rather, I the importance always of acknowledging the climate aspects of private disputes, in order that regulatory adjustments can be made elsewhere, if necessary. The purpose

[1086] My comments in the last few sentences relate mainly to the performance gap. Tort is a more obvious remedy for overheating problems, particularly when personal injury results.

of this chapter is to provide some theoretical groundwork concerning what we might expect from tort in and of itself, to support the discussion that follows in the doctrinal chapters below.

The two remaining chapters assimilate the policy, scientific and regulatory material analysed in the first part of the thesis; they use the theoretical frameworks presented in the foregoing chapter to analyse how tort doctrine would engage with the specific problems.[1087] Chapter Six engages with the barriers to tort liability in relation to poor construction and miscertification of domestic buildings resulting in a gap between, for instance, as designed and as built performance, or certified and post-occupancy performance.[1088] I explain that due to our very narrow perception of which of the claimant's interests are affected in this context, and the weak protection afforded these, the circumstances in which the defendant would ever have a duty of care not to cause these harms are limited and unlikely. I argue that seeing the basis of liability in negligence as structural, exposes the intractability of these outcomes. Simultaneously I argue that change is not impossible, but this requires deep change and adjustments in relation to our conceptions of what we hold as valuable. I also examine the remedies available to successful claimant, arguing that these do little to ameliorate the claimant's loss, but also do little to address other harms largely invisible in the tort claim, due to the way loss and damage are conceptualised in negligence. I question the absence of recourse to claimants, and what the effect of this impunity is for research

[1087] This sounds a strange endeavour! As I explain in both chapters, while I make some observations as to how things might go, I acknowledge that the variety of potential parties and infinite variables in 'live' litigation are too extensive for me to predict universal outcomes.
[1088] See Chapters Two text between n 182 – 185 where I explain the complexity of the 'performance gap'.

and development, and quality assurance, in the industries that deliver energy efficiency improvements.[1089]

As above, the second doctrinal chapter draws on the first part of the thesis; I consider when a claimant suffering overheating related discomfort or serious injury/death brought about by energy efficiency measures, might have an action in tort.[1090] Tort is a more natural remedy for these sorts of problems, and the strong protection afforded to the interests of putative claimants, means there are prospects for (particularly) viable personal injury claims, even for secondary titleholders. I go on to explain that the climate change context forces adjustments and reflection of how we conceive of the mutual nature of the duties owed between the parties. I conclude that persons suffering from the unintended consequences of building energy efficiency measures might be more likely to recover damages in 'climate blind' litigation, a perverse outcome which encourages a lack of awareness of both climate adaptation and mitigation policy goals.

Having reviewed and summarised the thesis I shall now go on to discuss my conclusions and the implications of my research in relation to its two broad themes. First, I discuss the potential in energy efficiency improvements and discuss how this potential has been poorly served by the regulatory measures, including the potential for private liability. Second, I consider the role that small private disputes such as these might have in relation to broader climate change policy, emphasising the importance of

[1089] This part of the chapter is a summary of the purpose and conclusions of each chapter of the thesis. The remainder of the chapter constitutes a thematic discussion of the research implications and conclusions, which draws heavily on the conclusions reached about the potential implications and effects of the tort remedies (or the absence thereof) in the two doctrinal chapters. For this reason the reiteration of the conclusions of these chapters is relatively brief as these shall be covered in more detail later in the chapter.

[1090] As explained in the chapter, this includes negligence, but also a brief discussion of the DPA. I feel no discomfort incorporating statutory wrongs under the umbrella of 'tort'.

recognising the smaller and more mundane matters that nevertheless are (or should be) recognisable as climate change litigation.

c) Energy efficiency

The thesis topic is an exploration of the limitations and potential of liability in tort arising from problems in domestic buildings with energy performance problems. I now go on to consolidate my conclusions on the research as a whole. This section will consider the research implications in relation to the recourse available to claimants either with a performance gap, or suffering unintended consequences of energy efficiency improvements. Before I address this question directly, I take a few steps back to make some broader comments and observations about the potential of energy efficiency, and question the regulatory management of energy efficiency improvements in domestic buildings. From there, I consider the limits and potential of tort both in relation to the householder claimant, then climate change mitigation/energy efficiency policy more generally.

i. The importance of energy efficiency

In the Introduction to the thesis, I explain that energy efficiency is of crucial importance to energy and climate change policy; it plays a key role in reducing energy demand. Because our fuel supply is carbon heavy, this reduction in demand abates greenhouse gas emissions without (necessarily) the lifestyle compromises demanded by energy conservation. [1091] Accordingly energy efficiency is, or should be, an attractive and reliable measure for climate change mitigation. Moreover, it carries multiple

[1091] See my comments in Introduction concerning the difference between energy efficiency and energy conservation: text between n 110 – 118.

additional benefits. From a geopolitical perspective, it contributes to energy security by supporting broad reductions in energy demand and reducing our collective dependency on fossil fuels. From a consumer or householder perspective, it can contribute to long-term financial savings and confidence through reduced individual dependency on the volatile pricing of energy supplied from the grid. Where occupants' socio-economic status is a barrier to indoor comfort, improvements in energy efficiency can ensure warmer domestic environments and consequent improvements in health.

Consequently energy efficiency in buildings stands to make significant contributions not only to climate change mitigation, but also generally in terms of energy demand policy. Its inclusion as a key measure for the England's energy and climate change policy is sensible and appropriate. As I explained in Chapter Three, this was sought to be achieved through progressively higher standards of energy efficiency in new build or public buildings, combined with informational measures and economic instruments to incentivise renovation and progress the rate of improvements in existing buildings. Given that householders would stand to benefit from improved energy efficiency it seems appropriate that they would contribute to the costs of this, particularly in privately owned property. Of course, this mix of regulatory measures is based on relevant European legislation; as I also explain in Chapter Three, despite ambitious additional measures during the previous decade, recent dramatic policy changes have seen these measures reduced to bare compliance with European legislation.[1092]

[1092] See discussion in Chapter Three Section a)i.

This regulatory mix seems less sensible, and the recent obliteration of energy efficiency policies less egregious, when the known problems of the energy performance gap and unintended consequences are taken into account.[1093] There may well be circumstances in other contexts, in which the imposition of unachievable quality standards on industry has brought about revolutions in knowledge and skill, as stakeholders seek compliance. And, while it can not be said that no effort has been made genuinely to achieve these standards in the research context, improvements falls far short of what was and is required to meet even the current minimum standards (let alone the zero-carbon standard to which England is still bound, under the EPBD). It seems that, rather than investing to reduce the knowledge and skills deficits required to close or eradicate the performance gap, and risks of unintended consequences, industry has chosen rather to make compromises when it comes to compliance.[1094] Neither are unknown problems: government and industry are openly aware of both.[1095] Of course, all the above represents a series of missed opportunities to improve and ensure the quality of energy efficient and otherwise healthy domestic buildings, and guarantee the maximum potential reduction of carbon emissions from the built environment.

Of course, the claimant[1096] is either compelled or incentivised to achieve the prescribed standards in her property. This might require her to pay a premium for a 'compliant' property, or indeed, invest in retrofit works.[1097]

[1093] Chapter Two: open knowledge of both these problems predates the EPBD, in the case of the performance gap by several decades – see discussion in that chapter and Bordass (n 186) and Orme (n 226) respectively.

[1094] My detailed discussion of the problematic nature of 'compliance' is in Chapter Four Section c)i. Notably, one of the key industry demands reflected in the ZCH (167) is that no further regulation be introduced until some progress is made.

[1095] Ibid. See text to n 108.

[1096] In Chapter Four at Section b)i. I explain who is a claimant.

[1097] Again, the range is broad: local authority tenants might assume no personal financial expense but they certainly bear the risks of unintended consequences. Similarly, private landlords taking advantage of a 'split incentive' scheme might not incur any upfront costs, but financial penalties could be passed to tenants.

She might not achieve any or sufficient benefit for her investment; or indeed might suffer overheating problems or other unintended consequences. Apart from carefully worded standard disclaimers or limited warranties,[1098] the true implications of which may well be lost on consumers, there appears to be a lack of frank communication as the risks of failure. It would have been open to industry at any stage to have open conversations as to the 'hit and miss' nature of energy efficiency improvements, and the risks of unintended consequences, however it is not apparent that this has ever been done on a commercial basis.[1099] It is worrisome that industry has continued to (and indeed, has to) accept instructions to meet targets that it knows to be unachievable. The open secret of obfuscation in the compliance process, masking underperformance, is similarly problematic.

So much for the claimant's perspective; there are implications from a greenhouse gas emissions reduction perspective as well. As I explore in Chapter One, the reduction of greenhouse gas emissions from the built environment is key to domestic climate change mitigation policy. Recent appraisals of the progress of these improvements reports an insufficient rate of transformation of the existing building stock – however these figures appear to rest on an assumption that existing retrofit works and assessments have been done adequately or accurately, which is not the case. I mention above, and discuss in Chapter Four, that a seeming obsession with how to stimulate the rate of energy efficiency transformation, from a regulatory perspective, might have resulted in a seeming neglect as to the quality or effectiveness of these works. This tendency seems to be

[1098] I discuss the limitations on contractual guarantees in Chapter Four Section d).
[1099] There are of course, a growing body of empirical studies, often incorporating post-occupancy evaluations, that conduct open conversations as to the costs and benefits of the improvements. It is not clear whether in all such circumstances the householders are paying commercial rates for their construction/design work.

perpetuated in the appraisal of energy efficiency goals. In particular, reliance on the recorded rate of energy efficiency transformations does not seem to take account of the performance gap, and the likelihood that many new energy performance certificates are simply wrong. So for instance, in as much as the Committee on Climate Change bemoans the poor rate of transformation in the built stock, the real picture of energy efficiency improvements is probably far worse. In addition, of course, many of the improvements that have been effected, have simultaneously created health-threatening overheating problems in the dwelling.

Faced with this combination of challenges it is hard to resist the implication that there is little point persisting with energy efficiency. The suggested avenues towards improvement - including improving mandatory regulation, improving communications and skills transfer – are difficult to implement and may not be successful.[1100] Open communication between providers (defendants) and householder (claimants) with a view to communicating shortcomings and risks, and enhancing learning, would arguably go further in improving the quality, effectiveness and safety of energy efficiency improvements, than increasingly stringent mandatory standards alone. Improving regulatory compliance and enforcement, would probably yield improved results. At the same time, an approach based on open communication, learning, and commitment to improvement would only be workable or possible if all parties attributed appropriate value to energy efficiency.

ii. Recourse for energy efficiency problems

[1100] As I explore earlier these are several of the solutions (to both problems) recommended in ZCH (n 167) and ZCH (n 224).

So, as I explain above, there are multiple potential benefits of energy efficiency improvements in domestic buildings. The regulatory measures intended to improve the rate and quality of energy performance have done nothing to address the knowledge and skills deficit required to achieve high levels of energy efficiency, safely. This has resulted in obfuscation and a culture of concealment (or simple inaccuracy) around underperforming, or unsafe, buildings. This has financial (and health) implications for the claimant, as well as implications for the achievement of energy demand reduction goals. Because the measures are installed in her property (or sometimes, affect her personally), only the claimant is in a position to take action in relation to problems arising. So, any kind of enforcement action regarding this key element of climate change mitigation policy is left to the consumer/householder.

As I discuss in Chapter Seven, there is at least in theory, a likely action in tort for discomfort or personal injury arising from overheating in high-energy efficiency buildings. In some limited circumstances claimants would have a statutory right of action through which they could seek compensation arising from the discomfort caused by indoor overheating. This might demand a climate conscious approach to be taken by adjudicators, for instance in determining foreseeability of harm in parts of the country where overheating is not currently considered of particular concern.[1101] Of course, as I mention in that chapter, the theoretical possibility of successful litigation does not mean this will materialise: the likely vulnerability of the claimant combined with low damages awards, and more generalised and growing access to justice concerns, could mean that even viable tort claims are never brought.[1102]

[1101] Chapter Seven Section d)i.
[1102] See comments in Chapter Seven in text to n 1176. I have not engaged in any detailed discussion about the erosion of access to justice and the unlikely prospects of bringing proceedings in England, as I take this to be fairly uncontentious.

As I explore in Chapters Four and Six, most performance gap claimants would not be able to claim compensation arising from the financial losses they suffer due to poor energy efficiency measures. There are some limited circumstances where this might be possible,[1103] it would appear that most contracts for energy efficiency works carefully exclude warranties for energy performance, and that there is no duty of care in tort. This means that the claimant is uncompensated, which is unsatisfactory.

The absence of recourse for the claimant has implications beyond the claimant's financial losses. A curious byproduct of the fact that these measures are installed in the claimant's property, is that in most instances she alone is in a position to bring remedial or enforcement action; essentially, it is difficult to think of any circumstances where someone other than the claimant might be in a position to have the premises repaired.[1104] On their face, the regulatory provisions that deal with compliance empower building control to order rectification in specific circumstances.[1105] However extreme enforcement action is not only unlikely, but also may not be relevant, because of the potential mismatch between the regulatory standards and what makes a highly energy efficient building.[1106] The additional layer of compliance added through energy performance certification often occurs at the end of the construction

[1103] For instance, I explained in Chapter Four that most contractual warranties only cover the integrity of the materials, not system performance – this of course means that where the installation or choice of materials is a significant factor, there might be a partial remedy in that context. Also, in Chapter Six I explain that there might be some limited basis on which a duty of care in tort might be established on the basis of negligent misstatements, most likely in relation to the miscertification of the building by an energy assessor.

[1104] This seems like a slight generalisation because of the variety of parties I have identified – see Chapter Four at Section b)i. – things are more complicated when the occupier is not the owner of the property, or in relation to local authority tenancies, but in most all instances neither the owner not tenant would be in a position to bring any kind of proceedings against the defendant.

[1105] See discussion in Chapter Four at text to n 484 – 487.

[1106] See my discussion in Chapter Three Sections b)i. and c)i. The building may legitimately pass building control inspections and yet not be energy efficient.

process, when it might be difficult to rectify problems; however in any event the EPC process supports informative measures and lacks enforcement measures to improve energy performance if a low or otherwise inaccurate rating is given. These would be valuable in and of themselves, were they accurate, which is almost routinely not the case.

It is unlikely that the claimant would be able to use any common law remedy to compel changes to the building. Even if she were able to establish liability, which is unlikely, her remedies would not extend to the repair of the building, only damages (other than in specific instances where a defendant in a contractual matter might be ordered to make specific performance).[1107] And of course, the claimant might not elect to take this route, or repairs might not be feasible. Effectively, even if the claimant could establish liability it is unlikely that this would result in a repair of the building. This means there is no mechanism either through regulation or the common law, to correct the problems. Given the expected life span of a building, the problem would continue until and unless some form of intervention occurred. Where the problem is energy underperformance, this will continue. Similarly where the problem is overheating, this would continue, presumably becoming a more pronounced problem on more days of the year, as the climate warmed.

In essence, regulations do exist that prescribe standards both for energy efficiency, and indoor comfort and safety. However, routine non-compliance with either the spirit or letter of the regulation appears endemic. The breach having occurred, there is no or very limited means through which affected parties can seek recourse, and the protection of their interests, including through tort.

[1107] See discussions of remedies in contract at text to n 543 – 548, and in tort at Chapter Six Section f).

d) Small private disputes as climate change litigation

The previous section considered when and to what extent a claimant has any recourse for problems arising due to energy efficiency improvements in her domestic building. I concluded that there are very limited circumstances in which the claimant will be compensated for shortcomings in or unintended consequences of energy efficiency works. I also observed that the absence of recourse for the claimant is a parallel issue with the lack of any mechanism of enforcement for the relevant standards. This has implications both for climate change mitigation and adaptation policy. In relation to mitigation, there is no way to force a renovation of a building with a performance gap; this represents an enforcement gap in relation to measures meant to reduce greenhouse gas emissions. In relation to adaptation,[1108] I have argued that even where a claimant is successful in a statutory or common law claim in relation to overheating problems, there is no way to compel renovations to ameliorate the problem.

As I explore above, measures for the achievement of energy efficiency in domestic buildings are implemented in the context of climate change. If done well, these have potential to contribute significantly to the abatement of greenhouse gas emissions, and hence, the mitigation of climate change. For this reason, the resolution of any dispute about these measures has potential to determine whether that contribution is a positive or negative one. Appreciating the importance of smaller disputes as bearing relevance in the climate change context requires an appreciation both of the need for

[1108] Of course, as I explain earlier in the thesis, my arguments are made from a climate change mitigation perspective. There is considerably more to be said about the need to adapt infrastructure, including domestic buildings, to the changing climate. As I argue, the overheating issue in energy efficient buildings represents an area where mitigation and adaptation policy should collide, representing an area that requires joined up thinking when it comes to policy and regulation about climate change.

a multiscalar response to climate change, and that the outcome of a small private dispute can constitute an element of that response. As I explain in the Introduction, the diffuse and cross-sectoral nature of the climate change problem demands a response to its challenges across scales. Thus, even though climate change is conceptualised as a global problem requiring a global response, it is as important that it be addressed at the local level as well. When determining private (or other) disputes that engage with any aspects of climate change law and policy, it is crucial that the instrumental effects of the dispute narrative, or outcome, be fully recognised. These impacts should cohere with other aspects of climate governance, and if they do not, then the issue might be addressed through other means. It might be easier to ignore the climate change issues in private litigation, as the policy context is drowned out in the clamour of the parties' competing interests. The diffuseness of climate change emissions means these can seem irrelevant, or be overlooked entirely.[1109] Also, while climate change is wrongly perceived as a global or international issue, climate issues might not be perceived as relevant in small-scale litigation. However, as is well recognised in some strands of tort scholarship, private liability will have implications that extend beyond the parties in dispute.

i. Distribution

In the previous section of this chapter, I rehearsed some of the issues that arise when the claimant is compensated for her loss, and in addition where the claimant's private law remedy might also be the only route to regulatory enforcement. In addition, as I explain earlier in the thesis,[1110] the question of whether the claimant can recover compensation for her losses also is

[1109] I argue this in Chapter Five, in that the climate change harms caused by the performance gap, the extra emissions, could very well be invisible in private litigation *even though a compelling reason for energy efficiency improvements is the need to reduce greenhouse gas emissions.*
[1110] Chapter Five [ ]

strongly tied to questions of distribution of loss and harm. When members of the public incur losses as a result of failings in new technology, then decisions about compensation are also implicitly decisions as to whom should bear the costs of their development.[1111] In the research context, the question would very much be one of whom should bear the costs of still imperfect measures to mitigate climate change, but also who should bear the cost of climate harms; the correct answer to this must surely reflect our truly collective responsibility for responding to climate change.[1112] In this context, an absence of recourse for performance gap claimants might seem reasonable and proportionate – that the claimant should bear the cost of the measures failing, rather than penalise a budding industry with adverse costs and damages orders. This probably does not extend to instances where the claimant's health - or in limited circumstances, comfort – is compromised.[1113] But of course the purpose of limiting 'enterprise' risk is to ensure that innovation is not stifled.

The problems arising in the research context, however, do not fit this framework. The defendant is not forging ahead with new technologies pluckily to tackle the demands of greenhouse gas emission reduction. Energy efficiency improvements have been installed in both domestic and non-domestic buildings for decades, and certainly the performance gap is not a new phenomenon. While it is not accurate to say that the problems considered in the thesis represent a uniquely British problem, they do not

[1111] Coined 'entrepeneur risk' by Glanville Williams, this reflects an understanding the imperfect products released onto the market bear a societal cost – Williams (n 529).
[1112] As I explore in the Introduction, one of the 'superwicked' features of climate change is the collective nature of our responsibility for it. See [ ] and [Lazarus]who coins the phrase 'superwicked'. This is, of course, not to say that our collective contribution has been in any way proportionate, or that the costs of responding should be borne proportionately. For this reason, requiring private householders to take steps to modify their properties to give effect to climate change mitigation policies, does not seem excessively onerous.
[1113] I have also remarked that many 'heat wave' deaths are in fact, climate deaths, and in these instances the defendant's liability would be based not on causing the death, but on failing to anticipate the risk of death, and taking steps to prevent it.

appear to the same extent, or at all, elsewhere. The knowledge and skills to construct healthy, energy efficient buildings for some reasons have been poorly absorbed in the British construction industry. If anything, industry (and government) have avoided learning opportunities, with a preponderance of research into the reasons and causes of the performance gap (and now overheating) being confined to academia, despite much of it being publicly available. In this sense it is not accurate to attribute constraints on liability to entrepreneur risk; if anything, this is a perversion of that principle. The cost to the claimant is that of a façade of compliance with EU and hence, domestic, regulation. In that sense impunity for (certainly) the problems of the performance gap due to an absence of private liability, preserves the defendant's position in an absence of innovation, rather than the opposite.

ii. Deterrence

In both the doctrinal chapters, I question whether potential liability in relation to each problem could deter the risky or wrongful behaviour. This reflects the fairly well-worn appreciation that tort can act as a pricing mechanism by making risky or dangerous behaviour more expensive, thus deterring it. In both instances I argue that the literature suggests a more complex picture and that the regulatory impact of both liability and no-liability could stand to reinforce or undermine risky behaviour in diverse ways. In this context questions about liability or no-liability to some extent reflect issues of impunity and value, or the question of what the defendant could 'get away with'.

So, if the prospect of liability in tort were to create a simple deterrent, the potential impact of liability, certainly in relation to the performance gap, would be swift industry-wide investment in skills and knowledge ensuring

an improvement in performance generally, and better accuracy in certifications. This would seem logical in a context where *Murphy* impunity for minor functional defects was to some extent implicated in a persistent culture of shoddy workmanship. However, this does not necessarily mean that a change in the common law,[1114] intended to compensate the claimant for her losses, would necessarily bring about a sea change. As I argue, in this instance finding a duty of care is more likely to have a perverse effect – compounding existing obfuscation or possibly deterring the works altogether. New build householders are not able to choose whether they implement measures, but liability could actively discourage retrofit. For instance, developers could refuse to accept instructions for these if performance problems carried a risk of liability; alternatively claimants might refuse these due to declining reputation or increasing costs.

Similarly, I argue in Chapter Seven that the imposition of liability for personal injury and death brought about by interior overheating might well bring about an improvement in the quality of the works, and possibly encourage the installation of what I call 'countermeasures' in construction. These would prevent overheating occurring even when exterior conditions were very warm. However, as I explain, these could yield perverse effects as well. The most obvious example is that construction professionals might routinely install cheap air conditioners in low cost energy efficient housing. This would, of course, significantly reduce the risk and extent of overheating, but also entirely undermine the specific and broader purpose of the energy efficiency measures.

The above shows that the potential outcomes of or risk of litigation in private litigation that interfaces with climate change policy areas, can affect

[1114] I explain in Chapter Six, that the odds are against there being a duty of care in relation to the claimant's losses occasioned by poor energy efficiency.

compliance with those measures in a complex way. Of course, as I explore in Chapter Five, assertions regarding the true impact of tort liability are still to some extent speculative. What can be concluded with a level of certainty, I would argue, is that the absence of a duty of care in relation to building defects (combined with the carefully designed contractual exclusions) has not contributed to innovation or improvements in quality in energy efficiency improvements. Far from being free to develop without fear of litigation, the absence of liability for energy performance shortcomings appears only to have contributed to the trivialisation of energy efficiency improvements and a general culture of poor compliance.

Of course, this does not mean that an alternative position on liability would change things for the better. There are suggestions that 'fears of liability' motivate construction/design teams to avoid post-occupancy evaluations; if anything this suggests that a risk of liability might not deter risky behaviour, but more deeply entrench a culture of concealment and creative compliance. Of course, concealment might deter litigation because potential claimants might not be aware of the issues.[1115] However this would (theoretically) not be viable throughout the disclosure processes demanded by litigation; a litigated dispute would provide a much needed opportunity to explore some of the compliance issues underlying energy performance problems, that to date have continued with impunity. This is not to argue that the instrumental impact of a tort claim should necessarily be determinative of outcome, but rather that these impacts and outcomes be recognised as such. As to whether potential liability both for underperformance and unintended consequences, represents a sufficient

[1115] I discuss across Chapters Two and Three, the complexity of the performance gap, both inherent and 'inpractice' problems with assessment, and explain how energy efficiency shortcomings are often masked, even when buildings are properly certified.

deterrent not just to the risky behaviour, but to undertaking energy efficiency improvements at all, remains to be seen.

The research holds out a distinct context where disputes over private interests could take place in the context of a relevant and contentious climate change policy area. It is possible or likely that potential or real litigation regarding these problems, whether it is improving the quality of the work, encouraging false compliance, or deterring the measures entirely. I suggest that these mundane disputes should be recognised as 'climate change liability' because of they stand either to reinforce or undermine more conventional forms of regulation that govern the area of climate change mitigation. So for instance, where the quality of the work improves, then private liability would support genuine compliance with the regulated standards. Where defendants were deterred from undertaking retrofit works due to the risks of liability, then the impact of private liability would be to undermine other key climate change mitigation policy and regulation, specifically, those concerning the rate of energy transformation of the existing built stock.

My argument is that energy efficiency in domestic buildings is just one area where the impact of private litigation could have a broader effect on climate change mitigation policy. In the thesis I have explored just a few areas where I anticipate that private litigation about this specific issue could interface with domestic energy efficiency and climate change mitigation policy, reinforcing or undermining aspects thereof. But there are myriad areas with potential for private disputes, where the climate change policy impacts remain unexplored. The areas covered, then, are representative of many other superficially mundane disputes, which nevertheless could have, even small, climate impacts. There are numerous other potential areas

where dispute resolution needs to take account of the impact of the litigation on climate change policy. This is because, as I argue in Chapter One, the complexity and urgency of the climate change problem demands an appropriate response across scales. On this approach, ensuring that good energy efficiency in domestic buildings is an important part of the mitigation policy mix, it is important that this not be undermined. If this is unavoidable, then this should be done overtly in order that this might be corrected by other mechanisms.

iii. Structural changes to tort

Above I argue that small and mundane private disputes, such as those in the research context, should be recognised as a species of what has come to be called 'climate change liability' because of their potential impact on climate change mitigation policy and regulation. However, as I discuss in the thesis, it is not simply in relation to the impacts or outcomes of litigation that I see relevance for climate change issues in these cases.

In the thesis, and particularly in Chapter Six, I emphasise how important it is to 'see' climate issues within the internal structure of a litigated case. I raise the example of when an overheating claimant might be said to have mitigated his own loss, if he has failed to make use of mechanical cooling, such as air conditioning, to manage the internal temperature in his premises. I argue that this should not be perceived as 'neutral', but as potentially undermining the very purpose of the energy efficiency improvements installed. This is one example, but the thesis contains several instances where a court could choose to 'see' climate issues or ignore them. The manner in which these issues are recognised, however, can be determinative of liability. More importantly, these can contribute to

the construction of a narrative in climate change issues are seen and responded to appropriately.

Central to this are the twinned concepts of 'climate blind' as opposed to 'climate conscious' approaches to the adjudication of private interests. There is little complexity in these terms – a climate blind approach is simply one in which climate change issues are ignored or treated as marginal; a climate conscious approach will take account of the importance of mitigation, of adaptation, at points where the subject matter of litigated issues touches on or has potential to impact on them.

As I argue, this is only one instance in which these kinds of issues present themselves; other circumstances will form the basis of future study.

e) Potential for future work

This thesis covers a tremendously broad area, and narrowing its scope has been an exceptional challenge. In many of the key thesis areas it represents the first principled study of an area, certainly in this jurisdiction, if not worldwide. In as much as the thesis has contributed to the scholarship in relation to energy efficiency regulation (in the broad sense) and private liability in the climate change context, these are also areas where it has paved the way for future research and exploration.

What has emerged in the thesis research, is the perception of home energy demand reduction through energy efficiency as a 'low hanging fruit' of climate change mitigation strategy, is sorely mistaken. The research has exposed an absence of clear distinction between infrastructural and behavioural measures for energy demand reduction, a failure properly to account for the connection between renewable energy and energy

efficiency, and an absence of effective quality control in relation to energy efficiency improvements. These take place in the context of an apparent devaluation or trivialisation of energy efficiency, even as we exhort its multiple benefits. There is considerable scope for further work to be done, exploring how the regulatory standards and incentives governing energy efficiency in domestic buildings might be improved.

Furthermore, despite the wealth of literature and growing caselaw concerning the potential for group or high profile litigation 'for' or to prevent climate change, this thesis represents the first enquiry into litigation 'in the context of' climate change. By looking at measures connected with mitigation policy, I have been able to illustrate various key respects in which climate change factors impact on the adjudication of any private disputes.

This contains tremendous potential for further research. There are unexplored issues directly in the research context – not least the potential to explore other liability issues in relation to known problems of energy efficiency, like other unintended consequences, or fuel poverty issues. However in addition there are also innumerable other areas where private disputes that interface with climate areas might arise – not least, disputes about renewable energy, liability for harm caused by flooding, fires or other extreme events, or the resolution of any kind of dispute arising from hydraulic fracturing. Not only does the author feel that early academic work teasing out some of the issues likely to arise in such litigation stand to support parties, but in addition, as litigation 'in the context of' climate change becomes more prevalent or visible, this could only enhance the academic project of exploring the potential and limitations of tort in connection with small scale private disputes.

f) Final conclusions

I would assert that the nature of climate change is such that a full range of responses across scales is necessary. The failure of international bodies to achieve any meaningful or workable policy solution to the mitigation of climate change means that responses on a smaller scale are arguably more urgent. Simultaneously, the delay in meaningful response has necessitated that adaptation measures are not only necessary, but in some cases urgent. There is a desperate need for joined up thinking in policy responses to ensure that one strand of climate strategy does not undermine the other.

I have explained above, that in considering these issues, we have to take account both of claimant outcomes and also the regulatory impact of poorly performing buildings. But in the context of the research, this also requires some deep thinking about private law. Making assumptions about both potential outcomes, but also about the behaviour of parties in responses, is dangerous in such a sensitive and urgent policy area. As for the future, it is important that we bring a climate conscious approach to the adjudication of private law disputes. Where claimant or defendant collective interests touch on private disputes, it is no longer sufficient to determine these without acknowledging their impact. It might be that this would have no impact on outcomes, but this does not mean that the other, nuanced effects of 'seeing' these interests lack importance. This individualistic focus on our own interests is what got us into this mess, but it is unlikely to get us out of it. The sad irony is that absorption and neurotic protection of our own interests, is not in our interest. Simultaneously, if anything, climate change represents a sufficiently compelling social and environmental phenomenon to force changes even to the deep structural nature of institutions such as private law.

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