# Systemically Resilient Prosperity: Adapting to and learning from COVID 19 (and other Strategic Challenges)

National Prosperity is in enabled by a National System of Infrastructure Networks (National Infrastructure) and a suite of complementary prosperity enabling systems (such as social infrastructure facilities and services, Households, communities and businesses.) Sustained long term National Prosperity requires National Infrastructure and all complementary prosperity enabling systems to be intrinsically resilient to the disruptive impacts of current and future strategic challenges.

Where, i) a Strategic Challenge is any event or trend which has the potential to initiate cascade, common cause or escalating failure(s)[[1]](#endnote-1) which disrupt the normal operations of one or more of the systems that enable Prosperity (see examples[[2]](#endnote-2).); ii) Resilience to a strategic challenge reduces the frequency, scale, intensity and duration[[3]](#endnote-3) of, but does not prevent, disruptive impacts initiated by the strategic challenge. iii) any actions taken to enhance or sustain systemic resilience to the disruptive impacts of any specific strategic challenges, will impact either positively or negatively on systemic resilience to other strategic challenges.

COVID 19 is a high profile example of this type of strategic challenge from which we can learn systemic lessons. It has exposed latent societal vulnerabilities and starkly illustrates that long term National Prosperity requires all levels of society and all economic structures to be intrinsically resilient to the disruptive impacts of the future strategic challenges. Specifically, it demonstrates that long term national prosperity requires actions to enhance the intrinsic resilience of National Infrastructure, Households, Communities, Businesses (and any other systems that enable National prosperity) and that each should be regarded as a complementary aspect of enhancing economic and societal resilience, and thus long term prosperity. Therefore, it is important that when addressing the unique challenges presented by COVID 19 we seek to identify, design or tailor actions that simultaneously enhance systemic resilience to multiple other strategic challenges, and wherever possible avoid actions that have the opposite impact.

To date, National Infrastructure Systems across the globe appear to be performing resiliently in the face of sudden and sustained changes to the:

* Pattern, scale, type and location of demand for Infrastructure Products and Services
* Logistic networks, supply webs and other infrastructure on which they depend
* Working patterns, availability and location of their skilled work forces
* The capacity at which they are capable of operating

This has been achieved in part by prioritising available resources (including skilled staff) to where they are most urgently needed. Whilst delaying, reducing, postponing, changing approaches to non-urgent actions such as Routine maintenance. It has also been supported by the emergence of increased use (and dependence on) some infrastructure services and technologies, such as video conferencing. These successes are significant, can be learnt from and should be celebrated.

However, it is also possible that in meeting the challenges of Covid-19, many components of national infrastructure systems are now operating closer to design thresholds, or for purposes not envisaged when originally designed and that new latent vulnerabilities have been created. Thus inadvertently, increasing the: likelihood of systemic disruption occurring and the likely scale, and/or intensity and/or duration of disruption if systemic disruption does occurs. Therefore, to ensure the system as a whole remains resilient it is necessary to be mindful of potential unintended emergent systemic impacts of actions taken in response to Covid-19.

**Strategic Questions for Resilient National Prosperity**

**During COVID 19**

*Q1. What have been the Disruptive Impacts of Covid-19 on?*

1. *National Economic Infrastructure*
2. *Social Infrastructure Provision*
3. *Other Enablers of National Prosperity (Households, Communities, Businesses, other)*

*Q2. Which Actions have been most/least effective in countering these disruptive impacts on?*

1. *National Economic Infrastructure*
2. *Social Infrastructure Provision*
3. *Other Enablers of National Prosperity (Households, Communities, Businesses, other)*

*Q3. What have been the most significant impacts of these Actions?*

1. *National Economic Infrastructure*
2. *Social Infrastructure Provision*
3. *Other Enablers of National Prosperity (Households, Communities, Businesses, other)*

**Post COVID 19 (the new normal)**

*Q4. What will be the long term impacts of Covid 19 on?*

1. *National Economic Infrastructure*
2. *Social Infrastructure Provision*
3. *Other Enablers of National Prosperity (Households, Communities, Businesses, other)*

*Q5. How can we best enhance or sustain systemic resilience to Other Strategic challenges?*

1. *National Economic Infrastructure*
2. *Social Infrastructure Provision*
3. *Other Enablers of National Prosperity (Households, Communities, Businesses, other)*
1. **Note on** **Disruption Types:** Rinaldi (2001) refers to these collectively as Interdependence related disruptions (IRD), and distinguishes between them as follows:

	* Cascade Failure – occurs when initial disruption to a single system component is propagated across the system through interdependencies between components.
	* Common Cause Failure – occurs when multiple system components are disrupted independently by an initial common cause, initiating multiple initially independent cascade failures
	* Escalating Failure - A Cascade or common cause failure that either occurs, or occurs with greater scale and intensity because the system components disrupted are already operating under stress, or latent vulnerabilities are present in the system [↑](#endnote-ref-1)
2. **Note on** **Strategic Challenges:** Specific examples of Strategic Challenges include:

Global warming as a driver of: long-term change to ambient operating conditions); and/or changes in the frequency, intensity, duration, clustering, predictability of extreme events and/or natural hazards;

Malicious actions (e.g. terrorism, sabotage); Accidental Disruption (including human error);

Digital transformation (or any technology driven Systemic transformation);

The demographic transition, urbanisation; regional population growth or any form of societal change that changes demand for infrastructure services;

Greater demand on existing capacity, Aging or stressed infrastructure components (or any other source of latent vulnerabilities);

global trends that effect the demand for availability and price of scarce resources; all risk included on a National risk register [↑](#endnote-ref-2)
3. **Note on Disruptive Impact Characteristics:**

	* Frequency - How often disruptive impacts cascade via interdependencies across the system of interest
	* Scale - The proportion of the system of interest experiencing disruptive impacts
	* Intensity -The speed at which disruptive impacts cascade via interdependencies across the system of interest Duration - The length of time which performance of the System of Interest remains below pre-disruption levels [↑](#endnote-ref-3)