

# Introduction

## Cultural heritage and sustainability

The central aim of sustainability (see box 1) is to achieve an acceptable quality of life for the world's population, combined with economic growth of communities, without depleting or damaging the natural resources needed to sustain future generations. The apparent simplicity of this all-embracing concept belies the practical difficulties for individuals and organisations involved with managing the cultural heritage wanting in building sustainability into their operations and activities. Taking account of sustainability in decision-making requires consideration of the long-term social, economic and environmental costs and benefits at global, regional and local level. Although targets and indicators have been established for social, economic and environmental aspects of sustainable development, they have yet to be developed for cultural heritage, and to be tried and tested in the context of historic buildings and sites, and museum collections.

Among the reasons for museums to take account of sustainable development in their policies are:

- ◆ The potential financial savings to be achieved in capital and revenue costs from 'green' policies and practices based on careful use of, and respect for, natural and other resources. Such an approach is also consistent with the Museums & Galleries Commission's long-standing advice to museums to question the need for tight levels of environmental control involving long-term commitment to energy-dependent technology [1]
- ◆ The policy adopted by the Heritage Lottery Fund (HLF) in 1998 to include environmental, social and economic sustainability as a central criterion for assessment of value-for-

Since the Earth Summit held at Rio in 1992, the British government and governments of 150 other countries have confirmed their commitment to the principles of sustainable development and to taking practical measures to implement them. **May Cassar** explains what sustainable development means in principle and how museums can contribute to the objectives of sustainability in practice

money of projects submitted for HLF grants. The HLF's current practice of encouraging applicants to consider fully the contribution of their projects to sustainable development will be backed up by good practice guidance, informed by a research study to be undertaken for HLF during 2000

- ◆ The advice to museums in the Museums Association's ethical guidelines on access [2] that they should find ways to reconcile the aim of making their collections accessible to wider audiences with their responsibilities for conserving and protecting the collections and other resources for future generations.

For local authority museums, additional reasons include:

- ◆ The role of local councils in supporting and implementing the government's commitment to Local Agenda 21 through partnerships and projects at local level (see box 2)
- ◆ The contribution of sustainable practices to improvements in efficiency and cost-effectiveness promoted through the government's Best Value initiative.

## Economic sustainability

So far, the social and economic benefits of museums and cultural heritage have been most widely recognised – and increasingly exploited – in the context of urban regeneration. Access to

the cultural life of communities is recognised as a key element in fostering social inclusion and enhancing quality of life, particularly in urban areas. This includes physical accessibility but also – in the wider socio-economic use of the term – access for all to services and information. As public institutions, museums, galleries, libraries and archives aim to respond to the needs of their communities and of the visitors who support them. By putting people at the centre of their activities, they help to promote the social and material vitality of the areas around them.

One example of the contribution that cultural activity can make to the economic health of cities is provided by Glasgow where a decade of promoting and improving its museums, galleries and other cultural centres, has helped attract inward business investment and led to a more widespread economic revival; in 1999 Glasgow also celebrates its achievements as European City of Design and Architecture. Another example is Bilbao where the new Guggenheim Museum has helped to regenerate the city and reduce its dependence on declining industries such as shipbuilding by attracting visitors and providing a catalyst for new jobs in the service and leisure industries. Temporary exhibitions can also have a significant economic impact. The recent exhibition of sculpture by Rodin at Lewes in East Sussex, for example, has coincided

## 1: DEFINING SUSTAINABLE DEVELOPMENT

The generally accepted definition of sustainable development from the report of the World Commission on Development and the Environment (the Brundtland Commission), 1987 is: *'Development which meets the needs of the present without compromising the ability of future generations to meet their own needs.'*

Key features of the present British government's broad interpretation of sustainability [1], which encompasses social, economic and environmental objectives, include:

- ◆ Effective environmental protection
- ◆ Prudent use of natural resources
- ◆ Social progress that recognises the needs of everyone
- ◆ Maintenance of high and stable levels of economic growth and employment.

Key areas in which action can be taken to achieve sustainability include:

- ◆ *Urban planning and regeneration:* Social and economic revitalisation of urban areas, including historic centres; reuse of existing buildings, brown field sites and

brown water sites; physical renewal of run-down inner cities and deprived areas

- ◆ *Transport:* Reduction of CO<sub>2</sub> emissions; reducing the effects of pollution from vehicles on public health, and buildings and their contents whether they are collections, fittings and fixtures; access to sustainable forms of transport; reduction in energy use; use of clean technologies and fuels
- ◆ *Building design and construction:* Use of recycled and environmentally-friendly materials and products; use of renewable energy sources, reduction in use of embodied energy, implementing energy efficiency measures; assessment of the environmental impact of construction projects; assessment of the life cycle, use and cost of buildings; taking account in building designs of future adaptability, maintenance and maintainability; designing for cost-effective use and ease of operation (see checklist, p63).

[1] *A better quality of life – a strategy for sustainable development for the UK*, CM4345

## 2: LOCAL AGENDA 21

At the United Nations Conference on Environment and Development (the Earth Summit) held in Rio in 1992, the 150 nations present – including Britain – endorsed Agenda 21 (the agenda for the 21st century). The 500-page document sets out how developed and developing countries can work towards sustainable development (see box 1). Two-thirds of the actions embodied in Agenda 21 require the active co-operation of local authorities and the communities in their areas. Chapter 28 calls on them to initiate local partnerships aimed at promoting action for sustainable development at local level – hence Local Agenda 21.

with unprecedented business activity in the town, notably a 15 per cent increase in retail sales, which the local authority has attributed directly to the popularity of the exhibition.

Cultural activity stimulates the growth of businesses such as hotels, restaurants and shops, improved transport planning and general refurbishment activities. In Europe as a whole, half of all building refurbishment is work related to the conservation of historic buildings. In the UK, the construction industry has benefited from an increase in capital investment in museums and galleries as a result of the introduction of funding from the National Lottery in 1995, including 573 grants totalling just over £540m allocated to capital projects by the Heritage Lottery Fund (as at October 1999).

## Heritage as cultural capital

The economic value of heritage, natural or cultural, is only one element of the contribution it makes to sustainable development. While economic values can be applied satisfactorily to some aspects of heritage, they do not adequately reflect other aspects, such as its cultural and social value or the potential conflict between providing greater access to cultural heritage and its long-term preservation. There is a need therefore to define the extent to which arguments based on the economic impact of the heritage can be utilised, and to identify the common ground between conservation professionals and economists. Reports by English Heritage [3] and The National Trust [4] are examples of how two major conservation organisations have responded to this need. Another example is a meeting convened in December 1998 by the Getty Conservation Institute on the economics of heritage conservation [5]. Out of the meeting emerged the concept of cultural capital in which the heritage of objects, buildings and sites are treated as capital assets, inherited from past generations to be cared for and passed on to future generations. Like natural resources, if cultural assets, whether inherited from the past or created by new investment, are not maintained they will decay and lose their value – economic, social, environmental, cultural – for our successors.

A sustainable approach to preserving this cultural capital involves:

- ◆ Thinking about the long-term impact of decisions
- ◆ Looking not only at the current value of the cultural heritage but also its value over several generations
- ◆ Taking account of the way in which objects, buildings and sites are stewarded; stewardship cannot be justified purely in economic terms by arguing, for example, that jobs, income, wealth and taxes can all be generated by preservation activities. Preservation of communities and

► 62

their heritage, natural and cultural, are keystones of sustainable development

- ◆ Encouraging museums to define more clearly in practical terms the principle of protection of cultural heritage in perpetuity by discussing whether the notion of preservation at all costs is viable in the long term
- ◆ Looking for ways to minimise the potential conflict between greater access to the cultural heritage and its long-term preservation. This means developing sustainable responses to the impact of market forces and tourism on cultural heritage; implementing measures to protect the fabric of historic city centres, taking account of the possible long-term effect of any action on the surrounding region; and questioning whether what is sustainable for cultural heritage is also sustainable for the natural environment, the local community, society and the economy in general.

In short, sustainability is a multi-faceted concept the application of which can only be achieved by breaking it down into manageable components.

### Principles into practice

By participating in debate on sustainable development, museums have the chance to demonstrate the potential for – and contribute to – an enhanced quality of life for present and future generations.

At a strategic level, museums can aim to:

- ◆ Develop methods for systematic assessment of the impact of their development plans and day-to-day activities on local communities and on the environment by focusing on those aspects of sustainable development identified as having the broadest socio-economic benefits: urban planning and regeneration, transport, and new construction or refurbishment (see box 1 and checklist, p63)
- ◆ Find ways of making collections, historic buildings and sites

- accessible to visitors without compromising their integrity or future survival. In a keynote lecture at a European Commission workshop on the protection, conservation and enhancement of cultural heritage, held at Santiago, Spain, in September 1999, B von Droste, Special Adviser to the Director-General of UNESCO for World Heritage described the concept of 'carrying capacity' as a measure of sustainable tourism. He advocated it as one of the fundamental features of sound cultural heritage management; a practical tool to maintain the balance between development and conservation; a threshold that should not be crossed without further planning; and a benchmark against which to measure change and an early warning of trouble
- ◆ Use collections and buildings to raise public awareness of the principles and practice of sustainable development.

Museums can begin to establish themselves as exemplars of sustainable development by:

- ◆ Demonstrating good practice in the preservation, conservation and management of collections, buildings and sites (see case studies on Museum of Science and Industry in Manchester, p66 and The National Trust, p75)
- ◆ Reducing their dependence on fossil fuels – the main source of CO<sub>2</sub> emissions which contributes to global warming and climate change – by using energy responsibly (see case studies on the Horniman Museum, p78 and Fleet Air Arm Museum, p81)
- ◆ Using building materials from sustainable sources and recycled materials to reduce demand for new materials whose embodied energy (that is the energy needed to produce them) would need to be taken into account (see case studies on Museum of Science and Industry in Manchester, p66 and Horniman

Museum, p78)

- ◆ Developing procedures for good housekeeping to minimise avoidable waste and make best use of all available resources (see case studies on Museum of Science and Industry in Manchester, p66 and Livesey Museum, p71)
- ◆ Supporting the local economy through employment and purchasing policies (see case studies on Museum of Science and Industry in Manchester, p66 and Gilbert White's House, p73)
- ◆ Using collections to explain the principles and practicalities of social and economic sustainability through exhibitions on themes such as, waste, housing, food and biodiversity (see case studies on Bolton Museum and Art Gallery, p69, Livesey Museum, p71, and Gilbert White's House, p73)
- ◆ Assessing the 'carrying capacity' of historic buildings and sites, and the communities around them, and if necessary taking measures to control or spread the load of visitors at peak times (see case studies on Gilbert White's House, p73 and The National Trust, p75)
- ◆ Contributing to Local Agenda 21 initiatives in partnership with their local authority and other agencies (see case studies on Bolton Museum and Art Gallery, p69 and Livesey Museum, p71).

### References

- [1] *Environmental Management – guidelines for museums*, Cassar M, Museums & Galleries Commission, 1995
- [2] *Ethical guidelines – Advice from the Museums Association Ethics Committee*, Number 4, 1999, Museums Association
- [3] *Sustaining the historic environment: New perspectives on the future*, English Heritage discussion document, March 1997
- [4] *Valuing our environment – A study of the economic impact of conserved landscapes and of the National Trust in the South West*, 1998
- [5] *Economics and Heritage Conservation – A meeting organised by the Getty Conservation Institute*, December 1998, J Paul Getty Trust, Los Angeles, 1999

## CHECKLIST: SUSTAINABLE MUSEUM BUILDINGS

This checklist suggests some questions that museums should consider when compiling briefs for new-build or refurbishment projects. The checklist relates to three key aspects of sustainability: urban planning and regeneration, transport, and building design and construction (see also box 1).

### Urban planning and regeneration

Consider the possible day-to-day and long-term impact of the museum's activities on the surrounding area and aim to predict and plan to avoid undesirable effects. Considerations include:

- ◆ The potential costs and benefits of increased numbers of visitors on social, economic and environmental conditions of the area
- ◆ The potential to create jobs for local people and support local businesses through purchasing policies
- ◆ The possible effects of tourism on cultural heritage and identity of the communities on which it depends.

### Transport

Consider the environmental impact and sustainability of different forms of transport used by staff and visitors (including effect on atmospheric pollution, noise, traffic congestion, travel time):

- ◆ If new sites are under consideration, can priority be given to those well-served by existing or planned public transport networks?
- ◆ Do roads and public transport facilities serving existing sites have the capacity to accommodate increased demand?
- ◆ What could be done to encourage the use of public transport? Does the museum provide adequate information in its publicity material about public transport facilities?
- ◆ What facilities could be provided at

the museum to cater for staff and visitors using transport other than private cars (such as cycle racks; secure cloakroom and changing facilities; security policy which allows visitors to deposit items such as rucksacks or shopping bags)?

### Building design and construction

Construction projects provide good opportunities for museums to make a significant contribution to environmental sustainability. Key considerations in the design of buildings and environmental control systems include:

#### Building lifespan

Typical targets in relation to sustainable development are:

- ◆ New buildings designed for an average length of life of between 70 to 100 years
- ◆ Services installations designed for an average useful life of between ten and 25 years
- ◆ Duration of first use for which the building is intended of at least ten years
- ◆ The flexibility to accommodate up to ten major internal modifications in response to changing requirements over the life span of the building.

#### Life cycle costs

Consider the costs of operation and maintenance during occupation, including the need to plan for:

- ◆ A budget for day-to-day operation and maintenance of the building
- ◆ Future expenditure of one-third of the initial capital cost of the services installation for their renewal up to four times during the life of the building
- ◆ Future expenditure of one-third the initial capital cost of the internal fit-out for up to ten re-fits during the life of the building.

### Design and specification

Consider the scope for:

- ◆ Minimising dependence on technology
- ◆ Specifying ecologically-friendly materials/technologies
- ◆ Adopting standardised environmental specifications to eliminate unnecessary variations and reduce waste
- ◆ Using recognised national and international standards as benchmarks for specification
- ◆ Keeping the complexity of the specification appropriate to the scale of the project
- ◆ Justifying any demand for high-tech, energy-intensive environmental controls against each of the following criteria: human comfort, needs of collections, life cycle costs, global environmental sustainability
- ◆ Accepting that environmental control ranges may be allowed to change with the seasons.
- ◆ Zoning the building according to variations in environmental conditions to suit different collections
- ◆ Specifying low-energy lighting
- ◆ Verifying the performance of individual components and materials.

### Energy usage

Features of a sustainable approach to the design and operation of museum buildings aimed at reducing energy consumption include:

- ◆ High thermal inertia rating for the building envelope using admittance values which link thermal conductivity, thermal capacity and method of assembly of construction components
- ◆ Stand-alone heating boiler (not serving other buildings)
- ◆ Installation of compact fluorescent lamps in circulation and service areas
- ◆ High-frequency control gear for lamps
- ◆ Installation of variable speed fans and staged chillers in air-conditioning systems

► 64

- ◆ Energy usage metered separately from other users to enable actual use by museum to be measured
- ◆ Sub-metering of energy usage for lighting, water heating, air-conditioning, space heating, catering, retail
- ◆ Periodic checking of energy tariffs
- ◆ Monitoring of fuel costs against predetermined energy conservation targets
- ◆ Setting rolling targets for energy use for heating normalised to degree-days to provide advance warning of high energy consumption
- ◆ Producing operational manuals and keeping them up-to-date
- ◆ Giving priority in maintenance procedures to repair of faults contributing to energy wastage
- ◆ Including lamp cleaning as part of maintenance programme
- ◆ Setting maximum limit 19°C for space heating
- ◆ Maximum use of daylighting subject to limits for conservation.

#### Rules of thumb for reducing energy usage

*Do simple things first* – aim to establish patterns of energy use:

- ◆ What percentage of energy is for specific functions/services?
- ◆ Where can energy savings be made?
- ◆ Which items of equipment are the most expensive to run (such as office equipment, interactive displays, exhibition lighting, environmental control equipment)?
- ◆ Could buffer zones (air lobbies) be used to reduce uncontrolled air exchanges?
- ◆ Are cloakroom facilities available where visitors can leave wet outer garments to help minimise need for dehumidification within the museum?
- ◆ Do all parts of the building need the same levels of environmental control?
- ◆ Can the environmental control system be set to a summer and winter schedule to enable environmental conditions to change gradually with the seasons?

*Plan and carry out energy improvements thoroughly* – if the building loses heat in the winter and gains heat in the summer, consider:

- ◆ Replacing large areas of single glazing with multiple glazing
- ◆ Installing low-tech methods of environmental control (and security) such as wooden shutters or heavy curtains
- ◆ Improving the air-tightness and increasing thermal insulation of the building before installing larger equipment and more sophisticated controls
- ◆ Assessing the scope for ducting conditioned air from areas of high control to areas needing a less stringent specification
- ◆ Installing variable speed fans to regulate ventilation according to occupancy levels in order to reduce energy consumption
- ◆ Considering the scope for heat recovery from existing plant rather than heat rejection
- ◆ Operating plant to take advantage of 'free cooling' from the exterior at appropriate times of the day or year when conditions outside are similar to what is required inside
- ◆ Zoning spaces to take advantage of natural climatic differences in the

building.

*Use appropriate technology to service the building more efficiently* – consider scope for recovering and redistributing excess heat:

- ◆ Is excess heat from lamps or IT equipment controlled at source? Or is it allowed to build up and then controlled with refrigeration?
- ◆ Is heat output from the lighting installation controlled?
- ◆ Could conventional technology such as the use of low-frequency fluorescent lamps be replaced by advanced (and more efficient) technology such as high-frequency lamps?
- ◆ Could conventional boilers be replaced by condensing boilers?
- ◆ Could areas or equipment accounting for high-energy usage be sub-metered to monitor consumption and costs?

#### Energy yardsticks

The EEO's energy consumption yardsticks for museums and galleries (in kWh/m<sup>2</sup>/yr), together with CO<sub>2</sub> emissions and indicative costs, provided in the guide *Energy Efficiency in Museums, Libraries and Churches* are tabulated below (see Bibliography in Resources section for publication details).

#### Yardsticks of annual energy consumption, carbon dioxide emissions and fuel costs for museums

Performance assessment	Energy consumption (kWh/m <sup>2</sup> /yr)		CO <sub>2</sub> emission (kg CO <sub>2</sub> /m <sup>2</sup> )	Cost £/m <sup>2</sup> /yr
	Fossil fuel	Electricity		
Low	<130	<90	<89	<8
Medium	130-185	90-125	89-125	8-11.3
High	>185	>125	>125	>11.3

#### Realistic targets for lighting loads (W/m<sup>2</sup>)

Low:	<10
Medium:	15
High:	>25

#### Design occupancy density (m<sup>2</sup>/person)

Low:	>10
Medium:	4-10
High:	<4