

NMDC guiding principles for reducing museums' carbon footprint

A. Background

Following discussions at the Bizot Group¹ meetings in May and October 2008, Sir Nicholas Serota, Tate, and Mark Jones, V&A, convened a group of UK conservators and other stakeholders to review museums' environmental conditions in an era of energy constraint, in response to feedback at the Bizot Group meetings.

The museums and galleries involved in large-scale exhibitions are often located in widely different climatic zones. Seeking to achieve an internationally agreed narrow environmental standard for temperature and relative humidity has resulted in an unnecessarily high energy use. The debate on the need for energy constraint by museums has been broadly welcomed by the conservation professionals from major UK and International Museums. There is a recognition that museums need to approach long-term collections care in a way that does not require excessive use of energy, whilst recognising their duty of care to collections. There is general agreement that it is time to shift museums' policies for environmental control, loan conditions and the guidance given to architects and engineers from the prescription of close control of ambient conditions throughout buildings and exhibition galleries to a more mutual understanding of the real conservation needs of different categories of object, which have widely different requirements and may have been exposed to very different environmental conditions in the past.

As a first step on the road to reform, it is proposed that museums adopt the following guiding principles in rethinking policy and practice with the aim of minimising energy use.

B. Draft Guiding Principles

Museums should review policy and practice, particularly regarding loan requirements, storage and display conditions, building design and air conditioning systems, with a view to reducing carbon footprints. Museums need to find ways to reconcile the desirability of long-term preservation of collections with the need to reduce energy use.

Museums should apply whatever methodology or strategies best suit their collections, building and needs, and innovative approaches should be encouraged. Some guiding principles might include:

- 1) Environmental standards should become more intelligent and better tailored to clearly identified needs. Blanket conditions should no longer apply. Instead conditions should be determined by the requirements of individual objects or groups of objects and the climate in the part of the world in which the museum is located. (See Appendix 1: *Proposed Interim Guidelines for Hygroscopic Materials*)
- 2) Care of collections should be achieved in a way that does not assume air-conditioning or any other current solutions. Passive methods simple technology that is easy to maintain, and lower energy solutions should be considered.

¹ The Bizot Group, also known as the International Group of Organizers of Large-scale Exhibitions, comprises the directors of the world's leading museums and galleries

- 3) Natural and sustainable environmental controls should be explored and made maximum use of. Including for instance:
- Buildings with high thermal mass
 - High thermal insulation
 - Low air exchange
 - Local control using microclimates – display cases
 - Glazed and backed paintings
 - Maximising the moisture buffering effect of the building and the materials used within it
- 4) When designing and constructing new buildings or renovating old ones, architects and engineers should be guided to significantly reduce significantly the building's carbon footprint as a primary objective. They should be encouraged and enabled to fully understand the past and present environmental performance of existing spaces and required to produce a guide to the most energy efficient use of the building.

C. Further Research:

To allow more definitive guidelines and conditions to be devised for particular objects or groups of objects, more research needs to be done to understand the rate of response of individual objects and better define the extremities of acceptable ranges, and particularly the acceptable rates of change of relative humidity and temperature.

In particular the following research on the following topics would be helpful:

- i) The sophisticated management of the environment within big buildings, using electronic monitoring of every space within the buildings concerned, and appropriate technology for control of air circulation and temperature to keep the overall environment reasonably stable and within acceptable parameters focussing on simple systems that are easy to maintain.
- ii) The effects of variations of temperature and humidity on different categories of objects and the relative importance of rates of change and absolute upper and lower limits compared to set points, taking account of seasonal variations.
- iii) Improved understanding of the relationship between levels of humidity and temperature and the agents of deterioration associated with them, such as biological (mould and insect pests) and chemical, coupled with additional means of prevention such as ventilation/air circulation.
- iv) More information on the effectiveness of passive buffering. For instance by using insulation and thermal mass to moderate temperature change and using hygroscopic building materials and finishes to moderate changes in relative humidity.
- v) Further research on controlling object microclimates (for example at the level of showcases as an alternative to controlling the environment within buildings as a whole.
- vi) The relationship between visitor comfort and environmental conditions that benefit collections.

Similarly, the investigation of new designs for museums and improved methods of building is needed.

Appendix 1:

Proposed Interim Guidelines for Hygroscopic Materials

The following is the proposed interim guideline:

For the majority of objects containing hygroscopic material (such as canvas paintings, textiles, ethnographic objects or animal glue) a stable relative humidity (RH) is required in the range of 40 - 60% and a stable temperature in the range 16 - 25°C.

More sensitive materials (e.g. scroll paintings on silk, panel paintings, vellum or parchment) will require specific and tight RH control, specified according to the materials.

Less sensitive materials (e.g. stone, ceramic) can have wider parameters for RH and temperature.

It must be made clear in adopting this guideline that RH conditions outside the range are not acceptable for the majority of hygroscopic materials, and that rigour will be needed to ensure that conditions do not drift outside the specified range. If international agreement for loan conditions for all materials types is to be achieved it must be recognised that the most sensitive material such as scroll paintings on silk, paintings on panel, vellum or parchment will always need tight control of conditions, which might be best achieved through the use of microclimates. Conversely the need for, and extent of, parameters for less sensitive materials should be re-considered and debated.