



# Improving the environmental sustainability of your theatre building

## Summary

In response to the climate emergency, theatres need to reduce their environmental impact. This advice note offers practical guidance on tackling this challenge in relation to theatre buildings.

## Who is this note for?

This advice note is intended for theatre owners and operators, and local authorities.

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Theatres need to reduce their environmental impact in response to the climate emergency. This advice note offers practical guidance in tackling this challenge. Some of the suggested measures have cost implications, but many offer immediate savings to utility bills that can offset the cost.

## Getting started with improving your building's sustainability

Improving the carbon footprint of a theatre building will mean:

- Reducing energy demand
- Improving the efficiency of power, heating and cooling systems
- Considering switching from gas or oil to electricity
- Considering generating energy from renewable resources (e.g. photovoltaic cells)
- Reviewing transport to the theatre

Other sustainability measures might include:

- Reducing how much water your building uses
- Reducing how much waste you generate
- Creating green space around your building to improve biodiversity and local air quality

A simple first step to take is to understand your building's existing usage of electricity and building temperatures. You can install monitors to identify trends in usage, understand where waste is occurring and consider which interventions could be most effective.

Some building interventions are relatively simple to implement. Others will require significant works to your building. For more elaborate projects, such as replacing old plant or reviewing the possibility of energy generation, it is essential to get good specialist advice from a sustainability / services engineer. They will be able to assess options, report payback times and advise on the most cost-effective solutions. Check they have expertise in theatres, and are able to cover sustainability advice as well as designing services systems. Some sustainability works may require planning or listed building consents, and most will need building regulations approval. Specialist architectural advice will be needed, almost certainly with input from the sustainability / services engineer.

Where major works are required you should ensure your consultants understand the importance of sustainable construction practices to your organisation.

## Reducing energy demand

The first step in improving a building's sustainability is to reduce how much energy it uses. Think through how energy is used by lighting, heating, cooling, ventilation and so on. Can you simply use less power? Could offices be laid out to make more use of natural light from windows? Could you make more use of natural, rather than mechanical ventilation? Check that windows open properly, and that staff understand how drafts can be created, for example by opening both top and bottom windows.

It is important to cut the energy you use in heating by properly insulating your building's walls, windows and roof. Older buildings often have little or no insulation, and uninsulated buildings leak energy. Although 'invisible' to visitors, improving your theatre's 'thermal performance' is essential to increasing sustainability. This will lead to lower heating costs,

and a more consistent environment, and can allow for a lower specification of plant and machinery.

Loft voids can be easily insulated. Insulation of flat roofs should be planned into roof replacement. Windows can be secondary glazed, or replaced with new double-glazed windows. Walls can be lined with insulation internally, or sometimes insulated on the outside, beneath a render coating. Historic buildings, with cornices and mouldings, are harder to insulate. Listed building consent may be needed, and specialist architectural advice should be sought.

As well as improving insulation, it is important to make your building 'leak' less, by checking windows and doors fit properly and have effective draught seals.

## **Improving the efficiency of your power, heating and cooling systems**

The next step is to make your energy systems as efficient as possible. Think through one at a time all of your systems for lighting, heating, cooling and plumbing.

### **Reducing the energy used by lighting systems**

Older lights should be replaced with LED lights. While this involves capital cost, costs will be offset by reduced electricity bills and less frequent lamp replacement. Foyers might be planned for different light levels at different times of day, so that all the lights aren't on at once. Working lights in auditoria may use less energy than house or stage lights.

Show lighting is used for short periods and usually accounts for relatively little carbon use. Over time it will be necessary to replace stage lights and dimmers with LED systems, but this is unlikely to be a sustainable option if your current systems are relatively new.

As important as the lights themselves are the switching systems that control them. Lights in offices, toilets and stairs should be controlled by movement sensors. Control systems should ensure no lights are left on at night or when rooms are empty.

### **Reducing the energy used by your heating, cooling and plumbing systems**

Faulty and old equipment is a very common form of energy wastage. Plant and machinery that is poorly maintained rapidly becomes inefficient, drawing increasing amounts of energy to achieve the same output. Good facilities management requires a planned preventative maintenance schedule so that equipment is kept in good working order and not left to decay until it is unusable and wasteful.

It may not be worth replacing boilers less than ten years old, but older plant can be replaced with newer, more efficient equipment. It may be possible to replace old boilers with air-source heat pumps, a sustainable alternative that costs more to install, but less to run. Check that hot water pipes are properly insulated to prevent wasteful heat loss.

### **Installing efficient control systems to minimise energy use**

Theatre buildings can be complex networks of plant and equipment that offer bespoke options for the temperature and ventilation of spaces. A building management system can control these aspects of the building. Consider how this system can be zoned for different modes of theatre operation. Are rooms that are not being used being heated out of hours? Is your rehearsal room being ventilated as if for a dance rehearsal during less intensive usage?

Can the areas of the theatre be zoned more efficiently? Local thermostats and timers can ensure energy is targeted at building users.

## **Switching from gas or oil to electricity**

As the National Grid becomes more reliant on sustainable energy sources such as wind farms, and reduces its reliance on fossil fuels, switching to electricity becomes part of a nationwide move to decarbonise our energy use. It will significantly improve sustainability both short and long-term.

It may be worth looking for a 'green' electricity supplier. All electricity arrives through the same grid, but some suppliers invest in renewable sources of generation to a level equivalent to the supply they sell. Choosing them supports the national move towards zero carbon energy generation.

## **Generating energy from renewable sources**

Energy generation might include ground-source or air-source heat pumps to replace boilers, photovoltaic cells on roofs or wind turbines.

Installations for generating energy attract attention and make a visible statement about your organisation's values, but are not always the most effective way to improve sustainability. Not every site will be appropriate for energy-generation systems, and it is important that if you choose them, you've first done all you can to reduce usage, and maximise the efficiency of your systems. Looking at possibilities, and evaluating payback periods and effectiveness requires the advice of a specialist sustainability and services engineer.

## **Reviewing transport to your theatre**

Audience (and staff) journeys to your theatre may be a significant element in its carbon footprint. You may not be able to move your building – but you can lobby local authorities to improve transport links, for example, ensuring bus and trains suit performance times. You can make sure bike racks are available to encourage cycle use and install charging points for electric bikes and cars.

## **Reducing how much water your building uses**

Water is a scarce resource, and energy is consumed in making clean drinking water. Sustainable buildings use less of it. Old toilets, taps and showers can be replaced with more efficient equipment. Some buildings recycle rainwater or 'greywater' (water from showers that can be filtered and used to flush toilets). These systems can be space-hungry, and will need careful planning in older buildings, but may be worth considering.

## Reducing how much waste you generate

Review your systems both to minimise how much waste your building generates, and to provide the infrastructure necessary to ensure effective recycling. Consider whether there are opportunities to reuse materials rather than recycling them as this will require less energy to process, and therefore have a lesser impact.

## Creating green space around your building to improve biodiversity

Sustainable buildings aim to regenerate the environment, rather than just reducing environmental harm. Green spaces, particularly those with trees, can absorb carbon dioxide, offsetting emissions from your building's footprint. They can improve local air quality as well as essential urban biodiversity. Green space also improves the wellbeing of staff, audiences and passers-by. While you may not have ample grounds around your theatre, consider whether your building has space for a green roof, or if there are local park spaces you could contribute to.

## Planning sustainability works

Some sustainability improvements may involve quite major building works. In that case, it is important to plan them as part of your overall strategy for building stewardship.

Grants may be available for some works, and your sustainability / services engineer should be able to advise on them.

## BREEAM

BREEAM is the most commonly-used system for evaluating the sustainability of buildings and building works. BREEAM rates buildings under different categories (such as VERY GOOD or EXCELLENT), and takes into account not only carbon impact, but a range of holistic measures around staff and audience wellbeing. Achieving a stated BREEAM rating is often a requirement in Planning permissions. BREEAM is not designed specifically for theatres and will probably only apply to larger capital projects – but for those, it will need to be considered. A specialist BREEAM adviser will be needed to assess projects aiming for a BREEAM rating.

## Sustainable productions

This advice note is focused on making your building more sustainable but theatres must also consider the sustainability of the work they produce. Useful guidance and resources about making sustainable productions can be found here:

Sustainability in Production Alliance - <http://www.sipa.org.uk/>

Julie's Bicycle - [https://juliesbicycle.com/category/resource\\_hub/](https://juliesbicycle.com/category/resource_hub/)

Creative Carbon Scotland - <https://www.creativecarbonscotland.com/>

## **The role of the Theatres Trust**

Theatres Trust is the national advisory public body for theatres and a statutory consultee on theatres in the planning system. We provide a free advice service for anyone planning to build a new theatre, adapt a building to theatre use or looking to make changes to their existing theatre. This could include providing details of environmental specialists or putting you in touch with organisations who have undertaken similar projects.

Theatres Trust also offers a number of grant schemes for capital projects and applications to make buildings more sustainable are always welcome. The theme of the Theatre Improvement Scheme in association with the Wolfson Foundation in 2020 is improving environmental sustainability with grants available up to £20,000.

Contact us at [advice@theatrust.org.uk](mailto:advice@theatrust.org.uk) with information about your project and how we can help.