



Green Theatre

Taking action on climate change

September 2008

MAYOR OF LONDON



Greater London Authority
September 2008

Published by

Greater London Authority
City Hall
The Queen's Walk
More London
London SE1 2AA

www.london.gov.uk

enquiries 020 7983 4100
minicom 020 7983 4458

ISBN 978-1-84781-188-2

Copies of this report
are available from
www.london.gov.uk

Printed on 100% recycled paper.

Contents

Foreword by Boris Johnson, Mayor of London	2
Why go green?	4
London's theatre industry's carbon footprint	6
Top tips to go greener	10
Success stories	17
Where do I start?	27
The Carbon calculator for production planning	30
Thank you!	32
Where to go for further information	33
Q&As	35

Foreword by Boris Johnson, Mayor of London

Theatre is of vital importance to London. Our artistic talent and reputation for excellence are well known around the world, but theatre also makes a significant contribution to the economy, and last year was no exception - attendances reached 13.6 million, making it the most successful year on record.

As a global city London has the ability to trailblaze new and exciting initiatives, with the potential to inspire and influence. London is in a very important position, as what we do here will be watched around the world.

I am committed to a 60 per cent reduction of London's greenhouse gas emissions from 1990 levels by 2025. This plan will help enable all of us to reach that target and avoid some of the potentially disastrous consequences of carrying on 'business as usual'. It will help theatres to communicate the message about climate change to audiences,

without imposing on their artistic integrity or reducing the quality of shows.

This plan is a response to the overwhelming concern of the theatre sector to reduce any negative impact on the environment and its production has been aided by some of the most influential players in the cultural world. These span commercial and subsidised theatres and arts organisations, and include The Theatres Trust, National Theatre, Royal Court, Live Nation, Ambassador Theatre Group (ATG), and Arcola Theatre.

I leave you with one final thought before you read the rest of this plan: if all central London theatres challenged the age-old practice of keeping stage lights on and only switched them on half an hour before the performance, they could collectively save over £100,000 a year in energy costs. The changes we make do not have to be expensive or difficult

to manage in order to have a huge impact on our purses as well as the planet. I look forward to working with you to make London's theatres the greenest in the world.

Boris Johnson
Mayor of London

‘...Arts Council England is delighted to be a partner in the Green Theatre Programme for London, recognising the importance of this work in helping theatres to increase the efficiency of their business processes thereby reducing the industry's carbon footprint while saving money and continuing to attract artists and audiences.

A programme such as this demonstrates that the arts in England can lead internationally in responding to the pressures of climate change, moving

beyond a duty of compliance with issues such as energy management, to a role of inspiration and influence much greater than that due to the industry's size alone. That this leadership should emerge from London is of great encouragement to those artists and audiences that are drawn to this world city for its ability to innovate...’

Moiria Sinclair, Executive Director
London, Arts Council England



LOTTERY FUNDED

Why go green?

Take the lead

London's theatre's productions and venues are renowned worldwide, and the city is one of the most important touring locations for companies globally. London theatres are not a large contributor to carbon emissions but their ability to influence is extremely significant. London theatres can reduce their own carbon emissions and at the same time have a much wider reach by showing audiences and other theatre industries what is possible.

Save money

Being green saves you money

Many of the ideas in this plan – switching to greener lighting, reducing energy consumption, re-using materials – will, in the medium term, save you a considerable amount of money. With rising electricity, gas and oil prices, there is a financial urgency to take action.

It is only a matter of time before legislation catches up with green issues. There is already new legislation concerning lighting and light fittings. Industries that get ahead of the game can not only better influence policy but reduce the pain of hasty compliance later on.

Who is this plan for?

This plan is for anyone working in London's theatre industries, from small independent production companies and arts venues. to large groups of commercial theatres.

This plan aims to guide you through some of the most practical and effective ways to reduce your energy use and make London theatres greener – while also saving you money.

Attract talent

The growing momentum to act on climate change has come from artists, directors, production staff and others within the theatre, arts and cultural industries, all eager to make a difference.

'...The Mayor of London's Green Theatre Programme has provided much-needed structure and impetus to a passionate and engaged sector that lacked the rigorous approach and direction to achieve systemic change. The programme has provided the tools and connected people, putting the industry on the path to achieve ambitious emissions reductions goals. The published documents and continued working groups will allow London's theatres to be at the cutting edge of environmental performance as well as performing arts...'

Andrew Haworth, Environmental Services Manager, Live Nation

This is a summary of the full Green Theatre Programme report. The full report is available for download at www.london.gov.uk/mayor and www.theatretrust.org.uk

London's theatre industry's carbon footprint

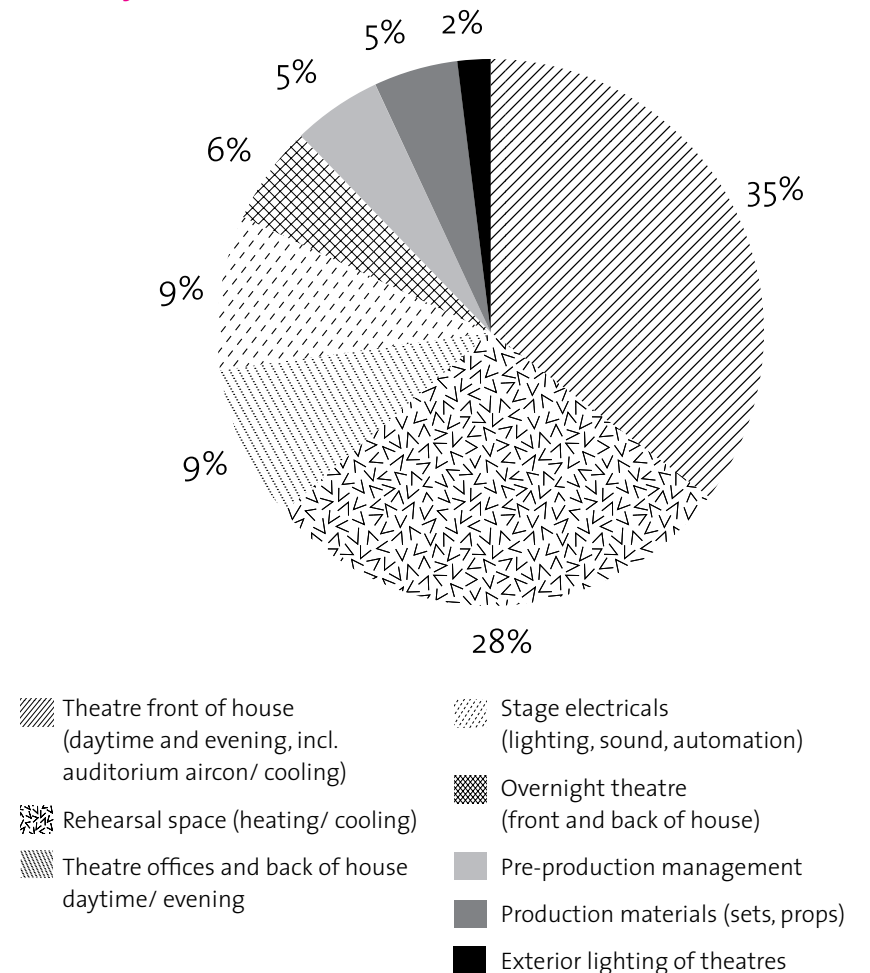
In order to enable a reduction in London's theatre's carbon emissions, our starting point was to measure where the emissions are coming from. Identifying the main problem areas within the industry provided us with a picture of where best to focus our efforts to achieve the most effective results.

The total emissions from London theatres (excluding pre-production and audience travel) are approximately 50,000 tonnes a year¹. This is roughly equivalent to driving a car 1.5 million times round the M25.

This figure does not include indirect emissions from audience travel, estimated at approximately 35,000 tonnes of CO₂ per annum. London audiences are good at using public transport. However, around one third still travel by car or taxi. Encouraging audiences to use more sustainable modes of transport is also key to reducing the theatre industry's carbon footprint.

¹This estimate was derived from a number of case studies and data sources, in particular: Carbon Trust surveys (National Theatre, Arcola, ATG Group, Delfont Macintosh theatres, Royal Court), Live Nation Survey, British Performing Arts Yearbook 2007/8, SOLT Theatre Audience Survey (MORI 2003-4), Audiences London Snapshot London II, Arts Council Economic Impact of UK Theatre (2004), DCMS Performing Arts data, SOLT box office 2007, theatres' own websites, White Light estimated lighting usage in London theatres.

London's theatre industry's carbon footprint: 50,000 tonnes a year

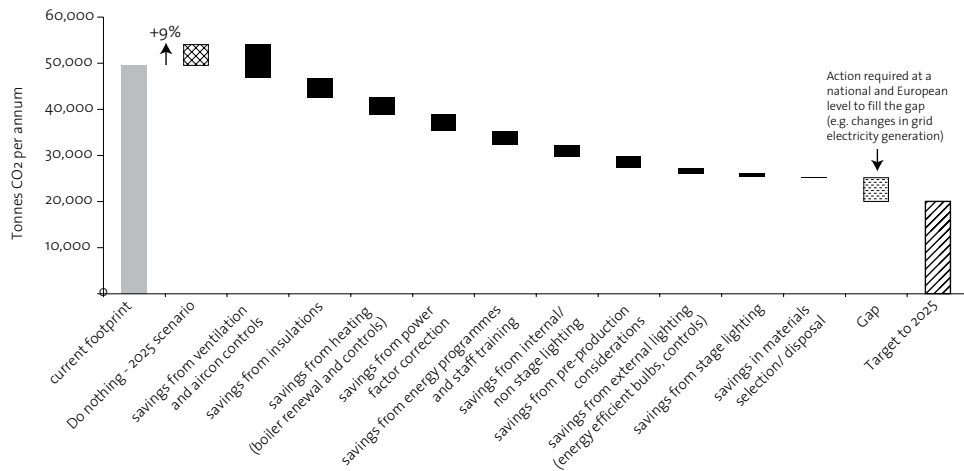


Without action, emissions and fuel bills are set to grow – in particular with the trend of West End productions using more energy to create ever more visually spectacular shows. There are plenty of actions we can take now to increase the energy efficiency of productions and theatre environments, without sacrificing artistic quality.

If all actions recommended in this plan are taken, London theatres can reduce their CO₂ emissions by almost 60 per cent from 1990 levels by 2025.

Note: Business as usual scenario assumes theatre emissions grow in line with London’s commercial and public sector growth. Studies by GLA economics suggest the two sectors are closely tied. Moreover, consumption of energy in West End productions continues to grow.

Total CO₂ savings identified to 2025



Did you know...

- The cost of installing low energy lighting will pay for itself in just two and a half years.
- The Theatres Trust can advise on energy saving initiatives for theatres (www.theatretrust.org.uk).
- Significant financial and CO₂ savings can be made by simply replacing incandescent bulbs with compact fluorescent bulbs (CFLs). Further savings will also be achieved because there is less need for air conditioning, fewer lamp replacements and less maintenance.

Top tips to go greener

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Ventilation and air conditioning/cooling controls	<ul style="list-style-type: none"> Reduce temperature for night-time hours (e.g. set heating in frost protection mode). Set your thermostat for lower temperatures in workshops and storage areas. Don't run cooling at the same time as heating. Install a 'deadband control' between heating and cooling so that neither is turned on until temperatures are outside acceptable levels of comfort (typically 19-24 degrees Celsius). Regularly check airflows from ventilation systems and ensure filters are clean in air handling units. Review operational times and parameters for heavy use equipment, including chillers (e.g. install automatic controls to reduce over-ventilation). Install air quality sensors and temperature sensors in the auditorium. Install insulation on internal appliances and with external walls, windows and roofs. Fit a modern Variable Speed Drive (VSD) to control the supply fan motors of any oversized motors. 	<ul style="list-style-type: none"> Instant Instant Instant Instant Instant <1 year 1-2 years 1-2 years 3 years 	10-12%

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Lighting	<p>External lighting:</p> <ul style="list-style-type: none"> Reduce hours of operation (especially during daylight hours). Switch to energy-efficient bulbs –swap standard tungsten bulbs with low energy CFL bulbs or replace external lighting with LEDs. <p>Internal non-stage lighting:</p> <ul style="list-style-type: none"> Change tungsten lamps used in general lighting applications for compact fluorescent. Set timer switches; fit occupancy sensors and lighting control systems to reduce 'out of performance' lighting. <p>Stage lighting:</p> <ul style="list-style-type: none"> Switch off discharge lighting between the end of the reset/rig check late afternoon and the half hour call before the show starts, and between matinee and evening performances. 	<ul style="list-style-type: none"> Instant (no cost) < 2.5 years < 2.5 years <1 year Instant (no cost) 	<p>2-4%</p> <p>5-6%</p> <p>c.2%</p> <p>9-12%</p>
Boiler renewal and controls	<ul style="list-style-type: none"> Consider switching to high efficiency/condenser boilers and convert oil boilers to gas. Reduce your set temperature by 1 degree to save an average of 8 % on the heating bill. Turn on auditorium heating later in day (closer to performance time); reduce temperatures for night-time hours (e.g. frost protection mode). Use automated controls (rather than manual); install thermostatic valves in wet radiators. 	<ul style="list-style-type: none"> <5 years Instant (no cost) Instant (no cost) 1.5 years 	8-10%

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Buildings and electrical insulation	<ul style="list-style-type: none"> • Ensure building insulation is brought up to minimum standards and improve further where practical. • Consider additional insulation to each floor level to minimise the impact of heat gain rising through buildings. • Check if the outside walls of the buildings can be additionally insulated and install where practical. • Improve insulation of hot water storage (tank and pipe) and electric heating cupboards. 	<ul style="list-style-type: none"> • Dependent on building. However, many actions achieve payback in under 2 years 	7-9% ²
Power factor correction	<ul style="list-style-type: none"> • Correcting the power factor to your building can be a quick way of making energy and financial savings: it is cheap to install and will have little impact on operations. Check the efficiency of your electrical equipment with a 'power factor' survey which identifies where you can save. • Following power factor correction, electrical equipment will need to be tested and possibly adjusted. Power factor equipment needs to be reviewed at least every twenty years or following significant equipment or layout changes. 	<ul style="list-style-type: none"> • 3 years 	7-8%

² In some cases this level of saving may not be physically possible due to the historical or visual nature of the building. Building insulations would generally be undertaken as part of larger refurbishment activity

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Energy management programmes and staff training	<ul style="list-style-type: none"> • Compile a formal energy management policy (including specific targets and policies) and form an energy management committee, with regular reviews and action planning. Allocate clear energy management responsibilities. Make this as fun and informative as possible for staff, possibly with small rewards and incentives. • Staff training can include: turning off lights, materials selection and recycling, correct heating and cooling settings, setting timers on all electrical systems, showing films like Al Gore's 'An Inconvenient Truth' to inspire action. • Collect accurate records of energy consumption (possibly to half hourly detail); track consumption against weather; identify causes of variance against targets. • Build energy efficiency into lifetime cost of new equipment purchases. • Ensure IT equipment is turned off during periods of non office working. • Seek efficiencies in catering equipment (e.g. fridges on timers to go on two hours before show); ensure other equipment only turned on during use. 	<ul style="list-style-type: none"> • <1 year 	5-7%
Pre-production considerations	<ul style="list-style-type: none"> • Considerations at the pre-production stage are likely to be a pre-requisite for savings indicated elsewhere. • Use the production carbon calculator in this plan to identify the biggest contributors of your footprint, so you can work out where to take action. 	<ul style="list-style-type: none"> • Instant 	c.5%

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Pre-production considerations <i>continued...</i>	<ul style="list-style-type: none"> • Ensure that energy costs are included in the production budget; consider setting an energy cap as a challenge to the creative team. • Ensure all buildings and spaces used (including those for rehearsals and for set construction) are well managed/insulated. • Try to reduce travel wherever possible, and reduce volume of equipment transported in tours by using local partners wherever possible. • Ensure all materials are sustainably sourced. 	• Instant	c.5%
Minimising travel emissions	<ul style="list-style-type: none"> • From staff: find rehearsal spaces near to production stage to avoid extra travel; encourage staff, crew and cast to use public transport; travel in low emission transport modes where possible (e.g. avoid flying within the UK). • From audiences: enhance visibility of public transport options to audiences by publicising on tickets, programmes, website; work with Oyster Plus programme to look at 2 for 1 deals (email Transport for London at marketingstrategy@tfl.gov.uk). • From suppliers: minimise frequency of deliveries to/collections from the theatre through better planning; use cycle couriers; reduce touring volumes by using trusted local partners (e.g. use local lighting rigs where possible). 	• Instant	c.10%

Areas for savings	Things you can do to reduce emissions	Typical payback time	% of CO ₂ savings (theatre venue)
Materials selection and disposal/recycling	<ul style="list-style-type: none"> • There are usually a number of alternative materials that could be chosen as part of the production process which would lead to an overall carbon reduction e.g. timber from sustainable sources (Forest Stewardship Council, www.fsc.org). • Reuse materials wherever possible, or implement recycling schemes, for example for: <ul style="list-style-type: none"> • sets and props • batteries (join the Mayor's battery recycling scheme, details on page 25) • lightbulbs and lamps • costumes (www.freecycle.org, www.traid.org.uk) • plastic glasses and consumables • furniture and carpets • waste electronic and electrical equipment • unused leaflets and programmes. 	• Instant	Variable. Typically <1%
Working with suppliers and partners	<ul style="list-style-type: none"> • Provide recycling and energy management facilities for production companies and others using the venue, and provide this information, together with your policies, in welcome packs. • Incorporate environmental behaviour from suppliers and partners into contracts, and wherever possible create financial incentives. For example, more accurate meter measurements would enable commercial theatres to charge production companies for their specific energy usage. • Specify that production companies comply with the theatre's recycling and waste management practices and policies. 	• Instant	Variable, typically around 20%

‘TippingPoint brings together artists and scientists to explore the wider cultural issues around climate change. We look forward to continuing to work with the Mayor’s office on The Greening London Theatres initiative as it is providing a series of critical and invaluable tools to enable the industry to take the practical steps necessary to reduce its carbon emissions.’

Angela McSherry, TippingPoint

More tips and recommendations are available in the full Green Theatre Programme, which can be accessed at www.london.gov.uk/mayor and www.theatrestrust.org.uk

Success stories

The
Theatres
Trust

No action is too small: Building sustainable theatres

The Theatres Trust, the national advisory public body for theatres, is leading the promotion of sustainable theatre buildings.

Following its organisation of the PLASAO7 special interest seminar ‘Theatres act on CO₂’, The Theatres Trust has been working with the Mayor’s Office on the Green Theatre Programme.

ABTT, ETC, Arup, Carr & Angier, Charcoalblue, Harlequin Floors, Northern Light, Theatre Projects, Consultants, White Light, Max Fordham, the National Theatre and the Southbank Centre all supported The Trust’s annual conference in 2008 at the Cottesloe Theatre, which looked at how to make theatres more environmentally sustainable.

The clear message from Conference08: ‘Building Sustainable Theatres’ was that

no action is too small to make a difference.

In future The Theatres Trust will be gathering information on theatres’ energy use to inform legislation and provide advice to theatres introducing climate change adaptations and implementing Display Energy Certificates. Visit www.theatrestrust.org.uk for more information.

‘...Theatres need to go green, from the stage door to box office, to make sure we’re doing everything we can to make our work sustainable and environmentally friendly...’

Alistair McGowan, Actor, impressionist and WWF Ambassador



Ambassador Theatre Group (ATG): Refurbishing theatres

In the last few years ATG has realised that replacing its ageing boilers, many of which had not been upgraded for more than 15 years, would achieve huge savings in its energy consumption, energy bills, and carbon footprint.

The boilers at the Piccadilly and Comedy theatres were both replaced with minimal disruption to performances of *Guys and Dolls* and *Boeing Boeing*, both showing at the time.

ATG Group opted to use boilers recommended for their high efficiency, costing up to 25 per cent of the theatre's annual CAPEX budget. However, ATG calculated that this investment would pay for itself within five to ten years and therefore that all its future boiler replacements should also be highly efficient.

At the same time as upgrading its boilers, ATG is investing in the air conditioning system at the Fortune Theatre. The current system, which is over 25 years old and in very poor condition due to age and water damage, provides a fraction of the fresh air required and runs at less than 68 per cent efficiency. The new system will be 98 per cent efficient (a 30 per cent improvement in performance) and will cut expensive running costs in one stroke.

National Theatre

National Theatre and Philips

The National Theatre is working with Royal Philips Electronics to replace its lighting in a five-year partnership package.

Phase 1 is ongoing and involves renewal of external lighting, reducing energy consumption of the previous installation by an estimated 50 per cent.

In Phase 2 the National Theatre is trialling the replacement of tungsten down lights with LED replacements in the Olivier Circle foyer. This is showing an 88 per cent saving in energy. Following extensive trials the National has changed the light source and control gear in the ETC Source 4 Profiles (spots on wall bars) throughout the foyers with Philips 70 watt Master CDM-T Elite technology. By changing the light source, the theatre will save 90,000kWh (75 per cent reduction compared with the current lighting) and 39 tonnes of CO₂ per year. There is a

range of similar improvements using Philips technology underway across the building.

Phase 3 will involve replacing the electronic SEEFACt sign with a Philips Vidiwall. This will result in a reduction of 55 per cent in electricity consumed, saving 30 tonnes of CO₂ per year.

‘...I think the most important thing is that it has completely turned the tide within the building. It signalled that we were about to make large changes in our lighting and in the way we used energy...’

John Langley, Theatre Manager, National Theatre



ATG/ABTT Technical Sustainability Forum: A forum to help technicians reduce the carbon footprint of their theatres

Ambassador Theatre Group (ATG) and the Association of British Theatre Technicians (ABTT), working with the Mayor's Office, launched a Technical Sustainability Forum for technicians in the theatre sector at New Wimbledon Theatre in May 2008.

They estimate that theatres can achieve 5 per cent savings in energy simply from increasing staff awareness of environmental management. At the first meeting ABTT, Dirty Harry's, Selecon, Scenery Salvage, the Timber Trade Federation and White Light each gave a talk on ways in which their services could help technicians to reduce, recycle and make better use of renewables. At the meeting ABTT announced that its new edition

of the Technical Standards would feature sustainability updates.

A number of ATG venues have been involved in energy saving initiatives with in-house teams and 'Enviro Champions' progressing their own ideas such as low energy and LED lighting in common areas of theatres or Passive Infra Red Occupancy switches in dressing rooms and toilet areas. ATG hopes to hold a second forum later this year and hopes to introduce more initiatives to bring the benefits of energy savings to their venues and theatre technicians.

.....
'...It was a valuable opportunity to share good practice and to develop awareness of the simple actions that technicians can take to reduce the carbon footprint of their theatres...'

Phillip Brown, Group Head of Safety and Environmental Services, ATG

.....



Arcola Theatre: A five-year programme to reduce carbon emissions

London's Arcola Theatre, one of the UK's leading independent venues, aims to become the world's first carbon neutral theatre.

Arcola has already installed a hydrogen fuel cell to power café/bar lighting and selected main house shows. The fuel cell operates almost silently, producing nothing but electricity and clean water. The 5kW fuel cell system takes pride of place in the foyer of the theatre and provides a spur for discussion about the benefits and challenges of this groundbreaking technology.

Arcola also installed a low energy LED lighting system in the café/bar area supplied by PixelRange.

It is estimated that the new lighting system has reduced energy costs in the bar by 60 per

cent and motivates lighting designers to reduce main house lighting energy consumption by 60 per cent.

.....
'...The environmental impact of all theatre productions can be reduced without artistic compromise through careful choices and creativity. I urge all directors to demand not more light and bigger set budgets but the right light and the right set...'

Mehmet Ergen, Artistic Director

.....
'...Small but significant changes in operations can deliver immediate CO₂ and financial benefits. Such actions are critical to motivating and demonstrating that more radical sustainability visions can be realised – theatre has a crucial role in acting fast to show that change is possible and positive...'

Dr Ben Todd, Executive Director

.....

Paule Constable

Paule Constable – Lighting design with carbon transparency

One of the UK's leading lighting designers, Paule Constable has worked for Glyndebourne, The Royal Opera House, English National Opera, Welsh National Opera, Theatre de Complicite, the Royal Court and the National Theatre. She is currently working on Ivanov for the Donmar and Oliver! for Cameron Mackintosh.

As someone who tries to be as environmentally aware as possible - cycling, composting, co-operative food shopping and commuting on public transport - Paule is equally passionate about trying to make her working life more environmentally responsible, despite being a self-confessed 'tungsten queen'. She's starting to look at how she can feed her concerns into decision making processes, operational policy, and into choices about using more energy efficient lighting and staging.

She is leading the way for a new generation of lighting designers.

Paule's top tips

1. Every light in the rig needs a clear use and purpose. I try not to create options and light the piece to avoid unnecessary equipment.
2. When deciding on equipment I consider what energy a luminaire uses and if the brightness is needed.
3. Does that unit have to be tungsten? I consider whether I can achieve the same effect with a lower powered yet bright discharge unit.
4. Consider the best practices regarding the length of time the rig is on. Attempt to only power up the rig as and when it is necessary.
5. In simple unseen areas such as working lights for off stage I suggest using low energy units as much as possible.

6. I discuss with my production electrician how accepted practices might change to cut down on wastage. Can we use the French equivalent to PVC tape – rubber straps made of old bike tyres? Velcro straps to attach cables to bars? Cable trays? What is possible?
7. Try to pre-plan so deliveries can be made once a day.
8. Use cycle couriers and encourage lighting departments to think about how they travel to work.
9. Introduce more sustainable office practices.
10. And finally, encourage the management to provide good quality mains drinking water on tap.

‘...I think that we need to be more carbon transparent in the way we design and light theatre productions. With lighting you're telling people about time and place, and trying to find the right emotional temperature. I want to be able to do this and at the same time be clear about how I'm having less impact on the environment...’

Paule Constable

Dirty Harry's
clean london



Recycling is cheaper

Theatres and production companies can now recycle or sell their old scenery and props, and reduce their waste management costs at the same time. On average 80 per cent of props and 40 per cent of scenery is sellable.

Scenery Salvage, a company with experience in taking away scenery in the television and film industries, is now offering a similar service for theatre productions. Their first trial with National Theatres was successfully completed in March 2008.

By working with Dirty Harry's, ATG – which runs 23 venues - was delighted to find it could save money by recycling (paper, glass, plastic, timber, fluorescent tubes and batteries), compared to conventional waste removal services. Visit www.scenerysalvage.com for more information.

‘...The quote [Dirty Harry's] gave us was, believe it or not, cheaper than the current price we were paying for waste collection and would also include the ability to recycle paper, glass, plastic, timber, fluorescent tubes and batteries. We have now been using Dirty Harry's for over six months and recycled 90 tonnes of glass, 11 tonnes of paper, 3 tonnes of cardboard and 1.5 tonnes of plastic. After a very successful six months there is no looking back...’

David Blyth, Operations and Building Development Director, ATG.

Battery recycling scheme

It is estimated that over 500,000 batteries are consumed annually by London theatres. To avoid these batteries being thrown away after use, the Mayor's Office has joined up with WRAP (Waste and Resources Action Programme) to launch a battery recycling service for London's theatres.

The Mayor/WRAP partnership has provided funding so every London theatre can set up battery recycling facilities. The scheme provides battery collection boxes of various sizes (smaller 'battboxes' and larger 'tube-10s') to get theatres started.

If you are a smaller battery consumer (less than 50 batteries per week)

- Call G&P Batteries on 0121 5683200 to receive your free Battbox. This will hold about 200 AA batteries. When the

box is full, call the same number to request your free collection.

- After this, it's over to you. A Battbox and collection from G&P Batteries costs just £25 so there's no easier way to reduce your environmental impact and get recycling.

If you are a larger battery consumer (over 50 batteries per week)

- WRAP have purchased some Tube-10s, which you can have free of charge. To find out more and request your free Tube-10, call Sophie Eastal on 020 7983 4412.

To purchase further Battboxes, call G&P Batteries on 0121 5683200.

Did you know...

- Lighting an office overnight wastes enough energy to heat water for 1,000 cups of tea.
- Switching off non-essential equipment in an office overnight saves enough energy to run a small car for 100 miles.
- If all central London theatres switched the rig on at the 'half hour' they could collectively save over £100,000 a year in energy costs alone.

Where do I start?

Work out your carbon footprint:

In order to reduce your emissions, it's best to start by identifying where you can make changes to achieve maximum impact. Organisations such as the Carbon Trust offer free surveys to help you work out how much carbon and waste your organisation is producing and where best to make reductions. They will help you develop an action plan tailored to your needs. Visit them online at www.carbontrust.co.uk or call 0800 085 2005.

Write an action plan:

This should articulate your organisation's goals and targets, outline the basic approach and produce an action plan for achieving those targets. See www.carbontrust.co.uk/energy/startsaving/tech_energy_management_implementation.htm for more information.

Involve Staff:

Provide training to change old

practices so that lights are switched off, waste is reused or recycled where possible and heating and cooling settings are always correct and switched off when spaces are not in use. Front of house training may need to be more frequent than for other staff, reflecting higher employee turnover.

Environmental Champions:

Designate 'green' responsibilities to specific staff members. Consider branding the training programme to raise staff awareness and enthusiasm e.g. use certificates and badges to recognise trained staff and ask staff what they think should be changed. Global Action Plan offers short training for environmental champions who then disseminate the lessons they learn (see www.globalactionplan.org.uk). Above all, reward success and make it fun!



Keep accurate records:

Knowledge is power – if you record your energy consumption, you can track how you are doing against targets and identify peaks in usage. Where building management systems are installed, use these to record plant operation. Comparing this to energy usage can identify significant savings (e.g. high recorded energy usage could be as a result of heating/cooling/ventilation operating continuously or outside necessary hours)

Write 'green' policies into contracts:

This will ensure that your suppliers are also working with you, and can have a large impact through your supply chain. Sign up to London Remade's Green Procurement Code (www.greenprocurementcode.co.uk/) for help with designing a green procurement policy, incorporating green

specifications into bought or designed products or services, and don't forget to communicate this approach to staff.

Build efficiency payback into capital expenditure:

For some heating and cooling investments, payback is achieved in around three years. The Carbon Trust can help prepare business cases for this kind of bigger investment and help with identifying potential suppliers.

The Carbon calculator for production planning

Most of the carbon footprint relating to a specific production is determined during the pre-production stage - through numerous decisions made in lighting, staging, and set design.

To help you understand the environmental implications of these decisions, we have developed a carbon calculator to estimate a footprint from each of the main production areas. This is intended to highlight which areas in a given production are the biggest creators of carbon emissions and in turn feed into your action plan for carbon reduction. Many of the specific actions that can reduce this footprint are those detailed throughout this document.

The carbon calculator is available for download at www.london.gov.uk/mayor and www.theatretrust.org.uk

‘...Theatre is all about collaboration and clearly there are a number of parties that need to join forces to address this issue. As the trade body representing the manufacturers and designers of entertainment technology we are fully committed to playing our part under the leadership of the Mayor...’

Matthew Griffiths, CEO PLASA (Professional Lighting and Sound Association)

Illustrative input page

Production		
What is the estimated show running time?		hours
What are the total number of showings of the production?		no
Approximately what is the total number of stage lights to be used?		no
Approximately what is the total number of spot lights to be used?		no
How many hours before the show begins will the stage lights be switched on?		hours
How many hours will the stage lights stay on after the show has finished?		hours
Approximately what is the electrical demand of sound equipment that will be used?		kWh
How many hours before the show begins will the sound equipment be switched on?		hours
How many hours will the sound equipment stay on after the show has finished?		hours
What is the size of the auditorium?		m2

Thank you!

It would not have been possible to develop this programme without the incredible commitment, openness and engagement from London's theatre community. In particular our thanks goes to:

AEAT

Alistair McGowan, WWF
Ambassador

Ambassador Theatre Group

Association of Lighting
Designers

Arcola Theatre

Arts Council

Arup

ATG

BECTU

Carbon Trust

Central School of Speech &
Drama

Delfont Macintosh

Dewynters

ETC

Equity

ITC

Live Nation

London Remade

Martin Professional

National Theatre

Philips

PixelRange

PLASA

PMA

Really Useful Group

Roundhouse

Royal Court

SOLT

The Theatres Trust

Tipping Point

TMA

Vari-Lite

White Light

WRAP

Young Vic

Where to go for further information

- The full Green Theatre Programme and the Carbon calculator for production planning are available for download at www.london.gov.uk/mayor or www.theatrust.org.uk.
- See www.carbontrust.co.uk for general environmental advice, information on carbon footprinting, and suggestions for office and business environments including straight forward action plans and recommendations for reducing your carbon footprint.
- The Energy Saving Trust (<http://www.energysavingtrust.org.uk/>) is another excellent source of advice. Although it focuses primarily on homes, advice is easily applied to work environments.
- LDA Envirowise (www.envirowise.gov.uk) offers free, independent and confidential advice and support, and links to numerous sources of further information. If you are not sure what help you need, are just starting out or would simply like to discuss your options, the Envirowise Advice Line (0800 585794) can point you in the right direction.
- London Remade Solutions (<http://www.londonremade.com/greening-the-office>) can help businesses reduce the waste they produce, reuse office items, start up or improve office recycling.

Did you know?

National Theatre has saved 50 per cent of its water consumption by introducing:

- infra red sensors to detect people movement, which in turn control urinal flushing in public toilets
- low content cisterns during lavatory refurbishment
- flow restrictors on taps during refurbishments
- aerating taps and showers.

Q&As

What about listed buildings?

Although listed buildings can present extra challenges, there is plenty that can be done within the fabric of the building which is compliant to regulation. English Heritage Projects (www.english-heritage.org.uk/server/show/nav.1043) may also be able to provide specific advice for listed buildings. Most opportunities to save energy will come from behavioural change.

Venues or production companies: who is best placed to take charge?

Both! To make a difference, theatres and production companies will need to work together and consider each other's needs. You'll find lots of helpful hints in this plan.

What about the cost?

We recognise that larger capital expenditures are often not possible and have endeavoured to focus recommendations on

low cost quick wins. Larger projects, as identified for heating and cooling, typically pay back in energy savings, but over a longer period. Large-scale investments can often be incorporated during a refurbishment at little extra cost.

Other formats and languages

For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us at the address below:

Public Liaison Unit

Greater London Authority
City Hall
The Queen's Walk
More London
London SE1 2AA

Telephone 020 7983 4100
Minicom **020 7983 4458**
www.london.gov.uk

You will need to supply your name, your postal address and state the format and title of the publication you require.

If you would like a summary of this document in your language, please phone the number or contact us at the address above.

Chinese

如果需要您母語版本的此文件，
請致電以下號碼或與下列地址聯絡

Vietnamese

Nếu bạn muốn có văn bản tài liệu
này bằng ngôn ngữ của mình, hãy
liên hệ theo số điện thoại hoặc địa
chỉ dưới đây.

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος
εγγράφου στη δική σας γλώσσα, παρακαλείστε να
επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυ-
δρομικά στην παρακάτω διεύθυνση.

Turkish

Bu belgenin kendi dilinizde
hazırlanmış bir nüshasını
edinmek için, lütfen aşağıdaki
telefon numarasını arayınız
veya adrese başvurunuz.

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ
ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ
ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Hindi

यदि आप इस दस्तावेज़ की प्रति अपनी
भाषा में चाहते हैं, तो कृपया निम्नलिखित
नंबर पर फोन करें अथवा नीचे दिये गये
पते पर संपर्क करें

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি
(কপি) চান, তা হলে নীচের ফোন নম্বরে
বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Urdu

اگر آپ اس دستاویز کی نقل اپنی زبان میں
چاہتے ہیں، تو براہ کرم نیچے دئے گئے نمبر
پر فون کریں یا دینے گئے پتے پر رابطہ کریں

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى
الاتصال برقم الهاتف أو مراسلة العنوان
أدناه

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં
જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર
ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

GREATER LONDON AUTHORITY

City Hall
The Queen's Walk
London SE1 2AA
www.london.gov.uk
Enquiries 020 7983 4100
Minicom 020 7983 4458

Mol/Sept08/CS D&P/MT/GLA1089