

# sustainable production guide

How to limit environmental impacts at every stage in the production process.

This guide is for artistic directors, producers, directors, production managers, lighting designers and technicians, set designers and builders, costume designers, and performing arts practitioners across the industry seeking to understand and reduce their environmental impacts.



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## Exploring New Possibilities for a Changing World

The creation of this guide has been an exciting journey. In May 2011 Julie's Bicycle held a Sustainable Production Day in partnership with the National Theatre, bringing together production professionals from across the UK theatre sector.

Attended by over 120 production managers, lighting designers, set designers, technicians, artistic and executive directors, writers and media representatives, the event covered everything from low carbon lighting technologies to the roles and responsibilities needed to drive more sustainable behaviour. This group of professionals has become the foundation for Julie's Bicycle's work on sustainable production and many of them have, in some form or another, contributed to the knowledge and ideas contained in this guide.

A second large-scale event followed in March 2013: 'Green My Production,' which was held in partnership with lighting hire specialists, White Light. This too, brought together over 100 creative professionals – representing not just theatre, but also dance, opera, music and film – and engaged the production supply chain by inviting suppliers to showcase a range of innovative, sustainability-focused resources and solutions.

The context in which these events have been staged is one of rapid environmental change and resource depletion. The path forwards is clear: we need to move away from an economy that operates based on a “take, make, dispose” approach to design and production, towards an approach that seeks to reuse, repurpose and recycle components, and ensure that waste is managed responsibly.

Encouragingly, we are already witnessing values and aesthetics beginning to shift as the arts and cultural sectors become more mindful of this reality. There are an ever-growing number of practitioners and organisations who are 'going green' and challenging suppliers and audiences to join their endeavour. This diverse group is piloting groundbreaking new ways of working, actively sourcing and investing in low carbon technologies, and digging deeper into our methods and processes than ever before. Environmentally sustainable thinking is becoming more than a moral imperative, it's contributing to the innovation of new materials, products and services, as well as more creatively engaged discussions around aesthetics. This guide is both a resource documenting best practice and an invitation to be part of this growing community, committed to developing future-proof production practices.

We hope you find the guide useful and look forward to hearing how you get on.

Julie's Bicycle 2013

## About This Guide

This guide focuses specifically on the *environmental* sustainability of production – and any mention of ‘sustainability’ should be read as such. A holistically sustainable production is one that addresses all three key pillars of sustainable development: **environmental**, **economic**, and **social**. However, as you read this guide you will notice that often through addressing environmental impacts financial and social issues such as labour practices, social justice, equality, and diversity are also invoked.

The carbon impacts of stage electrics, pre-production management and production materials amounts to approximately 20% of a theatre’s overall carbon footprint<sup>1</sup>. Carbon emissions are used as a proxy for wider impacts, but do not encompass all environmental impacts. As theatre professionals, exploring how to green the production process presents a real opportunity to influence the supply chain, and move towards a more robust and sustainable economy that’s able to keep creating remarkable work far into the future.

This guide contains the most up-to-date and comprehensive guidance to help you embed good environmental sustainability practice at the heart of your production. We’ve condensed what we have learnt into a series of checklists, for each role in the production process, separated into pre-production, production, and post-production. We realise each organisation may be at different points of their sustainable transition, so we’ve also categorised the suggested actions included in each check list into three levels (see colour-coded key): ‘sustainability starting points’ at the baseline level, ‘industry good practice’ in the middle, and ‘leading ideas’ for those that are at the forefront of this movement. Because the checklists are formulated by role some repetition occurs throughout the guide – we don’t expect users to read the guide from cover to cover but focus on their role or department.

We’ve also included case studies, useful tips and signposted key resources. We recognise that for production, sustainability must hold its own with a long list of other competing priorities. With that in mind, we’ve provided options that will work the way you do and will help you to continue making great art for less financial and environmental cost, far into the future.

There are many who added to the insight and advice provided in this guide. We would like to thank the team behind the Young Vic’s production of *After Miss Julie* (March–April 2012), for providing a host of insights into the practicalities of sustainable production; the team at the Royal Central School of Speech and Drama for furthering the process of experimentation with us; our reviewers Robin Barton, Tanja Beer, Richard Couldrey and Kate Ward and all those who provided case study material for this guide.

This is an ongoing area of work for Julie’s Bicycle. If you have any comments or additions please contact us at [info@juliesbicycle.com](mailto:info@juliesbicycle.com) or tweet us @JuliesBicycle with #GreenArts.

### Key

#### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

#### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

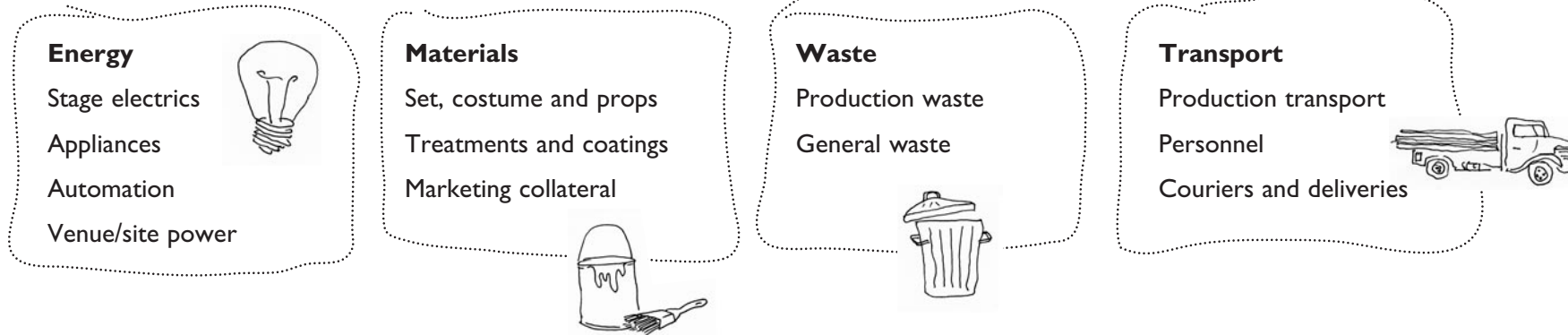
#### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

<sup>1</sup> Green Theatre Guide, Mayor of London (2008), p4. [www.juliesbicycle.com/resources/green-guides/greentheatreguide](http://www.juliesbicycle.com/resources/green-guides/greentheatreguide)

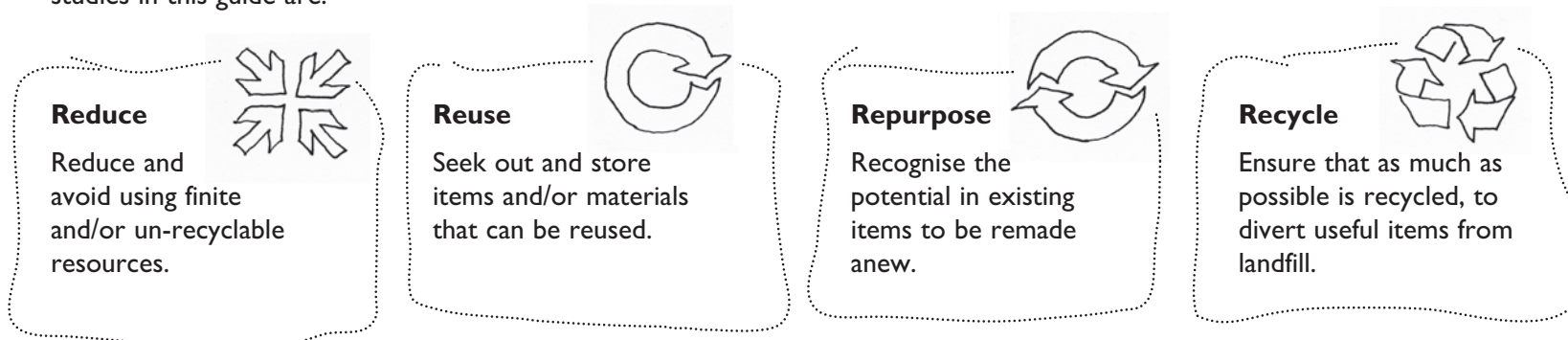
## Production Impacts: An Overview

The main environmental impacts associated with production are:



These impacts will be unpacked in each of the sections that follows in terms of how each member of the production team can contribute to reducing them.

The fundamental principles underpinning all of the actions and recommendations that make up the checklists and case studies in this guide are:



# I Production Management

The productions that most successfully implement new ways of sustainable working have two fundamental things in common: the environment is on par with artistic and financial considerations, and everyone involved in the production is engaged and invested in the goal of sustainability from the outset. The stronger the commitment across the team – from the director to the technical crew – the greater the willingness to experiment, take risks and try new products and ways of working will be.

## Re-framing Sustainability

It goes without saying that creative professionals strive for excellence in their work. Because it is often perceived as a costly luxury that requires budget and resources when both are in short supply, sustainability may at times feel like a restriction to putting on a great performance. However, it's important to realise that environmental principles can be viewed in the same way as budgetary or staging requirements: they are necessary parts of putting on a successful production. While some aspects of sustainable best practice can cost more, others can generate up to thousands of pounds worth of savings, and potentially salaries for more creative and crew staff, depending on the scale of the production. The challenge lies in collectively embracing sustainability as a non-negotiable element of the production process. Not an extra or add-on, but a starting point.

Set designer Soutra Gilmour discussed this issue at Green My Production, a Julie's Bicycle event on sustainable production held at White Light in March 2013. Ultimately, she says, *"You're always imperfect – that is for sure. It's a constant picking oneself up on the things you are and aren't doing – and celebrating the successes."*



You can watch a video summarising the event here:  
[www.youtube.com/watch?v=4vDZR4SM\\_L4](http://www.youtube.com/watch?v=4vDZR4SM_L4)

Strong leadership is crucial to establish a vision and practical framework for sustainable production that is achievable and relevant to the production. The following chapter will outline the specific steps and responsibilities which can be taken on by the four different leadership roles found in productions: artistic directors, producers, directors, and production managers. While each role may have a different focus, we believe it is essential for individuals working in each category to familiarise themselves with this guide in its entirety, in order to gain a deeper understanding of what each production department can contribute and how to work collaboratively.

## Key

### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

## Case study

### Sydney Theatre Company: Greening the Wharf

The STC's sustainability programme, Greening the Wharf, has enabled them to explore and implement best practice for environmentally sound production, and research everything from the latest LED lighting technology to sustainably sourced timber available to Australian theatre companies.

They have developed a comprehensive Green Production Policy, which can be seen along with other resources documenting their learning online:  
[www.greeningthewharf.com/projects/theatre-production](http://www.greeningthewharf.com/projects/theatre-production)

# I.I Artistic Director and Producer

## PRE-PRODUCTION

### Action

\* Develop your awareness of the overall environmental impacts associated with production. Because you set the vision, culture and tone of the production or event, the cast and crew will look to you for leadership and confidence on the issue of sustainability; if you don't act as though it's a priority, they won't either. Therefore, it's essential to have practical examples to hand and build a basic understanding of issues and terminology. Make a point to reassure people that sustainable practices are not designed to compromise the artistic quality of the production, but to ensure that the creative vision is realised sustainably. Use this guide as a starting point to familiarise yourself with a sustainable production cycle.

*For more suggestions on staff engagement, see page 14.*

\* Develop an environmental policy for the production with the director and production manager, detailing the environmental commitments the production will make. You may want to discuss possible themes with the wider cast and crew. Share the final policy internally and externally. Use this guide to help identify your actions, and read other companies' policies for inspiration.

*For tips on how to develop a policy see page 8.*

\*\* Allow more time for the production process in order to address and prioritise sustainability and budget salaries for the director, production manager and stage manager accordingly. Researching, testing and identifying sustainable products and processes can take longer, especially the first time around. If possible, an extra two months can have a huge impact.

\*\* Consider environmental commitments when contracting directors, designers, artists, venues and suppliers. Communicate your commitment to environmental concerns alongside artistic and financial considerations and that you expect them to do the same. Invite them to contribute ideas to how this will work in practice and use your production's environmental policy as a starting point for the conversation.

\*\* Include environmental commitments in contracts and job descriptions for all production crew. Give people relevant roles in the sustainability process, for example tasking the Production Assistant and other relevant crew members with gathering information to monitor the production's environmental impacts.

### Case study

#### Young Vic: 'After Miss Julie' Sustainable Production Pilot

The Young Vic achieved a reduction in carbon emissions of 38% overall for their production of *After Miss Julie* (March-April 2012), when compared to the average emissions for a show in the same space. This was achieved without spending more than their average production budget for the Maria Studio, where the show was performed. They reported that involving the entire creative and technical teams, as well as the cast, from the very first communication was fundamental to their success. Likewise, their decision to extend the production process and hire a stage manager for an additional three weeks enabled the team to take time to find appropriate "green" solutions and products.

Their pilot involved exploring sustainable production practice across all aspects of production, including the show's marketing and ticketing. You can read more about their learning here: [www.juliesbicycle.com/resources/case-studies/production/after-miss-julie](http://www.juliesbicycle.com/resources/case-studies/production/after-miss-julie)

\*\* Work with your production manager to develop a sustainable procurement policy.

*See page 9 for how to put together a procurement policy.*

## REHEARSAL AND PRODUCTION

### Action

\* Small actions can make big savings and are also an opportunity to lead by example. Switch off lights, recycle using the correct bins, avoid disposable food and drink containers and use public transport where possible.

\* Emphasise sustainability as a production priority by ensuring that it remains an agenda item on all production meetings. Make sure it's not something that gets mentioned once at the beginning then forgotten. Embed in the entire life-cycle of your production by speaking about it often, even if you're speaking about challenges/pitfalls.

## POST-PRODUCTION

### Action

\* Analyse the success of the production's sustainability initiatives using the evaluation put together by the production manager. Celebrate achievements with the team, and look at ways you can roll out and/or continue to explore new approaches in practice on future productions.

### RESOURCE

#### An Environmental Policy that Represents You

Ownership over your production's environmental policy is key to achieving buy-in from everyone on the team. If people are involved with agreeing targets and actions, they are more likely to help meet them. You may well find that people on your team already have ideas or expertise that will be useful in reducing your environmental impacts.

The best environmental policies are in line with the ethos of the production. Your policy should be unique to the production and the people in the room. It should use the best of your talents and creativity.

For support on writing a policy and action plan, see our guidelines: [www.juliesbicycle.com/resources/environmental-policy-guidelines](http://www.juliesbicycle.com/resources/environmental-policy-guidelines)

Here are some examples of production policies from Sydney Theatre Company and Arcola Theatre:

[www.greeningthewharf.com/projects/theatre-production](http://www.greeningthewharf.com/projects/theatre-production)

[www.arcolatheatre.com/greenarcola/greening\\_theatre](http://www.arcolatheatre.com/greenarcola/greening_theatre)



## I.2 Director

### PRE-PRODUCTION

#### Action

\* Develop your awareness of the overall environmental impacts associated with production. Because you set the vision, culture and tone of the production or event, the cast and crew will look to you for leadership and confidence on the issue of sustainability; if you don't act as though it's a priority, they won't either. Therefore, it's essential to have practical examples to hand and build a basic understanding of issues and terminology. Make a point to reassure people that sustainable practices are not designed to compromise the artistic quality of the production, but to ensure that the creative vision is realised sustainably. Use this guide as a starting point to familiarise yourself with a sustainable production cycle.

*For more suggestions on staff engagement, see page 14.*

\* Discuss environmental commitments and objectives with the artistic director and/or producer at the outset of the production process. Use the production's environmental policy to frame the conversation. Be clear what the "non-negotiables" are in terms of sustainability and also where you will allow some leeway for balancing sustainability with creative or financial considerations.

\* Work closely with your design team to explore creative sustainable solutions during the design phase of your set, costumes and props. Use the production's environmental policy and this guide to assist you. Include environmental sustainability as an objective in all design meetings and set each crew member small research tasks or different materials to look into.

*See Chapter 4 for more information on materials.*



#### RESOURCE

#### Writing a Sustainable Procurement Policy

Best practice in carbon measurement takes into account your supply chain as well as your direct impacts. Impacts such as the transport of the companies we buy from, or the embodied carbon and water used to manufacture the products we buy, all have an effect on our environment and whilst we may not be able to control them we still have influence. These 'lifecycle' or 'scope 3' emissions, as they are known, can be significant and increasingly organisations are asking for environmental credentials from those they work with. By joining this growing movement you are helping to green the sector's supply chain as well as your own operations. A sustainable procurement policy is a great way to develop environmental criteria that you expect contractors to adhere to.

The key questions you need to ask when sourcing products or services are:

1. Where does it come from?
2. Who made it?
3. What is it made of?
4. How is it packaged?
5. What will happen to it after the production?

## REHEARSAL AND PRODUCTION

### Action

- \* Small actions can make big savings and are also an opportunity to lead by example. Switch off lights, recycle using the correct bins, avoid disposable food and drink containers and use public transport where possible.
- \* Emphasise sustainability as a production priority by ensuring that it remains an agenda item on all production meetings. Embed sustainability in the entire life-cycle of your production by speaking about it often, even if it's to acknowledge the challenges.

## POST-PRODUCTION

### Action

- \* Analyse the success of the production's sustainability initiatives, using the evaluation put together by the production manager.
- \* Celebrate achievements with the team, and look at ways you can roll out and/or continue to explore new approaches in practice on future productions.
- \*\* Share your experience and any useful learning from the production with industry colleagues and networks.

To help answer these questions, look for marks, certifications and labels when contracting suppliers, such as:

- ISO 14001 international standard for environmental management: [www.bsigroup.co.uk/en-GB/iso-14001-environmental-management](http://www.bsigroup.co.uk/en-GB/iso-14001-environmental-management)
- Forest Stewardship Council (FSC) certification for timber: [www.fsc-uk.org](http://www.fsc-uk.org)
- EU Ecolabel: [www.ec.europa.eu/environment/ecolabel](http://www.ec.europa.eu/environment/ecolabel)
- Soil Association Organic standards: [www.soilassociation.org/whatisorganic/organicstandards/oursymbolandstandards](http://www.soilassociation.org/whatisorganic/organicstandards/oursymbolandstandards)
- International Union for Conservation of Nature (IUCN) Red List of Threatened Species (for animal products to avoid): [www.iucnredlist.org](http://www.iucnredlist.org)

Julie's Bicycle Sustainable Procurement Guide provides more in-depth guidance: [www.juliesbicycle.com/resources/practical-guides/sustainable-purchasing](http://www.juliesbicycle.com/resources/practical-guides/sustainable-purchasing)

## I.3 Production Manager

### PRE-PRODUCTION

#### Action

\* Use this guide to familiarise yourself with a sustainable production cycle.

\* Develop an environmental policy for the production with your artistic director and producer before the first production meeting, and set targets for what environmental impacts you'd like to reduce. For example, using only recycled steel and reducing transport emissions.

\*\* Develop an action plan setting out how you aim to achieve the targets and commitments detailed in your environmental policy and how success will be monitored. Use this guide to help you identify your actions.

Hold an extended production meeting to share the production's environmental objectives with all creative, cast and crew. Talk through your plans and why you think they are important. Ask each department to explore how they can contribute.

Share the final policy and action plan internally with the production crew, and externally with key stakeholders like venues and collaborators. Display the policy somewhere visible for all cast and crew.

*For more suggestions on staff engagement, see page 14.*

\*\*\* Set a carbon budget for the production, to encourage efficiency and low carbon practice. Communicate this via the production's policy and action plan, and include a column in budgets and planning systems to show the carbon impacts of decisions made.

\* Make environmental sustainability a standing item on all production meeting agendas. Share successes and challenges, and discuss how obstacles could be navigated as a team.

\* Prepare to measure your production's environmental impacts in order to track progress. Use the Monitoring Environmental Impacts Spotlight to understand what measurement tools are available to you and who to involve in the process.

*See the Monitoring Environmental Impacts Spotlight on page 15.*

#### HOW TO

#### Create a Carbon Budget

Setting an annual carbon budget for your organisation's productions, in line with your financial budgets, helps embed environmental sustainability as a core concern alongside artistic and financial decisions.

1. Measure the carbon emissions of stage lighting, equipment, set materials and transport for your shows using the Julie's Bicycle IG Tools for Production and Touring to assess their contribution to the show's carbon footprint:

[www.ig-tools.com](http://www.ig-tools.com)

2. Once you've started to develop a gauge for the carbon footprint of different types and sizes of show, create a projected carbon budget for your annual/seasonal programme (as applicable).

3. Use this budget as a "baseline" against which you can work to improve your carbon footprint.

4. Share each production's carbon budget with staff and artists alongside the financial budget. Ask them whether certain elements of the production could be realised with a lower environmental impact. For example, perhaps the show could be made using only recycled timber.

5. Identify areas for action that have

\* To aid data collection, add a column to your budget spreadsheets to track relevant data. For example, track delivery distances and vehicle types to measure transport emissions.

\*\* Create a sustainable procurement policy outlining the 'must haves' and the 'desired' credentials from your suppliers. Share this with all those involved in procurement. When contacting new suppliers ask to see their environmental policy and include sustainability as a contractual agreement.

*See page 9 for how to put together a procurement policy.*

\* Support the Lighting and Sound technical crews with local sourcing for hire equipment, and speak to existing suppliers about their environmental credentials and energy efficient products.

\*\* Work with the Stage Manager(s) to identify local suppliers of reclaimed, recycled and second hand materials for scenic construction and prop-making.

Hiring stage managers for longer to help with the process of sourcing second-hand materials and props can reduce your impacts drastically.

\* Ensure that all cast and crew have access to necessary amenities, such as fridge space, a microwave, sink and kettle to make hot drinks so that they can bring their own food and store it safely and/or cook communally.

\* If your budget allows, order reusable drinking bottles and/or mugs for the crew and cast to avoid the use of disposable plastic bottled water. Ensure that they have access to filtered drinking water throughout the rehearsal and performance periods.

\*\*\* Talk to the venue's building manager to discuss ways that energy might be saved for the duration of your production.

If you are producing an outdoor event, explore the possibility of using renewable power.

*See the Energy spotlight on page 18 for more information.*

## PRODUCTION

### Action

\* Small actions can make big savings and are also an opportunity to lead by example. Switch off lights, recycle using the correct bins, avoid disposable food and drink containers and use public transport where possible.

other benefits in addition to environmental savings, to encourage action. For example, a lighter set will be easier to design and tour, saving money on transportation and using less materials.

6. Keep monitoring the carbon footprint of your productions to compare actual figures against your projected budget, and identify actions that have the biggest impact in reducing carbon emissions.

7. Review your annual carbon budget each year based on your findings and identify any opportunities for carbon reduction against your baseline figure from the year before.

### RESOURCE

#### The Julie's Bicycle Green Suppliers Database

Use the Green Suppliers Database to find suppliers providing environmentally conscious services and resources. Listed companies are examined and evaluated by Julie's Bicycle staff according to a list of environmental sustainability criteria before being included on the database.

[www.juliesbicycle.com/resources/jb-green-database](http://www.juliesbicycle.com/resources/jb-green-database)

\* Do spot checks to ensure that the switch off routine is being adhered to for lighting and equipment – in particular that stage lighting is being doused after rig checks until the half.

\*\* Continue to monitor the key environmental impacts you have chosen to measure. Update cast and crew on progress during the production process by displaying the information backstage near to the environmental policy.

\*\*\* Share progress on your environmental actions with your audiences. Work with your marketing team to display information front of house, in the programme and/or digitally.

*See chapter 7 for more ideas on communicating with audiences.*

\*\* Check with the venue's building manager and the lighting operator if energy consumption during the show is running as expected or whether there are any anomalies. Try to establish what is causing any unusual peaks and troughs. This analysis will depend on what sub-metering is available in-house for the auditorium and whether any monitoring equipment is available for the lighting desk.

*For more information see the Energy Spotlight section on page 13.*

## POST PRODUCTION

### Action

\* Make sure all scenic materials, props, costumes and other items are recycled after the show.

The theatre's own store may wish to keep some items for future productions, and other possible destinations include [www.scenerysalvage.com](http://www.scenerysalvage.com), charity shops, other theatre stores, schools, [www.set-exchange.co.uk](http://www.set-exchange.co.uk), [www.freecycle.com](http://www.freecycle.com), and/or reclamation centres.

\* For the get-out, contract a waste disposal company that recycles as close to 100% of the production waste as possible. Also contract a waste service to responsibly dispose of any hazardous waste or toxic chemicals used in your workshop (e.g. acetone, methylated spirits, etc). Biffa, for example, offer a hazardous waste collection service.

\* Measure your production's final environmental impact using the Production Tool on the IG Tools, and the Venue and Touring Tools if applicable.

*See the Monitoring Environmental Impacts spotlight on page 15.*

### Case study

#### Getting Thrifty

Second hand props are usually cheaper than new materials, and these savings can be used to hire staff to spend more time sourcing materials. Both 'Peter and the Starcatcher' (Broadway) and 'After Miss Julie' (Young Vic) employed stage managers at least three weeks earlier than normal to allow more time for sourcing second hand props and materials.

'Peter and the Starcatcher,' designed by Tony Award-winning designer Donyale Werle, saved over £20,000 by using reclaimed materials, and 'After Miss Julie' spent the same as their average production budget whilst achieving big improvements in environmental performance.

See the full case studies on the Julie's Bicycle website: [www.juliesbicycle.com/resources/case-studies/production](http://www.juliesbicycle.com/resources/case-studies/production)

\* Evaluate your environmental performance against the environmental objectives and targets set out in your environmental production policy. Use an evaluation form to collate qualitative feedback to ensure that freelancers who move on quickly have the opportunity to feed in. Document good practice for inclusion in a environmental production policy for future shows.

\*\* Circulate the production's environmental impact results and achievements to all crew, company and other stakeholders such as funders, audience, artists and your marketing and PR department.

\*\* Hold a final wrap up meeting for the production team to share and discuss your experience of the sustainable production cycle. Share successes and challenges and agree what practices you'll roll out for future productions.

\* Use the production's footprint as a baseline against which to improve your next production's impacts.

#### Resource

##### Engaging Staff and Team

Don't be disheartened if not everyone in your cast or crew appears to be 100% committed to sustainability from the start. Sustainable production is still in its infancy and it will be a new concept for many people, so stay positive and keep doing what you can. Help them understand that this is a priority but isn't designed to limit or restrict creativity.

Involving staff and creatives with identifying environmental actions and commitments will help them feel invested in the process, and presenting information in an appealing, attractive and engaging way will ensure your efforts won't go unnoticed. Use films, diagrams, pictures, short sentences and charts, display information in a prominent position and use competitions, moving parts or pop quizzes to remind people to engage regularly.

##### Useful Resources

Local councils will provide free information posters to stick above your recycling bins showing what goes where.

The Carbon Trust offers a range of communication materials aimed at engaging staff with energy conservation:  
[www.carbontrust.com/resources/guides/energy-efficiency/employee-awareness-and-office-energy-efficiency#posters](http://www.carbontrust.com/resources/guides/energy-efficiency/employee-awareness-and-office-energy-efficiency#posters)

Do The Green Thing publish a new poster on different environmental and sustainability issues on a weekly basis:  
[www.dothegreenthing.tumblr.com](http://www.dothegreenthing.tumblr.com)

Sustrans provides resources for encouraging more sustainable transport to work: [www.sustrans.org.uk](http://www.sustrans.org.uk)

#### Case study

##### Sustainable Production Waste: Scenery Salvage

Scenery Salvage recycles and repurposes sets after the production has ended, including hard to recycle materials like polystyrene and glass reinforced polymer. They will collect scenery from location by lorry or skip and take it to a reclamation centre for further processing. Their unique service lies in keeping the process as straightforward as 'normal' waste collection, except that nothing ends up in landfill and as much as possible is repurposed or recycled. They can also provide advice from the beginning of the production process to help you source and design your set in a way that is easier, cheaper and greener to disassemble and dispose of. They are based in the UK, predominantly around the greater London area.

[www.scenerysalvage.com](http://www.scenerysalvage.com)

## Spotlight

### Monitoring Environmental Impacts

There are several useful tools available for monitoring the environmental impacts of your production. The data collection can be delegated to the most relevant crew member.

- 1. IG Tools carbon calculators** – using the IG Tool for Production you can measure the carbon emissions from lighting, sound, AV and automation, timber and steel. Other IG Tools in the suite will also enable you to measure transport, touring (accommodation and personnel travel) and venue energy. See the Data Collection appendix on page 20 for more information.
- 2. Sub-meters** enable you to accurately track power consumption from a particular source and/or equipment e.g. your lighting rig.
- 3. FocusTrack** software can be used to create a detailed overview of how much energy your lighting rig is consuming throughout the show, cue by cue. See chapter 2 on Lighting for more information.
- 4. Budget columns** can be added to track delivery distances, the sustainability credentials of materials and products purchased (i.e. whether it is new or recycled, or sourced in an environmentally sustainable way), and any other useful notes.

### The IG Tools

The primary tool we recommend to collate your production data is the IG Tools, a suite of free-to-use carbon calculators designed by Julie's Bicycle specifically for festivals, venues, offices, tours and productions to measure greenhouse gas emissions on an annual, quarterly, monthly or per-activity basis. The tools are a good way to collate different types of data, and track emissions on a production-by-production basis.

The IG Tools can be used during the planning stages of your production to compare the impacts resulting from different decisions, for example, when deciding on types of material and their disposal, method of transport, etc. They can also be used after the production is finished to assess the final carbon footprint of your production.

The IG Tools monitor a production's biggest impacts, which tend to be energy, timber and steel use, waste and transport. At present the IG Tools do not calculate the emissions of more specific materials and activities such as scenic art, costume and props. You can see a full breakdown of what the IG Tools enable you to monitor in the Data Collection appendix. For calculating more detailed production impacts, please contact [info@juliesbicycle.com](mailto:info@juliesbicycle.com).

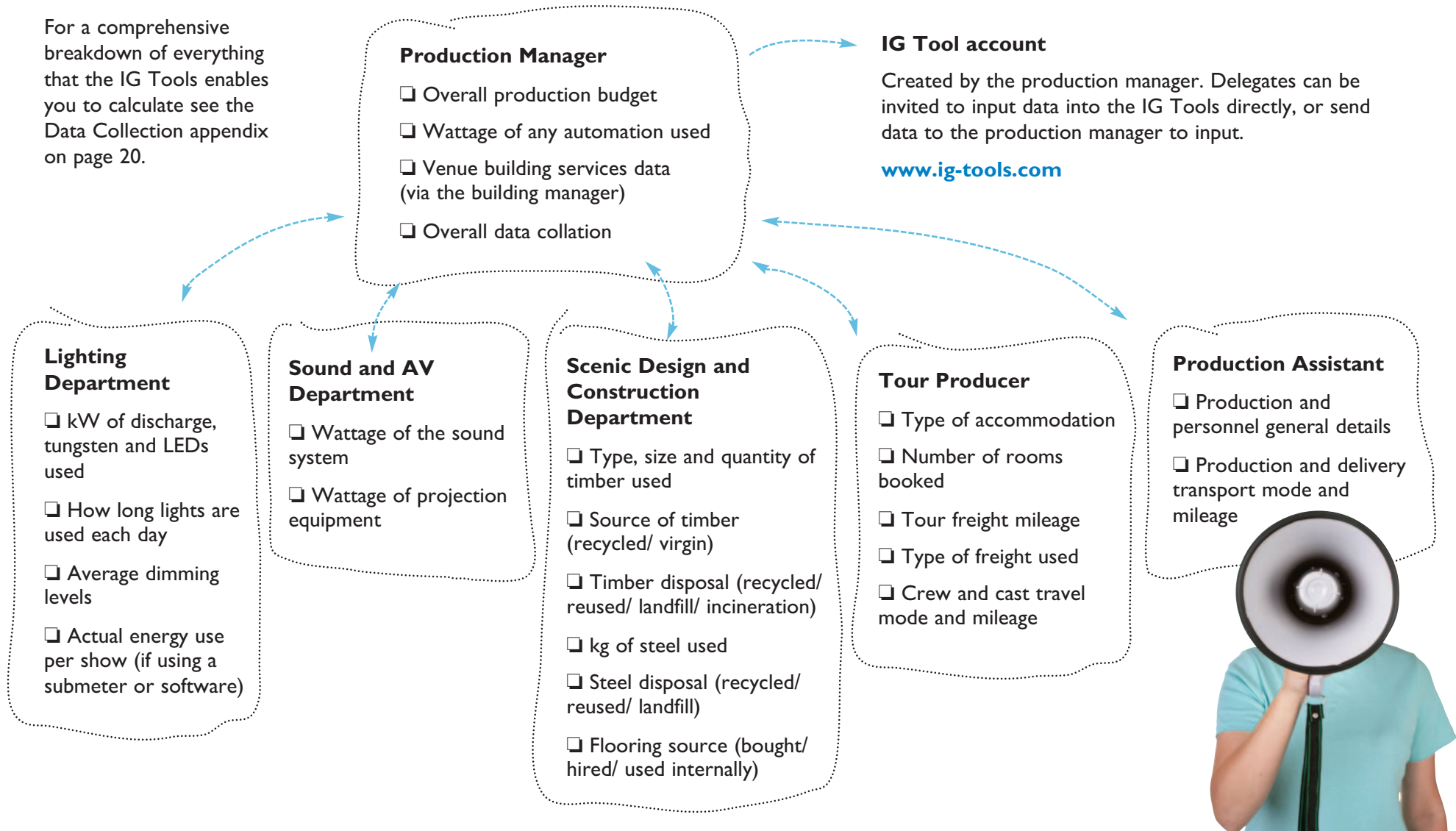
For more information, a user guide and 'how to' videos visit: [www.juliesbicycle.com/industry-green/ig-tools](http://www.juliesbicycle.com/industry-green/ig-tools)



## Monitoring Responsibilities

You may wish to delegate data collection responsibilities to members of your production team. See below for what each department needs to collect in order for you to calculate a robust environmental footprint for the production.

For a comprehensive breakdown of everything that the IG Tools enables you to calculate see the Data Collection appendix on page 20.





## Spotlight

### Productions on Tour

Taking a production on the road presents both opportunities and costs in terms of environmental sustainability. On the one hand, the more people who get to see a show, the lower its relative impacts become. In addition, by travelling to an audience, a production reduces the impacts from audience travel. On the other hand, the impacts of transporting set and equipment can be carbon intensive. The key to sustainable touring is in the planning.

- ❑ Contact receiving venues and festivals early on in the planning process to see what equipment and props you might be able to source locally and what stock items might be available on site.
- ❑ Work with your designer to minimise the size and weight of the set to reduce transport emissions.
- ❑ Try to avoid airfreight where possible. Using sea freight rather than air freight can reduce transport emissions by at least 25 times. See 'Up in the Air or Out to Sea' by Tristan Smith: [www.juliesbicycle.com/resources/fact-sheets/air-and-sea-freight](http://www.juliesbicycle.com/resources/fact-sheets/air-and-sea-freight)
- ❑ Use train, coach or other public transport options for cast and crew travel where possible.
- ❑ Use a green rider when planning your tour to communicate your environmental commitments to receiving venues and festivals. You can download a template from: [www.juliesbicycle.com/resources/jb-green-riders](http://www.juliesbicycle.com/resources/jb-green-riders)
- ❑ Try to choose travel operators and hotels that act responsibly and have robust environmental policies. Rented apartments have a much lower environmental impact than hotels, so use residential accommodation where possible and appropriate.

#### Resource

#### Green Mobility Guide

For more comprehensive information and support on greening your tour see the Julie's Bicycle Green Mobility Guide: [www.juliesbicycle.com/resources/green-guides/green-mobility-guide](http://www.juliesbicycle.com/resources/green-guides/green-mobility-guide)

#### Case study

#### As the World Tipped: Moving by Sea

In their 2011 production 'As The World Tipped' Wired Aerial Theatre was commissioned to explore the theme of climate change and toured UK outdoor arts festivals in the summer and autumn of 2011, followed by a tour to Sydney in January 2012.

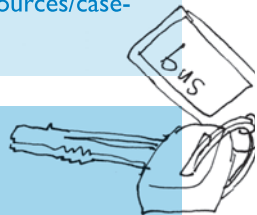
Wired Aerial deliberately sent the production materials to Australia by sea freight rather than air and reduced the size of their crew compared to their summer 2011 tour. They identified that the total impact of the travel, accommodation, freight and show power would be 54.4 tonnes of CO<sub>2</sub>e. If they had followed a 'business as usual' approach and sent the materials by air and not reduced the size of their crew, their emissions would have been 200.9 tonnes of CO<sub>2</sub>e – an increase of 370% from what they eventually achieved.

Read more in their case study: [www.juliesbicycle.com/resources/case-studies/production](http://www.juliesbicycle.com/resources/case-studies/production)

#### Fact

#### Bus Benefits

On average, coaches produce 70% less emissions per passenger when compared to car travel.



## Spotlight

### Energy

Energy is almost always a production's largest controllable environmental impact, both in venues and outdoors.

Venue-based productions can learn more about the broader energy impacts of their show by talking to the building manager and suggesting simple initiatives that can save energy and cost.

The largest energy impact in auditoriums is usually the heating, ventilation and air conditioning (HVAC), and the building manager may be able to adjust the Building Management System's HVAC parameters, allowing for more flexibility in temperature controls and using natural ventilation.

It's also worth discussing whether the pre-set HVAC timings make sense for how the space is used for your production. If the space is only used Monday – Saturday, for example, then there's no need for the HVAC system to work on a Sunday. Likewise, if the space is to be empty during the day, have the timers kick in an hour before the first people are likely to arrive.

Automation in larger commercial productions is another major contributor to huge spikes in energy use. Some theatres have had to go as far as installing energy substations to meet the power demand from long-term resident productions using ambitious stage electrics. Others have moved to more expensive energy contracts to cope. Increasingly, renewable power and community energy generation – alongside efficiency measures and better understanding – are providing potential solutions to issues such as these, and thus it's important that venue managers and producers are aware of the alternatives.

For indoor and outdoor events, there are increasingly efficient and environmentally sustainable power options for theatre that go beyond diesel generators. As renewable power technologies provide increasingly cost-effective and aesthetically pleasing alternatives to mains power and diesel generators, productions have become more open to experimenting.

Some organisations have also turned to alternative power generation methods for aesthetic, rather than environmental, reasons and have found these technologies a useful springboard into greening other aspects of their productions. Solar and hydrogen fuel cell power providers, for example, now offer generators that run silently, suiting intimate and/or acoustic performances more so than noisier diesel generators. Cycle power is also becoming a regular favourite at festivals, gigs, cinema screenings and other events for its ability to engage audiences to actively participate in making an event happen.

#### Resource

##### The Power Behind Festivals

This guide to sustainable temporary power provision gives recommendations for how events can save at least 10% on their fuel bills. Much of the information is directly relevant for outdoor or site specific theatre productions too.

[www.juliesbicycle.com/resources/practical-guides/powerful-thinking](http://www.juliesbicycle.com/resources/practical-guides/powerful-thinking)

Top tips include:

- If using diesel generators make sure you are using them as efficiently as possible. Learn about how to calculate energy demand efficiently, and how to plan your site so that generators run at maximum efficiency.
- Explore alternatives to diesel generators. Solutions like waste vegetable oil (WVO) biofuel, portable solar and wind power, and cycle power are proving to be fit for purpose and cost-effective for both outdoor and indoor events.
- Use suppliers as local to your event as possible to reduce transport emissions. Use the Julie's Bicycle Green Suppliers Database: [www.juliesbicycle.com/resources/JB-Green-Database/suppliers](http://www.juliesbicycle.com/resources/JB-Green-Database/suppliers)

Case study

### **'After Miss Julie' – a Temperate Climate**

For the Young Vic's production of 'After Miss Julie' (March–April 2012) in the Maria Studio, the theatre manager relaxed the building management system temperature control to between 18–24 degrees and made use of natural ventilation. By doing this they saved 34% on their energy consumption during the run. Despite pre-warning the audience that they may require extra layers, there were no complaints and the space maintained a fairly constant temperature. The Young Vic has now made these settings standard practice for the Maria Studio.

[www.juliesbicycle.com/resources/case-studies/production/after-miss-julie](http://www.juliesbicycle.com/resources/case-studies/production/after-miss-julie)

Case study

### **Cycle Power: Aesthetics Meets Sustainability**



When planning their first show '454 Grams,' theatre company Milk Presents were looking for a way to make their performers appear physically worn out. The solution that presented itself was bike power, where cast members would take turns pedalling throughout the performance. Instead of have all that physical energy go to waste, they combined their aesthetic decision with a practical one and used the bicycle to power an LED rig used to light the show.

With their DIY bicycle generator, made from a skateboard wheel, a piece of wood and some cabling, they powered '454 Grams' at Camden Fringe and Buxton Fringe festivals (2010) and a full run of 'Bluebeard: A Fairytale for Adults' at the Edinburgh Fringe (2011), for which they upgraded their bicycle to a tandem.

For their 2012 show, 'A Real Man's Guide to Sainthood,' Milk Presents worked with cycle power aficionado Adam Pride from the Veteran Cycle Club to build three more sophisticated bicycle generators, which powered three overhead projectors used during the show. To keep their energy use down they chose to use acoustic live music instead of recorded sound.

## Appendix: Data Collection Form

To capture as wide a carbon footprint as possible for your production, use the Julie’s Bicycle IG Tools:  
[www.juliesbicycle.com/resources/ig-tools](http://www.juliesbicycle.com/resources/ig-tools)

The table below identifies what data is required by the online IG Tools to automatically calculate your production’s carbon emissions, and how you can combine different IG Tools to assess as broad a range of impacts associated with a single production as possible.

Please note this table does not need to be manually completed, but rather treated as a checklist for the data you will need to input into the IG Tools. The IG Tools will generate a carbon footprint for as much information as you have. The table below sets out the broadest possible scope, but you do not need every item on it to get a carbon emissions result from the IG Tools.

### Impact

	IG Tool for Venues	IG Tool for Touring	IG Tool for Production
<b>PRODUCTION</b>			
<b>Personnel</b>			
Number of stage management and crew members			•
Production labour costs			•
<b>Transport</b>			
Production transport costs			•
Trucking freight: vehicle type / distance travelled		•	
Air freight: vehicle type / distance travelled / weight transported		•	
Sea freight: vehicle type / distance travelled / weight transported		•	
Rail freight: vehicle type / distance travelled / weight transported		•	

	IG Tool for Venues	IG Tool for Touring	IG Tool for Production
<b>Staging materials</b>			
Purchase and rental of equipment and materials			•
Stage size			•
Set production materials: timber and steel (source, size and quantity)			•
Set disposal			•
Flooring used (bought/hired/recycled)			•
<b>Lighting</b>			
Rehearsal rig (duration of use per day, dimming level)			•
Show rig (duration of use per day, dimming level)			•
Maintenance rig (duration of use per day, dimming level)			•
Average age of the lighting rig			•
Sub-metered energy use of rig (if you have sub-metering in place)			•
<b>Sound</b>			
Wattage of the sound system			•
Wattage of projection equipment			•
Wattage of automation			•
<b>TOURING</b>			
Number of indoor performances		•	
Number of outdoor performances		•	
Tickets sold		•	
Tour locations		•	
<b>Accommodation</b>			
Number of rooms booked		•	
Number of nights spent in hotels		•	
Number of nights spent in domestic accommodation		•	

IG Tool for  
Venues

IG Tool for  
Touring

IG Tool for  
Production

## **BUILDING SERVICES**

Venue floor area

•

Venue age

•

Capacity

•

Number of stages/performance spaces

•

Total number of performances

•

Total number of tickets/visitors plus guests

•

## **Energy**

Mains electricity use (kWh)

•

Mains gas use (kWh)

•

Diesel use (if using portable generators – litres)

•

Biodiesel use (if using portable generators – litres)

•

Onsite renewable energy (kWh)

•

Oil (litres)

•

Do you use a green energy tariff?

•

## **Water**

Water use (m<sup>3</sup>)

•

Sewerage (m<sup>3</sup>)

•

## **Waste**

Waste to landfill (tonnes/weekly bin bags)

•

Does your waste go to an energy from waste plant (incinerator)?

•

Waste to recycling (tonnes/weekly bin bags)

•

Waste to composting (tonnes)

•

IG Tool for  
Venues

IG Tool for  
Touring

IG Tool for  
Production

### Audience travel

OPTION 1: Use default data (no data collection needed)

•

OPTION 2:

•

% Audience travelling by dedicated coach / average distance

•

% Audience travelling by car or motorbike / average distance

•

% Audience travelling by public transport bus / average distance

•

% Audience travelling by train / average distance

•

% Audience travelling by tube / average distance

•

% Audience travelling by domestic flights / average distance

•

% Audience travelling by short haul flights / average distance

•

% Audience travelling by long haul flights / average distance

•

% Audience travelling by ferry / average distance

•

### Staff travel

Distance travelled by car

•

Distance travelled by taxi or private car hire

•

Distance travelled by train (national)

•

Distance travelled by train (international)

•

Distance travelled by domestic flights

•

Distance travelled by short haul flights

•

Distance travelled by long haul flights

•

## 2 Lighting

Because of its potential for huge energy consumption reductions, stage lighting is an area that requires considerable attention from an environmental sustainability perspective. It is responsible on average for 9% of a theatre venue's overall energy use<sup>2</sup>, though for some venues it is much higher. For outdoor arts and unconventional site-specific performances, lighting alone can be responsible for 19% of electricity consumption<sup>3</sup>.

Stage lighting therefore offers substantial potential to reduce both energy usage and carbon emissions, in particular for production companies that are not permanently venue-based and have more control over their lighting choices than the energy efficiency of the buildings they perform at.

### PRE-PRODUCTION

#### Action

\* Investigate the environmental impacts of different lighting choices. Explore what emerging technologies are currently being used in your area of production by talking to peers and suppliers.

*See the White Light and BBC green lighting guides on page 25 for more information.*

\*\* Find out what lighting stock the theatre you're working in has in-house and use this in your design over hiring equipment. This saves transport emissions, and also the embodied impacts of creating new fixtures when the efficient use of existing lights may be sufficient for your purposes.

\* If you need to hire, find a local supplier and combine deliveries to reduce transport emissions. Ask your supplier about what low energy products they offer, and whether they have an environmental policy for their business.

\* Set environmental sustainability commitments and targets for the show's lighting. Sit down with the production manager to go through the production's environmental policy and set measurable objectives for reducing the impacts from lighting.

\*\*\* Set a power limit for your lighting rig before it's designed, to encourage a more energy efficient design.

*Learn more from Sydney Theatre Company's experience on page 26.*

\* Use energy efficient bulbs, for example tungsten moving lights rather than discharge.

#### Key

##### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

##### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

##### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

<sup>2</sup> Green Theatre Guide, Mayor of London (2008), p4.

Available at: [www.juliesbicycle.com/resources/green-guides/greentheatreguide](http://www.juliesbicycle.com/resources/green-guides/greentheatreguide)

<sup>3</sup> ISAN Environmental Sustainability Toolkit (2012), p50. Available at:

[www.juliesbicycle.com/resources/green-guides/isan-environmental-sustainability-toolkit](http://www.juliesbicycle.com/resources/green-guides/isan-environmental-sustainability-toolkit)



✱✱ Design the rig to use the least amount of light fixtures possible to achieve the desired effect.

✱✱ Begin to explore the creative potential of LEDs. Design a mixed rig of LED and tungsten lamps, or a 100% LED rig depending on the effects you're trying to achieve.

✱✱✱ Invest in fit-for-purpose LED fixtures for your house stock (if venue-based). Install easy controls for turning the power off, as the standby power of LED fixtures can be considerable.

✱ Dim lights as much as possible within reason to significantly reduce energy demand. Use contrast instead of just brightness.

✱ Communicate to all technicians and suppliers that you want lighting power demand to be minimised and equipment used efficiently in set-up and rehearsals. Designate a crew member who is always responsible for turning things off.

✱ Establish a switch off routine to ensure lights and equipment are switched off when not in use (including using working lights for rehearsals), and communicate this to all technicians.

✱✱ Monitor the energy use from lighting during set-up. Keep a track of peaks and troughs and analyse the causes. Identify which activity is using the most energy and discuss ideas of minimising it with your team. There are several monitoring options: work with the venue's technician/building manager to sub-meter the rig, or use cue-by-cue power calculation software such as FocusTrack.

*See the FocusTrack case study on page 28.*

✱ Make sure all equipment is properly serviced and set up, and regularly clean the lenses of your lights and polish reflectors. Kit works most efficiently when working properly.

Keep your equipment well maintained, and request that kit is cleaned when you work outside your venue/if you are freelance.

✱ Contribute feedback on environmental initiatives at production meetings, and raise questions that need to be resolved.

✱ Use alternatives to PVC tape. It releases toxic chemicals into the environment during production, and it's unrecyclable. Theatres in the UK and Europe are already using Velcro, bungee cords, fabric ties and other alternatives.

✱ Conduct rehearsals under working lights. Use low energy working lights, such as LEDs where possible.

## RESOURCE

### Bright Ideas on Lighting

Making sustainable decisions in lighting often comes down to choosing the right light for the job. The White Light Green Guide sets out the question clearly:

*“Do I need that big, bright, high-wattage special when I know that the light is going to be on at a low level in a dark scene? Many fixtures will take a range of alternative bulbs, the popular Source Four being available in anything from 300W up to 750W and with longer-life, lower-output variants also available and perfect for use in work lights as well as the architectural lighting projects for which they were intended.”*

Both White Light and BBC offer more in-depth lighting guides for both stage, and film and television production.

White Light Green Guide:  
[www.whitelight.ltd.uk/greenguide](http://www.whitelight.ltd.uk/greenguide)

BBC Low Energy Lighting Guide:  
[www.downloads.bbc.co.uk/outreach/BB\\_C\\_LEL\\_Guidelines.pdf](http://www.downloads.bbc.co.uk/outreach/BB_C_LEL_Guidelines.pdf)

## PRODUCTION

### Action

- \* Switch lights and equipment off when not being used. After the rig check, douse stage lighting until the half.

Lighting manufacturers VariLite and Martin have both confirmed that not only is it more energy efficient to switch stage lights off when they are not in use, but it is also better for a bulb's lifetime!

- \* Use rechargeable batteries for any portable equipment.
- \* Monitor lighting energy use, and any other environmental performance indicators as set out in the production environmental policy.
- \*\* Consider dousing discharge fixtures during the show – look at the first and last cues that they are used in.

## POST-PRODUCTION

### Action

- \* Recycle any blown bulbs or other electronic equipment. Most lighting suppliers will collect and recycle bulbs.
- \* Recycle batteries after use. Use a collection scheme like Battery Back.
- \* File gels after the show for reuse on future productions.
- \*\* Look for local schools or groups who may be able to reuse materials such as gels, practicals and even the back of your large format lighting plans.
- \* Ensure any hired equipment is properly packaged in order to reduce the risk of damage on the way back to the supplier. Ideally reuse the packaging that was supplied and don't use too much tape on cables.
- \* Evaluate your environmental performance against your original objectives. Document good practice for inclusion in an environmental production policy for future shows. Provide feedback to the production manager on what you think went well and what needs new solutions.
- \* Share any learning and good low energy products that you've found with peers.

### Case study

#### Setting a limit

Lighting designers working with the Sydney Theatre Company at the Wharf Theatre are required to limit the overall energy capacity of their designs. The limits were set after a period of monitoring energy use for stage lighting, and currently stand at 190,000 watts in Wharf 1 (339 seats) and 120,000 watts in Wharf 2 (205 seats).

For more information on the STC's Greening the Wharf programme visit [www.greeningthewharf.com](http://www.greeningthewharf.com)



## Spotlight

### The Future of Lighting

The dominant trend in lighting design, in very broad terms, in the last few decades has been one of “more is better.” With ever-increasing demands from audiences expecting spectacle and surprise as well as a growing pool of technological tools by which to realise ambitious creative visions, designers and directors have stepped up to the challenge. In doing so, they’ve set the precedent for tech-heavy rigs, not always asking whether there might be another way to create the same effect – or one as visually fitting and spectacular – with less equipment and energy expenditure.

Realising the unsustainable nature of this trend, both in financial as well as environmental terms, lighting designers such as award-winning Paule Constable are responding to the challenge. Constable and others have been interrogating their practice and the technology available to creatively challenge themselves to design visual effects with less choice, rather than more. Instead of focusing solely on aesthetics, their objective is to design a luminaire that will be the most appropriate for the desired output, in terms of energy efficiency and aesthetics.

Theatres such as the Arcola have also been engaging designers to explore the creative possibilities of low energy LEDs, sometimes even setting a wattage limit, to see what designers are able to achieve. Other theatre organisations are also turning to low energy alternative fixtures, in particular for outdoor work. While this approach won’t work for every production, it is essential for all designers to find the balance between creative freedom and ethical responsibility without sacrificing quality.

Designers and technicians have been wary of investing in new, low energy lighting stock, due to concerns about the colour temperature of low energy alternatives to tungsten, such as LEDs. However, the LED market is developing fast, and fixtures have improved a great deal during the last few years. There is increasing willingness among lighting designers to experiment with mixing low energy Compact Fluorescent Lights (CFLs) and LEDs into their rig design.

LEDs can last up to 20 times longer than incandescent lighting, and use up to 85% less energy. The high cost of LEDs made investment prohibitive for some, despite the fact that they offer payback on energy bills in the long term if purchased as part of a theatre’s in-house stock, but as the energy efficiency market grows and becomes more competitive, prices are dropping at a rate of about 20% per year. This makes a gradual transition to a mixed LED rig increasingly plausible for theatres looking to update their in-house stock within the next few years, and hire companies are already making new lighting products available at affordable rates to those who aren’t looking to purchase.

While it seems like it would require a trade-off in either appearance or sustainability, balancing the aesthetics and the environmental demands of a product is possible with smart lighting design and careful selection of what technology to use. Manufacturers such as Philips, PRG, ETC, GDS and GLP have been investing in innovative technologies with strong environmental credentials, and hire companies are making products increasingly available.

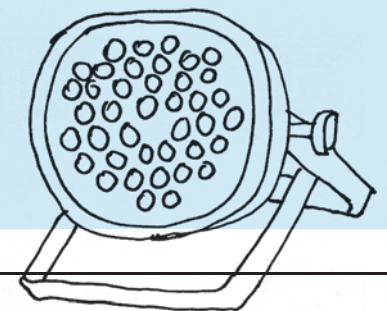
#### Case study

##### War Horse: The Big Switch Off

In early 2008, the National Theatre carried out an experiment called ‘The Big Switch Off’. Over twelve days and eighteen performances of the award-winning ‘War Horse,’ they switched off the moving lights between the end of the rig-check in late afternoon until 35 minutes before the show began. Every time, the lights came on cleanly and never failed during performance.

The company calculated that they would make an annual saving of around £1200, or 30% of typical lighting use, even before factoring in the costs of lamp replacement and reduced air conditioning demands. They have been implementing this practice ever since, with no equipment failure to date.

Source: White Light Green Guide



Government legislation isn't to be forgotten either. Legislation to encourage energy efficient products is already leading to the phase-out of incandescent bulbs in the retail market, which is having a knock-on effect on the production of lamps used in theatre lighting. Technicians are already finding certain tungsten lamps are no longer available. Sustainability doesn't have to come at the expense of creativity, and it's important that designers and technicians are aware of these issues so that they can work with manufacturers and lobby legislators to ensure that policy and developments in new technology reflect their creative needs.

It's important to remember that environmental sustainability doesn't rely solely on a transition to low energy products. There is little research into the environmental impacts embodied in the manufacturing of entertainment lighting fixtures, and therefore the efficient use and care of existing equipment is still a priority.

A balance must be struck between the development of new technology that is energy-efficient and fit for purpose, and the resourceful use of what we already own. Recognising this, some lighting suppliers have begun to develop ways of upgrading or retro-fitting existing fixtures to house low energy bulbs, as a means of creating less waste and using existing materials as efficiently as possible. It is this kind of mindful approach that will make the transition to a more sustainable entertainment lighting sector both affordable and creatively feasible.

### *Case study*

#### **FocusTrack**

FocusTrack gathers information about a show's lighting including details of each fixture in the rig and its power consumption, the level of each light in each cue collected from the lighting console, and a record of when each cue in the show was triggered. The software also has a PowerTrack function that calculates the power used by the show, producing both an overall and cue-by-cue figures and creates a graph which details how power consumption varies throughout a performance.

FocusTrack was used to document the show lighting of 'The Children's Hour' (2011) at the Comedy Theatre, lit by Neil Austin. The primary purpose of this was to give a record of the focus of all of the conventional and moving lights in the show and to help the theatre crew maintain the lighting during its run. However, the information gathered by FocusTrack's PowerTrack function also calculated that the power used by the show was 75.5kWh for one performance. PowerTrack's results will not give a 100% accurate result since it cannot take into account 'real world' factors that may impact power consumption, such as blown lamps or power loss in cables. However, during 'The Children's Hour' Ambassador Theatre Group also sub-metered the theatre's rear-of-house power consumption, providing an accurate data comparison. The shapes of the resulting graphs are very similar, proving the reliability of PowerTrack. The benefit of PowerTrack's results is that they provide data on performance lighting without the 'distraction' of other rear-of-house power usage. PowerTrack can also provide results even when it is difficult or impossible to meter the dimmers directly.

# 3 Sound and AV

The environmental impacts of sound and audiovisual systems include the energy required to power and transport them as well as the embodied impacts of the materials and processes used to make the equipment. Advances in technology have meant that PAs and other AV equipment such as projectors have increased in output while diminishing in size, weight and energy requirements, thereby reducing energy consumption and transport requirements. However, good planning can still make all the difference to your environmental footprint.

## PRE-PRODUCTION

### Action

\* Set sustainability commitments and targets for the show's sound and AV. Sit down with the production manager to go through the production's environmental policy and set measurable objectives for reducing the impacts from sound and AV.

\* Communicate to all technicians that you want show power demand to be minimised and equipment used efficiently in set-up and rehearsals.

\*\*\* Set a wattage limit for sound and AV equipment to encourage low energy designs and decisions.

\* Find out what equipment the venue has in-house and prioritise this over hiring equipment.

\*\* If you need to hire, find a local supplier and combine deliveries to reduce transport emissions.

Ask your supplier about what low energy products they offer, and whether they have an environmental policy for their business.

\*\*\* Switch from analogue to digital sound desks. Use low-wattage and energy efficient products e.g. Harman Crown XLS, Dobson Sounds pulse-width modulation systems.

\* Design intelligently for the space, making use of natural acoustics and using the most energy efficient equipment available to achieve the desired effect.

### Key

#### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

#### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

#### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

### Case study

#### Funktion-One

The Funktion-One is a patented, highly efficient, horn loaded loudspeaker system that produces four times more output than comparable products. It is an example of an emerging demand for more efficient and sustainable kit.

[www.funktion-one.com](http://www.funktion-one.com)

\* Use rechargeable batteries for all portable equipment wherever possible. Label all new rechargeable batteries with their start date, so that you know when to replace them.

\* Create a routine for recharging batteries after each show giving a crew member the responsibility of overseeing it.

\* Switch off equipment whenever it isn't being used.

\* Provide and ask for feedback on environmental initiatives at production meetings, and raise questions that need to be resolved.

## PRODUCTION

### Action

\* Switch all equipment off when it's not being used.

\* Make sure you know the correct charging cycle for your rechargeable batteries for radio mics and other portable equipment, and don't over-charge. Consider this when establishing your recharging routine.

\* Monitor the energy use from sound and AV by noting the wattage of the sound system in use and on standby. Communicate this to the production manager for inclusion in the production's carbon footprint.

## POST-PRODUCTION

### Action

\* Evaluate your environmental performance against your original objectives. Document good practice for inclusion in an environmental production policy for future shows. Feedback to the production manager on what you think went well, and what needs new solutions.

\* Share any learning and good low energy products that you've found with peers.

### RESOURCE

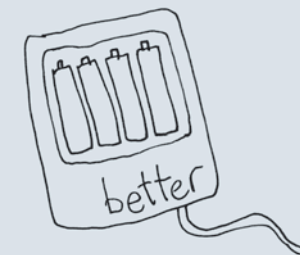
#### Better Batteries

A 2007 Uniross study found that throughout their lifecycle, rechargeable batteries have 32 times less impact on the environment than disposable batteries. Rechargeable battery systems also often have short payback periods and will save you money in the long run.

Whether you're using rechargeable or disposable batteries, ensure they're recycled after use. Batteries contain many harmful and hazardous substances (including mercury, lead, and cadmium) that can be a danger to the environment and human health if disposed in landfill or through incineration.

Use a scheme like Battery Back to set up your own collection point backstage, or take them to a local collection point: [www.batteryback.org](http://www.batteryback.org)

For more information, see the Julie's Bicycle Better Batteries practical guide: [www.juliesbicycle.com/resources/practical-guides/better-batteries](http://www.juliesbicycle.com/resources/practical-guides/better-batteries)



## Spotlight

### Musical Instruments

#### Wooden instruments

Many musical instruments are made from woods that are sourced from the world's tropical forests, therefore ensuring that they are made from well-managed forests is crucial. Increasingly, more and more manufacturers are turning to tonewoods certified by FSC and sustainably sourced bamboo for their instruments. For example, Taylor, Martin, Fender and Yamaha are all working with Greenpeace as part of the Music Wood Coalition to stimulate the supply of FSC certified Sitka spruce, the species most commonly used for soundboards for their guitars.

#### Electronic instruments and equipment

With electrical items such as keyboards, synthesizers, guitar amps and pedals so integral to many performances, considerations are how much energy the gear uses in operation and whether the manufacturer has environmental credentials, like the ISO14001 certification.

You can access further case studies involving some of the above organisations at:

[www.juliesbicycle.com/resources/case-studies/production](http://www.juliesbicycle.com/resources/case-studies/production)

#### Case study

##### WICKED Rechargeables

'WICKED' on Broadway has been saving roughly £2,600 per year by using rechargeable batteries in all on stage portable sound equipment since 2008. The London production began using a rechargeable battery system supplied by Autograph in June 2011 after trialling the technology for several weeks.

Running twice a day with a matinee and an evening performance, 'WICKED' London uses 32 battery cells per performance. The production maintains two full sets of batteries (64 cells in total) that are used alternately to allow time to fully recharge.

Each set of battery cells is colour coded with a sticker - one red set and one yellow set - and each cell is marked with the date it went into operation to keep track of roughly how many charge cycles it has undergone. Most manufactures will recommend that cells be renewed after a particular number of charge cycles and/or length of time.

In just two months, 'WICKED' London saved over 2,560 batteries by using rechargeables—a financial savings of £500. Economically speaking, the rechargeable system paid for itself after 15 weeks of use.

For more information see:

[www.juliesbicycle.com/resources/practical-guides/better-batteries](http://www.juliesbicycle.com/resources/practical-guides/better-batteries)



## 4 Set Design, Scenic Art and Construction

The key environmental impacts associated with stage sets come from the materials used and how they are sourced and manufactured, the construction process, and how the materials are disposed of after the production.

As much as 80% of a product's environmental impacts are locked in by decisions made during design<sup>4</sup>, so it's important to consider sustainability from the very beginning of your design process. By choosing more sustainable materials, construction and disposal methods, you can have a huge influence on a production's environmental performance.

When sustainability is factored into your supplier relationships as well as your own approach to design and construction, this task becomes a lot easier. For example if you outsource construction, working to engage the workshop with your sustainable aims and/or choosing a workshop that already has an environmental policy will be key. Likewise, working with suppliers that stock sustainably sourced wood, and/or providers of recycled metal products, can save you carbon and, in some cases, cost as well.

Set design and construction involves many different expertise and materials, but it's worth recognising priorities for action. The biggest impacts of set materials come from the materials most commonly used in terms of volume: timber and metal (steel and aluminium). Choosing where to source these materials and how to dispose of them after use can make a massive difference to the carbon footprint of your production.

### PRE-PRODUCTION

#### Action

✳ Set sustainability commitments and targets for the show's set design, scenic art and construction. Sit down with the producer and director to go through the production's environmental policy and set measurable sustainability objectives for reducing the impacts from set construction.

Design to maximise opportunities to reduce, reuse, repurpose and recycle.

✳✳ If working with an external construction workshop or contractors, share the production's environmental objectives and ask whether they have an environmental policy.

✳✳✳ Choose only to work with suppliers and contractors who have robust environmental credentials and an up to date environmental policy.

#### Key

##### ✳ Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

##### ✳✳ Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

##### ✳✳✳ Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

<sup>4</sup> EU Directive 2009/125/EC on Ecodesign (2009). Available at: [http://ec.europa.eu/energy/efficiency/ecodesign/eco\\_design\\_en.htm](http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm)



\* Combine hires and product deliveries to minimise transport emissions.

\*\* Build in a degree of flexibility into your design brief where possible to enable easier local sourcing, reuse and repurposing for set, props and costume.

\*\* Hire a stage manager earlier in the production process (or ask your production manager to do so) who can assist with sourcing second hand and/or ethical materials, props and costumes.

\*\* If you're a venue with a materials store, provide clear information to designers on what materials are available on site for them to reuse and repurpose.

\* If you're a freelance designer, ask your host venue what they have stored in-house that you might be able to use, and for information on locally based suppliers.

\*\* Stay on top of what environmental alternatives are available to materials you commonly work with, and what innovations from other relevant sectors – technology and architecture for example – you might be able to use and apply in your practice.

\* Choose timber over metal where possible, unless using recycled metals.

Timber has a lower environmental impact in its manufacturing than metals do. Wood is considered biologically carbon neutral, but different types of wood have varying environmental impacts relating to where they're sourced and how they're transported. Always use FSC certified timber with a proven chain of custody: [www.fsc.org](http://www.fsc.org).

*For more information on sustainable timber see page 35.*

\*\* Avoid unrecyclable or hard-to-recycle materials like plastics, polystyrene and PVC.

\* Avoid lauan or tropical hardwood/plywood and explore alternatives. If you must use it, ensure that your supply can provide you with a chain of custody that proved the timber is sourced from sustainably managed forests.

A chain of custody is proof from your supplier that they know exactly where the products they are supplying to you have come from, including the environmental credentials of the process.

*See our breakdown of alternatives on page 35.*

\*\* Avoid timber products such as MDF which are treated with a high content of toxic chemicals, such as phenaldehyde, which are harmful to human health as well as the environment.

\*\* Use reused metals, or metals made of at least 75% recycled content.

✱✱ Use unfinished metals to avoid chemical treatments and additional manufacturing impacts.

✱✱ Use non-toxic and water based paints with low levels of volatile organic compounds (VOCs).

✱✱✱ Use a painting wash up unit that separates out the wastewater into paint waste and reusable washing water. Examples are the Bristol UK Ltd Aqua-Service Portable Wash-up & Recycling Water Unit and the Dulux EnviroWash System.

✱ Use an eco-friendly alternative to traditional solvent based cleaning products such as Acetone, Xylene and MEK. Bio-Solv is one such product currently being used by scenic workshops in the UK.

✱ Try to use natural, low-toxicity alternatives to treatments. For example, use natural varnishes and lacquers, raw oils like linseed, wax made from natural sources (petroleum free), and PVA adhesives.

✱✱ Use organic and environmentally certified stage textiles.

*'see chapter 5, wardrobe and stage fabrics, for more details.*

✱ Keep track of the materials you use (particularly timber and steel), and quantity, so that the Production Manager can measure the environmental impacts of your set.

Check out the IG Tool for Production that can be used to measure the carbon emissions from timber and steel use: [www.ig-tools.com](http://www.ig-tools.com)

✱ Construct set so that different constituent parts can be easily dismantled after use to make recycling and repurposing more straightforward.

Use glue and nails sparingly.

## POST-PRODUCTION

### Action

✱✱ Reuse and recycle set, staging, props, costumes and special effects equipment within your own productions (if you have access to storage) and/or via environmental production waste services.

Ask your skip company what their waste policy is, and whether they can provide a 100% recycled service.

Alternatively, use local recycling centres, online “Freecycle” networks, and waste disposal companies that commit to

### RESOURCE

#### Mo'olelo Green Theatre Choices Toolkit

Mo'olelo Performing Arts Company have developed a toolkit that ranks materials commonly used in stage production in terms of their environmental sustainability. Including everything from timbers and treatments to ceramics and textiles, the scorecards included in the toolkit are useful resources for learning more about what options are available to inform environmental decision-making early on in the design process.

The toolkit was developed by Mo'olelo Performing Arts Company (Seema Sueko, Executive Artistic Director) through the the A-ha! Program: *Think it, Do it*, funded by MetLife and administered by Theatre Communications Group, the national organisation for the American theatre.

Mo'olelo Performing Arts Company is happy to share their 24-page Toolkit. To request an electronic copy, complete the form on their website:

[www.moolelo.net/green](http://www.moolelo.net/green)

recycling waste rather than sending it to landfill. Examples include: Scenery Salvage ([www.scenerysalvage.com](http://www.scenerysalvage.com)) and Set Exchange ([www.set-exchange.co.uk](http://www.set-exchange.co.uk)).

\* Evaluate your environmental performance against your original objectives. Document good practice for inclusion in an environmental production policy for future shows. Provide feedback to the Production Manager on what you think went well, and what needs new solutions.

\*\* Document good practice and good suppliers found during the process and other useful learning for inclusion in an environmental production policy for future shows.

\* Share any learning and good low energy products that you've found with peers.

#### RESOURCE

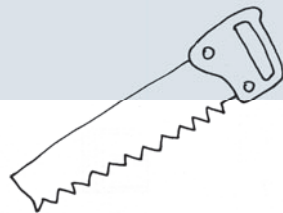
##### Alternatives to Tropical Hardwood Plyboard

The demand for plywood is driving illegal logging, rapid rainforest destruction and negative social impacts for local people in the areas where it is most heavily logged – Brazil and parts of Southeast Asia. Below are some of the alternatives:

##### FSC Certified Panel Products

FSC softwood plywood, along with FSC OSB and MDF, should be considered as an alternative to tropical lauan plywoods. See the Greenpeace Good Wood Guide for a comprehensive list of FSC options:

[www.greenpeace.org.uk/media/reports/good-wood-guide](http://www.greenpeace.org.uk/media/reports/good-wood-guide)



##### EcoSheet

EcoSheet panels are made from 100% post-consumer recycled plastics and have been engineered to perform as an alternative to imported plywood, or virgin plastic panels, by 2K Manufacturing. EcoSheet panels are 100% recyclable.

##### Strawboard (and other agricultural residue panels)

Strawboard is made of waste straw, or other agricultural residue materials, compressed with non-formaldehyde glues. It's 100% recyclable and biodegradable and is free of harmful substances.

##### Hardboard (Masonite®)

Hardboard is made from sawdust combined with resin under pressure, resulting in a stiff and durable panel with a smooth surface texture ideal for paint finishing. The Masonite® brand Hardboard is manufactured from 100% eucalyptus logs and is biodegradable.

#### Case study

##### The Hidden Impacts of Materials

In 2011 scenic designer Simon York did a piece of research into the embodied impacts of timber, steel and aluminium – the most common materials used in stage construction in terms of volume. He then worked with the Royal Court Theatre to measure the embodied emissions of the timber and steel used in their productions over one year. The results ranged between 19 tonnes of CO<sub>2</sub>e and 64 tonnes of CO<sub>2</sub>e per production, with the top end of the spectrum representing the use of timber from non-sustainable sources and set being sent to landfill after use. The lower end represented the use of sustainably sourced timber (such as FSC certified timber) and set materials being recycled and/or repurposed after the production. These findings show that the choices we make in what materials to use and how we dispose of them can have a huge impact on the carbon emissions of stage sets.

As a result of this study, the Royal Court have now banned the use of all tropical hardwood ply in their productions, as this timber is largely sourced from regions of the Amazon which are at risk of irreversible deforestation. This type of timber also has higher transport emissions associated with the long distance it has to travel to reach the UK.

### Case study

#### **‘Peter and the Starcatcher’**

‘Donyale Werle, designer of Broadway show, ‘Peter and the Starcatcher,’ is committed to sustainability in her design practice. She is a member of the Broadway Green Alliance which seeks to raise awareness and engagement in environmental action among the theatre sector across the USA.

For ‘Peter and the Starcatcher,’ she worked with environmentally conscious workshop, Papier Mache Monkey, who were meticulous about making sure nothing was wasted – even down to the sawdust from the workshop, which was incorporated in the set design.

Donyale hired extra stagehands to assist with her mission of sourcing as much of the set materials second hand. A fortuitous relationship with Disney was established, giving them access to the Disney storeroom, where they sourced pallets, nets and other materials from the set of the ‘Little Mermaid.’ Donyale also sought out corks from local restaurants and did some skip diving, as well as other creative ideas for sourcing materials.

The production saved around £22,000 by sourcing materials second hand, after accounting for the costs of the extra people they hired. The show won a Tony Award for Best Design in 2012, a testament to the fact that sustainable design approaches can work on a commercial, as well as a small scale.

For the full case study see:

[www.juliesbicycle.com/resources/case-studies/production/peter-and-the-starcatcher](http://www.juliesbicycle.com/resources/case-studies/production/peter-and-the-starcatcher)

### Case study

#### **Embracing Sustainable Theatre Design**

Driven by a strong environmental ethos, designer Soutra Gilmour developed her own practice statement and personal manifesto for eco-design to create “the new and innovative from the old and the used.” Gilmour approaches each new production she works on with different and appropriate environmental solutions, depending on her ability to influence within the budget and creative perimeters negotiated with other creative collaborators. These can include re-appropriating vintage furniture and costuming from the company’s store, using reclaimed and recycled materials and purchasing organic fabric. New homes are always sought out for the set, props and costumes after the show is over. Furthermore, Soutra seeks to build up a network of ethical, local and sustainably minded suppliers as well as relationships with fashion and arts institutions to help towards her vision of eco-design.

In her studio, sustainability means recycling model boxes, using renewable electricity supplier Ecotricity, avoiding spray paints, recycling old scripts in the printer, reusing envelopes and packaging, installing low energy bulbs, and travelling by public transport to deliver models, visit set builders and attend rehearsals.

Read her statement:

[www.soutragilmour.com/pdf/Eco-design-board.pdf](http://www.soutragilmour.com/pdf/Eco-design-board.pdf)

### Case study

#### **Community RePaint**

Community RePaint schemes collect reusable, leftover paint and re-distribute it to individuals, families, communities and charities in need across the UK, in partnerships with a variety of organisations such as local councils and refuse centres. In 2012 the Community RePaint network collected 387,495 litres of paint donated by both householders and businesses that would otherwise have gone to waste, and redistributed over 218,000 of those litres at a fraction of the cost of new paint. The scheme is managed by environmental consultancy, Resource Futures.

[www.communityrepaint.org.uk](http://www.communityrepaint.org.uk)

## 5 Wardrobe and Stage Fabrics

In general, the textile industry has a long way to travel on its road to sustainability. When it comes to theatre and production, the impacts of stage fabrics and costume making are complex and it's increasingly difficult to separate the environmental issue from the wider social ones. Between issues around cotton growing and bleaching, embodied carbon and water from manufacturing, the ethical labour concerns of textile workers, and the huge amount of textile waste which ends up in landfill, it is hard to make an informed decision on sourcing costume and stage fabrics. The best guiding principle to navigate this fraught terrain is still the four R's; Reduce, Reuse, Repurpose, Recycle. If used in the correct order as listed, these serve as a valuable methodology to simplify your decision making process.

### PRE-PRODUCTION

#### Action

\* Identify your environmental goals and objectives with the production manager before the design and production process has begun. Communicate these to the wardrobe department team (if relevant) via the production's environmental policy or a statement of intent specifically for your department.

\* Prioritise alternatives to making costumes from scratch.

There is an incredible pre-existing stock of theatrical costumes available in storehouses, hire shops, charity shops and so on, which can be utilised both for reuse and repurposing. Design costumes to maximise the reuse of existing garments and/or off cuts and fabric you have stored in-house.

\* For buying new fabric, look for certified organic textiles that have a majority percentage of organic content.

\*\* Use environmentally conscious suppliers who not only stock eco-friendly fabric, but are also committed to improving the sustainability of their production and operational processes and the welfare of workers across their supply chain.

Ask to see their environmental policy if it's not on their website, and look out for certifications like GOTS, GRS and OEKO-TEX® Standard 1000.

*See more information on textile certifications and sustainable purchasing on page 40.*

\* Purchase fabrics that will be suitable for machine-washing to reduce reliance on dry cleaning.

#### Key

##### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

##### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

##### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

✖✖ Buy fabric manufactured and located as close to you as possible to reduce transport emissions.

✖ Look for eco alternatives to plastic and metal accessories. For example, coconut shell buttons.

✖ Switch all equipment off when not in use.

✖✖ Be economical with your threads and fabric offcuts – use and reuse these as much as possible within your construction process.

For example, could your fabric offcuts be made into cable ties for the production crew to use as alternatives to PVC tape during rigging?

## PRODUCTION

### Action

✖ Don't throw unneeded hangers into the general waste. If they're broken see if they can be repurposed. If they're undamaged and you no longer need them, donate them to someone in the team who does, or a local charity shop.

✖ Launder clothes at 30 degrees. Use a detergent with the AISE sustainable cleaning charter logo or EU Eco Label. Drip dry clothes and avoid using tumble dryers.

Per load, only 10% of total energy used goes to the washer motor; the rest goes into heating the water. By laundering at 30 degrees you can use 40% less energy than a 40 degree wash. Plus your clothes and fabrics will stay nicer for longer!

✖✖ For dry clean only clothes use alternatives like hand washing or steam cleaning.

Find a dry cleaner that uses lower impact methods such as wet cleaning and CO<sub>2</sub> solvents, or any other methods that avoid the chemical Perchloroethylene (PERC), which is hazardous to health and the environment.

✖ Switch all cleaning and alteration equipment off when not in use.

✖✖ Avoid using toxic dyes and fabric paints – use natural dyes such as tea/coffee to stain or break down costumes where possible.



## POST-PRODUCTION

### Action

- ✱✱ Employ your stage manager for an additional week to ensure that all costumes find new homes and are not sent to landfill. Contact local schools and theatres to see if they can use materials.
- ✱ Evaluate your environmental performance against your original objectives. Document good practice and good suppliers found during the process and other useful learning for inclusion in an environmental production policy for future shows. Feedback to the production manager on what you think went well, and what needs new solutions.
- ✱ Share any learning and good low energy products that you've found with peers.

### spotlight

#### Cotton: What's the Issue?

Many of the pesticides used on natural fibres such as cotton are severely harmful to human health and the environment. Deleterious health impacts include cancer, damage to the nervous system (in both humans and insects), disruptions to hormonal balance and the reproductive system, and in extreme cases, death. The World Health Organisation estimates that 20,000 to 40,000 people die from accidental pesticide poisoning each year, most of them in developing countries. Some pesticides remain in the environment for decades and contaminate the environment far from where they were used.

Pesticides are also becoming increasingly expensive and can make up as much as 60% of farmers' production costs, leading to severe indebtedness and contributing to conditions of poverty for farmers. Inability to pay debts brings on thousands of farmer suicides each year.

Aside from the environmental and social impacts of pesticides, the textile industry is an immense drain on water supply. It takes about 90 litres of water to produce one metre of upholstery weight fabric. Processes including dyeing, the application of speciality chemicals and finishing processes, and the washes required between each step involved in fabric treatment all contribute to this massive water usage. The water used is usually returned to the ecosystem without treatment, which pollutes the groundwater. This leads to a decline in the amount of useable water and increased health risks among the people also dependent on that water and the entire local ecosystem.



## Resource

### What are Sustainable Textiles?

Ethical, environmental and sustainably produced textiles are identified by the following characteristics:

- ❑ Fabrics made using organic raw materials, such as pesticide-free cotton and silk made by worms fed on organic trees.
- ❑ No harmful chemicals and bleaches used in the process of colouring fabric.
- ❑ Fabrics made from recycled and reused textiles, such as second-hand clothes and recycled plastic bottles.
- ❑ Durable textiles made to last, so that drapery and garments last longer.
- ❑ Fair trade products that ensure the people who make them are paid a fair price and have decent working conditions.
- ❑ Textiles produced by manufacturers and distributed by retailers who are addressing the wider environmental and social impacts of their business.

Certifications to look out for:

#### GOTS Certification

The Global Organic Textile Standard (GOTS) is a textile processing standard for organic fibres, including ecological and social criteria, backed by independent certification of the entire textile supply chain. The certification process takes all of the textile processing stages into consideration, from the fibre to the finished product. The raw fibre must be organic farming certified, and the standard aims to guarantee traceability, the use of environmentally friendly and health-safe chemicals, a quality system, energy reduction and the respect of social criteria.

#### Global Recycling Standard

The Global Recycling Standard (GRS) focuses on the percentage of pre- and post-consumer recycled content of a textile product. It has strict provision for how waste is handled during the production process, water treatment requirements and chemicals use, and

social responsibility in accordance with the International Labor Organisation (ILO) criteria.

#### OEKO-TEX® Standards

The OEKO-TEX® Standard 100 is an independent testing and certification system for textile raw materials, intermediate and end products at all stages of production. The certification indicates that harmful substances were not used in textile production.

**The OEKO-TEX® Standard 1000** is a testing, auditing and certification system for environmentally friendly operations along the textile chain. It includes all operationally relevant areas (management, production technologies, use of resources, quality assurance, safety precautions, social working conditions etc.) and represents a holistic examination of sustainability.

## Case study

### Sustainable Stage Drapery

ShowTex is a worldwide manufacturer and distributor of flame retardant stage drapery, tracks and motion control systems to the entertainment sector. In addition to implementing a global green policy across their company operations, ShowTex are addressing the sustainability of the raw materials that go into their fabrics and into the textile production process overall. They currently offer a range of OEKO-TEX® 100 certified theatre velvets and two certified event fabrics, and are in the process of certifying the rest of their two hundred plus product collection with the OEKO-TEX® 100 and OEKO-TEX® 100+ standards.





## 6 Cast

Actors and artists have as much of a role to play in the greening of a show than anyone else. Their buy-in and behaviour are integral to achieving the production's overall environmental goals. The cast are often the ambassadors for a show, the face of the production's achievements, and can help spread the word on the production's commitment to sustainability to other stakeholders, so getting them on board is essential.

### REHEARSAL & PRODUCTION

#### Action

\* Agree environmental actions and objectives for the cast with the director and production manager. Work with the stage manager to ensure you have the necessary resources to fulfil these actions.

\* Use your rehearsal/performance space kitchen's reusable plates and mugs whenever possible. Drink tap water and carry a reusable water bottle to minimise waste and find out about the buildings recycling facilities.

\* Use a reusable mug or flask when purchasing hot drinks.

Some coffee shops and cafeterias will offer a discount when you use your own mug.

\* Only fill the kettle with as much water as you need and ask who wants a hot drink before you boil the water. The energy used to boil a kettle could light a room for a whole evening.

\*\* Think about your lunch. Avoid out of season produce from far away countries with lots of packaging. Choose local produce wherever possible and only buy as much as you need, as food waste increases your personal carbon footprint drastically.

Explore buying as a group. A theatre bar may for example be willing to offer you a standard staff meal at a reduced rate. This minimises packaging and transport emissions and provides you with a cheap and tasty meal. Ask for it to be made with locally sourced and organic ingredients where possible.

\* Turn lights, heating and cooling systems, and any production or personal equipment off when not in use to save energy.

\* Print double sided and two sides to a page to save paper and use recycled paper for printing and note taking.

#### Key

##### \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

##### \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

##### \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

#### RESOURCE

##### Green Riders

You can use the Julie's Bicycle Green Rider to communicate environmental commitments and requests: [www.juliesbicycle.com/resources/jb-green-rider](http://www.juliesbicycle.com/resources/jb-green-rider)

✱✱ Use a tablet or e-reader to save on script printing.

✱✱ If there aren't adequate recycling facilities backstage and in rehearsal areas, ask for them to be provided.

## POST-PRODUCTION

### Action

✱ Evaluate your environmental performance against your original objectives. Feed back any good practice and good suppliers or products found during the process and other useful learning to the production manager.

✱ Share any learning and good products that you've found with peers.

### spotlight

## Catering 'Good Food'

Whether it's catering for staff, crew and cast, receptions or audiences, your food and drink choices not only have a significant impact on the environment, but also clearly communicate your commitment to sustainability.

Top tips for sustainable catering are:

1. Work with local suppliers serving locally sourced produce.
2. Choose organic and fairtrade produce where available.
3. Prioritise vegetarian and vegan options over meat.
4. Use reusable, biodegradable or fully compostable service ware.
5. Encourage recycling and food composting by making facilities available and clearly signposted.

### Did you know?

The carbon emissions of meat production can be up to 30 times greater than commonly used vegetables.

For more information see: [www.ewg.org/meateatersguide/a-meat-eaters-guide-to-climate-change-health-what-you-eat-matters/climate-and-environmental-impacts](http://www.ewg.org/meateatersguide/a-meat-eaters-guide-to-climate-change-health-what-you-eat-matters/climate-and-environmental-impacts)

### RESOURCE

#### Good Food for Festivals Guide

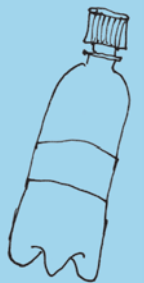
For events that service food to audiences, the Good Food for Festivals Guide provides detailed guidance and case studies on how to choose sustainably sourced food and work with traders and concessions with solid environmental credentials:

[www.sustainweb.org/publications/info/24](http://www.sustainweb.org/publications/info/24)

### Fact

#### Did you know?

It takes seven litres of water and high amounts of oil and energy to manufacture a one litre plastic bottle, and while plastic bottles can be recycled only 20% of them actually are. Most of the other 80% ends up polluting our oceans. Using tap water and reusable bottles across the production team and cast can make a huge difference.



# 7 Communications and Marketing

Communicating your commitment to sustainability is important both internally and externally. Internally it helps with the adoption of sustainable behaviours, demonstrates your intentions to your supply chain and encourages the whole company to get on board with sustainability objectives. Externally it brings you reputational advantages, stimulates the wider industry and encourages a wider adoption of sustainable practices.

Talking publicly about your sustainability achievements is an important but sometimes daunting task. Selecting the activity to communicate – those bits which set you apart from the crowd when it comes to environmental initiatives – can be a challenging job for marketing and communications departments new to the concept of sustainability.

Work closely with your communications department to ensure the information that goes out is accurate and clear. Stick to your main achievements, avoid jargon and don't gloss over anything. Remember that telling stories is the most effective method of communication, so when presenting a bevy of statistics use names, pictures and anecdotes to add colour and interest. Energy data and statistics make valuable appendices but are not your lead message.

Like any other communications, sustainability messaging should be targeted for your audience, on brand and shouldn't be boring. Evidence is already showing that creative events can engage audiences in challenging their own behaviour, and the more productions, organisations and venues disclosing their environmental concern, the bigger the impact on wider social change.

Key

## \* Starting Points

Basic practices to start embedding environmental sustainability into your decision-making.

## \*\* Industry Good Practice

Pushing it a bit further; impact reducing initiatives that will raise you just above the norm.

## \*\*\* Leading Ideas

Stuff to shout about; the ideas and practices that are beginning to fundamentally change the way we make theatre.

## PRE-PRODUCTION

### Action

\* Get involved with establishing the show's environmental objectives at the start of the process with the production manager. Help the production manager to create an environmental production policy that will engage the relevant audiences and encourage sustainable behaviour change.

\* Factor in time with the marketing and communications team from the very beginning of the production process so that they can see the story develop and understand the environmental process the production has been through. Help them understand both what and why you are doing environmental initiative.

\* Be energy efficient in the office – switch off printers, computers, lights and other equipment when not in use. Think before you print and always print double sided.

✱✱ Photos, videos, testimonials, and statistics are all helpful for presswork. Document the sustainability initiatives of the production team and keep track of achievements via regular production meetings.

✱✱ Explore alternatives to printed marketing collateral. Limiting the number of flyers, posters and programmes you print can reduce your footprint. Use digital marketing strategies such as Facebook, Twitter and others which are paper free and can integrate better with database software.

However, digital data still has an environmental impact via the energy use of computer servers, so limit the size of digital files and maximise the impact of each communication you put out.

✱✱ Explore paperless ticketing options, such as reusable tokens, electronic tickets and others.

✱ Choose a printing company with environmental credentials. For example, using recycled and/or FSC paper stock, printing with vegetable and/or soy based inks, and implementing an environmental management system such as ISO 14001.

✱✱ Use your blog or social media to keep audiences updated on environmental initiatives. Don't be afraid to discuss challenges – your audience will be more engaged through honesty rather than a rose-tinted account.

✱✱ Communicate environmental policies, impacts and successes on your website.

✱ Make public transport information for your production available on your website, and include this information in email ticket confirmations.

✱✱✱ Embed or link to a travel carbon calculator on your website and highlight it in audience communications, to encourage people to take the lowest impact form of public transport to your event.

✱✱ If your production is taking place in a rural area with limited public transport links, put on your own service and incentivise people.

For example, offering a car-sharing scheme can encourage people to maximise car occupancy. You could put on a coach service to the nearest train station and include the option for people to book a seat on the coach when they buy tickets, or create incentives for cyclists, like a free drink or 10% off their next booking.

Include information on the show's environmental aims and achievements in the show programme.

✱✱✱ Create a programme hire scheme (if you charge for programmes) and encourage people who don't want to keep their programme to return it for reuse at the end of the night.

## PRODUCTION

### Action

\* Tell audiences how they can help green your show by travelling by public transport and bicycle in communications leading up to their visit. Remind them of any incentives or special initiatives.

Use the principle of reciprocity. Show all of the ways you have already reduced the productions impact and then ask them to play their part.

\*\* Be creative with opportunities to communicate the show's environmental initiatives during the run, for example via an interactive display in the venue/site or a post-show talk that can also be live streamed and filmed for future reference.

## POST-PRODUCTION

### Action

\* Evaluate your environmental performance against your original objectives. Document good practice and good suppliers and other useful learning for inclusion in an environmental production policy for future shows. Give feedback to the production manager on what you think went well, and what needs new solutions.

\*\* Once the data on environmental impact reduction is collected by the production manager, analyse it for press potential. If you have made any really remarkable savings then put together a press release for local and industry press.

\*\* Create a case study on the production for your website and to send to press.

\* Share any learning and good low energy products that you've found with peers.

### Case study

#### 'After Miss Julie' Communicating Sustainability

The Young Vic's marketing department managed to reduce carbon emissions from paper use for their show 'After Miss Julie' by 99% from 124kg to 1.6kg. They did this by sending press releases electronically and not printing flyers, reserving paper usage only for the posters outside the theatre. Furthermore, to engage and involve the audience from the start, pre-performance communications highlighted the importance of audience travel and requested the audience find lower carbon modes of transport.

They also piloted a paperless ticketing system where reusable tokens made from wood scraps from the workshop were given to audience members to gain entry to the studio.

Audiences could also opt to hire a programme for a reduced price of 50p (compared to the full price of £3), handing it back after the performance to be reused. Programmes were printed on recycled paper with vegetable inks.

The team wanted to avoid "preaching" to disinterested audience members, yet make information available and attractive to those who were willing to engage. The programme was peppered with information about the show's sustainability initiatives. For example, the cast and staff biographies included information about each member's most interesting environmental challenge during the production. To keep things visually interesting, graphical content from David McCandless (author of *Information is Beautiful*) was used to creatively depict the carbon footprint of various products and services.

At the end of the show audiences exited through a 'green walkway' painted with a mural of the production's environmental actions designed by a graphic artist. The design was painted onto the wall to minimise the environmental impact compared to vinyl stickers or boards. Additional material was available on the Young Vic's website and blog, which featured interviews with the cast and other information.

Read the full case study: [www.juliesbicycle.com/resources/case-studies/production/after-miss-julie](http://www.juliesbicycle.com/resources/case-studies/production/after-miss-julie)

### Case study

#### Empowering Audiences: 'Cheese'

Working with pedal-power specialists Magnificent Revolution, theatre company fanSHEN customised four gym machines to generate energy to power their production of 'Cheese' (September 2013). The machines were placed in London gyms not far from the performance venue in Oxford Circus, and were linked to a battery which stored energy as people used the machines to get fit. Each night, the batteries were transported to the performance venue and used to power the show.

Each person contributing to the energy generation process was able to measure their workout in terms of household energy usage, for example: 'You've now generated enough electricity to have boiled a kettle for two cups of tea,' and got discount on their ticket to see 'Cheese,' depending on how much power they pedalled.

fanSHEN documented the whole process of customising the machines, developing the show and researching resources available for making their work more sustainable via a dedicated blog, [www.pedallingpower.wordpress.com](http://www.pedallingpower.wordpress.com), and organised three post show talks focusing on environmental themes relevant to the show and their energy generation experiment.

### Case study

#### 'As the World Tipped': Be the Change

'As the World Tipped,' Wired Aerial Theatre's production tackling themes related to climate change, ended with an image asking audiences to "Demand Change" towards creating a fairer, more environmentally sustainable world. They were keen to provide audiences with top tips for making a difference in their own lives, and included a "Be the Change" page on their website which provided 10 environmental actions for audiences.

[www.wiredaerialtheatre.com/as-the-world-tipped](http://www.wiredaerialtheatre.com/as-the-world-tipped)

### Fact

#### The Arts and Behaviour Change

A survey from Buckinghamshire New University and music industry campaign group A Greener Festival asked 2,300 festival fans from around the world in 2012 if they had changed their behaviour as a result of green initiatives or ideas they had discovered at festivals. An impressive 43.1% said they had, proving that engaging audiences in green initiatives has great potential for positive knock on effects.

## We want to hear from you!

We hope this guide will help you with your sustainable production journey, wherever you're at right now. To contribute to this area of our work, please share your sustainable production achievements and success stories with us.

Let us know what methods you are trialling, what challenges you are coming up against and what successes you have achieved. This helps us to continue to improve our resources, collect best practice and share it with the wider industry.

Our job is to amplify the incredible work you are already doing and to develop tools to make your job easier. Contact us at: [info@juliesbicycle.com](mailto:info@juliesbicycle.com).

## About Julie's Bicycle

Julie's Bicycle is a not for profit organisation making sustainability intrinsic to the business, art and ethics of the creative industries.

Founded by the music industry, with expertise from the arts and sustainability, Julie's Bicycle bridges the gap between the creative industries and sustainability. Based on a foundation of peer-reviewed research, Julie's Bicycle works with arts organisations and leadership to create change through practical tools and resources, events, training, consultancy and thought leadership.

Julie's Bicycle is currently working with over 1000 arts organisations across the UK and internationally, large and small to help them measure, manage and reduce their environmental impacts.

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**JULIE'S BICYCLE**   
SUSTAINING CREATIVITY

2013

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