

JULIE'S BICYCLE 

Green Mobility

GUIDE

**A guide to
environmentally
sustainable mobility
for performing arts**

Julie's Bicycle
May 2011

on the move 

An OTM cultural mobility information dossier

Green Mobility

A guide to environmentally sustainable mobility for performing arts

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On the Move aims to facilitate cross-border mobility in the arts and culture sector contributing to build up a vibrant European shared cultural space strongly connected worldwide.

It provides information, engages in research, capacity building and advocacy mediating between artists and cultural operators, the sector organisations and policy makers.

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Julie's Bicycle (JB) is a not-for-profit organisation working with the arts and creative industries to make environmental sustainability a core component of their business. We focus on practical solutions which balance artistic, financial and social considerations.

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2.0 Forewords

We at On the Move strongly believe in the importance of mobility as a way to grow – not economically but in our capacity as human beings, broadening our horizons, seeing how others do things. In fact, On the Move believes so strongly in mobility that it has made it its mission to support the mobility of artists and cultural professionals in all its diversity. But we have to ask ourselves: Is promoting mobility still responsible in our day and age, with pollution and global warming becoming possibly the biggest threats to humankind in history? How does my mobility today influence our world of tomorrow? We live at a time when it becomes more and more difficult to take the right decision given the complexity of our increasingly globalised and interconnected world. Choices affecting the environment taken on one side of the globe can have an impact on the living conditions, the lives and the future of people on the other side of the world.

The following guide on green mobility shows that once again artists also come up with creative solutions to address this issue: many of them have already found new ways to create artistic work while taking a caring stance on the environment. OTM is happy to have teamed up with Julie's Bicycle to produce this guide as an inspiration but also as a practical tool helping artists and cultural professionals – and anyone wanting to make a difference! – to take responsible decisions while still enjoying all the benefits of mobility. Because when we talk about the sustainability of cultural mobility, it should mean that we are willing to change our attitude and behaviour in our everyday professional practice. OTM sincerely hopes the present guide helps you to make a difference.



Martina Marti

President, On the Move

Over the last five years sustainability issues have, at last, been recognised as significant and of relevance to the cultural sector. Sustainability touches all aspects of our creative sectors. It stimulates carbon as well as financial savings, communicates a positive brand to audiences and artists, preempts regulatory demands and builds resilience into our future business models. However, while awareness is strong, finding solutions that are relevant and realistic, tailored to the realities of touring, is much more elusive. This piece of work, commissioned by OTM, is an attempt to address the core problem – moving productions contingent on travel and transportation – as sustainably as possible. The performing arts are characterised by creativity, resourcefulness and innovation. This guide hopes to galvanise these qualities and inspire greater ambition so that, together, the arts can play a pivotal role in our future.



Alison Tickell

Director, Julie's Bicycle

3.0 Findings and Conclusions

3.1 Findings

1. Whilst environmental sustainability is understood to be an important issue for touring companies, it remains a secondary priority and is superseded by the following issues:

- Economic growth has slowed in recent years, resulting in many cases in reduced public funding and audiences with less disposable income. Therefore, many arts organisations have uncertain futures and are therefore finding it hard to plan for the medium and long term.
- Governing bodies and senior management have not yet integrated environmental sustainability into their core thinking, and therefore the issue lacks authority and leadership. The perception that environmental sustainability will have negative budgetary and artistic implications is still strong.
- At an operational level many organisations do not have the staff time or resources available to drive forward environmental initiatives.

2. Creating multiple-date tours that maximise the travel and are environmentally efficient is challenging:

- It is difficult to coordinate a rationalised tour pattern that fits with the availability of multiple venues and festival appearance opportunities, particularly in the absence of formal circuits.
- Contracted exclusivity clauses restrict opportunities for multiple performances.
- Under-resourced planning time can result in insufficient development of new audiences, with touring companies relying on existing relationships, rather than seeking new relationships that could lead to more rationalised tour patterns.

3. A variety of environmental initiatives are being adopted by individual touring companies and supporting arts organisations, but they are not being taken up more broadly. Examples include:

- Environmental policies and charters
- Dedicated green champions within the organisation
- Green riders in contractual agreements
- Measurement of environmental impacts
- Local, re-used and/or sustainably sourced set materials
- Energy efficient lighting equipment
- Renewable energy sources
- Promotion to audiences of public transport, car-sharing and cycling infrastructure
- Educational workshops to improve environmental understanding of staff and audiences
- Environmental certification and accreditation
- Merchandise with good environmental credentials

4. Touring companies and arts organisations are restricted by a lack of information, guidance, tools and training to support environmental initiatives.

- With limited time and expertise arts organisations do not know where to get help in understanding and reducing their environmental impact.
- Organisations need to be signposted to information resources as well as training in environmental management.
- There is a need for sector-appropriate tools.

5. Leadership from funding/regulatory bodies on environmental sustainability would be welcomed:

- Touring companies and arts organisations want public funding bodies to provide guidance, incentives and financial support for environmental practices.
- Arts organisations want to know what is expected of them and how to make the necessary changes without lessening the artistic experience.
- Public funding bodies need to support touring companies and arts organisations and invest in innovative touring models that have reduced environmental impacts.

3.2 Conclusions

The performing arts sector has not yet widely recognised or considered the environmental impact of touring activities. It has not been a business priority, nor a requirement for public funding.

Better co-ordination between touring companies and venues to develop environmentally rationalised touring models is needed. This would be facilitated by venue touring circuits as well as coordinating with performing arts festivals to avoid one-off presentations of work.

Sector specific tools, guidance and training for developing environmentally sustainable models of touring are needed.

Performing arts funders have a pivotal role in setting environmental criteria as a key requirement of funding, signposting information, resources and tools as well as providing financing support for innovative practices.

Investment for demonstrating new touring models that reduce environmental impacts, extend audience reach and ensure artistic quality while not damaging the business model is urgently needed.

Femke Eerland, Noorderzon Performing Arts Festival Groningen, The Netherlands

“Our most important decision, that we’ve already taken, is that we care. Being ahead of the curve has enabled us to establish and reinvent our profile. It has been a hard and rocky, but fun and rewarding road.”

4.0 What you can do

Environmental action is an ongoing process that can be understood in four parts:

- commitment to environmental issues
- understanding your environmental impacts
- improving your environmental impacts
- communicating your impacts and improvements

This chapter shows in practical detail how you can take environmental action in your professional life. The tips are addressed to those responsible for organising a tour and putting on a production, and to those managing and running venues. They also address membership organisations and funding bodies.

4.1 Touring Companies

4.1.1 *For Artistic Directors, Directors and Producers*

Commitment

- ☐ Develop an environmental policy to cover at least energy, water and waste environmental impacts. (www.juliesbicycle.com/resources)
- ☐ Give a team member responsibility for co-ordinating environmental initiatives.
- ☐ Ensure contractual discussions include environmental impacts.

Understanding

- ☐ Use the free web-based IG (Industry Green) tour tool at the tour planning stages and on completion of the tour to compare results. (www.juliesbicycle.com/resources)

Routing

- ☐ Optimise the tour itinerary so the total distance travelled is minimised by scheduling performance dates and venues within a reasonable proximity.
- ☐ Avoid doing one-off performance tours.
- ☐ If presenting work at a festival identify other opportunities in the same geographic region to present work. Ask for support from the festival promoter.

Venue

- ☐ Use a green rider or include sustainability clauses in contracts with venues. (www.juliesbicycle.com/resources)
- ☐ Try and book venues with environmental credentials.
- ☐ Ask venues about their food and drinks procurement policy and about the actions they are taking to reduce their environmental impacts. This could be part of the green rider.

Planning

- ☐ Use digital communications (skype/video-conferencing) as much as possible as an alternative to international travel when planning the tour.
- ☐ Encourage staff and performers to travel by public transport or in car shares to get to performance locations.
- ☐ If staff and performers require hotel accommodation whilst on tour ask hotels what efforts they are making to reduce environmental impact.
- ☐ Hire caterers with environmental policies and credentials.

Logistics

- ☐ Within Europe use ground transportation for production equipment rather than airfreighting as much as possible. When doing inter-continental tours plan enough time to use sea freight rather than airfreight to transport production equipment.
- ☐ Use logistics companies with fuel-efficient vehicles and drivers with eco-driving training.
- ☐ If using biofuels make sure they are sustainably sourced i.e. waste vegetable oil.

Communicating

- ☐ Share the environmental impacts of the tour and the efforts being taken to reduce those impacts with board, staff, suppliers, and audiences.
- ☐ Prepare a case study of your tour's 'greening' experience (positive and negative) to share learning with colleagues.

4.1.2 For Production Managers, Lighting Designers and Technicians

Lighting

- ☐ Work with Artistic Directors to develop a performance aesthetic that has a low environmental impact.
- ☐ Calculate the set power demand by summing the wattage of all lights being used to create the aesthetic effect.
- ☐ Minimise show power demand where possible by using technologies with low wattage and design the show to require less lighting.
- ☐ Ask your suppliers for information about products with good environmental credentials.
- ☐ Establish a routine to ensure lights are switched off.

Production

- ☐ Work with Artistic Directors to develop a set aesthetic that has a low environmental impact.
- ☐ Use the ICE database developed by the University of Bath to calculate the impact (embodied energy and carbon) of production materials when developing a specification for a set. Identify ways to reduce the embodied energy and carbon by using less and different materials where possible. See the 'Here to help' section of this guide for more information.
- ☐ Use recycled materials for building sets where possible.

- ☐ Contact the venue(s) to find out what equipment they have in-house or can source locally to avoid the need to transport equipment.
- ☐ Use services where available to store and/or recycle set materials.
- ☐ Join or establish partnerships and mechanisms with other organisations for sharing production resources.
- ☐ Develop a sustainable procurement policy for equipment and material use.

Drom (artist management)

Based in Barcelona, Spain, Drom specialises in the management and promotion of street-arts, circus and world music, in Spain and around the world. Drom's aim is the cultural development of individuals of all ages and backgrounds, enabling everyone to have access to 'culture' via the creation of networks and circuits facilitating the mobility of artists.

During 2010 Drom organised a 'green mobility' tour as part of the Comic Festival in Baskeland in collaboration with the French street theatre company Dynamogene, and Porpol Teatro, the theatre group that has organised the Comic Festival since 1994. During the tour one performer and two members of staff travelled in a van to five villages in the Alava Province that were just 30-50 kms apart, to showcase the production over five performances.

Creating a well-organised mini "village circuit" reduced petrol consumption, as well as associated costs and emissions, but also reduced the even more impactful audience travel emissions, as the rural population didn't have to travel to the city to attend the show. All this was possible with the support of the Alava Delegation that provided them with 50% of the budget (the Alava Delegation is in turn funded by the central government in Madrid).

For more information visit:

www.dromcultura.com
www.porpolteatro.com
www.dynamogene.net

4.2 Venues

4.2.1 For Managers, Facility Managers, Green Champions,

Commitment

- ☐ Develop an environmental policy to cover at least energy, water and waste impacts. (www.juliesbicycle.com/resources)
- ☐ Give a team member responsibility for co-ordinating environmental efforts.
- ☐ Ensure contractual discussions encompass environmental impacts.
- ☐ If you use an exclusion policy ensure this is rational and not preventing a touring production from presenting work outside your audience catchment.
- ☐ Make information about in-house production specifications and local suppliers available to incoming productions (ideally online).

Understanding

- ☐ Use the free web-based IG (Industry Green) venue tool or equivalent to audit your company's environmental impacts (energy, water, waste, travel). (www.juliesbicycle.com/resources)
- ☐ Use a tool to monitor energy use, ideally once a week.

Improvement

- ☐ Create an environmental improvement plan with targets and timelines for reducing environmental impacts.
- ☐ Use at least a proportion of money generated from venue energy savings for funding further environmental improvements.

Communication

- ☐ Communicate to board, staff, suppliers, incoming productions and audiences the environmental impacts of the venue and the efforts being taken to reduce those impacts.
- ☐ Apply for an environmental performance certification that is relevant to your venue.
- ☐ Prepare a case study of your venue's 'greening' experience (positive and negative) to share learning with colleagues.

Food and Drink

- ☐ Develop a sustainable procurement policy for food and drinks.
- ☐ Learn about the environmental impacts of food and drink sold at the venue: minimise animal products and maximise organic, local and seasonal choices.
- ☐ Monitor catering energy and identify opportunities for energy savings.
- ☐ Monitor food waste and reduce over-ordering. Consider a composting service for food waste and compostable packaging.
- ☐ Work with contracted food and drink concessions to offer consumables (including packaging, cutlery and serving receptacles) with low environmental impacts.

Publicity materials and merchandise

- ☐ Use electronic-based publicity material as much as possible over printed.
- ☐ Ensure all printed materials have recycled content and/or use FSC paper and are printed using non-toxic and biodegradable inks.
- ☐ Select the correct size of material to maximise content.
- ☐ Use merchandisers that have environmental credentials, for example, t-shirts that have a product carbon label with the emissions per t-shirt displayed.

Audience Travel

- ☐ Provide public transport information to your audiences on your website, including a travel carbon calculator so that they can investigate the mode and route with the lowest emissions.
- ☐ Offer a combined performance and public transport ticket.

- ❑ Offer only a limited number of car spaces to encourage car sharing and use of public transport.
- ❑ Provide bike racks at the venue and let audiences know via the website and tickets that racks are available.
- ❑ Make information available on car-share services from the venue website.
- ❑ Discuss putting on extra public transport services, and synchronising services with the start and end of performances, with local travel operators.

4.3 Membership Organisations

- ❑ Make environmental sustainability a standing agenda item.
- ❑ Keep up to date on environmentally related legislation, financial and economic trends as well as audience concern.
- ❑ Signpost members to resources for reducing the environmental impacts of touring.
- ❑ Develop a charter for members, which sets out environmental principles, and includes a commitment to monitor and reduce environmental impacts.
- ❑ Recognise and award members that are environmental leaders, and publicise models of good practice.
- ❑ Use your lobbying power to push for further development of environmentally sustainable technologies.
- ❑ Collect, collate and report statistics relevant for monitoring environmental efforts of the sector.

Alcantara (performing arts development association)

Alcantara, a performing arts organisation based in Lisbon Portugal, used local building products such as cork for building reconstructions. It has also been working closely with artists to help them reduce the impact of their work– e.g. leading contemporary dancers have opted to travel with fewer number of trailers, putting on less elaborate performances with smaller energy requirements and the need for fewer lights, while at the same time improving on the quality of their performances.

For more information visit: www.alkantara.pt

4.4 Funding Organisations

- ❑ Ensure environmental sustainability is a core issue on the agenda for strategy development.
- ❑ Signpost to information on emerging practice for low environmental impact touring within the performing arts sector.
- ❑ Support organisations providing resources and training to help arts organisations embed environmental decision-making in all areas of their activity.
- ❑ Set environmental guidelines and reporting requirements to funded organisations.

- ❑ Assess the funding support given to organisations on environmental criteria in addition to artistic and financial criteria.
- ❑ Publicise models of good practice, including outstanding creative achievement using green technology.

IETM/Australia Council for the Arts Collaboration Project “Climate Commission”

Australia Council for the Arts and IETM – the international network for contemporary performing arts – have developed a program of activities led by Project Director, David Pledger, to begin building a sustainable matrix of relationships between Australia and Europe. One of the underlying themes driving the program is the acknowledgment of climate change in artistic practice. The program included a “Climate Commission” for a new artwork conceived in the context of climate change. Other than the quality of the idea and the experience of the team, the Commission had the criteria that the project seek to achieve carbon reduction compared to “business as usual”.

Made by a collection of Australian and European artists and scientists who work under the moniker Time’s Up, Control of the Commons will undertake a series of watercourse journeys in Australia and Europe, investigating water usage, attitudes to water and kinship/friendship networks along the watercourses. The vessels used will be recycled or sustainably-grown small boats, powered by their crews and the wind. The project will be governed by the Three Rs: Reduce our need for expendables; Reuse technologies to avoid waste and Recycle the vessels at journey’s end. The presentation at Burning Ice in June 2012 produced by Brussels’ Kaaithheater will include direct documentation, kinship and friendship analysis, interviews, photography and video mapping.

For more information visit:

www.ietm.org/index.lasso?p=information&q=newsdetail&id=491

David Leddy, Fire Exit Ltd, Scotland

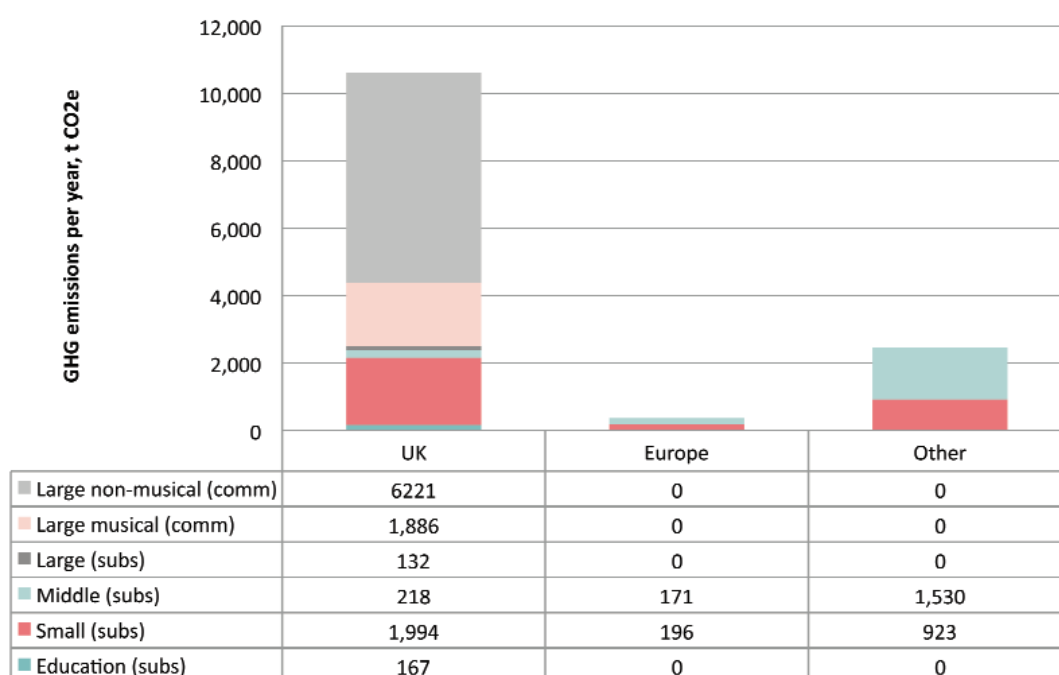
“Many artists feel their creative vision shouldn't be compromised. I’m happy to try to take on the challenge of being creative and exciting but at the same time lowering carbon.”

5.0 Moving Arts Summary

In 2010 Julie’s Bicycle published *Moving Arts: Managing the Carbon Impacts of Touring* (Vol.1: Bands, Vol.2: Orchestras, Vol.3: Theatres). The study investigated the carbon impacts of moving people and productions to create live performances around the world. It calculated the total annual and “per performance” greenhouse gas emissions from all scales of touring activity undertaken in the UK and by UK-based theatre companies touring overseas.

The total GHG emissions impact by UK theatre touring companies within the UK and globally in 2009, based on available data, is estimated to be approximately 13,400 t CO₂e (see Figure 1), which is equivalent to driving around the world 1,500 times.

Figure 1 GHG emissions impact by UK theatre touring companies by scale and geographic region



Note: subs = subsidised, comm = commercial

From the 31 tour samples that contributed to the study, Julie’s Bicycle calculated the per performance greenhouse gas emissions for different scales of production touring to different geographic regions (see **Figure 2**). For example, a middle scale tour (a touring party of 7-24 people) from the UK to mainland Europe will produce ~1.1 tonne CO₂e per performance. Julie’s Bicycle recommends that more theatre companies measure and report the GHG emissions produced from their touring activities so that benchmarks or “industry averages” can be created from the initial values identified in the study. Touring companies will then be able to compare themselves to industry averages and set themselves targets to improve beyond the average. Information submitted through the IG Tools (online carbon calculators hosted by Julie’s Bicycle) is supporting this benchmarking work.

Theresa von Wuthenau, Imagine 2020 Network

“We have, as a network, written a “green rider” that each organisation adapts for their artists. It encourages, among other things, more environmentally responsible touring. I worked on this document with Mark Godber at Artsadmin and I was inspired by what I found on the Julie’s Bicycle website.”

Figure 2 Per performance tonnes of CO₂e for different scales of tours to different geographic regions.

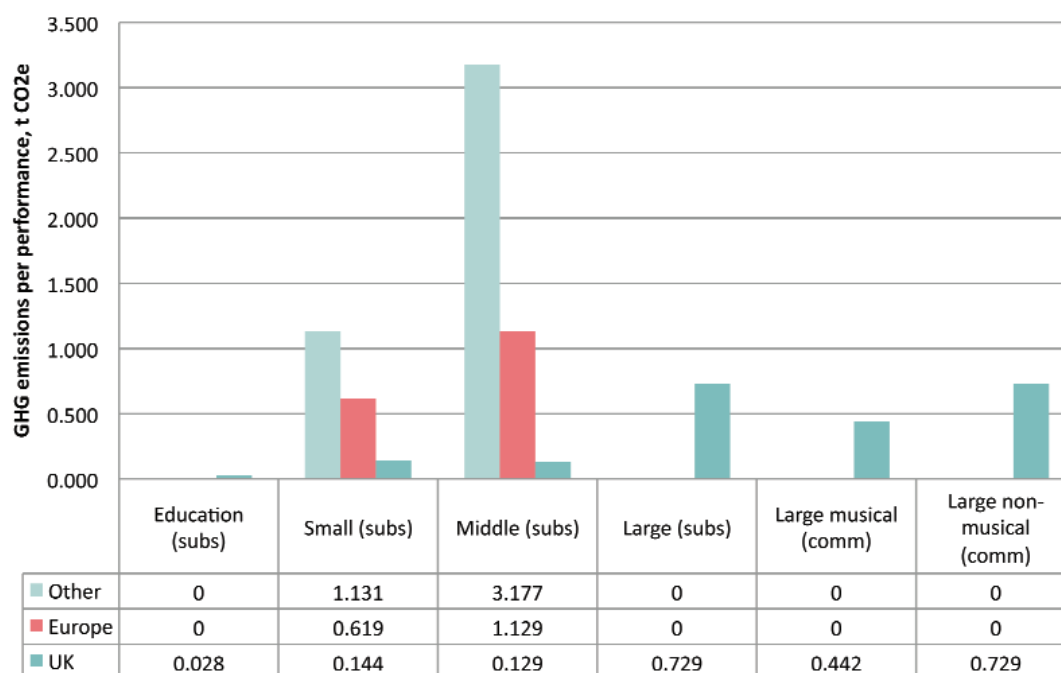
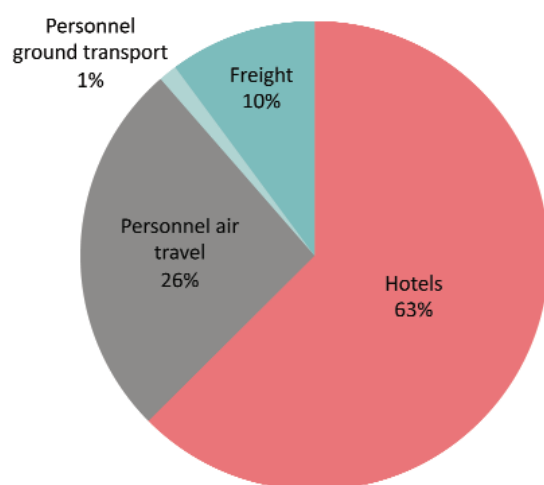


Figure 3 shows the GHG emissions produced by a 74-performance European tour with a touring party of 24. It resulted in 99 t CO₂e being produced from the movement of people and production to put on the live performance. Over half of the emissions were generated as a result of accommodation and a quarter of the emissions were from air travel. Use the IG Tool to discover the GHG emissions produced from your tour.

The findings of Moving Arts have helped the UK theatre sector understand its carbon impacts and the need for tools and resources to support the sector to reduce its environmental impacts. Many of these tools and resources are applicable and available for use by the theatre sectors from other countries such as the IG Tool and green rider template. These tools are signposted for you in this guide.

Figure 3 Percentage of GHG emissions by source for a middle-scale subsidised theatre tour in Europe



To read the full report go to: www.juliesbicycle.com/resources

6.0 Hot Topics

The following set of pieces cover a wide range of hot topics on sustainability that are relevant to the performing arts sector.

Hot Topic 1: Science Says

Our climate is regulated by a balance of heat-trapping gases in the atmosphere such as water vapour, carbon dioxide and methane. Without these gases solar heat from the sun would escape back into space and the planet would be uninhabitable. Because of their warming nature these gases are referred to as greenhouse gases (GHG), and the phenomenon is known as the greenhouse effect. Earth's climate has varied naturally in the past, but the human activities of burning fossil fuels, industrial agriculture and land use are causing a rapid increase in the concentration of GHGs, which is enhancing the greenhouse effect and resulting in hotter overall mean temperature and variable, extreme weather conditions.

Our climate supports rich and diverse ecosystems which have determined how humans have evolved and how we currently live. Disrupting the natural equilibrium of GHGs is already having profound effects on the planet and our consequent way of life.

KEY FACTS

Current global gas concentrations in atmosphere:

- Carbon dioxide: 390 parts per million (ppm) – exceeds the natural range experienced in the last 650,000 years and is increasing by 1-2ppm each year
- All GHG emissions: increasing by 3.3% per annum since 2000

Effects:

- Increase in global mean temperature by 0.7°C compared to pre-industrial times; a 4.9°C increase is expected by 2100
- 40% loss in arctic ice since 1980
- Rise in sea levels of 3-4 mm/year
- Increased levels of carbon dioxide absorbed by oceans is resulting in acidification

Impacts:

- 20-30% of plants, animals and fish at risk of extinction with a 1.5°C-2.5°C increase
- Adverse effects on agriculture, fisheries, forests and water resources
- Countries of low latitude and many coastal regions at risk of flooding
- Increased frequency of heat waves, droughts, extreme precipitation, and related impacts (i.e. wild fires, heat stress, vegetation changes)

Uncertainty:

- Scale and longevity of impacts
- Understanding of extent processes will change, such as location and intensity of monsoon cycles and La Niña and El Niño cycles

Next steps:

- Stabilising global GHG emission levels between 445-535ppm (i.e. reduce current global emission levels by 50%)

- Minimising climate risks by ensuring global mean temperature does not increase by more than 2°C
- Supporting societies to adapt to climate change and impacts that are already occurring and are irreversible

David Leddy (writer, director and performer)

The development of a formal environmental sustainability policy that is broad in its aims but specific on its objectives, travel policies that ban flying within the UK unless absolutely necessary, and the sharing of emerging practice with peers have been a few of the initiatives David Leddy has been engaging in for his productions.

Furthermore, some of his productions have combined artistic excellence with a low environmental impact by using smaller touring party and few, if any, props whilst on tour, and these are sourced locally. For example, *Susurrus* involves people listening to an MP3 player and following a map around a botanical garden – only one person needs to travel with the production to set it up, MP3 players are sourced locally and then reused for other productions, or sold by the venues.

For more information visit: www.davidleddy.com

Hot Topic 2: The Global Response

First steps

In 1992 the United Nations convened the Earth Summit in Rio de Janeiro resulting in the first governance framework designed to tackle climate change on a global scale. The United Nations Framework Convention on Climate Change (UNFCCC) aimed to stabilise global greenhouse gas (GHG) concentrations in the atmosphere to prevent dangerous anthropogenic interferences with the climate system.

The treaty came into force in 1994 but despite its ambition it set no mandatory limits on GHG emissions and contained no enforcement mechanisms. As a result the Kyoto Protocol to the UNFCCC was adopted in 1997 in Kyoto, Japan. To date, the Protocol, which came into force in 2005, is the only legally binding global framework on climate change and represents the first attempt to monitor and regulate global emissions. It set binding targets for 37 industrialised countries for reducing emissions by an average of 5.2% against 1990 levels over the five-year period 2008-2012. Specifically, 15 countries within the European Union have a combined reduction target of 8% over the five-year period below 1990 levels. Developing countries were not required to reduce emissions.

United Nations Climate Conferences

The parties to the UNFCCC have met every year since 1995 in Conference of the Parties (COP) to assess progress and to advocate the global climate change governance agenda. The most highly publicised COP so far has been COP15 in Copenhagen, Denmark, in 2009, which aimed to get an international agreement to take the place of the Kyoto Protocol, which expires in 2012. The negotiations that took place at COP15 revealed the complexity and intractability inherent in tackling climate change. The degree of political and economic compromise needed to develop an equitable and effective legal framework that satisfied both rich and poor nations proved impossible to achieve. The outcome of COP15 was the Copenhagen Accord, a document that is not legally binding and does not commit countries to agree to a binding successor to the Kyoto Protocol. It was drafted by

the United States in collaboration with China, India, South Africa and Brazil and specifies reduction targets. It is commonly held that the most positive outcome of Copenhagen was the UN REDD (Reducing Emissions from Deforestation and Forest Degradation) agreement, designed to reduce deforestation and forest degradation in developing countries, and thereby reduce emissions.

The most recent COP was at Cancun in Mexico, in December 2010. COP16 adopted the Copenhagen Accord, as well as emission mitigation targets voluntarily submitted by 80 countries. The Cancun Agreement is not a legally binding document but it is considered to be an important step on the road to building a comprehensive and legally binding framework for climate action for the period after 2012.

The next COP (COP17) will take place in Durban, in South Africa in November 2011.

Climate Justice

Climate change may be a global problem requiring global solutions, but the resulting impacts will vary in scale and length depending on geographic location and specific political and economic conditions. Industrialised countries are responsible for more than ten times the average per capita emissions as compared to developing countries, but will be least affected. Already developing countries are experiencing extreme weather but these nations have the least infrastructural capacity to deal with the consequences. This is further compounded by the inevitable drive for improved living standards in emerging economies, stoking further demand for energy hungry goods and services such as those enjoyed for generations in advanced economies. Despite this difficult framework some emerging economies, such as China, are investing heavily in low carbon infrastructures and attempts to provide access to investment and knowledge transfer mechanisms to developing countries are ongoing. However, there are enormous tensions and contradictions inherent in current global governance mechanisms and much still needs to be resolved.¹

Climate justice – or reparation for the past and entitlement to equitable standards of living for the future – is at the heart of much climate debate. The Kyoto Protocol introduced the notion of ‘common but differentiated responsibilities’ to address the issue of burden (who is to blame) and of responsibility (who will take action) by committing only industrialised nations to emission reductions. However with many developing countries experiencing rapid growth – China now exceeds the USA as the world’s biggest emitter of GHGs – many industrialised countries now want to see a broader distribution of responsibility for reducing emissions. With Kyoto nearing the end of its commitment period (2012) and no other legally binding framework in place as yet, much more urgency, commitment and accountability will be needed.

Issues for Cop17 (Durban) and beyond

Should the Kyoto Protocol be extended, should it build on the Copenhagen Accord to include targets for developing nations, and what will the timelines be?

It is likely that emerging economies such as China will have to commit to some reduction targets, but these targets should not be as high as those of developed nations. Instead, emission reduction targets within industrialised and emerging economies should take into consideration the economic history of each nation and distinguish between absolute and relative (i.e. per capita) emissions. For example, China may be the world’s largest absolute emitter (~17%) but its emissions per capita are just 5.5 tonnes CO₂e (with the highest emitting nation per capita, Qatar, at ~38 tonnes CO₂e) whereas the US, the world’s second largest absolute emitter (~16%) has ~23 tonnes CO₂e per capita.

¹ Grubb, M. 2003. The Economics of the Kyoto Protocol, World Economics, 4(3), viewed on February 17th 2011, available at: <http://www.econ.cam.ac.uk/rstaff/grubb/publications/J36.pdf>

What mechanisms will we use to support the achievement of reduction targets and encourage the transfer of low carbon technology to emerging economies?

The Kyoto Protocol developed several market mechanisms to achieve this: Emissions Trading between developed nations who had signed up to the Kyoto protocol, as well as the creation of “credits” for projects that reduced carbon emissions in developing nations that could then be traded under two initiatives called “Joint Implementation” and the “Clean Development Mechanism”. Coming out of Copenhagen and Cancun, The UN REDD Agreement will incentivise preservation or extension of forests, while a new Green Climate Fund totaling \$100 billion by 2020 has been created to support developing countries to adapt to climate change, although the actual required scale and distribution of funds remains controversial.

Climate change challenges us to go beyond our immediate national interests. This is difficult when the current negotiating structures are predicated on national representation via the United Nations – particularly when a relatively small number of countries are responsible for a huge proportion of global emissions. Governments need electorates that understand the problem and support international cooperation and compromise rather than lobbying for vested national interests. Indeed, national boundaries are an arbitrary way to allocate rights and responsibilities, given the globalised flows of goods and services around the world. For example, the UK Carbon Trust has found that the UK’s emissions have increased, once the emissions “embodied” in imported consumer goods are included in the figures, in contrast to the decrease of emissions from within the UK. Should China or India have to pay for the emissions caused by producing consumer goods for the rest of the world?

Fiddling while Rome Burns?

A global response to the global problem of climate change must be found. However, governments and policy are not the only places for action and transformation. While an overarching agreement with targets and timelines remains crucial, business and the public also have key roles to play, and the performing arts is particularly important given that they are businesses which also connect in a unique way with the public as their audiences. Firstly, by demanding higher environmental standards from themselves, colleagues, suppliers and funders, the performing arts can lead with “bottom up” initiatives, that put pressure on governments to create workable solutions, while preparing themselves for a climate changing future. Secondly, by transforming artistic practice so it includes a consideration of environmental impacts, the performing arts set an example to their audiences, which strengthens the capacity of the performing arts to participate in and indeed stimulate dialogue on this most vital issue.

Intergovernmental Panel on Climate Change (IPCC)

What it is:

The IPCC – a scientific and intergovernmental institution – is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO), to provide the world with a clear scientific view on the current state of knowledge in climate change.

www.ipcc.ch/docs/UNEP_GC-14_decision_IPCC_1987.pdf

Although it does not conduct new research, it reviews and assesses the most recent scientific and socio-economic information relevant to the understanding of climate change and publishes the results in comprehensive assessment reports every 5-6 years. The 4th, and most recent report was published in 2007, with the next report expected in 2013/14. In the interim it publishes special reports, methodology documents and technical papers. Working groups and a task force of leading academics coordinate the assessment of the research. The IPCC is expanding its remit to include innovation and technology to mitigate emissions as well as the development of a low-carbon economy.

Transparency and accountability is critical to maintaining trust and in 2009 the IPCC received much negative media criticism. This was triggered by the hacking of East Anglia University e-mails, which unveiled alleged collusion by climate scientists to withhold scientific information and manipulate data to make the case for global warming appear stronger than it is. This was compounded by an error in the report about the retreat of Himalaya glaciers. Whilst the furore has died down with a UK Parliamentary inquiry finding the UEA scientists not guilty of misrepresenting their research findings and the IPCC committed to improving scientific review of the evidence, trust in climate science has yet to be fully restored.

National responses

China: Overtaking the US as the world's largest emitter in 2007, China is responsible for ~22% of the world's carbon emissions. It has signed and ratified the Kyoto Protocol, but as a developing country the Protocol does not require any emissions reductions. China highly commends and supports the Copenhagen Accord and was a major driver behind the Cancun Agreement. Domestically, China will endeavour to lower its carbon dioxide emissions per unit of GDP by 40-45% by 2020 compared to the 2005 level; increase the share of non-fossil fuels in primary energy consumption to around 15% by 2020; and increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels.

United States of America: The world's second largest emitter with ~20% of the global share of carbon emissions. The USA has famously resisted any legally binding document for addressing climate change in global negotiations, but was a major driving force behind the Copenhagen Accord, agreeing to a reduction target in the range of 17% by 2020 (with a 2005 baseline) in conformity with anticipated US energy and climate legislation. It is formally engaging with the Cancun Agreement.

European Union: A driving force in international negotiations responsible for ~14% of the world's carbon emissions – in third place if counted as a single nation. In 2007 EU leaders endorsed a Climate and Energy Policy and committed to transforming Europe into an energy-efficient, low carbon economy, expected to take effect at the start of 2013 (post-Kyoto). The Policy aims by 2020 to (i) cut GHG by at least 20% of 1990 levels (and by 30% if other developed countries commit to comparable cuts); (ii) cut energy consumption by 20% of projected 2020 levels by improving energy efficiency; (iii) increase use of renewables (wind, solar, biomass, etc) to 20% of total energy production (currently $\pm 8.5\%$). The EU-27 signed and ratified the Kyoto Protocol, and is engaging with the Copenhagen Accord and the Cancun Agreement.

Examples of national responses within the European Union include:

France: Ranked as the 18th largest emitter, it is responsible for ~1% of global carbon emissions. Annual total greenhouse gas emissions are 415 million tonnes, which is approximately 6.5 tonnes per capita. France is one of the greenest economies in the European Union, mainly due to a national energy policy with a very low-carbon electricity mix, based on nuclear (80% of electricity) and hydro energies (10% of electricity). It also has a range of low-carbon policies, including low diesel fuel taxes, an annual tax based on the power of cars, binding objectives for fuel distributors to include a certain amount of biofuel in their fuel mix, subsidies through feed in tariffs for renewable energy, and transportation policies to improve public transportation modes e.g. the launch of the High-Speed Train, which is the longest rail network in the world after Japan.

Germany: The world's 6th largest emitter, accounting for ~3% of global carbon emissions. Annual total greenhouse gas emissions are 829 million tonnes, which is approximately 10 tonnes per capita. The German government has set itself ambitious targets for climate protection by adopting the German Strategy for Adaptation to Climate Change. Amongst other objectives, Germany aims to reduce its emissions by 40% by 2020 compared to 1990, and to facilitate an international post-2012 climate agreement with the help of the International Climate Initiative. It is also using revenues generated by emissions trading to invest in low carbon infrastructure such as solar facilities. Germany has also adopted the draft act on the demonstration and application of technologies for the capture, transport and permanent storage of carbon dioxide (CO₂).

Sweden: Sweden is ranked as the 60th largest emitter, responsible for ~0.17% of global carbon emissions. Annual total greenhouse gas emissions are ~65 million tonnes which is approximately 0.53 tonnes per capita. In 2008, total Swedish emissions had fallen by a total of 9% since 1990 due to a range of domestic policies. Examples include replacing oil-fired heating with biofuels, maintaining emissions from industrial energy use, electricity production and district heating at approximately the same levels as in 1990, and reducing emissions from agriculture and waste significantly since 1990, partly due to reduced landfill disposal of organic waste. There is also a Local Investment Programme (LIP) which promotes ecological sustainability at the local level and a Climate Investment Programme which provides subsidies for projects that reduce the impact of climate change.

United Kingdom: The UK is the 8th largest emitter globally, accounting for ~2% of global carbon emissions. Annual total greenhouse gas emissions are 575 million tonnes, which works out to be approximately 11 tonnes per UK resident. The UK is the first country in the world with a Climate Change Act, which requires UK emissions to be reduced by 80% from 1990 levels by 2050.

India: Is the world's 4th largest emitter, responsible for ~5% of the world's carbon emissions.. It has signed and ratified the Kyoto Protocol but faces the same problem as China in that it is a developing country that is not required by the terms of the Protocol to engage in emissions reductions. Domestically India pledged to endeavour to reduce the emissions intensity of its GDP by 20-25% by 2020 in comparison to the 2005 level of emissions – these targets however are not legally binding. It is formally engaging with the Copenhagen Accord and the Cancun Agreement.

Brazil: Another emerging economy, Brazil is ranked 17th and responsible for ~1% of global carbon emissions. Its list of voluntary domestic targets are expected to achieve a reduction of 36%-39% by 2020, and include a commitment to improving energy efficiency, investing in biofuels and renewable energy sources and reducing deforestation. Like China and India it signed and ratified the Kyoto Protocol but is not required to reduce emissions. It is also formally engaging with the Copenhagen Accord and the Cancun Agreement.

Hot Topic 3: Engineering the Future

New global investment in renewable energy reached \$243 billion in 2010, a doubling since 2006. As investment has increased, so has the variety and ingenuity of solutions including solar, wind, wave and tide. This drive has been supported by emerging policy frameworks, such as the EU's target for 20% renewable energy by 2020.

Beyond opportunities for energy efficiency and building-integrated renewables, it is crucial that the EU's electricity networks are modernised and incorporate large-scale renewable energy.

Wind

Global wind power installations increased by over 22% in 2010 to 194GW. The EU saw 50% growth in offshore wind in the UK, Denmark and Belgium during 2010.

Solar

Solar power for heat and electricity are generally building-scale solutions in the EU. Feed-In Tariffs have pushed installation in the EU and this will continue, helped by manufacturers predicting 15% reduction in costs for solar panels in 2011. Large-scale solar power is promised by concentrated solar power (CSP), which uses the sun's heat in desert habitats to drive turbines. Current estimates are that 1% of the world's deserts could provide for current world electricity use. Spain has led the way so far due to government support, along with North African and Middle Eastern countries.

Wave and tide

Despite remaining relatively untested, hopes remain high for harnessing wave and tidal power. Many projects are moving forward, both at shoreline and out to sea, with names like Limpet, Oyster and PowerBuoy.

Noorderzon (Performing Arts Festival)

Noorderzon Performing Arts Festival in Groningen is the first large event in the Netherlands to be awarded a silver 'Green Key' Certification. Green Key focuses on a number of issues including communication, water, safety, waste prevention and separation, energy, food and beverages, mobility and transport, merchandise etc. It has three levels of awards (bronze, silver, gold) based on commitment and reductions achieved, and is reviewed annually.

The festival provides organic and Fairtrade products, uses LED lights and recycled or FSC certified paper, and holds education workshops for staff and audience on recycling, waste separation, and water conservation. It offers free tap water, and educational brochures on the quality of tap water for audience, uses renewable energy to power the event – for example windmills and solar panels, and biofuels for generators – and has close relationships with universities and high schools for research and internships. Other initiatives underway include the development of sustainable stages using energy-saving filament-free lighting, merchandise produced using only wind and solar energy (Earth Positive T-shirts) and working with only socially responsible partners. Finally, the festival also measures the energy, water and waste consumption of its office operations year-round.

For more information visit: www.noorderzon.nl

Hot Topic 4: Controversies!

Biofuels

What they are: Fuels derived directly from living matter e.g. biodiesel, algal fuel, and bioethanol. There are three categories of biofuels which refer to the type of plant material used to create the fuel. The first category of biofuels are derived from plant material that is also a food source e.g. ethanol from corn. The second category of biofuels are derived from plant material that is not a food source such as biodiesel from inedible oil. The third category of biofuels refers to algae used to derive biodiesel. Currently only the biofuels in the first category are economically viable at scale.

Pros: Biofuel derived from waste products (such as used cooking oil or animal carcasses) has minimal environmental and carbon issues. There could be carbon benefits if the biofuels used are reducing or preventing carbon emissions overall. Biofuel crops are one of the main markets for Genetically Modified (GM) alternatives; all crops tend to have competing uses (i.e. for food or for energy), so the GM alternatives for biofuel crops could relieve pressure on food crops.

Cons: Biofuels may compete with food production, causing spikes in food prices and/or displacement of food cultivation to un-cleared lands i.e. rainforest (land-use change is a leading factor contributing to climate change). Increased production can lead to biodiversity loss and displacement of local communities. In the tropics crop and plantations cultivation contributes to carbon emissions through the clearing of carbon-rich forests; soil erosion from intensive agricultural methods; the large use of fertilisers; and the transport of feedstock. Producing biofuels from crops, plant material and algae is expensive and not necessarily economically viable, so biofuel generation tends to be heavily subsidised by governments.

Emissions Trading

What it is: As with cultural goods, our economy is not organised to fully value environmental goods and services. As a result the implicit costs of using and/or degrading environmental goods and services are often excluded from the external price, an extrinsic cost which, in economics, is termed an 'externality'. Climate change, for example, is the most dramatic example of a global negative externality. There are currently two ways to internalise the costs of climate change into our economy: taxation or a cap and trade scheme (see below and glossary). The rationale for a tax is to levy a price for carbon and, providing the price is set at the right level, low emission options will become attractive, thereby reducing carbon. The advantage of a tax is that price is certain; the disadvantage is the quantity of emissions reductions is not certain.

A cap and trade scheme turns the taxation model on its head by setting a limit on the quantity of emissions allowed over a given time period so reductions are certain, but the price per tonne will change depending on how easy it is for the economy to stay within the emissions limit. The EU Emissions Trading Scheme for large energy users is the largest trading scheme globally. A number of governments are considering carbon taxation as an option for reducing emissions.

Pros: Taxation will give rise to revenue that could be used to reduce other distortionary taxes. It is also more transparent than a cap and trade scheme as offenders will be clear on how much they need to pay for polluting. Under a cap and trade scheme, buyers of permits will be paying a charge for polluting whereas sellers will be rewarded for having reduced. Society thus incurs the lowest possible cost because those who can reduce emissions most cheaply will do so, whilst the rest will buy permits. It is preferential to society to auction polluting permits rather give them away for free or low cost as governments can use this revenue. However, polluting industries often argue they should be rewarded pollution permits as they are at an unfair advantage against competitors outside the system or have less polluting assets to begin.

Cons: Costing carbon could lead to a negative carbon leakage i.e. placing the regulated company or government at a disadvantage when compared to non-regulated peers. There are also associated distributional impacts, as it is argued that carbon pricing could disproportionately disadvantage the poor who have limited options to change consumption patterns. With a cap and trade scheme, if the cap is too high and too many emission permits are issued, permits may have a very low price, so there will be no incentives to reduce emissions. If the cap is too low and too few permits are issued, the result will be an excessively high permit price. Furthermore, initial free allocation of permits is often dependent on historic factors, such as the existing levels of pollution from a company at the time of allocation. This creates a disincentive to pollute before being allocated permits. The scheme also has associated issues of carbon leakage i.e. decrease in national emissions of countries involved in the scheme but an overall increase in global emissions.

Nuclear Power

What it is: Nuclear power is produced by controlled nuclear reactions. Nuclear power plants use nuclear fission reactions to heat water to produce steam, which is then used to generate electricity. Around 14% of the world's energy needs are met by nuclear power stations.

Pros: A sustainable energy source that reduces carbon emissions and increases national energy security by decreasing dependence on imported energy sources. Nuclear power produces little, if any, air pollution (i.e. smog, GHGs), and has an excellent operational safety record in the Western world. Risks of storing waste are believed to be small and further reduced by using the latest technology in reactors.

Cons: Issues with processing, transporting and storing radioactive nuclear waste. The engineering and components needed are the same as those used in the manufacture of nuclear weapons increasing the risk of nuclear weapons proliferation. Nuclear reactors are complex and often unpredictable, and in the case of nuclear accidents consequences are unknown. Environmental damage and health risks are associated with uranium mining, the raw material primarily used in nuclear reactors. New technology developed to reduce the risks associated with storing nuclear

waste is argued not to be sufficiently advanced to adequately minimise risks. When the lifecycle of the nuclear fuel chain is taken into account the carbon generated is not as minimal as simply assessing emissions from the energy produced. Opposition by local communities to nuclear power plants and waste storage facilities means that finding suitable sites is difficult. Lastly, uranium is a raw material in limited supply, just like oil, that will eventually run out.

Offsetting

What it is: A carbon offset is a mechanism that allows a company, organisation or individual to reduce their greenhouse gas emissions in one area of activity (e.g. building energy use or air travel) by investing in projects that seek to reduce the greenhouse gas emissions in another (i.e. energy efficiency, new clean technology, or forestation). The idea of carbon offsetting is to neutralise net emissions. The emissions saved from a carbon offset project should be certified as carbon reduction. These offset credits can then be sold and bought through the carbon market as tonnes of CO₂ equivalent. There are two types of offset credits: (i) those meeting the standards of the compliance market (i.e. EU emissions trading scheme and Kyoto Protocol) and (ii) the standards of the voluntary market (i.e. not regulated and therefore it is the responsibility of the buyer to discern if credits are resulting in environmental benefits). Offsets are not the solution to climate change as they do not, in themselves, reduce carbon and should only be used as part of a wider climate change mitigation strategy once all other feasible reductions have been achieved. Carbon offsetting can be organised at a domestic level, but more often than not carbon offsetting schemes are a transaction between industrialised and developing countries. This is because carbon offsetting is viewed as a climate change mechanism able to facilitate clean technology and development goals in developing countries, whilst enabling industrialised countries to reduce emissions cost effectively.

Pros: A cheap, fast, and simple way to manage carbon emissions in addition to direct emission reductions. Offset projects can result in direct financial benefits or project co-benefits (i.e. access to electricity) for small communities or projects, particularly in developing countries or countries with large areas of ecologically important land.

Cons: Questionable emissions reductions which can lack transparency and accountability. Risk of fraud and profiteering by individuals and companies, especially in the voluntary market. Some offset projects have unwanted effects for local communities and also might not result in emissions reductions.

Valuing Forestation

What it is: Despite our economy being reliant on the ecosystems that surround us (e.g. forests, oceans, soil), it does not value these goods and services in financial terms. Forests in particular provide us with a huge range of goods and services e.g. water purification, soil creation, pollution dilution and waste treatment, as well as being the home of millions of species upon which our ecosystem relies. Recent land-use changes in response to increasing global population have made forests vulnerable to deforestation. Forests are large carbon stores; cutting down trees will release large amounts of stored carbon into the atmosphere, further exacerbating climate change. Protecting and replanting forests will slow the rate of CO₂ going into the atmosphere. It is critical that the true value of forests is reflected in financial terms. In 2006 Sir Nicholas Stern published his seminal report 'The Economics Of Climate Change' in which he posited that the costs of avoiding a warming of 5°C through the mitigation of emissions will be 1% of GDP, compared to 5-10% of GDP for adaptation. More recently 'The Economics of Ecosystems and Biodiversity (TEEB) (2010)' proposes a framework to account for the true value of the environment. Forests protection is a relatively low cost climate mitigation option.

Pros: The costs of conserving biodiversity compared to the benefits are in a ratio of 1:10-1:100 according to TEEB. Reflecting the true costs of using the resources provided by forests could potentially lead to their conservation, which, as well as mitigating climate change, is crucial in stopping further biodiversity loss.

Cons: It is difficult to put a value on whole ecosystems such as forests. Forests are a common asset and should remain as the 'commons'. A low price could lead to disincentives to increase deforestation.

Imagine 2020 and Slow Boat

Imagine 2020 is a network of European arts organisations “working together to encourage artists and audiences to engage with the subject of climate change”. The network led to a two-year programme - Thin Ice - that profiled the partners' activities taking place in their respective countries addressing climate change, including the 2 Degrees festival in London in 2009. Imagine 2020's first commission, which will be launched in 2013 considers the issue of climate change artistically and practically; i.e. addressing artist and production travel, energy requirements, and locally produced sets and props. The Network, whose members include ArtsAdmin, Lift, Kaai Theatre, Le UAI, New Theatre Institute of Latvia also provides artists with green riders, employees with an eco-charter, and is working on providing audiences with good practice guidelines that include incentives such as providing free drinks to those who carpool.

For more information visit: www.imagine2020.eu

The British Council and ArtsAdmin organised the first Slow Boat Conference alongside the 2 Degrees festival of climate change-themed work that Artsadmin produced in July 2009 in London, UK. ArtsAdmin Co-director Judith Knight, conceived of Slow Boat after attending a TippingPoint meeting of scientists, artists and arts administrators to discuss imaginative responses to climate change, and becoming a founder member of the Imagine 2020 Network. Slow Boat was attended by over 100 theatre and dance companies to devise solutions to reduce the impact of international touring. Discussions ranged across the ecological impact of international performing arts practices; linking international cultural exchange to sustainability; and exploring whether artist mobility is still desired and tenable. Many artists currently depend on air travel for their livelihood, and Slow Boat wants to stimulate practical ideas for alternatives.

Kaaithheater, VTi and Imagine 2020 held the second Slow Boat Conference in Brussels in late 2010, focusing mainly on how to build up an international arts practice when the context is a socio-ecological crisis. Other issues included alternatives to travel and touring; slowing down and what the consequences of that would be; whether terms such as 'relocalising' and 'permaculture' are relevant to the arts; what is the footprint of residence-hopping and how fruitful it is.

The next Slow Boat will take place in late 2011. For more information contact: www.artsadmin.co.uk

Hot Topic 5: Up in the Air or Out to Sea?

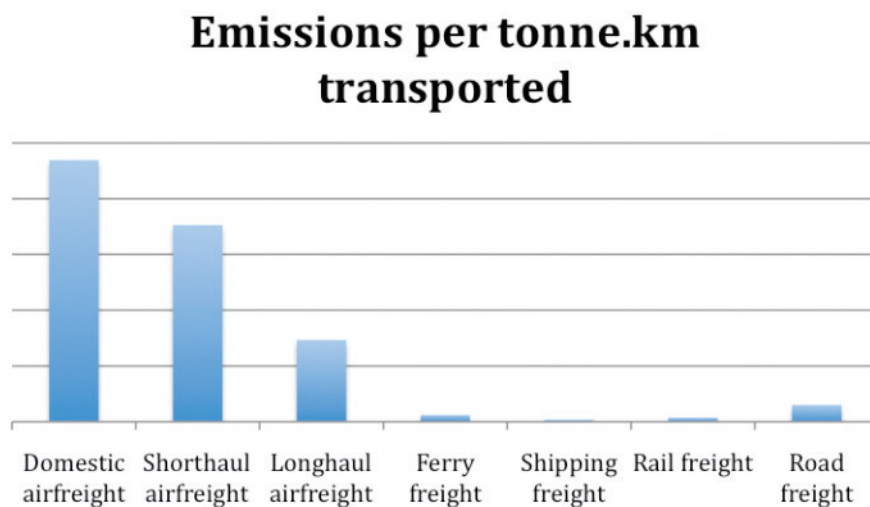
(Adapted from the original developed by Tristan Smith, University College London Energy Institute)

Touring is, by definition, contingent on travel – often by air. At the moment the greenhouse gas (GHG) emissions created by aviation and shipping account for approximately 3% of global emissions each. Neither industry shows signs of slowing down; aviation and shipping are the workhorses of globalisation, with 80% of global trade travelling by ship. Given current trends in aviation and shipping if we fail to control emissions these sectors will represent a much more significant proportion of global greenhouse gas emissions.

However due to the lack of renewable and biofuel solutions neither the aviation nor the shipping sector currently foresees an imminent switch away from liquid fossil fuels, despite the EU's efforts at regulation through the GHG Emissions Trading Scheme (ETS). Effective emissions reductions are only likely if organisations make careful decisions about how much they travel and where they source raw materials and products.

In terms of freighting, airfreight is easily the worst emitter (see **Figure 4** below) and whenever possible preference should be given to transport by ship, rail and road. Within Europe rail and road are the more efficient modes for freighting production. For inter-continental, sea freight is the most efficient mode. However, any decision must be based on the details of the specific route.

Figure 4 Emissions per tonne.km transported



NTM (Swedish Network for Transport and the Environment),
cited in the British Chamber of Shipping (2009).

When it comes to passenger transport it is harder to generalise about the relative greenhouse gas emissions of different types of transport. Europe has a comprehensive rail network, and developing a trans-European high-speed rail network is a stated goal of the European Union. However, travel by a full coach or van can be more efficient than travel by train. Long distance passenger travel by sea may not result in significant carbon savings compared to flying due to the poor fuel efficiency and occupancy of the ship services.

If aviation is the selected mode of passenger transport then you can choose the most efficient type of flight. This means travelling economy with as few changes as possible. For short-haul, business class produces 50% more emissions per passenger than economy. For long-haul journeys, first class produces 4 times more emissions per passenger than economy.

Hot Topic 6: Me and My Car

(Adapted from the original developed by Jillian Anable, University of Aberdeen)

The transport sector is consistently responsible for around a quarter of carbon dioxide emissions in developed countries, two-thirds of which are accounted for by individuals' travel, and the rest by freight. Transport is also one of the few sectors of the economy where emissions continue to increase year-on-year despite improvements in vehicle efficiency and information and communication technology. Leisure travel, in all its guises (excluding shopping), is responsible for around 30% of personal travel emissions and is one of the fastest growing sectors of car based travel demand.

Audience travel is no exception to these trends, being the largest cause of greenhouse gas emissions in the performing arts sector. While it is not necessarily within their direct control, it is still crucial that performing arts organisations do everything they can to encourage audiences to make low environmental impact travel choices.

Opportunities for government and EU-wide policy to reduce leisure travel carbon emissions involve a consideration of engine efficiency, how vehicles are being used, the mode of transport used to meet a given demand, and distance travelled to leisure activities. Improvements in vehicle and fuel technologies of motorised transport is an obvious priority, but travel demand is growing faster which diminishes the impact of savings achieved by more efficient vehicles and fuels.

Evidence provided by studies into mobility management now points to the potential of a great number of low cost interventions that would reduce the environmental impacts of leisure travel, such as ticketing and pricing alterations, car clubs and car sharing schemes, personalised journey planning and promotional campaigns to alter travel choices.

Efforts to influence audience travel patterns require excellent partnership between transport operators, promoters, local authorities and venues. As transport psychologists and sociologists suggest, the key will be to create and market journey experiences which rival the independence, flexibility and perceived lack of stress offered by the private car. The challenge is to make the audience's journey experience become an integral part of the whole cultural experience.

Hot Topic 7: Shine a Light

Lighting has a central role in shaping the aesthetics of a show. In order to maintain a competitive edge and provide audiences with increasingly spectacular events, there is often pressure on productions to use extraordinary lighting features. These features can rely on inefficient lighting technology, which drives up environmental impacts and energy costs.

Striking a balance between the aesthetic and the environmental demands of a show is possible with smart lighting design and technologies.

Much is possible through behaviour change, for example simply turning lights off between rig-check and the show. Designer behaviour change includes recognising that all light is relative, ensuring bulbs are dimmed whenever possible, utilising whatever the venue already has in stock, using the lowest wattage Source Four you can manage, and choosing tungsten moving lights rather than discharge. Anecdotal evidence provided to Julie's Bicycle is that this kind of intelligent design can halve the wattage of the show and the final lighting energy consumption.

Touring productions present the additional challenges of transporting or hiring kit. Reducing power demand usually reduces the amount of equipment taken on the road, which reduces transport impacts too.

In recent years LED (light emitting diode) based technological innovations have enabled artistic directors and lighting designers to further reduce power demand. LED washlights and cycloramas are starting to enter common use, due to their great energy efficiencies, longer operational life and lower heat load. Most designers feel LED light quality has remained too cold to light skin, however, several recent LED solutions such as quads offer a white and amber mix to give a warm enough light, while also offering RGB for flexibility. Investment in new technology is risky, but as electricity costs rise the pay-back period for LEDs shortens.

Electrosmog (festival)

Electrosmog Festival, the International Festival for “Sustainable Immobility “ got its name by asking the question “Are increased electronic connections truly more energy efficient and ecologically sustainable? Or do they lead to new forms of electromagnetic pollution?” Based in several countries around the globe, all the events at the festival take place in at least two locations connected in real time and are streamed online, creating local hubs for audiences, join in discussions and debates and visit virtual theatres. The festival explores the concept of sustainable immobility in theory and in practice, documenting and archiving all online events that take place, but requiring absolutely no travelling.

The Festival is underpinned by the growing global crisis of mobility of people and products in travel and transport. It seeks to explore a lifestyle with stronger links to local cultures while deepening connections to others across any geographical climate, by means of new communication technologies instead of physical travel.

The central question of the festival is “How can a sustainable, immobile way of life be achieved?”, emphasising the need for technological and non-technological solutions. The events it hosts bring together a broad coalition of designers, environmentalists, urban and spatial planners, technologists, artists, theorists and citizens to explore the issue, and includes theoretical debates and discussions, performances, art projects, exhibits and screenings. So far one Electrosmog Festival has taken place, involving audience from various locations including Amsterdam, Riga, New York, Madrid, Helsinki, London, Banff, New Zealand, Munich and Delhi.

For more information visit: www.electrosmogfestival.net

Sigrid Niemer, ufaFabrik, Germany

“Including the arts in a sustainable strategy means activating the resources of creativity, humour and awareness – powerful partners on the way to a better quality of life for all of us.”

Hot Topic 8: To Ply or Not to Ply?

Set construction, storage and disposal is an essential part of the production cycle in the performing arts and comprises a range of possible environmental impacts and opportunities. Financial constraints can make sustainable sourcing of materials prohibitive. However reusing materials during construction, or recycling the set rather than sending it to landfill, can have financial benefits.

Materials

There are various materials available for set construction. Timber is environmentally benign compared to metal structures. However, timbers have variable environmental credentials depending on the variety and source. Tropical hardwood plywood, or “ply” (a timber product manufactured from thin sheets of wood) is important to avoid as its legality is difficult to verify; it is a very low value product of tropical hardwood and its use drives further tropical deforestation. 13 million hectares of forest were destroyed each year from 2000-2010, resulting in approximately 20% of the world’s annual GHG emissions. Better choices are softwood or temperate hardwood ply, and ensuring all timber is Forest Stewardship Council (FSC) certified.

Storage and reuse

For the numerous small- and middle-scale performing arts companies storage space is unavailable and tight budgets do not include storage facility fees. This is compounded by the uncertainty of re-using the set in the future. Solutions include smaller companies sharing the costs of storage facilities for the most valuable or reusable items, or specialist salvage companies managing the recycling, storage and reuse of sets, scenery elements and props.

Transport

When a production is on a short tour, it is often impractical to construct the set locally, due to cost and time constraints. The end result is the generation of GHG emissions produced by the planes, ships and trucks carrying the set around the world. Furthermore, once transported to another region, it may be illegal to dispose of the set locally as export-import regulations may require the set to be returned to the country of origin. This translates into higher transport costs and emissions. Improvements can be achieved by planning transport during set design, for example by setting a target of one truck or container for transport.

Hot Topic 9: Snacking on Emissions

Eating and drinking are an absolutely central part of live performances – whether that be keeping artists and crew going through intensive work schedules, or for audiences as part of a special night out. Both food production and disposal lead to the emission of greenhouse gases (GHGs), and food is estimated to contribute about a third of Europe’s GHG emissions. Here’s why:

- Cows and sheep produce methane – a GHG 23 times more potent than carbon dioxide – resulting in 6% of world GHG emissions.
- Deforestation for agriculture releases carbon into the atmosphere. For example in 2004-5 1.2 million hectares of Amazon rainforest were cleared and planted with soy for animal feed. These forests are critical stores of carbon emissions.
- Pesticides and fertilisers are made directly from oil and gas – it takes 3 calories of oil to produce one calorie of wheat, and 54 calories of oil to produce one calorie of beef.

- Both heating and lighting to grow food locally but out of season, and flying out of season food within and into the EU, have carbon impacts which vary according to type of food and distance.
- Chilled storage and transport – worldwide 15% of electricity is used for refrigeration.
- Packaging at every stage can result in significant waste, especially of plastics.
- Wasted food rotting in landfill emits methane – in Europe on average 50% of food grown is wasted. (Lundqvist, J. 2010 Producing More or Wasting Less)

The answer? Choose dairy-free, meat-free, organic, seasonal, local, fresh and unpackaged food, and eat it all! As a rule of thumb choosing dairy and meat free and choosing organic are the most important and equally beneficial and often meet the other criteria anyway. These choices also help other issues such as water use and pollution. Choosing food carefully and reducing waste can save money as well as environmental impacts, while also sending a visible (and tasty) signal to colleagues and audiences that the venue or event is committed.

Many choices are simply common sense, and there are some certification schemes to help. The Soil Association's organic mark is widely recognised in the UK, France uses the AB symbol, Germany uses the 'bio' label and the Demeter label is widely recognised to be the most stringent organic label. Globally, the Sustainable Food Lab, a network of business, non-profit and public organisations, has been working to accelerate the shift of sustainable food from niche to mainstream.

Thomas Walgrave, Alcantara, Portugal

“Top names from the contemporary dance world have been championing environmental issues by, for example, not travelling with large numbers of trailers, and putting on simpler performances with fewer lighting requirements, and the quality of their work is only becoming better.”

KVS (theatre company)

KVS is a leading theatre company in Brussels, which is seriously investigating how changes in its operational behaviour can reduce its carbon output. A theatre company that has characterised itself by engaging relentlessly on the international scene, it is now reflecting on the consequences of that engagement in not just environmental but also social and professional contexts, exploring the argument between internationalisation and participation, and the tension between the global and the local.

The artistic director of the KVS, Jan Goossens, who gave the keynote at the second Slow Boat Conference in Brussels in late 2010, seeks to examine the social contextualisation of international arts practice. He noted that so much effort has gone into travelling elsewhere to find the next 'big thing' on the international scene, without even thinking to look into one's own backyard for the 'international'. Through this argument Jan wanted to draw attention to this urgent global problem in the context of reviewing established practices which may no longer be effective or appropriate, providing a motivation and opportunity for artists, programmers and presenters to rethink what they do, and evolve cultural production imaginatively by developing new templates to create new work and new producing environments in which that work can happen.

For more information visit: www.kvs.be

Adapted from David Pledger's "Notes from Brussels" blog

www.australiacouncil.gov.au/special_projects/initiatives/arts_market_development_officers/david_pledger_notes_from_brussels

7.0 Here to Help

Touring companies and arts organisations will need to respond to the many issues associated with environmental sustainability for a burgeoning number of reasons: legislative or funding requirements, opportunities for operating efficiencies thereby reducing costs, preparing for future compliance, or they may consider themselves ethically responsible to their organisations, audiences and artists.

This section identifies some of the emerging resources available to help touring companies and arts organisations improve their environmental performance. These resources fall broadly into three categories:

Tools – usually online calculators and databases that offer automated but targeted information.

Guidance – on or offline publications that gather together best practice, advice, worksheets, templates and case studies to inspire improved environmental performance.

Certifications, Standards and Awards – assessment, labelling and award programmes support environmental ambitions by offering assurances that a product or service has met predetermined environmental criteria, or is complying with environmental standards. They can also provide guidance directly to the certifying or awarded organisation, by specifying what organisational practices are required to achieve a minimum level of achievement.

The options below should be seen as a starting point. Touring companies and arts organisations should search for local resources that can complement performing arts-specific resources. Often local municipalities, central government environment departments, NGOs, charities or universities develop generic resources that can be beneficial to performing arts organisations.

7.1 Tools and Databases

Julie's Bicycle IG (Industry Green) Tools

Developed specifically for the arts and creative industries, the IG Tools are free online carbon calculators suitable for use across the world. The IG Tools measure the greenhouse gas emissions produced by touring, venues, festivals and offices. The IG Tool will provide results on greenhouse gas emissions generated by energy, water, waste, audience and business travel. For touring companies, the IG Tour Tool can be used as a planning tool before the tour takes place, to calculate expected emissions, and can then be revisited when the tour is complete to identify the actual emissions. Alongside the IG Tools are tips, guidance, resources and publications on the Julie's Bicycle website.

www.juliesbicycle.com/resources

Auto Diagnostic Tool for Environmental Responsibility Events (ADERE)

ADERE – the Auto Diagnostic Tool for Environmentally Responsible Events is a three-stage tool for analysing the environmental impacts of events. The tool has been developed in cooperation with organisers of cultural, sporting and professional events, non-government organisations involved in environmental protection, and ADEME, the French Agency for Environment and Energy Management. It asks a series of questions divided into six themes: food, advocacy, transportation, accommodation, places, technique and decoration, and communication. Reporting takes place before, during and after the event. The tool identifies an event's environmental impacts, and tips to reduce them. Additional documents can be downloaded.

www.evenementresponsable.fr

Transport Direct Carbon Calculator

By entering journey distance and intended travel mode this free calculator will compare the greenhouse gas emissions across different travel modes (car, rail, bus/coach and plane).
www.transportdirect.info/Web2/Tools/Home.aspx?cacheparam=4

Inventory of Carbon and Embodied Database

The University of Bath has developed the ICE database. It enables you to calculate the embodied energy and carbon emissions that are associated with different materials used to create a stage set. To use the database you will need to know the type and quantity of materials used.
www.bath.ac.uk/mech-eng/sert/embodied

7.2 Guidance

Environmental Policy

It is beneficial for all organisations and companies to have an Environmental Policy, which focuses on the environmental impacts created by their activities and includes commitments and strategies to reduce those impacts. Julie's Bicycle has information, guidance and templates for developing an environmental policy appropriate for your organisation or company.
www.juliesbicycle.com/resources

Green Rider template

Julie's Bicycle has developed a template as well as environmental sustainability contract clauses that touring companies can use and adapt to the specific needs of their project. In addition, Julie's Bicycle can also provide guidance if the venue or promoter wants to request incoming productions to adhere to a set of environmental guidelines.
www.juliesbicycle.com/resources

GRI: Sustainability reporting guidelines

The Global Reporting Initiative (GRI) is a network-based organisation that has pioneered the development of a widely used sustainability reporting framework. They are committed to its continuous improvement and application worldwide. This framework sets out the principles and indicators that organisations can use to measure and report their economic, environmental, and social performance. A sector supplement for Events will be launched in autumn 2011.
www.globalreporting.org/Home

7.3 Certifications, Standards and Awards

AB Symbol

In France, organic certification was introduced in 1985. The certification for the green-white "AB – agriculture biologique" label fulfills the EU regulations for organic food. The certification process is overseen by a public institute ("Agence française pour le développement et la promotion de l'agriculture biologique" usually shortened to "Agence bio") established in November 2001. The actual certification authorities include a number of different institutes like Aclave, Agrocert, Ecocert SA, Qualité France SA, Ulase, SGS ICS.
www.agencebio.org

Bio label

The German national “Bio” label is a hexagonal green-black-white mark with wide popularity – in 2007 there were 2431 companies having certified 41708 products. The popularity of the label is extending to neighbouring countries like Austria, Switzerland and France.

www.organic-bio.com/en/labels

Demeter label

Demeter International is the largest certification organisation for biodynamic agriculture, and is one of three predominant organic certifiers. The “Demeter” label has been in use since 1928 and it is still regarded as providing the highest standards for organic food in the world.

www.demeter.net

EMAS

The Eco-Management and Audit Scheme is a voluntary initiative established by European regulation to improve companies’ environmental performance.

ec.europa.eu/environment/emas/index_en.htm

Fairtrade

The FAIRTRADE Mark is an independent consumer label which appears on products in over 50 countries as a guarantee that they have been certified against internationally agreed Fairtrade standards. The Mark indicates that the product has been certified to give a better deal to the producers involved – it does not act as an endorsement of an entire company’s business practices.

www.fairtrade.net

FSC

The FSC logo is a branded global trust mark that identifies responsible forest management in the market place. It empowers consumers to make responsible purchasing decisions on forest products. All forest products with the FSC label carry a guarantee to consumers that the product comes from responsible sources. An FSC certified product can only carry the FSC logo if the production chain can be fully and reliably traced from the forest through each and every processing stage all the way to the shelf. There are three FSC labels: FSC pure, FSC mixed sources and FSC recycled.

FSC 100% label: Products that come only from well-managed forests that have met FSC’s high social and environmental standards.

FSC mixed sources: Products that support the development of responsible forest management worldwide. The wood comes from FSC-certified, well-managed forests, recycled material and/or controlled wood from non-controversial sources.

FSC recycled: Products that support the re-use of forest resources which helps to reduce the pressure on natural forests.

Green Key

An international eco-label primarily for hospitality facilities that aims to contribute to prevention of climate change and sustainable tourism by awarding and promoting good initiatives.

www.green-key.org

Greener Festival Award

Applicable internationally, the Greener Festival Award scheme is based around the twin aims of promoting greener practices and promoting sustainability at festivals.

www.agreenerfestival.com

Industry Green

The Industry Green certification was developed by Julie's Bicycle in the UK, with international applicability. It is based on four principles of environmental good practice: commitment, understanding, improvement and communication. It is available for festivals and outdoor events, venues, offices and CD packaging. With CO₂ reduction at its heart, the certification requires a body of evidence gathered over a 12 month period, covering impacts associated with energy, water, waste and travel alongside organisational commitment, improvement and communication. It is an industry-endorsed brand, and the certification is externally assessed by the Environmental Change Institute, Oxford University and verified by an independent Expert Advisory Group.

www.juliesbicycle.com/industry-green

ISO (International Organisation for Standardisation)

Provides both guidance for implementing an environmental management system and a standard against which organisations can be certified by a third party assessor. ISO is currently developing an international version of British Standard (BS) 8901, a standard that specifies requirements for planning and managing sustainable events of all sizes and types. This guidance is more suitable to an event host (e.g. venue or festival) rather than touring company.

www.iso.org/iso/home.html

Soil Association

Any product sold as 'organic' must comply with strict rules set at UK, European and international levels. These rules (known as standards) assure consumers they are buying genuinely organic products that can be fully traceable back to the farm. A product with the Soil Association symbol indicates that it not only meets the UK government's minimum requirements, but also exceeds them – especially in areas concerning the environment and animal welfare. The Soil Association have also developed standards for areas not covered by government or EU regulations such as conservation, fish farming, textiles, and health and beauty care products.

www.soilassociation.org

The ICC Birmingham (venue)

The ICC Birmingham is taking on the challenge of tackling audience travel impacts by offering a carbon calculator on its website to help audiences work out the different carbon emissions that their travel choices produce. The ICC is accessible by five different types of travel (bus, coach, car, air and train) or even on foot, which means there are really compelling alternatives to travel by car. The calculator makes clear the benefits of these alternatives – it also provides audiences with the option of offsetting their journey if they wish, in collaboration with a charitable carbon offset company.

For more information visit: www.theicc.co.uk/carboncalculator

8.0 Glossary

Atmosphere

The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen and oxygen, together with trace gases including carbon dioxide and ozone.

Aerosols

A collection of air-borne solid or liquid particles, with a typical size between 0.01 and 10µm, that reside in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. Aerosols may influence climate in two ways: directly through scattering and absorbing radiation, and indirectly through acting as condensation nuclei for cloud formation or modifying the optical properties and lifetime of clouds.

Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation:

Anticipatory adaptation - Adaptation that takes place before impacts of climate change are observed. Also referred to as proactive adaptation.

Autonomous adaptation - Adaptation that does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation.

Planned adaptation - Adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state.

Biosphere

The part of the Earth system comprising all ecosystems and living organisms in the atmosphere, on land (terrestrial biosphere), or in the oceans (marine biosphere), including derived dead organic matter, such as litter, soil organic matter, and oceanic detritus.

Biodiversity

The total diversity of all organisms and ecosystems at various spatial scales (from genes to entire biomes).

Biofuels

Fuels derived directly from living matter e.g. biodiesel, algal fuel, and bioethanol. There are three categories of biofuels, which refer to the type of plant material used to create the fuel. The first category of biofuels are derived from plant material that is also a food source i.e. ethanol from corn. The second category of biofuels are derived from plant material that is not also a food source i.e. biodiesel from inedible oil. The third category of biofuels refers to algae used to derive biodiesel. Currently only the biofuels in the first category are economically viable at scale.

Biomass

The total mass of living organisms in a given area or volume; recently dead plant material is often included as dead biomass. The quantity of biomass is expressed as a dry weight or as the energy, carbon or nitrogen content.

Cap and Trade Scheme

A central authority (usually a government body) sets a limit or cap on the amount of a pollutant that can be emitted. The limit or cap is allocated or sold to firms in the form of emissions permits which represent the right to emit or discharge a specific volume of the specified pollutant. Firms are required to hold a number of permits (or credits) equivalent to their emissions. The total number of permits cannot exceed the cap, limiting total emissions to that level. Firms that need to increase their emission permits must buy permits from those who require fewer permits. The transfer of permits is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions. Thus, in theory, those who can reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest cost to society.

Carbon Dioxide

A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

Carbon Dioxide Equivalent (CO₂e)

The universal unit of measurement used to indicate the global warming potential (GWP) of each of the 6 Kyoto greenhouse gases. It is used to evaluate the impacts of releasing (or avoiding the release of) different greenhouse gases.

Carbon Footprint

A measure of the impact human activities have on the environment in terms of the amount of greenhouse gases produced, measured in units of carbon dioxide.

Carbon Dioxide Sink

A carbon dioxide reservoir that is increasing in size. Main natural sinks are (1) the oceans (absorbed about one-third of all human-generated CO₂ emissions to date), and (2) plants that use photosynthesis to remove carbon from the atmosphere by incorporating it into biomass and release oxygen into the atmosphere. This concept of CO₂ sinks has become more widely known because the Kyoto Protocol allows the use of carbon dioxide sinks as a form of carbon offset.

CDM (Clean Development Mechanism)

The CDM allows greenhouse gas emission reduction projects to take place in countries that have no emission targets under the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol, yet are signatories.

Climate

Climate in a narrow sense is usually defined as the “average weather,” or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organisation (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind.

Climate Change

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability over comparable time periods.

Climate Justice

Reparation for the past and entitlement to equal standards of living for the future.

Deforestation

A natural or anthropogenic process that converts forest land to non-forest. See afforestation and reforestation.

Direct Emissions

Emissions that are produced by organisation-owned equipment or emissions from organisation-owned premises, such as carbon dioxide from electricity generators, gas boilers and vehicles, or methane from landfill sites.

Ecological Footprint

Ecological footprint analysis compares human demand on nature with the biosphere's ability to regenerate resources and provide services. Using this assessment, it is possible to estimate how many planet Earths it would take to support humanity if everybody lived a given lifestyle.

Embodied Energy and Carbon

Embodied energy is defined as the commercial energy (fossil fuels, nuclear, etc) that was used in the work to make any product, bring it to market, and dispose of it. Embodied energy is an accounting methodology which aims to find the sum total of the energy necessary for an entire product lifecycle, including raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition.

The term ‘embodied carbon’ refers to carbon dioxide emitted at all stages of a good’s manufacturing process, from the mining of raw materials through the distribution process, to the final product provided to the consumer. Depending on the calculation, the term can also be used to include other GHGs.

Emissions

The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Emissions Standards

Requirements that set specific limits to the amount of pollutants that can be released into the environment. Many emission standards focus on regulating pollutants released by cars but they can also regulate emissions from industry, power plants, small equipment such as lawn mowers and diesel generators. The 700 million cars currently on the world's roads produce 2.8 billion tons of CO₂ annually. This represents 20% of the world's CO₂ emissions.

Emissions Trading

Like with cultural goods, our economy is not organised to sufficiently value environmental goods and services in financial terms. As a result the implicit costs of using and/or degrading environmental goods and services are often excluded from the external price, which in economics is termed an 'externality'. Climate change, for example, is the most dramatic example of a global negative externality. One of the two ways currently available to internalise the costs of climate change into our economy is a cap and trade scheme. The scheme sets a limit on the quantity of emissions allowed over a given time period so reductions are certain, but the price per tonne will change depending on how easy it is for the economy to stay within the emissions limit. The EU Emissions Trading Scheme for large energy users is the largest trading scheme globally. A number of governments are considering carbon taxation as an option for reducing emissions.

Energy Efficient Lighting Equipment

Efficient energy use, sometimes simply called energy efficiency, is the goal of efforts to reduce the amount of energy required to provide products and services. For example, installing fluorescent lights or natural skylights reduces the amount of energy required to attain the same level of illumination compared to using traditional incandescent light bulbs. Compact fluorescent lights use two-thirds less energy and may last 6 to 10 times longer than incandescent lights. Improvements in energy efficiency are most often achieved by adopting a more efficient technology or production process.

Environmental Credentials

Qualifications and/or achievements of an organisation in the remit of environmental sustainability, such as a certification (e.g. Industry Green, BS 8901, ISO etc).

Environmental Impacts

The effects human activity has on the environment, usually measured in terms of carbon dioxide equivalent. Examples of negative impacts on the environment include emissions released from travel, from energy, waste and water consumption, from accommodation, etc.

Environmental Sustainability

Environmental sustainability refers to the ability of natural ecosystems to remain diverse and productive, thus being able to support life over a period of time. All human activity is based on these ecological goods and services. Some human activities, such as the excessive production of GHG emissions (including carbon dioxide), has led to the decline in natural ecosystems and to changes in the balance of natural cycles, thus undermining and degrading the capacity of ecosystems to continue supporting life. Living sustainably, for example, by reducing carbon dioxide and other GHG emissions, will ensure the long-term viability and productivity of these ecosystems, providing both humans and other living systems with the capacity to endure. It is in this context that we create a direct link between GHG emission reductions and environmental impacts.

Global Warming

The continuous gradual rise of the earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate patterns (see also Climate Change).

Global Warming Potential (GWP)

The GWP is an index that compares the relative potential (to CO₂) of the 6 greenhouse gases to contribute to global warming i.e. the additional heat/energy which is retained in the Earth's ecosystem through the release of this gas into the atmosphere. The additional heat/energy impact of all other greenhouse gases are compared with the impacts of carbon dioxide (CO₂) and referred to in terms of a CO₂ equivalent (CO₂e) e.g. Carbon dioxide has been designated a GWP of 1, Methane has a GWP of 23.

Green Champions

Individuals within organisations or organisations that are willing to be sector leaders in the environmental sustainability remit, piloting initiatives and campaigns.

Green Rider

A Green Rider is intended to offer guidelines for all touring companies, and to stimulate dialogue between visiting managers and venues about best practice in reducing environmental impacts. It follows the format of a technical rider that performing arts companies have been accustomed to use, and focuses on putting on environmentally sustainable productions.

Greenhouse Effect

Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back towards space from the Earth's surface is absorbed by water vapour, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase. See greenhouse gases, anthropogenic, climate, global warming.

Greenhouse Gases

The current Intergovernmental Panel on Climate Change (IPCC) inventory includes six major greenhouse gases. These are Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF₆).

Greenhouse Gas Protocol

Greenhouse Gas Protocol is the most widely used international standard for understanding, quantifying, and managing greenhouse gas emissions. It is published by the World Business Council for Sustainable Development and the World Resources Institute.

Indirect Emissions

Emissions that are a consequence of the activities of the reporting company but occur from sources owned or controlled by another organisation or individual. They include all outsourced power generation (e.g. electricity, hot water), outsourced services (e.g. waste disposal, business travel, transport of company-owned goods) and outsourced manufacturing processes. Indirect emissions also cover the activities of franchised companies and the emissions associated with downstream and/or upstream manufacture, transport and disposal of products used by the organisation, referred to as product life-cycle emissions.

Industry Green (IG) Touring Tool

Julie's Bicycle has developed a suite of online, free carbon calculators designed specifically for the arts and creative industries, to enable users to calculate their carbon footprint. The Touring tool specifically, asks for general information on the tour in question, as well as information on the number of performances, accommodation, personnel travel, show power demand and freightage, if applicable, and enables users to note any innovations and initiatives they have been involved in. The Touring Tool is just one of the four tools currently available – the others are Venues, Festivals/Outdoor Events and Offices.

IPCC

The Intergovernmental Panel on Climate Change. A special intergovernmental body established by the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO) to provide assessments of the results of climate change research to policy makers.

Kyoto Protocol

The Kyoto Protocol originated at the 3rd Conference of the Parties (COP) to the United Nations Convention on Climate Change held in Kyoto, Japan in December 1997. It specifies the level of emission reductions, deadlines and methodologies that signatory countries (i.e. countries who have signed the Kyoto Protocol) are to achieve.

LED Lights

A light-emitting diode (LED) is a semiconductor light source – they are used as indicator lamps in many devices and are increasingly used for other lighting. LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved robustness, smaller size, faster switching, and greater durability and reliability.

Life Cycle Analysis (LCA)

Aka a 'life cycle assessment', or 'cradle to grave analysis', is an investigation and valuation of the environmental impacts of a given product or service caused or necessitated by its existence. It is a variant of input-output analysis focusing on physical rather than monetary flows.

Methane (CH₄)

A hydrocarbon that is a greenhouse gas with a global warming potential (GWP) most recently estimated at 23 times that of carbon dioxide (CO₂). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. The GWP is from the IPCC's Third Assessment Report (TAR).

Nitrogen Oxides (NO_x)

Gases consisting of one molecule of nitrogen and varying numbers of oxygen molecules. Nitrogen oxides are produced in the emissions of vehicle exhausts and power stations. In the atmosphere, nitrogen oxides can contribute to the formation of photochemical ozone (smog), can impair visibility, and have health consequences; they are thus considered pollutants.

Nitrous Oxide (N₂O)

A powerful greenhouse gas with a global warming potential of 296 times that of carbon dioxide (CO₂). Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilisers, fossil fuel combustion, nitric acid production, and biomass burning. The GWP is from the IPCC's Third Assessment Report (TAR).

Offsetting

A carbon offset is a mechanism that allows a company, organisation or individual to reduce their greenhouse gas emissions in one area of activity (e.g. building energy use or air travel) by investing in projects that seek to reduce the greenhouse gas emissions in another (i.e. energy efficiency, new clean technology, or forestation). The idea of carbon offsetting is to neutralise net emissions. The emissions saved from a carbon offset project should be certified as carbon reduction. These offset credits can then be sold and bought through the carbon market as tonnes of CO₂ equivalent.

Pollutants

Carbon monoxide [CO]: road transport is responsible for 90% of the carbon monoxide in the air.

Nitrogen dioxide [NO_x]: a highly poisonous brown gas formed in high temperature environments, contributes to visibility degradation.

Sulphur dioxide [SO₂]: is a colourless, non-flammable gas with a penetrating odour that irritates the eyes and air passages.

Particulates [PM₁₀]: tiny particles responsible for most of the smell and dirt associated with traffic pollution. Mostly diesel vehicles are responsible for 90% of the particulates in the air.

Ozone [O₃]: Smog, or ground-level ozone, is the build up of secondary photochemical pollutants.

Benzene and 1,3-Butadiene: These are part of a group known as polycyclic hydrocarbons. They are carcinogens caused mostly by petrol vehicles.

Lead [Pb]: a soft heavy malleable toxic metal, causes blood and brain disorders.

Reforestation

Planting of forests on lands that have previously contained forests but that have been converted to some other use. For a discussion of the term forest and related terms such as afforestation, reforestation and deforestation, and see the IPCC Special Report on Land Use, Land-Use Change, and Forestry (IPCC, 2000).

Renewable energy sources

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished).

Stratosphere

Highly stratified region of atmosphere above the troposphere extending from about 10 km (ranging from 9 km in high latitudes to 16 km in the tropics) to about 50 km.

Sustainable development

Development that meets the cultural, social, political and economic needs of the present generation without compromising the ability of future generations to meet their own needs.

Troposphere

The lowest part of the atmosphere from the surface to about 10 km in altitude in mid-latitudes (ranging from 9 km in high latitudes to 16 km in the tropics on average) where clouds and 'weather' phenomena occur. In the troposphere, temperatures generally decrease with height.

United Nations Framework Convention on Climate Change (UNFCCC)

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognises that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified.

Water Vapour

The most abundant greenhouse gas, it is the water present in the atmosphere in gaseous form. Water vapour is an important part of the natural greenhouse effect. While humans are not significantly increasing its concentration, it contributes to the enhanced greenhouse effect because the warming influence of greenhouse gases leads to a positive water vapour feedback. In addition to its role as a natural greenhouse gas, water vapour plays an important role in regulating the temperature of the planet because clouds form when excess water vapour in the atmosphere condenses to form ice and water droplets and precipitation. See greenhouse gases.

Weather

Atmospheric condition at any given time or place. It is measured in terms of wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season. Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organisation (WMO). Climate in a wider sense is the state, including a statistical description, of the climate system. A simple way of remembering the difference is that climate is what you expect (e.g. cold winters) and 'weather' is what you get (e.g. a blizzard).

Benjamin Costantini, La Crème Records, Spain

"When it comes to touring management, Creative Commons is more than an internationally-connected digital rights-licensing infrastructure. Think about it whenever you plan to trip abroad as an artist and ask your manager to use it for press kits too. Sustainability is also about sharing and crowdsourced opportunities. It might also help you to connect with great promoters and artists worldwide. If you are into a DIY project, this is the best way to thrive in the digital market and make your tour more eco-friendly."

9.0 Methodology

9.1 Research Approach

This guide was commissioned by On the Move (OTM) and written by Julie's Bicycle to promote environmentally sustainable mobility in the performing arts building on the 2010 three-volume study by Julie's Bicycle titled *Moving Arts: Managing the Carbon Impacts of Touring* (Vol.1: Bands, Vol.2: Orchestras, Vol.3: Theatre). The guide identifies current practice in the industry and translates the research recommendations from the *Moving Arts* study into practical and applicable how-to's, focusing on the specific role of each protagonist (e.g. artists, venues, managers, producers etc).

The guide focused on the following OTM research aims:

We want to initiate a reflection on... / We want to be sensible about... / We want to discuss... / We want to inform about... the environmentally sustainable mobility of artists in the cultural sector with our members, partners and users.

The original research undertaken for the guide was in two-parts:

- 1) Julie's Bicycle created two sets of online surveys on Survey Monkey (one for venues and one for touring companies) that focused on attitudes towards, and examples of, artist's mobility. The surveys were distributed by OTM to its members and others via its website, its monthly newsletter and direct contact with members.
- 2) Julie's Bicycle interviewed by phone a small number of key informants to provide in-depth case studies for the guide.

9.2 Research Boundaries

Setting the study scope is critical to understanding the findings, and to ensure that the analysis can be interrogated both on its own terms but also in comparison to other reputable research and data.

9.2.1 Sector boundary

The guide has focused on touring companies and venues within Europe for the surveys and interviews.

9.2.2 Timeframe boundary

The guide, released in 2011, has built on the three-volume study titled *Moving Arts* that was produced by Julie's Bicycle in 2010.

9.2.3 Beyond the scope of the guide

Touring companies and venues located outside of Europe.

9.3 Data Collection

The study collected qualitative data via two online surveys and phone interviews with key informants.

9.3.1 Surveys

Two online surveys were circulated to the cultural sector in Europe. These surveys were used to understand attitudes towards, and gather examples of, artist's mobility. The surveys were distributed by OTM to its members and others via its website, its monthly newsletter and direct contact with its members. Julie's Bicycle also promoted the survey via a number of European arts networks and organisations.

The survey content was as follows:

A survey of touring companies that asked for:

- a. General information
- b. Touring activity in 2010
- c. Environmental considerations
- d. Case-study information and feedback

The survey had 10 complete responses from a good cross section of different-sized performing arts touring companies. Geographically these ranged from Italy to France, Portugal to Spain, Slovenia to Romania, the UK to Ireland and Norway.

A survey to performing arts venues across Europe that asked for:

- e. General information
- f. Programming in 2010
- g. Environmental considerations
- h. Case-study information and feedback

The survey had 10 complete responses from a good cross section of different size performing arts venues. Geographically these ranged from Spain to Germany, Croatia to Slovakia, France to Belgium and Portugal, with capacities of 90 to 1,600.

9.3.2 Interviews with key informants

Julie's Bicycle interviewed a small number of key informants that included: 1 director, 2 artistic directors, and 1 network coordinator. The interviews provided her with a 'real-life' context of the issues, and enabled us to determine the opportunities and obstacles that organisations face around Europe. The insights given in these interviews reiterated the findings of the extensive interviews and focus groups undertaken by the Moving Arts study.

The types of questions asked included:

- General information about the organisation;
- Environmental considerations;
- Opportunities and obstacles for addressing environmental issues at the company and sector level;
- Role of supply-chain and government in catalysing sustainability;
- Issues of support and capacity building.

Table I below outlines the total primary data contributions to the guide.

Table I *Primary data contributions to the Green Mobility Guide*

	Green Mobility Guide
Interviews	4
Touring Performing Arts Company Survey	10
Performing Arts Company Survey	10

For a technical note about the methodology used for the carbon emissions analysis of tours within Moving Arts please visit www.juliesbicycle.com/resources. A technical note is provided for download alongside the Moving Arts documents.

