THE THEATRE GREEN BOOK

Sustainable Productions :
Detailed Guidance

Version 2

1 Introduction 4
2 Key Principles 5

3 Planning a Sustainable Production 6
4 Co-production and Visiting Companies 8
5 The Creative Challenge 9
6 Sets and Scenery 11
7 Props 13
8 Costume, Wardrobe, Wigs, Hair and Makeup 14
9 Lighting, Sound, AV 15
10 Rehearsing, Managing, Disposing 16
11 Touring 18
12 Dance and Ballet 20

13 Looking Ahead 21
14 Different Scales 22

We would like to thank everyone who has supported the Green Book with their time, their commitment and ideas. Their names are in the acknowledgements. And special thanks to the funders of the Green Book, whose names you'll find in the inside back cover.

The Theatre Green Book is copyright © Buro Happold and Renew Culture Ltd. All rights reserved.

Renew Culture
The Theatre Green Book

BURO HAPPOLD

Foreword

We're living in a climate crisis. Theatre makers - like everyone else - want to respond to that emergency. But for theatre, the need to change is particularly urgent. If theatre is to be part of the most vital conversation humanity faces, then it has to change its practice.

The Theatre Green Book provides clear standards for that change. In other sections it shows how to improve the sustainability of theatre operations and theatre buildings. This section is about making productions more sustainably.

Climate emergency is the reality in which theatre - like everything else - is now made. But producing sustainable shows is not an end in itself. Theatre's purpose, range, creativity and ambition should remain as broad and vital as ever. Indeed, it is that very creativity and theatre's ability constantly to reinvent itself which will generate fresh theatrical thinking in this new reality.

Theatre artists always work within parameters (of time, cost or scale). Working in the context of the climate emergency, they should feel no more restricted in creative ambition than they do now. Rather, their purpose is to channel that creativity through a new set of premises.

Working together, theatre-makers of all kinds – freelancers and venues, companies and producers – have collaborated on the Theatre Green Book. Based on widely agreed values and strategies, the result is a shared standard for making work, as a community, in the reality of the climate crisis.

Lisa Burger and Paddy Dillon, Renew Culture

sustainable productions

DETAILED GUIDANCE

1 Introduction

1 Why the Green Book?

"As storytellers, we have a unique capacity to explore key issues with audiences both on and off the stage. In a warming world, this means taking leadership in communicating the importance of environmental action, whether that be through the content of our projects or the sharing of our practice." Staging Change, 2019

The climate crisis is an immediate threat to our safety, equity and prosperity. We urgently need to limit carbon emissions, reduce biodiversity damage; and in doing so, achieve a just transition where people, places and communities are supported and vulnerable groups protected.

Theatre cannot solve the climate crisis alone, but it can play an urgent role in addressing it. Theatre can question and challenge, provoke, entertain and surprise. It can reflect the preoccupations of generations facing a time of dizzying, frightening change.

But to do that, theatre itself needs to change. We need to be able to make work responsibly and sustainably. Freelancers, theatres, producers and companies all need a single, shared standard to work to. Hence the Theatre Green Book.

2 A Clear Path to Sustainability

The Theatre Green Book gives theatre a path towards sustainability. It builds on years of work by theatre-makers and sustainability pioneers like Julie's Bicycle, Creative Carbon Scotland, SiPA, Ecostage and others. It maps the journey towards a way of theatre-making that is low carbon and low waste, values people, and contributes to a more sustainable society.

Theatre-makers have already begun that shift by reusing and recycling, by switching to low energy equipment and researching alternative materials. This guidance is built on their expertise.

Everyone in theatre starts their career by creatively stretching resource: all theatre-makers are experts in sustainability. To the challenge of responding to the climate emergency, theatre is already bringing resourcefulness, dynamism and creativity.

3 A Creative Opportunity

The climate crisis is not just a challenge to be overcome. Shifting the parameters by which theatre is made is a moment of exciting creative opportunity.

No one yet knows what shows will look like, made in the reality of the climate emergency. Theatre-makers will answer that question project by project. Throughout its history, theatre has shown an extraordinary capacity for reinvention. The next few years should be seen not as a restriction, but as an invitation to dynamic creative change.

4 Scope of the Green Book

The Green Book divides the challenge into three areas. Together, they give theatre clear, practical and detailed guidance towards sustainability:

1 Sustainable Productions (this section)

2 Sustainable Operations

3 Sustainable Buildings

5 Sustainable Productions

Shows have an impact on the planet. They use energy and materials, require travel, create waste and employ harmful chemicals.

The Theatre Green Book shows how to reduce that impact. It shows everyone involved in the chain of a production how their practice can change to make shows more sustainably. It presents actions that can be taken by theatre-makers now, as well as those to be adopted rapidly as expertise grows and green infrastructure develops.

Its guidance is designed for theatre-making of all types and scales.

Small-scale shows may involve smaller teams and less resource, but the principles of sustainability are the same: to create more with less; to collaborate more closely; to focus on people not objects; to replace the consumption of resource with creativity.

6 Reasons to Change

Theatre isn't alone in facing change. Everything and everyone on the planet is affected by the climate emergency, and everything we do will be changed by it – including making art.

The changes we make can be overwhelmingly positive for how we work as individuals and communities.

- More collaborative and open ways of working can dissolve hierarchies, and breed respect among the many talents that contribute to making a show.
- Sustainability shifts our focus from resources to people.
- Working locally can reconnect theatre-makers with their communities and make theatre more accessible.
- Listening to new voices means including more diverse theatre-makers who will bring new perspectives to the challenge.

This guidance has been built on the expertise of freelancers, buildings, specialists and organisations. The collaboration and mutual respect which theatre-makers have collectively brought to the Green Book is the key to working sustainably – in every sense.

Net Zero

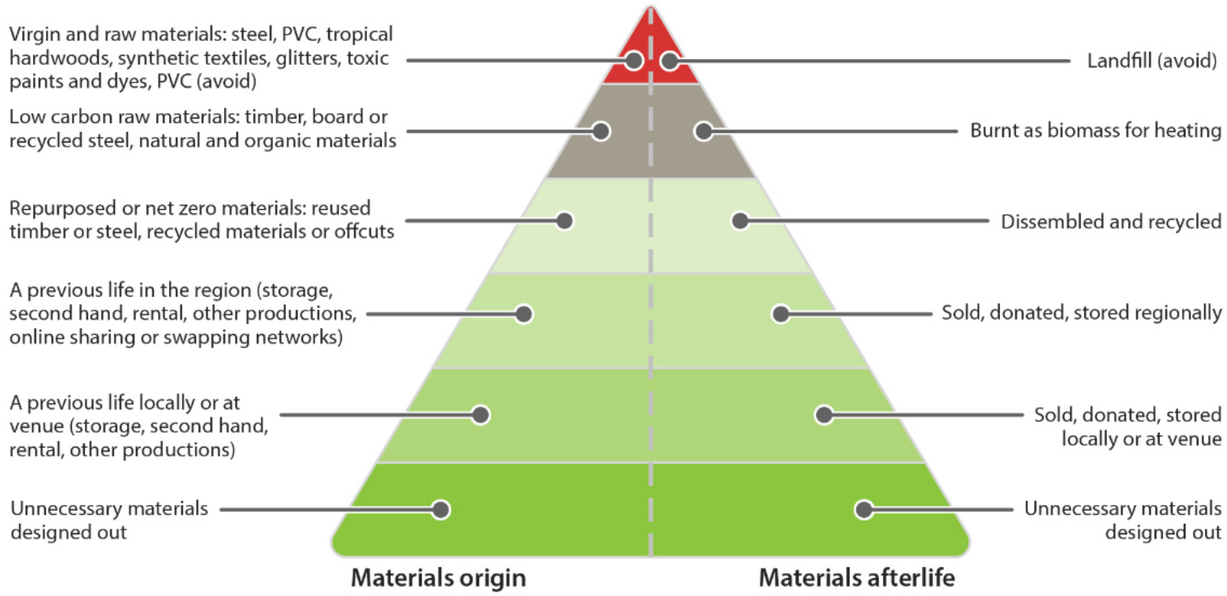
The key to a sustainable production is to move from a linear economy for production (raw materials used on stage then thrown away), to a circular economy where we reuse and recycle as much as possible.

Accurately measuring the carbon impact of a production is time-consuming, complicated, and depends on numerous variables. But if we shift to a culture of reuse and recycling, we know we're doing all we can. An 'Advanced' Theatre Green Book production is effectively net zero.

Carbon off-setting (to balance any carbon impact you can't avoid) is covered in the Operations section.

Copyright © Buro Happold and Renew Culture. All rights reserved

2 Key Principles



The Materials Hierarchy

1 Sustainable Working Means ...

Sustainable planning

A sustainable production begins with an invitation that clearly defines a sustainability standard – and makes sure everyone understands it and how they will work together to achieve it. Budgets and schedules need to allow for sustainability. Working sustainably will require more time particularly when first introduced. Collaboration and communication are key.

Sustainable creating

Sustainability starts with the director's concept and the designer's vision. The whole team collaborates to achieve that vision in a sustainable way.

New tools and processes

The Production Calculator helps guide sustainability by working out how much material is reused or recycled. Meanwhile, workshop and manufacturing processes can follow sustainable guidelines.

Sustainable materials

Sustainable theatre requires a step-change towards the use of equipment and materials which have had a previous life, and will go on to be reused, repurposed or recycled.

Clean procurement and transport

Making shows sustainably needs a significant reduction in transport and deliveries, with rail, electric vehicles and public transport used as a priority.

2 The Materials Hierarchy

Everything in a truly sustainable show will have had a previous life. Everything will be used again. That creates a 'circular economy'.

Start by designing out the need for materials.

Whatever is needed should come from a reused or recycled source – locally, if possible, to reduce transport. Next best are materials which are, at least, sourced sustainably. At the bottom of the pyramid are raw materials which involve carbon, are destructive to manufacture, and ought to be avoided.

There's a similar process for thinking what to do with everything afterwards, from best – reusing it in the theatre – down to the worst: chucking it away.

Training and Learning

Theatre's shift towards sustainable working needs everyone to understand the principles on which green guidance is based.

More widespread Climate Literacy training can help the whole sector move forwards. Meanwhile theatre's own networks can help share theatre-makers' experiences, innovations, new techniques and lessons learnt in working sustainably

Go to the Toolkit for information on Climate Literacy training.

3 Theatre Green Book Standards

The Theatre Green Book sets three standards for sustainable working: Basic, Intermediate and Advanced. In a Basic production, 50% of the sets and scenery, props and costumes need to be reused or recycled, and 65% used again after the show (based on weight).

The Theatre Green Book Production Calculator gives you a checklist for each standard, and simple worksheets to help you calculate your percentage of reuse / recycling, and (for Advanced shows) a basic calculation of carbon impact.

Assessing a production isn't an exact science. Use common sense, avoid getting lost in details, and the Calculator will give you a reliable tool for the transition to sustainable working.

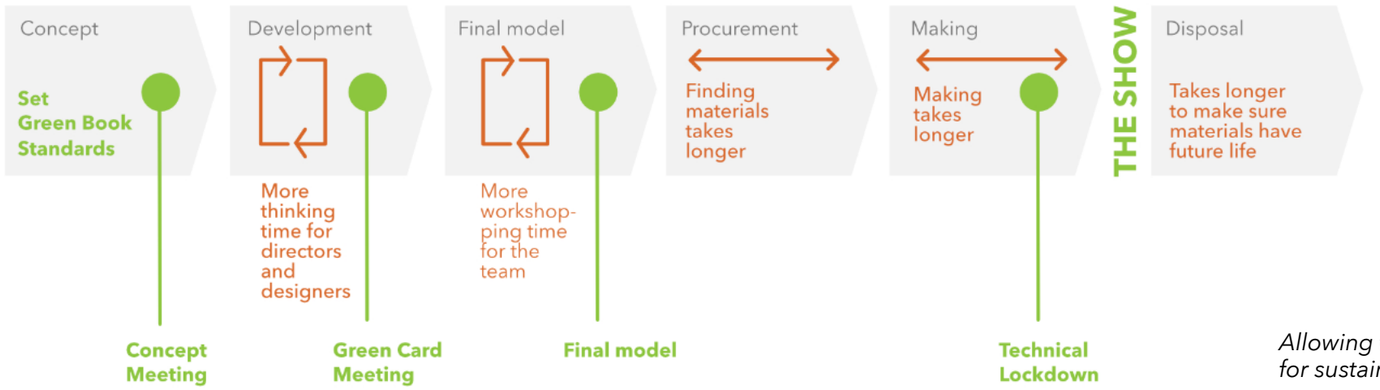
What do We Mean by Green?

The Green Book uses 'sustainability' and 'greener practices' as catch-alls to cover decarbonising theatre productions, reducing waste and eliminating environmentally harmful practices. That keeps it simple and readable, regardless of anyone's prior knowledge.

For a more precise vocabulary for green theatre, see the glossary in the Resources area. The Future Materials Banks keeps an excellent lexicon of general terms at www.futurematerialsbank.com/lexicon.

Copyright © Buro Happold and Renew Culture. All rights reserved

3 Planning a Sustainable Production



Allowing time : scheduling for sustainability

1 Key Principles

Planning a show sustainably means:

- Setting a clear sustainability target at the outset.
- Setting up the team, budget and schedule to support sustainable working.
- Giving everyone the tools they need to achieve a sustainable outcome.

2 Communications

Setting a standard

The Green Book sets three clear standards: Basic, Intermediate and Advanced. The Standards define actions for each. The Theatre Green Book standards enable you to set a clear goal for each production, which defines what everyone needs to do, and will be increasingly familiar to all theatre-makers.

Theatres new to sustainability sometimes aim too high, demoralising the whole team. It's good to start with Basic, so everyone has a chance to learn. It can even be helpful to carry out assessments of some past productions, to discover how sustainable you already are.

The Invitation

It's essential to define the sustainability standard with the first invitation to team members, explain what it means and how they will be supported. Introduce it later, and sustainability will appear restrictive. Include it from the start, and it will be built into creative thinking from the outset. Before anyone starts work, they need to understand the parameters they're working within, and the values they're being asked to share.

Artistic Directors have a vital role to play in making the sustainability standard a clear part of the invitation, and then holding creative teams to achieving it.

You'll only achieve a sustainable result if everyone fully understands the part they need to play. Whenever team members are invited, induct them in how the Theatre Green Book works, and the responsibility they have for helping deliver the show as sustainably as possible.

Freelancers

Regular teams will soon become familiar with the Theatre Green Book. Freelancers may be new to it, and to your processes. Give them the support they need – including climate literacy training – to deliver what you ask. Meanwhile, freelancers can influence the transition by asking theatres whether they're using the Theatre Green Book, and what systems they have in place – or even insisting on a Theatre Green Book standard in their contract riders. It's hard to change organisations from the outside, but theatre depends on freelancers, and their influence and expertise is vital.

Appointments

Sustainable working needs teams to be appointed early, so makers can help achieve creative ideas in sustainable ways.

Contract Riders, or Green Production Agreements, help make your values clear, and help the team to collaborate in achieving a given target. Contracts with suppliers and makers should reference the same standard.

Go to the Toolkit for sample wordings.

Collaborative Working

Sustainable theatre-making needs teams to collaborate. Where possible, makers and suppliers should join early meetings to offer suggestions and workshop solutions. Directors and designers need to respond flexibly, to make space for sustainable thinking. Producers must foster an atmosphere of mutual respect and trust across the whole team.

Sustainability needs to be a constant refrain, but two key meetings will embed sustainable practice:

- A sustainability meeting at concept stage integrates sustainable thinking from the outset.
- Later, the White Card model can be the focus of a meeting where the whole team audits design against Theatre Green Book targets, workshops options, and agrees actions.

Go to the Toolkit for more on meeting, sharing and reviewing.

3 Schedules and Budgets

Schedules

Sustainability takes time. Schedules need to allow it.

Time spent at concept stage refines thinking and avoids late change. Designers need time to explore creative solutions – it might include trips to your store or meeting other designers who are working in the same season to explore shared design elements. Achieving sustainability requires iterative conversations among the team. Even ordering second-hand costumes takes longer than buying online.

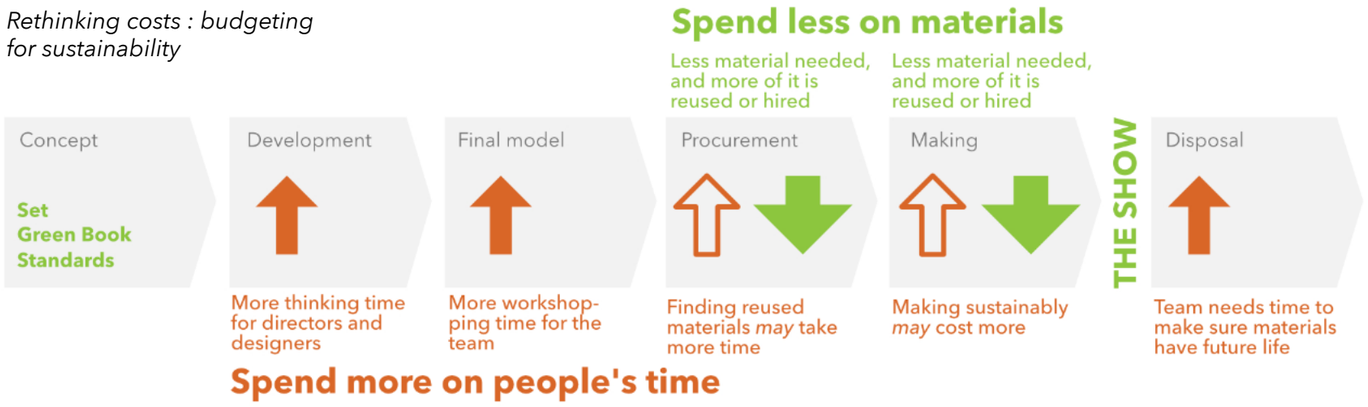
Commissioning Multiple Shows and Seasons

Whenever shows can be commissioned together as a series or season, they can share resources and reuse components.

Consecutive shows might share the same floor. Lighting and technical set-ups can be retained. Props and set components can be shared. Designers working together can swap information and access the same recycled materials.

The result can be significant savings in materials and energy, along with the costs and emissions associated with remaking, rigging and transporting components. Deliveries can serve more than one show at the same time.

Copyright © Buro Happold and Renew Culture. All rights reserved



Schedules need rethinking to allow sustainable practice. *See diagram on previous page and go to the Toolkit for more information.*

Budgets

Budgets need to reflect the same shift, buying extra time from designers and makers for the collaborative conversation sustainability needs.

Purchase costs will change. A new set made with sustainably-sourced materials may cost more. Made with reused components and recycled materials, it can cost less.

Show budgets, like schedules, need to change shape. *See diagram above and go to the Toolkit for more information.*

4 Tools and Methods

Information

Theatre-makers need the right tools to reach sustainable outcomes.

Producers can help freelancers with information about in-house and local resources. They can encourage different production teams to share components, materials, floors, equipment and ideas. Theatre's strong networks are an essential resource for sustainability. *Go to the Toolkit for a checklist of information to provide.*

Space and Storage

Being able to recycle and reuse most effectively will require more space. When a production has reached the end of its life, space is needed to break the elements down and to remove fixings – glue, nails – so that it can be reused or recycled. You may need to rethink how you use your workshop or back of house to do this and find storage for the elements which can be reused in another production. There are good examples of companies coming together to share stores for mutual benefit.

Intellectual Property

Designers may rightly be concerned that their designs will be reused without permission. It's important they have the chance to define elements of the design which they see as protected (for example, a bespoke staircase or sculptural set). These elements can be defined individually, while leaving generic components (standard windows and doors, masking, floor textures) and materials to be reused freely.

Evaluating

The Productions Calculator helps you evaluate the sustainability of each production. It gives you checklists for the three Theatre Green Book standards: Basic, Intermediate and Advanced. Excel worksheets help assess how much of your sets and scenery, props and costumes are reused / recycled based on weight.

Measuring a production isn't an exact science, and production teams are always short of time. Don't get lost in too much detail. Use common sense to guide decisions. The Production Calculator is not a perfect system but a tool to help you think more sustainably, and record how your practice is changing.

Go to Productions Resources for the Production Calculator.

Sharing and Training

Sustainability will become easier as the sector's climate literacy continues to develop. Theatre-makers will learn by trialling and sharing, so it's essential, after a show, to review outcomes and share honestly what worked, and what didn't.

Making work sustainably can be something to share with audiences, as well, who increasingly expect sustainable practice.

By gathering data, Producers can lay the ground for carbon budgeting. They can support staff and freelancers with training.

Go to the Toolkit for information on carbon literacy training, and on reviewing and sharing outcomes.

5 After the Show

Long-running Productions

A production which runs for a long time, or is often revived, is more sustainable than the same show made for a few performances only. The same material is being shared across more dates and a bigger audience.

Because it's usually impossible to know how long a production will last, the Theatre Green Book doesn't currently make allowance for the benefit of long-running shows. Instead, it focuses on making each production as sustainably as possible. But we'll continue to work on a methodology to balance environmental impact against the size of audience and the time a production lasts.

The End of the Show

A sustainable show doesn't end on the closing night. Returning materials and components, costumes and props to further use is every bit as important as procuring them sustainably in the first place.

Producers need sustainable disposal systems and protocols. Online theatre networks can help. Good relationships with local second-hand shops, community centres, other theatres and prop stores will help make sure materials have an afterlife – and nothing ends up in the skip.

6 Additional Benefits

Sustainable practice doesn't only benefit the environment. It can help theatre-makers and their communities:

- Working collaboratively improves working culture for everybody.
- Working collectively brings more diverse talent into the industry.
- Working locally connects theatre to communities.
- Managing resources proactively reduces costs.

Outdoor and Site Specific Shows

Outdoor and site specific shows can be extremely sustainable. They may need minimal lighting and set, for example.

They also impose specific challenges, like how to provide power sustainably, set up dressing room facilities etc. In some natural locations it's important to check the show doesn't harm wildlife.

Go to the Toolkit for more guidance.

Copyright © Buro Happold and Renew Culture. All rights reserved

4 Co-productions and Visiting Companies

1 Introduction

Many productions are partnerships between two or more theatres or companies. Usually there is a 'lead producer' responsible for leading the production and making (or commissioning) the show. But the nature and role of co-production partners varies widely.

Some do no more than invest money. Others take an active role in decision-making, or take on some of the responsibilities of putting the production together and touring it. Some are involved in regular co-productions with partners they know well, and whose values they share. Others are ad hoc partners who don't know the co-producers well, and have different priorities for the production.

To co-produce a sustainable production to Theatre Green Book standards requires sensitivity, flexibility, and good communication.

2 Starting Out

At the outset of a project, it is essential to agree the sustainability ambition of the production. This should be written into partnership agreements wherever possible.

Inducting new partners into the Theatre Green Book and its standards will ensure that everyone fully understands the parameters that will govern the production, and any costs resulting. It's also an opportunity to share Theatre Green Book principles with your partners.

Agree early how the production's green credentials will be used as part of marketing and communicating the show.

3 Responsibilities

An early step is to determine who will be responsible for ensuring, and demonstrating to partners, that the production meets its Theatre Green Book standard. This will normally be the lead producer. However, other partners may be more experienced in green production – in which case they may have a defined role as sustainability advisers or champions.

Identify who will have responsibility for completing the Production Calculator and other measurements (eg travel and waste).

A meeting between heads of production of the main partners will allow them to identify specific expertise in different areas which might help the team achieve the most sustainable outcomes.

Just as important is to identify who will have responsibility for disposing of the production after the tour is over.

4 Planning for Sustainability

Co-production partners have the opportunity to pool resources for reuse and recycling, and make them available to the creative team. Technical resources at each receiving venue should be collated and shared, to give the producing and creative team all the information they need to plan the most sustainable tour.

For touring shows, try to plan the tour to minimise travel. At an early stage, the partners should consider how best to reduce the set, equipment and people that will need to tour. Considerations will include the size and construction of the set, the use of local tech equipment and staff etc. An early priority is to define a realistic but clear haulage limit for the tour, and make sure this is fully understood by all.

Establish a haulage limit (e.g. two transit vans). While working on the design, the team should make sure they develop and record a plan for disposal or storage of all materials after the tour.

5 Working Sustainably

Discuss and agree how you can use virtual tools and written technical specifications to minimise travel to venues. Agree your travel and accommodation policy between all co-producers to standardise expectation about train travel, car sharing and accommodation.

In rehearsing and running the production, make everyone involved aware of the Theatre Green Book standard you are working towards, even if they haven't been involved in the development stage.

When it comes to the actual tour, look for opportunities to minimise show-running consumables, or to buy sustainably in bulk, to service the entire run.

6 Opportunities

A co-production s a ready-made sharing network to spread best practice and expertise.

If you are initiating a co-production, you may decide to require that any partners joining should have reached a certain Theatre Green Book level – or have plans to do so. If you are joining a co-production, you may be able to lobby for the production to be made to Theatre Green Book standards, and to introduce other partners to sustainable working.

In working with receiving venues, you have an opportunity to influence venues in how they manage operations such as marketing and catering. Agree with venues a set of basic requirements and recommendations – for example, making sure they inform audiences about sustainable travel options.

If you share values, that will be an opportunity to help them on their own transition. You may not have that kind of influence – but there will always be opportunities to encourage more sustainable working.

Copyright © Buro Happold and Renew Culture. All rights reserved

5 The Creative Challenge

1 Why Change?

Many – perhaps most – creative theatre-makers find this question easy to answer. The climate crisis is the most challenging humanity has ever faced. If theatre wants to be part of the conversation around it, then theatre must itself become sustainable. Productions may not be the largest part of theatre's impact on the planet, but they are the most visible. They're what theatre is for. Besides, if theatre can pioneer its own transition, it can show the way to other sectors, generating change across society.

Despite that realisation, it's important to recognise the creative challenge of thinking and working differently.

Theatre won't be transformed overnight. Sustainability is a transition in which creative theatre-makers have an essential role to play. But sustainable theatre doesn't only rest on their shoulders. They make change most effectively by embracing the collective support of the whole production team in developing a vision to its most sustainable form.

The climate crisis has generated a new set of parameters in which we need to work. A creative response begins by recognising our responsibility for the decisions we make – including decisions that harm the planet. Those parameters can, of course, be presented as restrictive. They can make it harder to realise familiar ideas sustainably.

Only through creative thinking can they be sublimated into a new future for theatre.

2 A Different Challenge

The challenge facing theatre writers, directors and designers is to conceive and create ambitious new shows which express everything they wish to say about the world while working within the reality of the climate crisis.

That reality, and the challenge of responding to it, is already shaping the work of many designers and directors.

A work of theatre can, of course, take the climate emergency as its subject – in which case it's all the more important to make it in a way that reflects climate realities. But making shows sustainably is not an end in itself. It isn't theatre's purpose or ambition which have changed; but the parameters within which it's made.

Parameters are, of course, nothing new – theatre makers have always worked within boundaries of cost, space and time. Limitation can be a spur to invention; constraint and creativity can inter-react. Almost without exception, theatre artists in their early careers work within severe constraints, making shows with whatever's to hand.

The climate emergency has brought a different set of parameters, however. Working within them is a different creative challenge.

3 A Different Approach

Some theatre-makers have been exploring this challenge for years; for others, it will be new. The future direction of theatre will take shape through the work they make.

The role of this guidance is not to suggest creative solutions, but to define the parameters within which theatre must work. Equally, it would be wrong to make assumptions about the work those parameters will generate. Sustainability might, at first sight, suggest aesthetic austerity and minimalism; and those may be approaches some theatre artists choose. But they are not inevitable answers to the new questions the climate emergency is asking.

Sustainability doesn't dictate what shows should look like. Theatre has always responded to crucial new subjects through creativity and invention, and, in the process, discovered unanticipated new forms of expression.

The climate crisis creates a new reality. In adapting their art-form to it, theatre-makers are already conceiving theatre in new ways.

4 A Different Way of Working

In the collaborative chain that makes a show, no one person can 'own' sustainability. Everyone's practice is affected; everyone is dependent on others, from producers to set-builders, to work in new ways. Responding to the climate emergency is a collective responsibility.

Sustainability requires new ways of working, therefore. It needs collegiality and collaboration, which demand more time, and promote different kinds of creative relationship.

Making shows in a linear and hierarchical way stifles the collective conversations which allow sustainable answers to be found. Makers' expertise is needed at early stages to develop an idea in the most sustainable possible way. Iterative conversations are needed to nudge a vision to its most sustainable form.

Working in this way needs more time. Schedules need to be rethought, along with budgets that pay for more time, rather than more material (chapter three provides detail on the principles of producing shows more sustainably).

New Writing and Devised Work

New writing and devised work present special challenges. Even more than usual, rehearsal is a journey of discovery and change. That energy mustn't be squeezed out of the process. Planning in advance shouldn't exclude the effect of the unanticipated.

Directors and Designers will learn over time how to balance the drive to avoid last minute change, with the need to retain creative energy. The aim must be to cushion the effect of late surprises, not wholly to exclude them.

Plan everything possible. Question a last-minute impulse to rely on 'stuff'. Think twice about making or buying more, or throwing away something that's already been made.

Copyright © Buro Happold and Renew Culture. All rights reserved

Working collectively also requires a high degree of trust and mutual respect. Makers, production staff and suppliers are all part of a team whose shared purpose is to realise creative ideas sustainably.

Theatre is a wide road filled with collaborators all travelling in the same direction. Responding to the climate emergency is a collective responsibility, and the work it generates will be a collective endeavour.

5 Some Starting-points

As stated above, it is no part of this guidance either to prescribe creative answers, or predetermine outcomes. There is no single creative prescription for the new approaches which are growing out of the climate crisis. Collectively, theatre-makers are inventing them, show by show and season by season.

For the many theatre-makers who have already engaged with the challenge of the climate emergency, the notes that follow may therefore seem superfluous. They should be read not as prescriptive, but as a series of starting-points which summarise theatre-makers' experience so far.

The Concept

How sustainably a show can be achieved can depend on the director and designer. Responsibility for working sustainably lies with everybody, and teams must collectively rise to that challenge. But making work within the parameters of the climate emergency is a journey that starts with the initial concept.

Sustainability can never be an afterthought. It needs to begin at a show's inception.

Collaboration

Making a show sustainably is a collective task. By working together, teams can refine a show towards sustainability using their common expertise.

New production milestones are needed to support this:

- A sustainability meeting at concept stage integrates sustainable thinking from the outset.
- Later, the White Card model can be the focus of a 'Green Card' meeting where the whole team audits design against Green Book targets, workshops options, and agrees actions.

Flexibility

Collaboration requires flexibility. Working with a team to nudge an idea towards sustainably means sharing control. Everyone needs to keep their minds open.

Losing a few centimetres here or adding some there might make it possible to reuse last year's revolve, or help the workshop cut a floor from fewer boards. A reused stair from a previous show might not be the first idea – but it might be the right one. Designers working sustainably keep their minds open to change.

Time

Working in this way needs time. It takes time to invent sustainable ways of achieving a creative vision, just as it takes time to track down sustainable materials – time which producers must include in schedules.

In the same way, conceiving a show sustainably also needs more time. Less resource demands more invention; template solutions will no longer work. Theatre-makers need time to find new answers to new questions.

Doing More with Less

Whenever designers ask themselves if each element is working hard enough, sustainable thinking is aligned with creative process. Sustainable theatre-making requires everything – every idea, every piece of material – to work as hard as possible.

Different Approaches

Stage design has developed a tried-and-tested technology of new ply cladding on new steel frames. That's challenging to achieve sustainably. Some designers have found it helpful to start from a different place – from a space's architecture; from what's available in theatre stores; or from the particular qualities of reused or recycled materials.

Sustainable Making

There's guidance for sustainable making throughout this volume.

- The first step is to minimise, through design, how much material a set requires.
- The next is to find reused components or recycled materials – ideally locally, to reduce transport.
- Failing that, new materials can at least be sourced as sustainably as possible.
- The very last resort is virgin material from unsustainable sources which harm the planet.

Intellectual Property

Bespoke designs need to be protected. No one wants to see their work turn up unaltered in someone else's show. But copyright can be safeguarded by identifying the specific components a designer wants to protect. Everything else – generic components such as windows and floors, masking, salvaged materials etc – can be made available for reuse or recycling.

More Isn't the Answer

When a show proves troublesome, teams have sometimes tried to solve the problem by modifying sets or ordering new props. That can ruin a show's sustainability. Better solutions may need more time instead – for planning, preparation, or experiment.

Look Ahead

Productions don't end at the final curtain. In a circular economy, everything on stage should have been used before, and will be used again – and theatre makers need to think of that in advance. If the team has made something of value, there will be other ways of valuing it again. Don't assume that a show's final audience is the skip.

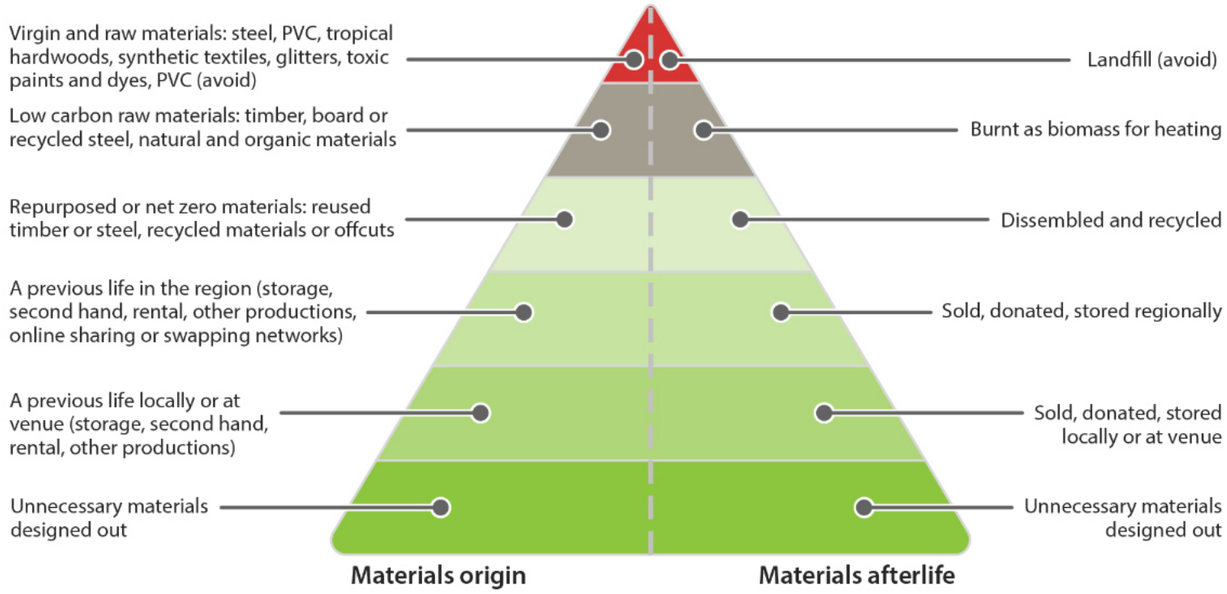
6 Additional Benefits

Sustainable practice doesn't only benefit the environment.

- Working collaboratively improves working culture for everybody.
- Working collectively brings more diverse talent into the industry.
- Working locally connects theatre to communities.

Copyright © Buro Happold and Renew Culture. All rights reserved

6 Sets and Scenery



The Materials Hierarchy

1 Key Principles

The ultimate goal is to eliminate raw materials, reduce transport, and build sets without damaging the environment.

The Materials Hierarchy

- The first step is to minimise, through design, how much material a set requires.
- The next is to find reused components or recycled materials – ideally locally, to reduce transport.
- Failing that, new materials can at least be sourced as sustainably as possible.
- The very last resort is virgin material from unsustainable sources which harm the planet.

'Reuse' and 'Recycling'

- Reuse means taking components – doors, floors, furniture – and using them again.
- Recycling means breaking something into materials which can be used again.

2 Communications & Planning

Making sets and scenery sustainably is a challenge for the whole team. To work sustainably, it's easiest if you can appoint everyone early, and promote collaboration.

Producers need to equip designers and makers with information on available sustainability resources. They must promote collaboration with teams working on other productions, to share floors, materials, components and equipment.

Budget and schedule must allow for the extra communication needed between designers, production managers and makers. They must build in, and pay for, the iterative process of refining ideas to their most sustainable form.

3 Design

Sustainability can never be achieved as an afterthought. It needs to be embedded in the design process.

A sustainable design process will be more collaborative. Makers and suppliers will join early meetings to offer suggestions and workshop solutions. Directors and designers will approach that dialogue flexibly, to allow space for sustainable solutions.

Sustainability needs to be a constant refrain, but two key meetings will embed sustainable practice:

- A sustainability meeting at concept stage integrates sustainable thinking from the outset.
- Later, the White Card model should be the focus of a 'Green Card' meeting where the whole team reviews the design against Green Book targets, workshops options, and agrees actions.

4 Materials

Reuse and Recycling

Finding reused components and recycled materials – and returning them to a future life – will be easier once theatre's sharing and storage systems are better established. Until then, a lot can be unearthed through venue storage, networks of designers, production managers, and set builders, online sharing sites, and second-hand shops.

After the show, set materials needn't only go back into set-building. A piece of plywood from a flat might go through multiple lives, some in theatre, and others in general use.

Go to the Toolkit for more on Reuse and Recycling.

Sustainable Sourcing

Sets and scenery mainly use steel, softwood, ply (and other sheet materials), and plastics. They all damage the planet. Steel has a high carbon footprint. Much UK plywood is imported long-distance from East Asia, from forests which may not be sustainably managed. Plastics interfere with ecosystems.

Theatre-makers can reduce their impact by specifying and sourcing materials sustainably. There are certification schemes for timber products, and green alternatives for glues and paints. Manufacturers' information can reveal carbon footprints and chemical content. Even plastics can be compostable or recycled.

Go to the Toolkit for more information on Sustainable Sourcing.

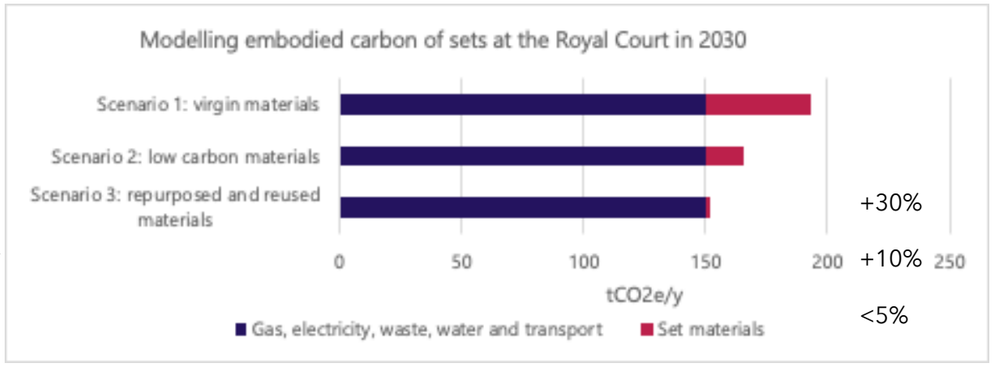
Copyright © Buro Happold and Renew Culture. All rights reserved

How Much Carbon in a Set?

Sets and scenery are a significant part of theatre's footprint – depending how they're sourced.

One typical theatre uses 30,000 kg a year of steel, timber and boards. By 2030, when they'll be halfway to carbon zero, that will represent about 30% of their overall carbon footprint from building and operations.

Sourced sustainably, the same sets could represent only 10%. Reduce the need for new materials still further through design, reuse and recycling, and they'd be less than 5%.



Materials to Avoid

Some materials are particularly damaging, through scarcity, manufacture, or chemical harm. These include polystyrene, PVC, unrecycled steel and tropical hardwoods. They should be phased out of use in theatres as quickly as possible. *Go to the Toolkit for a list of Harmful Materials.*

Scenic Art

Scenic art is a specialist theatre skill with an important contribution for sustainability.

- Paints, equipment and materials can be harmful, and should all be sourced sustainably.
- Some of the guidance for props (below) also applies to scenic art.
- Scenic artists should be consulted early to make sure time and budget is allowed for sustainable practice (such as the costs and drying-times of water-based paints). *Go to the Toolkit for more guidance.*

5 Tools & Processes

Evaluation

Unless we assess our work, it's impossible to know how sustainable it is. The Theatre Green Book gives you checklists to evaluate which standard you've reached.

Measuring the carbon footprint of a production is complicated, inaccurate and time-consuming. The Theatre Green Book concentrates first on measuring 'circularity': how much of the material on stage is reused or recycled, and what happens to it afterwards. Use the Production Calculator to record sets and scenery, props and furniture, and costumes. Record them by weight (there are tables to help), score each one by where it comes from and your plan to dispose of it afterwards, and it will automatically report what standard you've reached.

For advanced productions, as theatres approach net zero, it's helpful to start measuring carbon impact. The Production Calculator does that by focusing on those elements which you can measure easily and accurately: new set materials such as steel, aluminium and timber, and the travel required by deliveries and touring. Together, they represent perhaps 90-95% of the impact of each show. The Theatre Green Book Production Calculator measures them for you.

Go to Productions Resources for the Production Calculator.

Over time, two design approaches will make sustainability easier:

Modular Design

Sets often include generic components: floors, flats, doors, walls, windows, stairs, balustrades. Designed to modular dimensions, those components become far easier to reuse in new sets – making them available to subsequent designers cheaply and sustainably.

Explore modular framing, which can replace carbon-intensive welded steel with reusable 'meccano' & scaffold-type systems.

Go to the Toolkit for more guidance.

Designing and Making for Disassembly

Sets and scenery can be designed and made to allow easier disassembly and reuse of materials. Generic materials, kept in whole sheets and fixed with demountable joints, can be recycled as a sustainable resource for the next show.

If flats, floors and other components are made for disassembly, their materials can be reused and recycled over a long period.

Go to the Toolkit for more guidance.

Sustainable Working : Designers

Foamboard, glue and paint contain harmful chemicals, and most models are thrown away – unsustainably. Venues should help by providing robust, reusable model boxes (which designers must return in reusable condition).

For set modelling, most designers already reuse materials where they can, and more sustainable foamboards and glues are becoming available. Meanwhile, CAD modelling is zero-waste, and will become zero-carbon as electricity systems decarbonise. In future CAD may cross-reference to inventories of set materials and components. *Go to the Toolkit for more guidance.*

Sustainable Working : Makers

Workshops and makers can shift to sustainable tools and practices, such as electric tools, air drying, sinks that separate harmful wastewater, and cold laundries for textiles. *Go to the Toolkit for more guidance.*

Workshops, Buildings and Machinery

Workshop machinery should be managed for sustainability:

- When buying new machinery, check it is energy-efficient, durable, and easy to maintain.
- Good maintenance is necessary to make equipment last as long as possible.
- At the end of machinery life, replace with energy efficient alternatives.
- Install LED lighting in workshops to reduce electrical demand.
- Consider "Ecodesign" welding.
- Make sure extract equipment is adequate and well-maintained, and replace filters regularly.

Copyright © Buro Happold and Renew Culture. All rights reserved

7 Props

1 Key Principles

The ultimate goal is to eliminate raw materials, reduce transport, and provide props without damaging the environment.

Sourcing Ready-made Props

Sustainable theatre-making means reusing existing props and furniture wherever possible, and making sure they go on to have another life after the show.

To reduce how much they buy new, designers and props supervisors need more time for sourcing, and a flexible approach to using what's available.

Producers need to make time and budget available for that. Theatre networks can help locate the right props for the show.

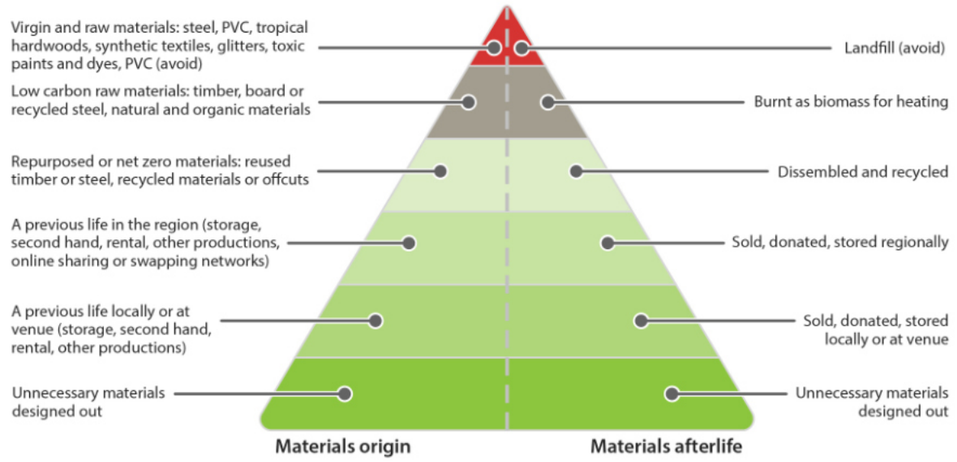
Making Props: the Materials Hierarchy

- The first step is to minimise, through design, how much material a show's fabricated props require.
- The next is to find reused components or recycled materials – ideally locally, to reduce transport.
- Failing that, new materials can at least be sourced as sustainably as possible.
- The very last resort is virgin material from unsustainable sources which harm the planet.

Workshops

Workshop practices should be made as sustainable as possible.

Go to the toolkit for guidance on sustainable workshop practice.



The Materials Hierarchy

2 Communications and Planning

Working sustainably requires collective thinking. Designers and props departments or supervisors need to start talking early to find props and furniture from sustainable sources. Producers and theatres need to provide information on what's available from store, or on local second-hand shops and networks. They should connect designers with teams working on other productions to see what can be reused.

Budget and schedule must allow for the extra communication needed between designers, production managers and makers. They must include the time needed to source props sustainably.

Designers can help by not being too specific in what they ask for. Directors can help by identifying early on the props they need for rehearsal. Where possible they can use substitutes to avoid requiring props out of sequence. Above all, they can help avoid last-minute ordering and multiple deliveries.

Last-minute changes may sometimes be unavoidable - but there needs to be a very good reason for them.

3 Reuse and Recycling

Wherever possible, it's important to source reused props and furniture, rather than making or buying new.

There are many sources to explore, already familiar to designers and props supervisors, including theatre props stores, networks of props stores in other theatres, productions being planned for the same stage, props hire companies, local second-hand shops and networks, online second-hand resources for theatre, and eBay and other online second-hand networks.

As important as buying reused props is making sure that, after the show, they return to the circular economy. Props and furniture can find a second life either through returning to store, or being sold through second-hand markets.

Go to the Toolkit for Reuse and Recycling resources.

4 Materials

Sustainable Sourcing

Props don't always use large quantities of material, but they 're often made of materials that harm the planet. Plastics, in particular, cause harm to the environment. So do many glues, paints, enamels and other chemical products.

Theatre-makers can reduce their impact by finding alternatives to harmful materials, and specifying wood, metal and plastic sustainably. To assess materials, manufacturers' information can reveal carbon footprints and chemical content. Plastics can be compostable or recycled.

Go to the Toolkit for more information on Sustainable Sourcing.

Materials to Avoid

Some materials are particularly damaging, through scarcity, manufacture, or chemical harm. These include polystyrene, PVC and tropical hardwoods. They should be phased out of use in theatres as quickly as possible.

Go to the Toolkit for a list of Harmful Materials.

Last Minute Ordering

To avoid last minute deliveries:

- Include props and costumes earlier in the production. Encourage directors to plan what they need for rehearsal.
- Be flexible. Avoid over-specific requirements.
- Use local suppliers.
- Make single large orders, to reduce the number of deliveries.

Copyright © Buro Happold and Renew Culture. All rights reserved

8 Costume, Wardrobe, Wigs, Hair and Makeup

1 Key Principles

Sustainable sourcing and making of costumes aims to eliminate the use of unsustainable and inorganic materials. Sustainable practice for wardrobe, wigs, hair and makeup uses products which are sourced sustainably and ethically, and don't damage the environment.

At present, costumes, wigs and care products often rely on materials for which there are no truly sustainable alternatives. Theatre-makers can help lobby suppliers to research better alternatives – and use their networks to share knowledge as they become available.

Sourcing Costumes

Wherever possible, costumes should be reused or recycled. Some will come from store, others – including basics like T-shirts or jeans – should come from second-hand sources. It's equally important to ensure that costumes are returned to storage or the second-hand market after the show, rather than thrown away.

Making Costumes

Making costumes is one of theatre's greatest skills. Sustainable costumes use recycled or sustainable textiles. They're designed to be cared for sustainably and recycled afterwards. Choice of materials for new costumes should include a consideration of durability of fabrics to ensure they will last and be made to ensure they can be refitted for future performers.

Stage blood and other effects often require more harmful cleaning products. Consider options for removal of parts to allow for separate washing.

Note: Costumes for dance and ballet often have special requirements, which are covered in the Dance and Ballet section.

During the Show

Laundry and cleaning of costumes and wigs can have a greater impact on the environment than the costumes themselves. Adopt more sustainable practice by avoiding harmful chemicals wherever possible and consolidating washing and drying loads. *See below and in the Toolkit.*

2 Communications and Planning

All departments / supervisors need to be involved early to make time for sustainable sourcing. Planning early can also reduce last minute ordering, next day delivery and use of fast fashion. Directors can help by identifying early on the costumes or wigs they need for rehearsal.

Designers and costume departments need more time for sourcing, and a flexible approach to choosing from what's available. Producers must make time and budget available.

Producers and theatres also need to provide information on what's available from store, and on local second-hand shops and networks.

3 Reuse and Recycling

Wherever possible, it's important to source reused costumes, rather than making or buying new. Designers and costume departments know many sources.

It's equally important to give clothes a second life through storing, selling or donating after the show. If worn out, they should be disposed of through sustainable recycling operations. Go to the Toolkit for more information on reuse and recycling.

4 Materials

Sustainable Sourcing

If possible, costume departments should use recycled or 'deadstock' fabrics and cottons. Failing that, textiles should be certified organic, contain only organic dyes, be sourced locally if possible, and be machine washable, to avoid chemical or dry cleaning. Scraps should be recycled in textile banks.

For hair and makeup, sustainable, non-toxic products should be used, with clear environmental labelling and disposal instructions. *Go to the Toolkit for more information on Costumes*

Materials to Avoid

Some materials used in costumes, wardrobe, wigs and make-up are particularly damaging. These include glitter, synthetic dyes and products containing parabens and triclosan. For fastenings, use sewing, ties, pins & clips, instead of tapes, pastes & glues.

Cosmetic products should be accredited with an EU Ecolabel, Ecocert, COSMOS or similar, and come in 100% recyclable, compostable or reusable packaging.

5 Caring for Costumes and Wigs

Sustainable care of costumes and wigs means reducing the use of harmful chemicals and energy. Launder textiles below 30°C with products that meet AISE or EU Ecolabel requirements. Tumble drying should be avoided if possible.

6 Deliveries

Last-minute, one-off deliveries can best be avoided by early decision-making, and avoiding last minute changes of mind.

Combined orders from single sources will avoid the need for multiple deliveries, and the planning involved will help reduce reliance on last-minute ordering. Co-ordinating with other productions can reduce deliveries even further.

Deliveries are more sustainable if they're local, and use public transport or bike couriers.

Last Minute Ordering and Fast Fashion

Shows often order at the last minute, using fast fashion retailers and next day delivery. That means a lot of one-off deliveries, and last minute quick alterations which make clothes harder to reuse later. Instead:

- Plan costumes earlier in the production. Ask directors to decide early what they need for rehearsal.
- Design and source flexibly, avoiding over-specific requirements.
- Use local costume suppliers.
- Last minute changes may sometimes be unavoidable – but be sure there's a good reason for them.

Copyright © Buro Happold and Renew Culture. All rights reserved

9 Lighting, Sound, AV

1 Key Principles

Lighting, sound and audio-visual equipment uses energy, even when on standby. Some equipment also generates heat, requiring cooling from air conditioning systems.

Manufacturing technical equipment uses scarce materials and minerals. Maintenance and disposal also have an impact.

Deliveries affect a show's sustainability, too, as do ancillary products like gaffer tape and gels.

Technical theatre is a relative success story for sustainability. New technologies use less energy. Equipment is modular, and is often kept on site or hired, meaning easy reuse. That provides a strong foundation for further progress, by looking at the impact of technical theatre both in design, in use, and over its full lifespan.

2 Design

Designers can start reducing energy by minimising equipment and considering natural acoustics and lighting – where possible – to reduce energy need.

Next, sustainability means using available technical equipment, and sharing it with other shows. Bespoke systems require more resource, and often more energy too. If possible, use in-house lighting and systems, rigs from other productions in the venue, or equipment readily available at hire companies. Modular and standard designs are easier for others to reuse.

It helps to think flexibly. For example, question whether available lighting gels will do the job, rather than ordering new.

3 Communications and Planning

Working sustainably needs lighting, sound and AV designers to integrate their thinking at the earliest stages of a show's conception. Producers must set up the necessary meetings, provide information so designers know what's available locally, and connect them with other teams to share thinking and equipment.

For example, a single set-up (once common in rep) might be configured to suit a sequence of different shows, saving deliveries, resource – and cost.

4 In Use

Switch-on and off routines can minimise energy use. For lighting, this might include switching off discharge lighting between the end of the reset or rig check and the half hour call before the show starts, and between matinee and evening performances; and turning off dimmer racks, PSUs, drivers and other tech overnight.

It may also be possible to reduce energy use (an example for lighting design would be lower wattage lamps).

Tools for technical fit-up can also help sustainability. Cable ties and PVC tapes can be replaced, in many conditions, with cloth ties, snap fasteners and clamps.

Ancillaries like lighting gels can be used for as long as possible and stored for reuse, rather than being thrown away. For long-term installations, dichroic filters may be a better option.

5 Equipment

Lighting, Sound and AV are most sustainable where efficient equipment is reused repeatedly across its lifespan.

Equipment and AV systems should be carefully looked after, repaired frequently to maintain energy efficiency, and refurbished (where possible) rather than thrown away. They should be replaced by new only when they have reached the end of their life. Don't ask for new or upgraded equipment unless shows really need it.

Lighting and AV teams can extend equipment lifespans with careful handling and more frequent maintenance. Maintenance training is often available for complex units.

Repair equipment rather than replacing it. At end of life, make sure it's disposed of safely. Equipment no longer needed may still be useful to others. Think how it can be reused, donated, repurposed, recycled or stored. This includes bespoke lights and equipment, screens, stage lighting gels, and practicals.

WEEE recycling schemes can ensure safe disposal.

6 Deliveries

If there isn't adequate equipment in-house, next best is to rent or order in bulk from a single supplier, combining forces across departments if possible.

Avoid multiple deliveries of ancillary products or spares. Instead, plan ahead, communicating with other departments and productions to streamline deliveries. When hiring, try and ensure enough spares are included to cover the full run. Use of low carbon transport methods for deliveries – such as electric vehicles and rail transport – will also help reduce transport emissions.

Go to the Toolkit for more details on working sustainably.

7 Digital

Unfortunately, digital work is not zero-carbon. It causes substantial carbon emissions in manufacturing, powering and cooling computers and data centres. Active digital management is needed to minimise your digital footprint.

The biggest impact is in storage of digital content. Keeping multiple copies of large documents increases digital storage exponentially. While editing digital content, it's not uncommon to save copies as the edit progresses. Saved copies – each as big as the final version – can stay on the server, or in the cloud, for years. The same applies to high-res photographic images, and audio files.

Initiate a project to review current storage and discard unneeded files. Establish clear guidance for everyone in reducing digital storage to a minimum.

Receiving Venues

In many receiving venues, each show has its own technical set-up, requiring transport and set-up, often to create similar rigs.

- Collaboration between productions can share rigs and systems. Explore whether flexible supplier and hirer contracts could allow transfer of rentals between teams.
- Venues can hire and sublet equipment, or require incoming productions to use local hirers or green transportation.
- Venues can help productions develop shared guidance on use of standard systems and equipment.

Copyright © Buro Happold and Renew Culture. All rights reserved

10 Rehearsing, Managing, Disposing

1 Key Players

The chapters above indicate how to produce and develop a show sustainably. It's just as important to keep working sustainably through rehearsal to opening night; through the run; and beyond it to final disposal.

Much of the original team will move on to other projects. Stewardship of the show's sustainability will often pass to the stage management and costume teams, to cast and crew. With long-running shows, that stewardship may go on for years before the show is finally closed and disposed of.

It's important to induct everyone who joins the production, to make sure they understand the sustainability target and what it means for them.

Stage Management

Stage managers often overlap with production managers towards the end of the development period. Their role is often crucial in rehearsals. If they are provided with sufficient resources of time and budget they can make a serious and instant contribution to greening a show. They can keep monitoring and supporting the show during a period when late changes might threaten sustainability targets.

If it's possible to appoint the stage manager early, their sustainability expertise can be equally valuable during the show's development.

Cast

Many actors have a deep commitment to sustainability, while the actors' union, Equity, has pioneered an influential Green New Deal for the profession. It's important that the cast understands the parameters within which the show is produced, and shares them. Cast can have huge impact in talking about the production's sustainability in promotional material. They have a vital part to play in the rehearsal room, and in choices made for travel and accommodation during a tour.

2 Rehearsals

Experience from productions made with the Theatre Green Book shows that the rehearsal period sometimes undermines the achievement of conceiving and making a production sustainably. Sustainability needs particular care as more individuals join the production and opening gets closer. Careful discussion between creative team, stage management and workshops can minimise the remaking of scenic elements and multiple last minute deliveries.

Rehearsal Rooms and Spaces

Sustainable Operations gives advice on how to run buildings as efficiently as possible. The key for rehearsal rooms is to heat or cool them only when occupied, by matching heating / cooling times to occupancy schedules. Reduce temperature for unoccupied hours.

Keep windows and doors closed whenever the heating is on. When the weather allows, ventilate with fresh air rather than running mechanical ventilation systems. CO2 sensors can make sure ventilation is only running when needed. Make sure lighting is switched off when not needed.

If you have to hire rehearsal space, then if possible choose rehearsal spaces that minimise travel, and provide the most sustainable environment.

Rehearsal Practice

Reduce the number of paper scripts you print. Not every change needs a full new script for everyone. Research materials can be shared on laptops. Some casts and directors may be happy to work with digital scripts on tablets.

Catering for rehearsals needs to follow the same principles as elsewhere: avoid single-use coffee cups and packaging for food. If you regularly send out to the same suppliers, then seek out a local supplier who can deliver sustainably, offer plant-based options, and uses sustainable packaging.

Props etc

If Directors can plan in advance the props and other materials and equipment they need for rehearsal, it will be far easier to supply it sustainably.

Change

Creative rehearsals rely on change – particularly for new work and devised shows. But any change, whether to sets, props, or costumes, is likely to be last-minute, needed in a hurry, and impossible to source sustainably. The more it is avoided (or at least questioned to make sure it's really necessary), the better.

Cast, Freelancers, Visitors, Contractors

Communicate with visiting cast, creative and freelance teams. Induct them on environmental policies when they arrive, making sure they understand your sustainability values and targets.

Make sure you provide guidance on:

- Travel.
- The use of heating, ventilation and other systems, including how to switch them off if they're last to leave.
- Your policies around catering, bottled water etc.

Most of all, make sure you listen to their needs and help find sustainable responses to them. Different casts and creative teams may have very different requirements.

Copyright © Buro Happold and Renew Culture. All rights reserved

3 Show Management

Managing Sustainability is an ongoing task. Once a production has opened it will be in the care of the stage management, wardrobe, wigs, hair and makeup teams. Their support for standards can significantly affect a production's contribution to a greener theatre industry.

Sustainable management is needed of transport and deliveries. Sustainable care of costumes and wigs becomes essential. Consumables such as rechargeable batteries need to be carefully chosen. For long-running shows, managing a production sustainably is a significant part of reducing its footprint.

Dressing Rooms

Much of the guidance for rehearsals also applies to Dressing Rooms. Make sure you're heating or cooling dressing rooms only when they're occupied. In addition, it's important to make sure that hot water for showers is provided as sustainably as possible at the times actors need it. Rather than offer separate fridges in each room, a shared fridge in the Green Room will use less energy.

Consumables

Long-running shows consume everything from rechargeable batteries, through food and drink to printer ink and packaging.

Use the Theatre Green Book's Sustainable Operations section to manage them sustainably.

Touring

Transport, accommodation, catering and local procurement are all opportunities for more sustainable practice. Stage Management teams that visit receiving venues have an opportunity to work with local suppliers who support a sustainable supply chain.

Green purchasing decisions may only make a small difference venue by venue – but the cumulative effect over many weeks and productions is significant.

See the Touring chapter for more guidance.

Costume Care

Sustainable care of costumes should continue throughout a production's run.

Repairs are always preferable to remaking. Ancillary products such as hangers and bags should be sourced sustainably.

A sustainable approach to laundry includes avoiding unnecessary cleaning, washing at lower temperatures, and selecting detergents carefully. Washing techniques should aim to filter out micro-fibres. Drying cupboards are preferred to tumble dryers. Dry-cleaning should be avoided where possible.

Make sure equipment is efficient and well-maintained. In replacing elderly equipment, research replacements that minimise energy and water use.

See the Costume chapter and Toolkit for more guidance.

Wigs, Hair, Make-up

The environmental impact of wigs, hair and make-up continues throughout a shows' run.

See the Wigs, Hair, Make-up chapter, and related Toolkits, for guidance on sustainable practice.

4 Disposal

Long-running productions and tours, along with revivals, may be disposed of long after the original planning period. Sustainable disposal becomes the responsibility of stage management and costume teams.

Disposal of Sets, Props and Furniture

With long-running shows, Stage Managers may have a role in disposal, finding new homes for props, furniture or other elements. Some may return to store. For others there may be a ready second-hand market through websites or second-hand shops.

Costumes

There are many options for disposal of costumes at the end of a run. Some may be returned to store. Others might be resold through the second-hand market, donated to charity – or given to performers. Worn-out costumes should be disposed of through materials and textile banks.

Copyright © Buro Happold and Renew Culture. All rights reserved

11 Touring

1 Key Principles

Touring models vary from local/rural to national, European or international, from small and mid-scale venues to outdoor festivals and found spaces. Each has its own challenges, but the priorities, in all forms of touring, are to reduce:

- Movement of people (travel)
- Movement of things (transport)

Touring footprint is directly related to increased mileage. More distance travelled, with less sustainable means, has more impact on the environment.

Touring is part of theatre's ecosystem. It is innately sustainable since it helps each production reach more people – so we mustn't stop touring. Touring will become easier as more sustainable freight options become available. In the meantime, we can tour more sustainably through focus on:

- Planning – early discussions with all staff and receiving houses.
- Design – reducing how much material you move.
- Freight – reducing and limiting the amount of set and equipment needed.
- Travel – choosing the most sustainable options / routes available.
- Accommodation / people – reducing the number and impact of overnight stays.

2 Communications & Planning

Whether you are making a production to tour a known circuit of venues, or a show to tour nationally or internationally long-term, there are several principles to consider.

- Regularly discuss sustainability practice within your company / organisation, setting Theatre Green Book standards for shows (supported, where possible, by green contracts). Keep updating your practice based on feedback from each tour.
- Whenever possible, arrange the tour geographically so that each leg is the shortest distance possible, and avoid covering the same miles twice. This can be hard to achieve (each venue's availability will be different). Early co-ordination with all partners is essential.
- Plan additional activity, or extra performances, so you stay longer in each location, achieving more activity for the miles covered. Partners may identify nearby venues to support this.
- During the early planning phase, try to replace physical site visits with detailed plans and online meetings.
- Share all resources information; and agree to no additional hire costs if using in-house equipment, to save touring your own.

3 Designing Touring Shows

Design within pre-agreed limitations on freight (e.g. 'a single 3.5 tonne van'). Design with ease of movement and reduction of volume in mind.

If possible, design around common stock items available at all known venues or easily hired, made or sourced locally.

Design shows to fit into suitcases that travel with the company. If a company member has to travel by air, an additional bag in the hold has much less impact than a separate freight movement.

For international tours, consider re-building the set to avoid air freight. If time limitations are an issue, construct two sets that travel independently by slow sea freight.

4 Freight

Wherever possible, road freight should be in either electric, biomass or euro 6 compliant vehicles.

Touring Technical Equipment

In small to mid-scale touring, the use of in-house equipment is often the norm, with no need to transport technical equipment. Re-lights and re-designs are accepted as common practice.

For local rural touring, venues may have little or no equipment, and hiring may be impractical. In this instance, tour with sustainable transport wherever possible.

With mid / large-scale touring, venues are often not equipped to the same standard as the tour. In that case, consider the impact of local hire against transport, taking mileage for the whole tour into account.

Copyright © Buro Happold and Renew Culture. All rights reserved

Touring Set

Wherever possible, reduce the volume of set both by design (see above) and by exploring what can be sourced at each venue (e.g. chairs). Check whether the cumulative reductions actually reduce the number or size of vehicles on the road.

For European and intercontinental touring, freight usually moves from location to location independent of the company, only returning to the UK at end of the tour. Freight often remains in storage elsewhere, or arrives early at the next receiving venue. Intensive logistical planning is needed to reduce the impact of complex movements:

- Avoid moving empty or semi-laden vehicles. It may be possible to share a truck with another presentation performing at the same venue or festival.

- Avoid air freight whenever possible. With careful programming, sea freight should be the preferred option, and emits only a sixtieth of the CO2 of air freight.

5 Travel

Choose rail travel over road and air whenever possible (access requirements allowing).

If private transport is unavoidable, try to make sure it is shared. For example, arrange air/rail travel so that arrival and departure times coincide.

If air flight is unavoidable, book direct flights only (take-off and landing cause more impact than direct miles). Use rail / flight combinations instead of multiple flights.

6 Accommodation / Number on the Road

Book self-catering accommodation over hotels where possible. If hotels are needed, seek green accreditation. Avoid daily room service.

Avoid non-essential personnel travelling with the company, or limit how many venues they travel to.

Consider hiring staff locally for certain roles. For example, for a show travelling long-distance to Japan, USA or Australia, send a single technical team member to set-up, and teach locally hired crew the show. The extra day's fit-up required is better than moving large numbers of people.

In some instances, consider managing set-up, focus or show calls remotely via zoom or specialist software.

7 Monitoring

Record all areas of activity in as much detail as possible: miles covered, mode of transport, nights of accommodation, energy consumption etc. The Production Calculator includes a travel calculator to help.

Use CO2e data as a benchmark against future touring, focusing efforts on reducing the heaviest areas of emission.

Share what you learn from each tour, and feed it into your planning for the next.

Copyright © Buro Happold and Renew Culture. All rights reserved

12 Dance and Ballet

1 Key Principles

In most respects, dance and ballet productions follow the same principles as other performance, but there are a number of key differences. In particular:

- Dance buildings, stages, dressing and rehearsal rooms often need to be maintained at temperatures that allow dancers to work and perform safely.

- Costumes for dance are much harder to reuse and recycle; new costumes sometimes require unsustainable fabrics; but large ballet productions (for example) often demand a large number of costumes.

- Stages for dance need to be to exceptionally smooth to allow safe performance.

These differences can make sustainable production harder. However, it is often the case that set and scenery for dance is less extensive than in other productions, which in practice counterbalances the challenges of costume-making.

2 Dance Buildings

Dancers need a constant temperature from dressing room to stage or rehearsal and back, that allows them to work and perform safely. These will be governed by industry standards (and the needs of individual companies) and shouldn't be compromised.

It's important to warm spaces in advance to reach safe working temperatures. At the same time, good management and control is needed to avoid either overheating spaces, or heating them after the rehearsal or performance is finished.

Make sure your building system is set to warm up rooms with sufficient time to meet classes and on-stage usage. But, as for all building users, ensure that rooms are set to the pre-agreed temperature, and are not heated for longer than necessary.

3 Dance Costumes

Fabrics

Much dance wear uses synthetic fabrics for fit, stretch and breathability. Look for materials that can be sourced locally to minimise transport. Consider the durability of the fabric and the way the costumes are made to allow for extended use and refitting.

Washing

Some stage effects (blood etc) can only be removed with non-environmental detergents. Consider design options for minimising the number of costumes which need separate and individual cleaning treatments.

Undergarments need hot washing temperatures. Use your judgement to consolidate and balance washing loads wherever possible. It's better to have fewer hot washes than multiple loads.

Shoes

Ballet and pointe shoes are a major cause of waste, and reuse is generally impossible. (Some companies have explored inventively repurposing them into Christmas Tree decorations and bags – but this is not currently available on a large scale). Some waste contractors will recycle shoes with textiles. Glues and dyes can hinder this, so only treat shoes if necessary. Try to source suppliers who use less plastic in their shoes and try to buy in the UK to minimise transport costs.

Remember to pass on information about more sustainable shoe suppliers to freelancers if they buy their own shoes.

Tights

Some suppliers will recycle tights (e.g. https://imperfectpointes.com/pages/tights-recycling-scheme. Look for suppliers who are trying to find more sustainable fabrics

4 Dance Stages

Dance stages need to be smooth, often requiring specialist tape to connect panels. Currently, there is no non-PVC alternative for this. Safety should not be compromised. As new, more sustainable products become available, dance companies should experiment carefully, and share what they learn.

5 Dance Standards

At present, there are few sustainable alternatives to the fabrics from which most dance costumes are made, while reuse and recycling of dance costumes is limited by staining and wear-and-tear.

Dance companies should do their best to reuse and recycle, and choose sustainable options. However, the percentage requirements for costumes in the Theatre Green Book standards will often not be realistically achievable. Dance and ballet productions therefore need not include costumes in their calculations until more sustainable materials and processes become available.

6 Leading Change

Improvement in the sustainability options open to dance will come faster if companies actively lobby dance suppliers for change, experiment with new products and services, and share information as soon as it becomes available.

Copyright © Buro Happold and Renew Culture. All rights reserved

13 Looking Ahead

New Initiatives

Over time, making shows sustainably will get easier. There are initiatives, mentioned throughout this document, which should make it quicker and cheaper to deliver ambitious shows sustainably, as we transition to new ways of working.

Theatre has a role to play in lobbying suppliers, and working collaboratively to develop new practices and materials initiatives. The quicker this is done, the easier it will be to make shows sustainably. The principal changes are as follows:

1 Modular Design

Much technical design is already modular. A greater modular element can help sets and scenery towards sustainability.

Modular floors, flats, and generic architectural elements like windows and doors can be reused across shows, reducing the need to build them from scratch for each production. Development of modular components, shared within venues or between venues, could give designers a base set of structures with a very low carbon footprint (since they are used for a long period of time), as a basis for the bespoke elements of each design.

2 Virtual Modelling

Increasing use of AutoCAD, Blender, Cinema 4D, Sketchup and other virtual design platforms will enable set, lighting, sound and AV designers to work collaboratively and remotely on models, and eliminate the waste associated with white card models.

3 Materials Passports

With a shift to reuse and repurposing of materials, some industries are beginning to develop documents that trace where materials have come from and how they have been used. This allows for both easy checks on carbon footprints and records the history of each object.

4 Storage Facilities

Well-managed storage of props, sets and objects is essential, helping designers reuse and repurpose materials achievable more readily. This means facilities with good catalogues, records, and management systems; online browsing capabilities and easy booking systems Some regions are already exploring shared storage and reuse facilities. *See Toolkit for updates*.

5 Carbon Calculators

Carbon calculators aim to calculate the carbon impact of a production. However, complex and bespoke processes like theatre production can be extremely difficult to assess. Calculators often require quantities of time-consuming data to be added. They appear to offer scientific results, but are often based on loose assumptions.

The Theatre Green Book focuses, instead, on the transition to a circular economy, concentrating on reuse and recycling.

In addition, the Theatre Green Book Production Calculator includes calculations of carbon impact for those elements of production (amounting to some 90-95% of total impact) which can be measured easily and accurately:

- New set-building materials
- Touring and travel

Through these calculations, it will become easier to set standards and benchmarks for productions.

6 Design for Disassembly

If materials are glued, cut and taped they can be difficult to recycle or adapt for reuse later. Designing and constructing in such a way that allows for the component to be taken apart once it's use is complete is a great way to make sure materials can be sustainably reused or recycled after a production is complete.

This may mean keeping materials in sheet form, using mechanical connections (like sewing, screws, pins and clamps), and keeping clear drawings and instructions to aid disassembly.

Go to the Toolkit for more details on all these initiatives.

Sustainable Working

Inclusivity and access

Producing more sustainable theatre can strongly align with initiatives to make culture more inclusive and accessible.

Diversity

Creatively rethinking theatre needs the talent and insight of more diverse theatre-makers.

Communication

Communication, sharing, collaboration and good listening are needed to make theatre more sustainable. This way of working also makes it more accessible to new theatre-makers, and helps diversity.

Communities

Links to communities and local spaces in efforts to source materials sustainably will reaffirm the role of theatre in local areas, working with groups who might otherwise have few connections with it.

People

Sustainability means a shift from things to people. Valuing theatre-makers' work is essential in making theatre accessible and equitable.

Copyright © Buro Happold and Renew Culture. All rights reserved

14 Different Scales

Working at Different Scales

The Green Book aims to provide recommendations that will work for productions of all kinds, at all scales. Its guidance has been developed by freelancers and venues, by building-based and touring companies working at large and small scales.

The challenge of sustainability is the same, and so is the solution: Collaborate more and use less. Plan. Think. Look ahead.

Small Scale Work

However, small-scale productions will not have the resources available to large buildings. Teams will be smaller, with many roles doubled. Budgets will be even tighter.

Theatre Green Book guidance is designed to be achievable at all scales – but companies must make their own decisions about how to satisfy them with the resource available. The important thing is to work with the principles the Theatre Green Book has identified, which apply to everybody.

It's worth noting, too, that small-scale theatre is probably way ahead when it comes to making work sustainably. Small-scale theatre's expertise in stretching resource, reusing and recycling is the basis on which all theatre should be made.

Different Challenges

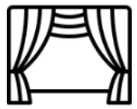
Productions vary in style, size, venue typology, production team set-up and more. Shows have different priorities, and face different challenges, as do venues of different scales, working with different performance types in different locations.

Some of these differences are covered in the table on the right.

	Easy wins	Key challenges	Where to focus
Freelancers	Connect with other shows in the region, highlighting opportunities for resource sharing	Dependent on venue sustainability appetite and engagement, and in-venue systems.	Look for assurance of engagement and support from production teams at project conception.
	Working with different productions and teams spreads new ideas about sustainability	Being given budget and time to develop sustainable work.	Share knowledge and experiences of sustainability across productions.
Small-scale productions	Culture of reuse, repurpose, local sourcing and sharing	Reliance on Fast Fashion and next day delivery	Collaboration with local networks, larger venues and community groups for resource sharing
	Collaboration and job share between teams embed sustainability more easily into shows	High proportion of waste to landfill	Early planning at concept stage to minimise reliance on fast fashion and next day deliveries
	Hiring and renting already widespread	Limited or no storage and less range of in-house materials and facilities	
		Financial constraints	
Large, building-based productions	Staff available to manage deliveries and facilities	Incoming production staff may be keen to 'make their mark', avoiding unfamiliar approaches	ADs and EDs to embed sustainability at the point of invitation and conception
	In-venue stores and equipment should help reduce need for single-use items	Hiring and casting locally may not be favourable to producers	Clear green standards to be set for all productions
	Storage, and established waste and recycling systems give options for disposal after shows	Travel for touring and outreach work	Cataloguing and sharing information about stored materials
			Providing carbon literacy training to in-house staff and contracted freelancers
Remote or rural productions	Strong local networks and community links for resource sharing	Specialist materials and equipment may need to come from distant locations	Collaboration on and participation in regional storage efforts
	May have more space available for storage and reuse, with dedicated stores	May be harder to share materials with other venues and find end-of-life uses for materials	Electrification of vehicle fleet to reduce carbon footprint of transport
Commercial or receiving venues	Long runs use high-quality and durable props and sets, minimising waste	Limited culture of discussing sustainability	Culture change, embedding sustainability into budgets, schedules and meetings
	Renting and hiring already widespread	Rigs and sound systems often reinstalled afresh each show	Collaboration with hirers and previous shows in venues to share rigs and other equipment
		Touring shows lack local knowledge and networks for sourcing sustainably	
Opera and ballet	Sets and props often stored for reuse in future seasons and repeat performances	Culture of long-distance touring, including internationally	Use of carbon calculators in tour planning and scheduling to inform decision-making
		A high frequency of short-run shows often scheduled	Explore recreating sets in distant tour locations to reduce transport requirements
			Tour fleet electrified or shifted to rail

Copyright © Buro Happold and Renew Culture. All rights reserved

You'll find tools and more in the RESOURCES area



Sustainable **Productions**

for…

- *Downloadable Production Calculator*
- *Detailed guidance*
- *Case studies*
- *Toolkit*

Go to ***Productions*** *resources*

Sustainable **Operations**

for…

- *Downloadable Operations Tracker*
- *Detailed guidance*
- *Case studies*
- *Toolkit*

Go to ***Operations*** *resources*

Sustainable **Buildings**

for…

- *Downloadable Building Survey Tool*
- *Detailed guidance*
- *Case studies*
- *Toolkit*

Go to ***Buildings*** *resources*

Certification

for…

- *Downloadable Self-certification forms*
- *Sustainability Glossary*

Go to ***General*** *resources*

Renew Culture are co-founders and co-authors of the Theatre Green Book. We have pioneered the growth of Green Book networks across the world, and are leaders in theatre's journey to sustainability.

https://www.renewculture.co.uk

Renew Culture
The Theatre Green Book

Buro Happold is an international, integrated consultancy of engineers, consultants and advisers. After leading the construction industry in declaring a climate emergency, we've committed to reduce our own impact by achieving challenging science-based targets. We are collectively working towards an equitable and green future by adapting our business to mitigate climate change and the biodiversity crisis and helping others achieve their sustainability goals.

https://www.burohappold.com/about/

BURO HAPPOLD

Neither the Theatre Green Book, nor its writers and sponsors, are liable for any damages which may result indirectly or directly from applying or using the Theatre Green Book and its contents. No warranty or guarantee is given or implied about the accuracy, reliability, completeness or suitability of advice contained in the Theatre Green Book. It is offered in good faith to help theatre-makers move towards more sustainable practice, but using the contents is solely at the risk and responsibility of users.