

THE THEATRE GREEN BOOK

1 : Sustainable Productions
(version beta.2 for trialling)



The Theatre Green Book is built on years of thinking, research and advocacy by pioneering organisations, theatres, theatre companies and individuals. You'll find their names in the acknowledgements and bibliography, and their ideas throughout.

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:

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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 Green Book provides clear standards for that change. In other volumes it will show how to improve the sustainability of theatre buildings and theatre operations. This volume 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.

Paddy Dillon, Green Book Co-ordinator

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The Theatre Green Book has brought together theatre-makers and sustainability experts to create a common standard for making theatre sustainably.

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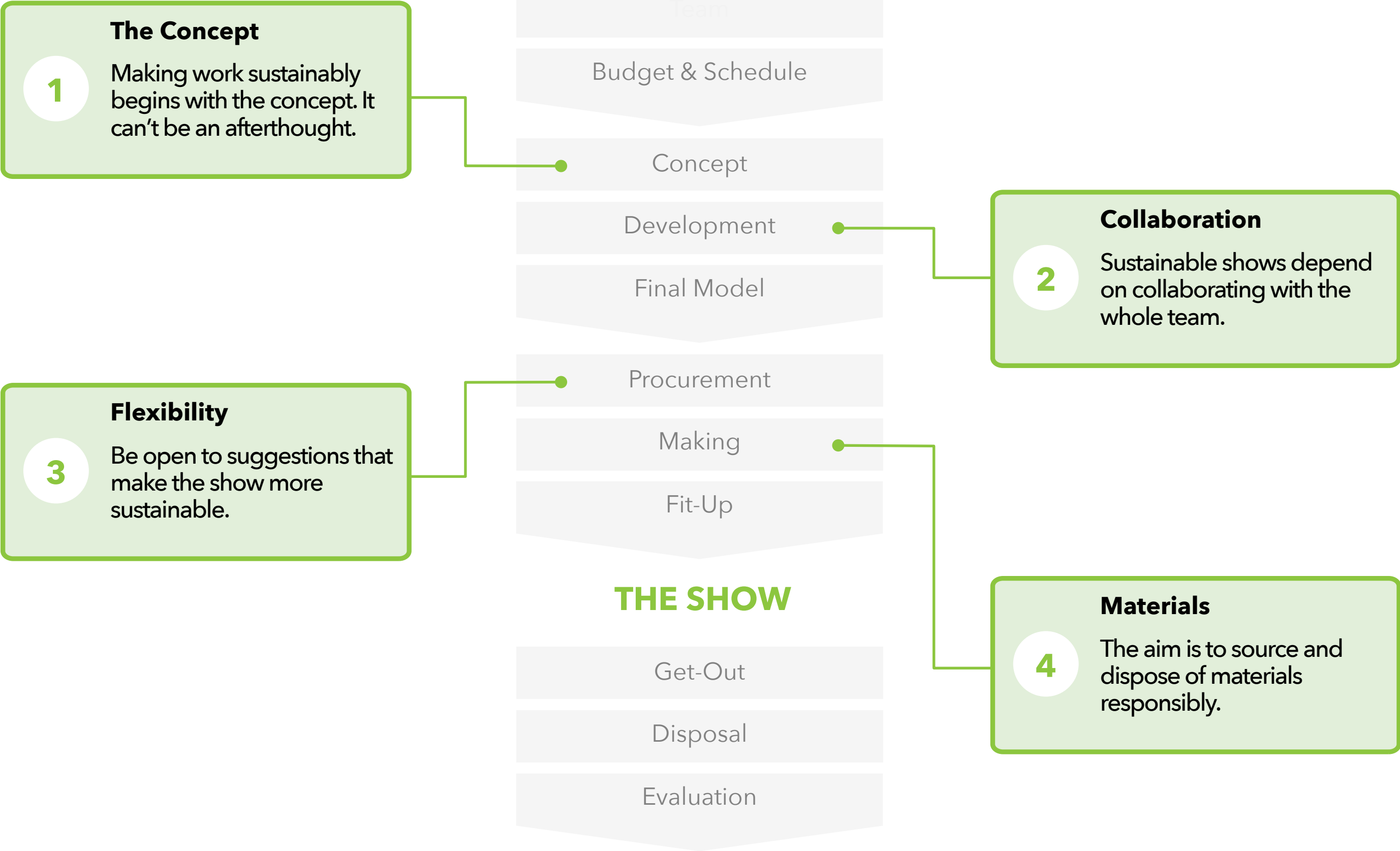
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sustainable productions

AT A GLANCE

"We have a once-in-a-generation opportunity to build a resilient recovery plan that is fair and tackles the climate and ecological crisis with urgency. We cannot let this opportunity pass us by." Julie's Bicycle, 2020

The Creative Challenge



Producing

1

The Invitation
Make the sustainability target clear at the very first invitation.

3

Key Meetings
Establish sustainability meetings to assess and workshop the show.



2

Budget and Schedule
Set budgets and schedules to match the time and costs sustainability needs.

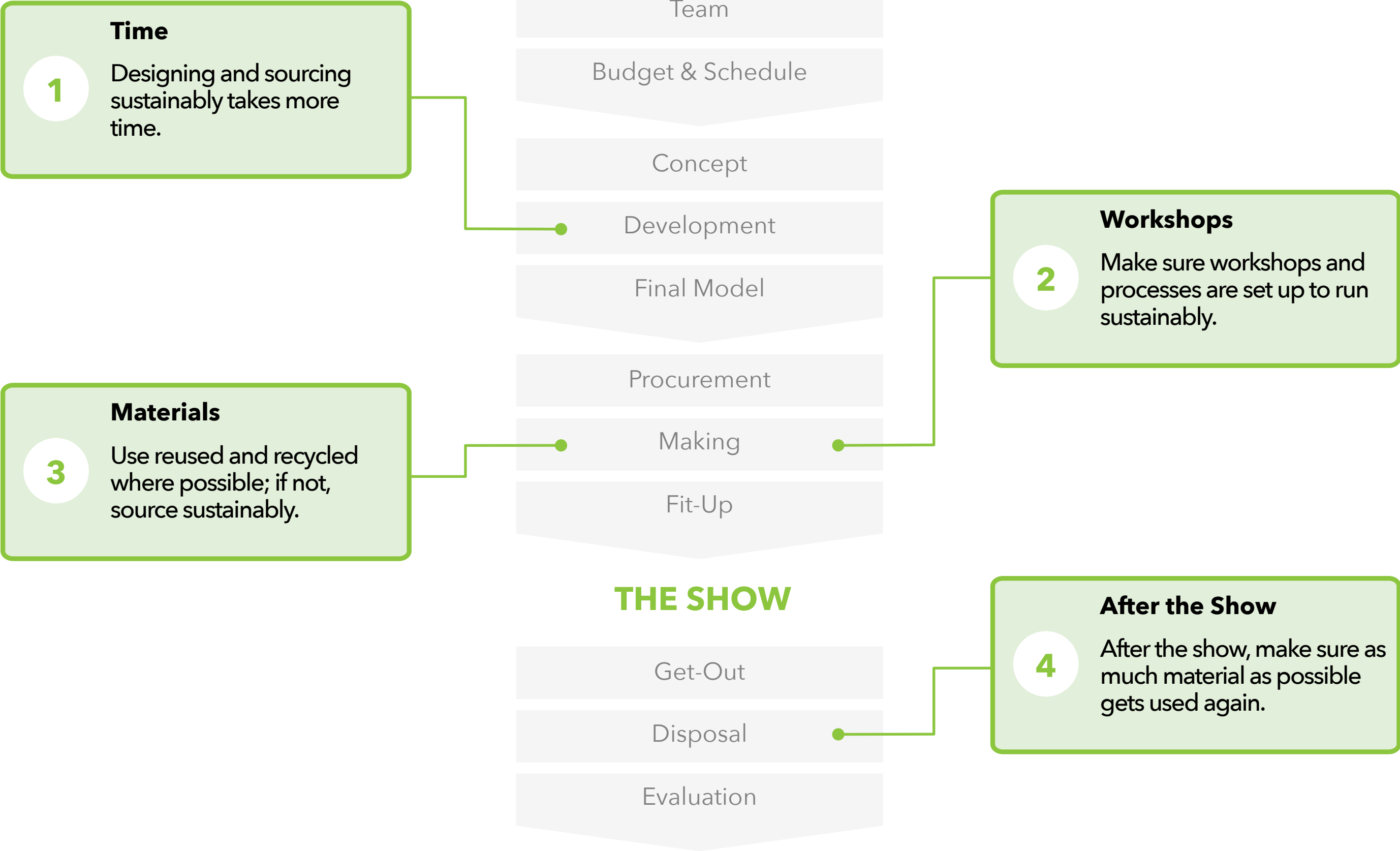
THE SHOW



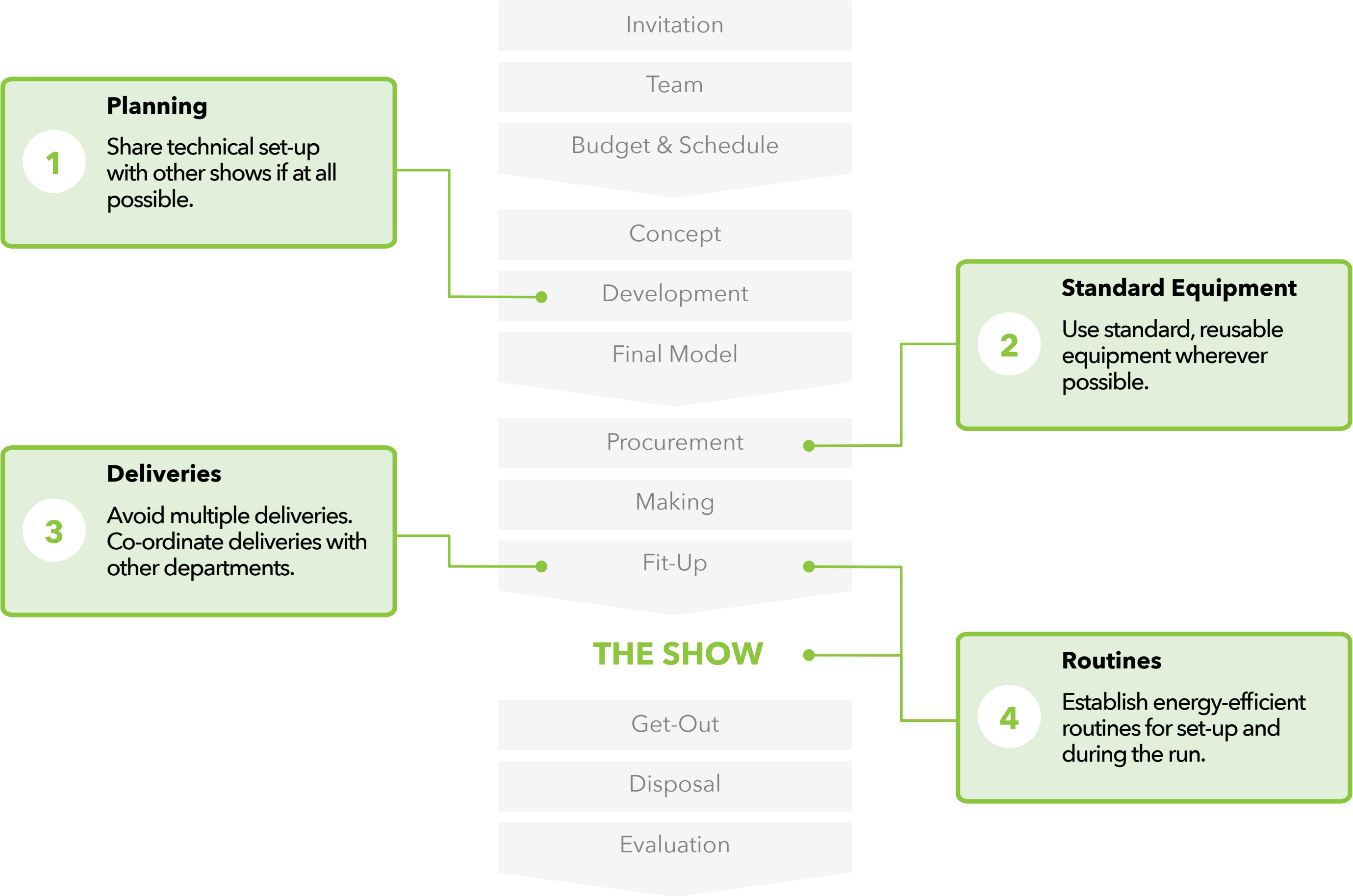
4

Review and Share
Measure outcomes, record results and share lessons learnt.

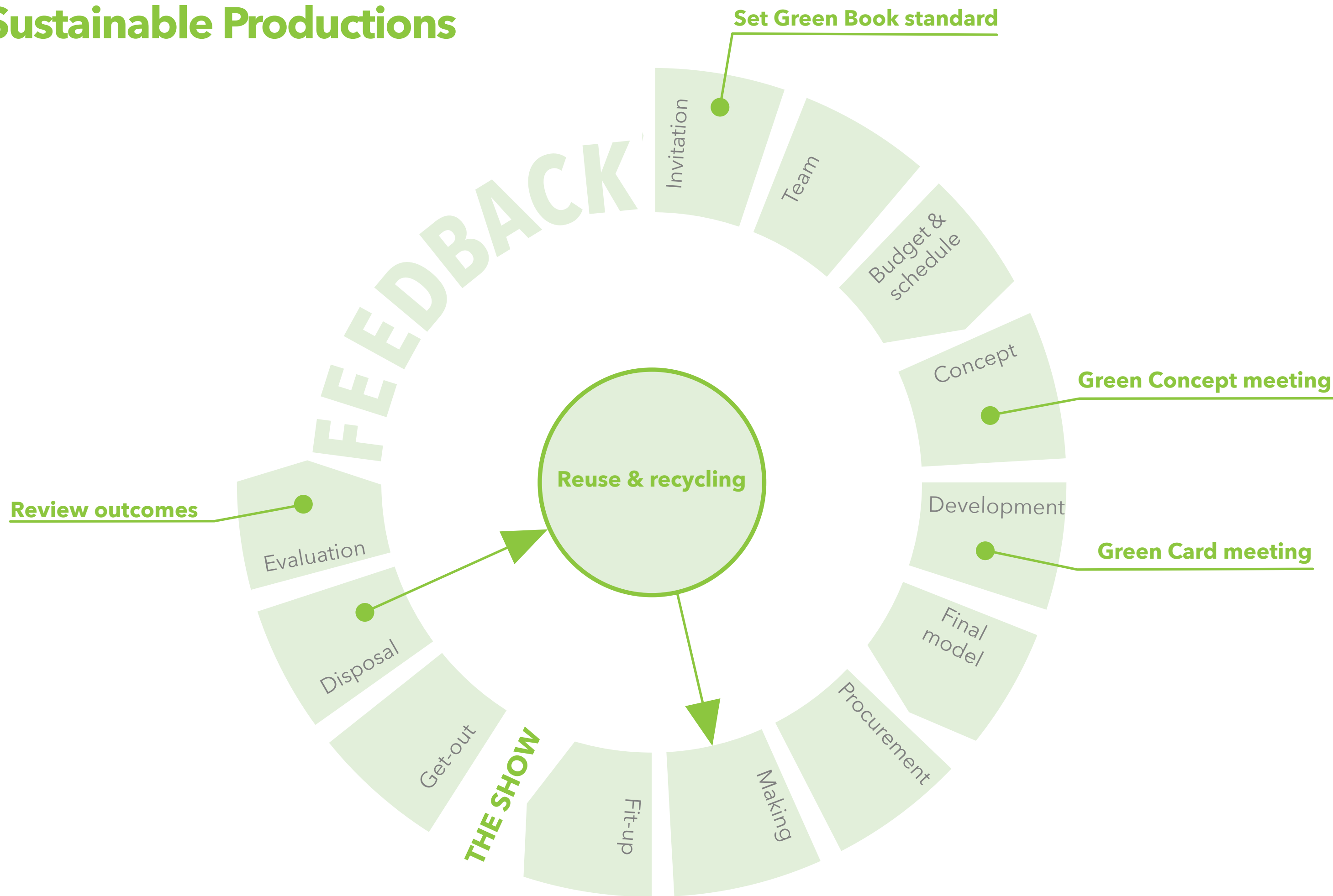
Making and Disposal



Technical



Sustainable Productions



Do more with less.

Use more reused components and recycled materials.

If it has to be new, think where it comes from.

Reduce harmful chemicals.

Reduce travel. Reduce deliveries.

Make sure everything gets used again.

More detail? *Keep scrolling to the next section*

THE PRINCIPLES

In a hurry? *Click on THE GUIDANCE to jump to detailed guidance*

THE GUIDANCE

sustainable productions

THE PRINCIPLES

"The cultural sector has a unique ability to imagine and experiment with alternative futures, question the status quo, see the world differently and explore the future with audiences and participants. Without the cultural sector playing its part in helping current and future society to move towards a more sustainable way of life, this essential shift will not happen."

Creative Carbon Scotland, 2020

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 as far as possible: 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 will have three parts. Together, they will give theatre clear, practical and detailed guidance towards sustainability:

- 1 Sustainable Shows (this volume)
- 2 Sustainable Buildings
- 3 Sustainable Operations

5 Sustainable Shows

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

The 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.

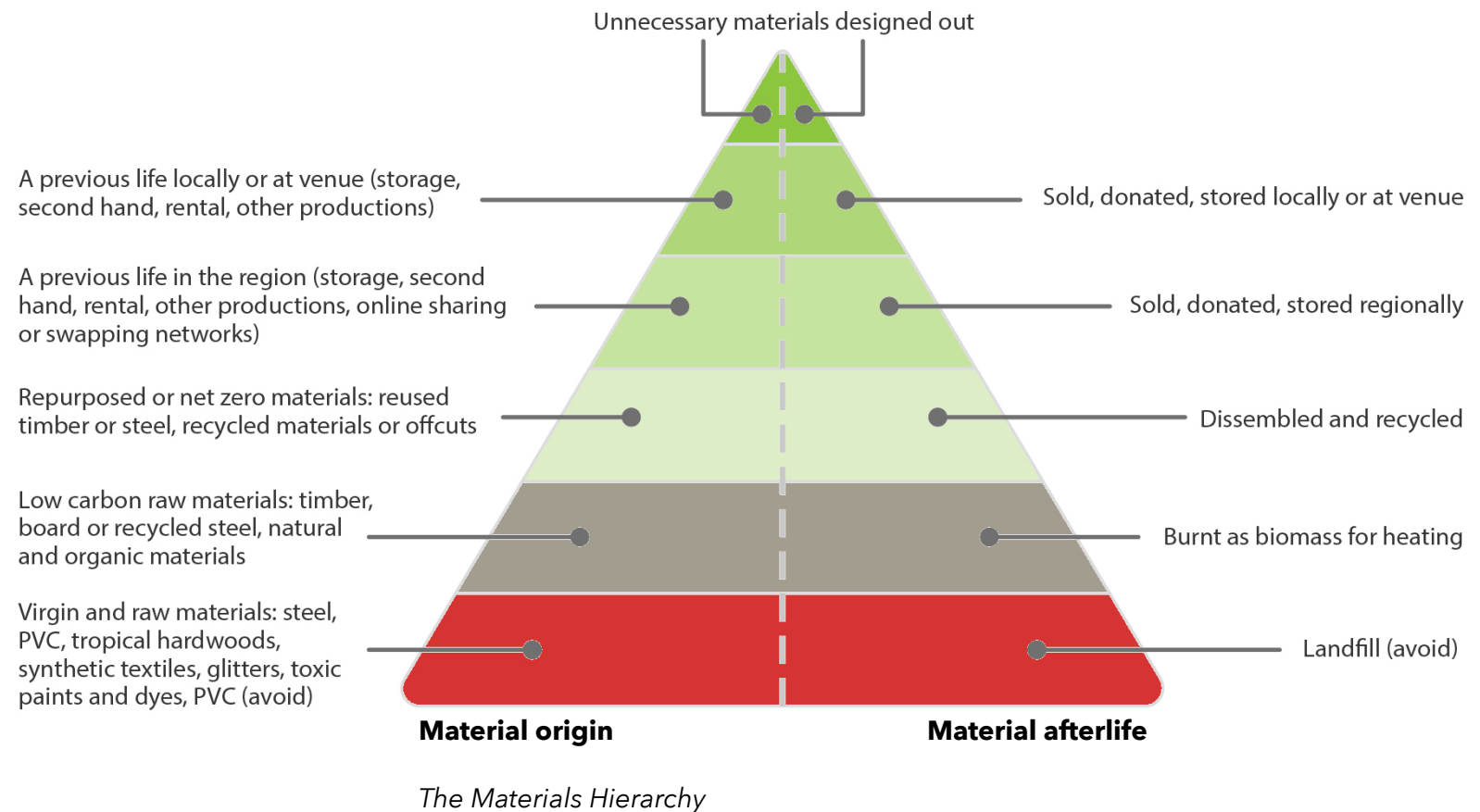
Net Zero

At present, there isn’t enough data on theatre production to determine when net zero can realistically be achieved by most theatres. Until theatres trial more sustainable shows, it’s hard to know how quickly the transition can be accomplished.

The Green Book therefore sets out the path which leads to net zero: a well-managed ‘Advanced’ production should have a minimal carbon footprint.

As data emerges, theatres feed back, and carbon tracking become more widespread, we’ll be able to judge more accurately theatre’s progress on the journey to net zero.

2 Key Principles



1 Sustainable Working Means ...

Sustainable creating

Sustainability begins at the outset, with the director's concept and the designer's vision. The team can work collectively to achieve that vision in a sustainable way.

Planning and communicating

Sustainable outcomes depend on collaboration and communication. Budgets and schedules need to allow for that, and include meetings where teams can work on sustainability together. Lessons need to be shared.

New tools and processes

Materials Inventories and (for more advanced shows) Carbon Calculators can help guide sustainability. 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, and 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 in landfill.

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, the Future Materials Banks keeps an excellent lexicon of terms at www.futurematerialsbank.com/lexicon.

3 Carbon Calculators and Materials Inventories

Carbon Calculators help people assess the emissions associated with a design, action or product. But they need a lot of data, and need teams with time and training to use them.

In the next few years, they must become widespread. Producers can help by gathering information to feed into rigorous evidence-based carbon budgets. The Green Book recommends their use on Advanced shows. *Go to the Toolkit for information on Carbon Calculators.*

In the meantime, Materials Inventories can give teams a snapshot of where materials and products come from, and how easily they can be recycled. The Green Book recommends them for all other shows. *Go to the Toolkit for a typical Materials Inventory.*

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 The Creative Challenge

1 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 interreact. 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.

2 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.

3 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 four provides detail on the principles of producing shows more sustainably).

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.

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.

4 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

Whether a show can be achieved sustainably 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.

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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.

4 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.

4 Producing a Show

1 Key Principles

Producing 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: Baseline, Intermediate and Advanced. The **GUIDANCE** defines actions for each, and who needs to do what.

Freelancers often work with new venues and teams. Green Book standards will become familiar to everyone in the industry, providing a common framework for sustainability.

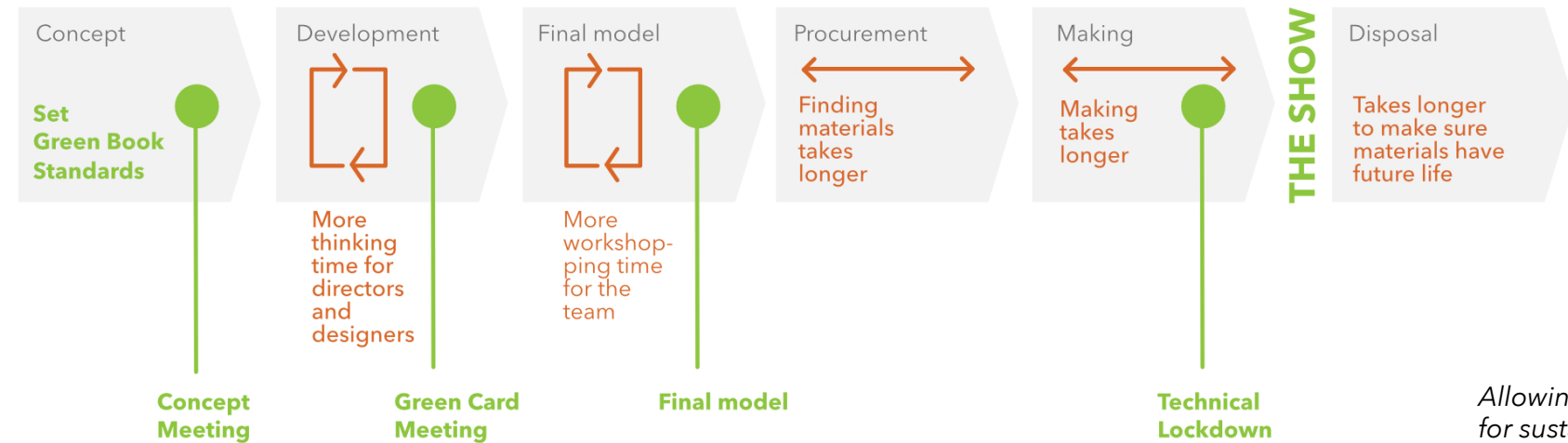
The Invitation

It's essential to define the sustainability standard with the first invitation to team members. Introduce it later, and sustainability will appear restrictive. Include it from the start, and it will be built into creative thinking from the outset.

Appointments

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

A Sustainability Champion, appointed from within the team, can help, support, encourage and co-ordinate.



A Green Production Agreement, signed by everyone, binds the team to collaborate in achieving a given target. Contracts with suppliers and makers should reference the same standard.

Go to the Toolkit for more on Sustainability Champions, and sample wording for a Green Production Agreement.

Collaborative working

Sustainable theatre-making needs teams to collaborate. Makers and suppliers will 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 'Green Card' meeting where the whole team audits design against 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. Achieving them sustainably requires iterative conversations among the team. Even ordering second-hand costumes takes longer than buying online.

Schedules need rethinking to allow sustainable practice. See *diagramme above and go to the Toolkit for more information.*

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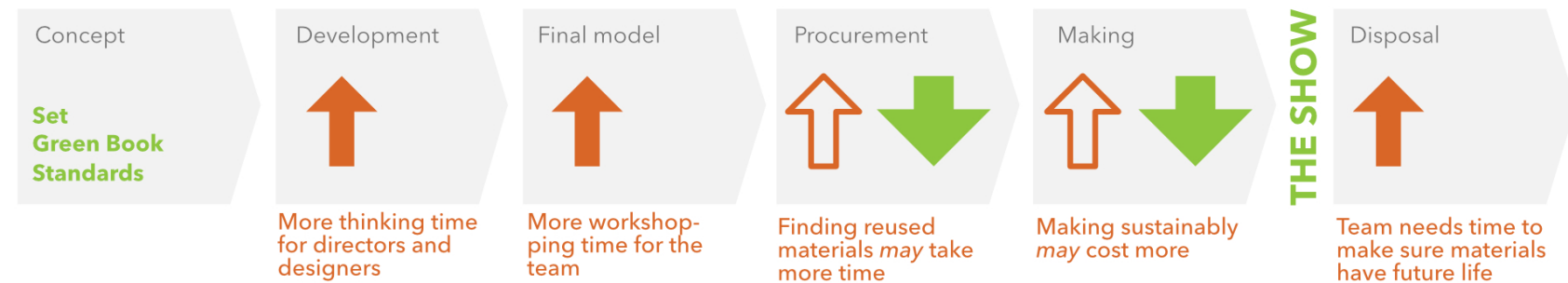
Budgets

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 *diagramme on next page and go to the Toolkit for more information.*

Rethinking costs : budgeting for sustainability



Spend more on people's time

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.*

Evaluating

More data is needed to establish Carbon Budgets for shows, while few theatre-makers are trained in using Carbon Calculators.

A Materials Inventory is the best fall-back. Managed by the Sustainability Champion, it helps the team track all the materials in a show: where they come from and how they can be reused afterwards.

In working on the show, Plan - Do - Check - Act can work for sustainability, as it does for Health & Safety

Go to the Toolkit for a sample Materials Inventory.

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.

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 will 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.

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. 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.

5 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.

Touring

Touring can bring the same show to a wider audience, therefore spreading the carbon 'cost' of its materials. On the other hand, touring by road or air has a large carbon footprint.

As electric freight vehicles become available, touring will become easier. In the meantime it's important to follow some basic touring guidelines which cover both how the tour is planned, and how the show is designed.

Networks of touring venues and consortia can improve sustainability by working together.

There may also be more radical options, such as remaking a show in each location with minimal sets, locally sourced.

Go to the Toolkit for more guidance on Touring.

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 on Outdoor / Site Specific productions, and on Ecological Impact Assessments.

5 Sets and Scenery

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.

2 Communications & Planning

Making sets and scenery sustainably is a challenge for the whole team. To work sustainably, producers need to appoint everyone early, and promote collaboration.

They 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:

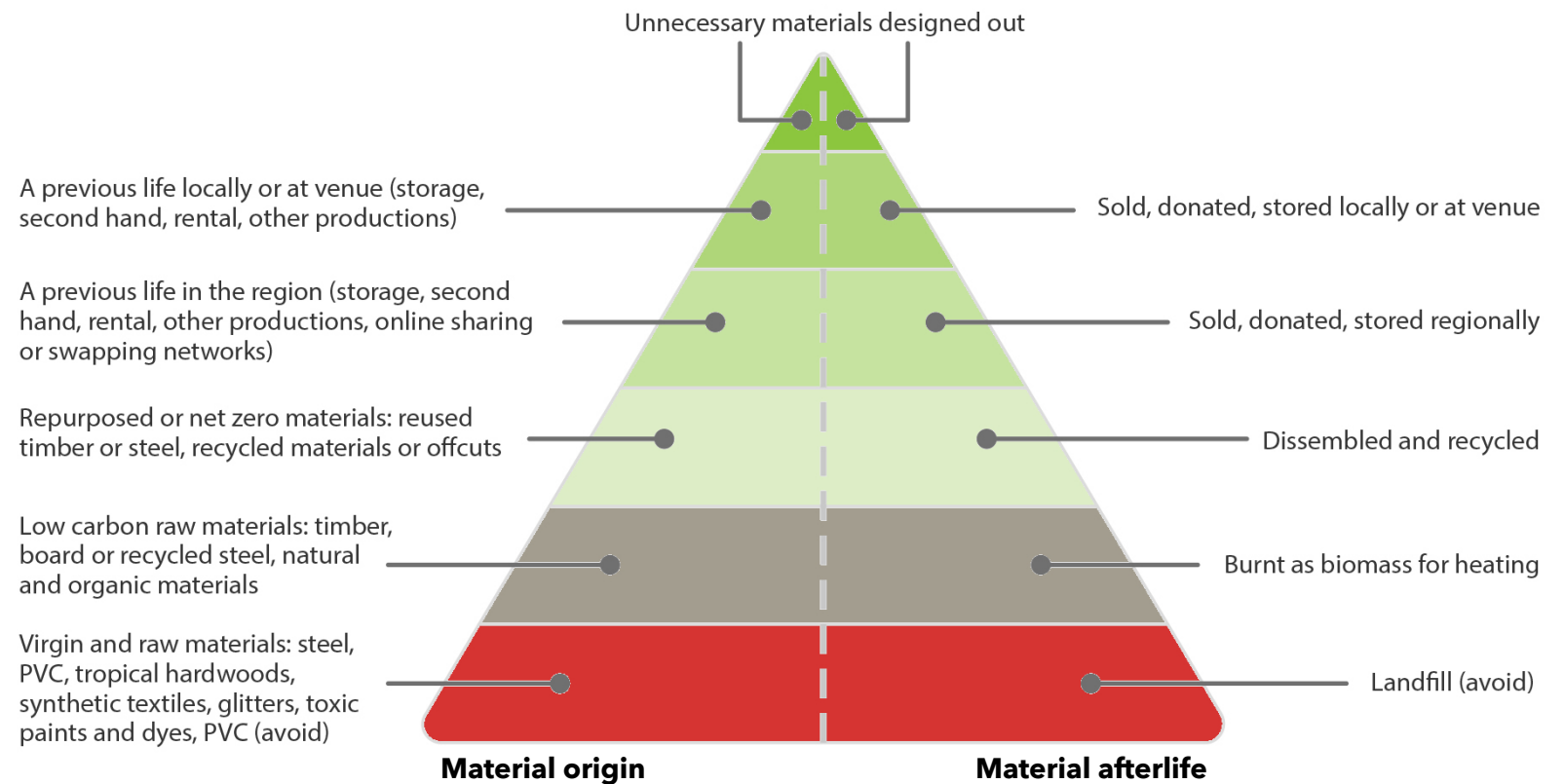
- A sustainability meeting at concept stage integrates sustainable thinking from the outset.
- Later, the White Card model should be the focus of a 'Green Card' meeting where the whole team audits design against Green Book targets, workshops options, and agrees actions.

4 Materials

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.

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.

Materials to avoid

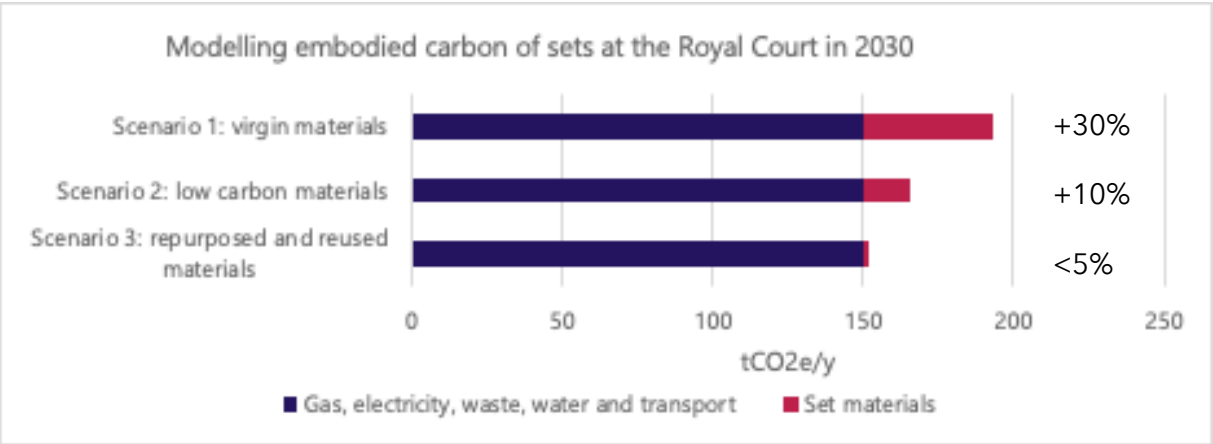
Some materials are particularly damaging, through scarcity, manufacture, or chemical harm. These include polystyrene, PVC, unrecycled steel and tropical hardwoods. They should be phased out of use in theatres as quickly as possible. *Go to the Toolkit for a list of Harmful Materials.*

How Much Carbon in a Set?

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

The Royal Court 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%.



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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 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 on Scenic Art.

Special Effects and Automated Parts

Everything in a show has an environmental impact.

Special effects are no exception. Snow becomes waste. Dry ice involves chemical manufacture. It’s always worth looking for more sustainable alternatives.

Go to the Toolkit for more guidance.

5 Tools & Processes

Evaluation

Measuring the impact of sets and scenery will become easier as carbon calculators develop, theatre-makers learn to use them, and more data establishes carbon budgets.

In the meantime, Materials Inventories provide a vital snapshot of where materials in a show come from, and allow designers and makers to plan for their reuse after the show.

Set-makers must record all materials used, by weight if possible, and make sure these are captured in the Materials Inventory.

Go to the Toolkit for links to available Carbon Calculators and a sample Materials Inventory.

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

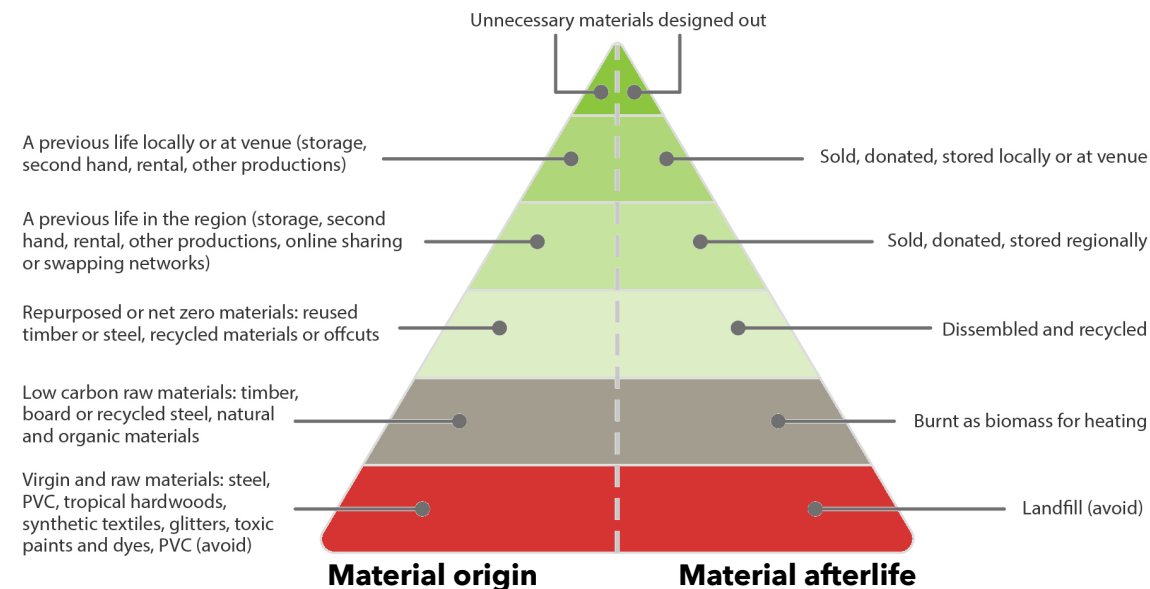
Foamboard, glue and paint contain harmful chemicals, and most models are thrown away – unsustainably. Venues should help by providing robust, reusable model boxes (which designers must return in reusable condition).

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.

6 Props



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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.*

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

Shows often order at the last minute, using next day delivery. That means a lot of one-off deliveries. To change that culture:

- Include props and costumes earlier in the production, with directors planning what they need for rehearsal
- Design and source flexibly, avoiding over-specific requirements.
- Use local suppliers.
- Make single orders from limited sources so as to streamline deliveries.

7 Costumes, 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 hair and makeup uses products which are sourced sustainably, and don't damage the environment.

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.

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. To change that culture:
- Include props and costumes earlier in the production, with directors pre-planning what they need for rehearsal.
 - Design and source flexibly, avoiding over-specific requirements.
 - Use local prop and costume suppliers.
 - Last minute changes may sometimes be unavoidable – but be sure there's a good reason for them.

During the show

The quantities of materials used in costumes, wigs and make-up products are limited. Often more harmful are the chemicals used, and the energy that goes into washing and drying. All of those can be addressed by more sustainable practice (see below and *Toolkit*).

2 Communications and Planning

Costume 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,

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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, 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.

8 Lighting, Sound, AV

1 Key Principles

Lighting, sound and audio-visual equipment use 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.

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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.

Receiving Venues

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

9 Looking Ahead

New Initiatives

Over time, making shows sustainably should 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.

The quicker theatre can develop these initiatives, the easier it will be to make shows sustainably. The principal changes are as follows:

1 Modular Design

Technical design is already largely 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 cultural history of an object.

4 Storage Facilities

Well-managed storage of props, sets and objects is essential to make reuse and repurposing of materials achievable and flexible for designers. This means facilities with well-catalogued and recorded management systems, online browsing capabilities and easy booking systems.

Some regions are already exploring shared storage and reuse facilities

5 Carbon Calculators

Carbon calculators are databases of materials and activities with an accompanying carbon footprint. These can be used to calculate the carbon footprint of different options, to support decision-making.

Crucially, once carbon footprints are used widely, typical standards for productions will be better understood, allowing for targets and carbon budgets to be set.

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 its 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 transparency are needed to make theatre more sustainable. They also makes it more accessible to new theatre-makers, and help 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.

10 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.

The guidance that follows 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 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

sustainable productions

THE GUIDANCE

"Our industry must embrace sustainability to ensure its future." SiPA

3 Steps Towards Sustainability

Choose which Green Book standard to work to. The following pages give detail on each.

	1 Baseline
Invitation	B.1 The production's Green Book Baseline standard is stated as part of the initial invitation to everyone involved.
Production Agreement	B.2 A Green Production Agreement is signed by everyone involved in the production.
Team	B.3 The full team is appointed early to allow for collaboration on sustainability.
Sustainability Champion	B.4 A Sustainability Champion is appointed at the outset to track, guide and support sustainability efforts across the team.
Budget & Schedule	B.5 The budget and schedule are set to support sustainable working.
Concept	B.6 An early meeting at concept stage includes makers, so the whole team can work on how to achieve the vision sustainably.
Development	B.7 A 'Green Card' meeting of the whole team reviews sustainability against standard, and agrees actions.
Evaluation	B.8 A Materials Inventory lists the sources of ALL materials, and their planned disposal routes after the show.
Making	B.9 The Sustainable Workshop guidance is understood and agreed by all, to establish green workshop practices.
	B.10 50% of each category of materials used in the production (set, props, costumes etc) has a previous life.
	B.11 New materials are sustainably sourced if possible. 100% of plastics are reusable, recyclable or compostable.
	B.12 Materials and products which damage the environment are avoided if possible.
	B.13 Deliveries are minimised, and last minute deliveries avoided if possible.
Technical	B.14 Technical teams follow guidance in chapter 8, reducing energy through switch-off routines etc.
Costumes	B.15 The Costumes guidance is understood and followed, to maximise reuse and manage costumes sustainably.
Review	B.16 A review meeting is held by the Sustainability Champion to assess the show's outcome and share lessons learnt.
Disposal	B.17 After the show, 65% of materials are re-used or recycled. Technical systems are maintained, reused or sustainably returned.
Outdoors	B.18 Outdoor / Site Specific shows follow Green Book guidance for Outdoor / Site Specific shows.
Touring	B.19 Touring shows follow Green Book guidance for Touring (see Toolkit).

2 Intermediate
I.1 The production's Green Book Intermediate standard is stated as part of the initial invitation to everyone involved.
I.2 As Baseline.
I.3 The team is given an information pack of in-house & local resources to support sustainability.
I.4 All key members of the team have undertaken carbon literacy training before production starts.
I.5 As Baseline.
I.6 As Baseline.
I.7 As Baseline.
I.8 As Baseline.
I.9 As Baseline.
I.10 75% of each category of materials used in production (set, costumes, props etc) has a previous life.
I.11 All other materials are sourced sustainably.
I.12 Materials and products which damage the environment are avoided.
I.13 Vehicle mileage associated with the production and deliveries is tracked and recorded.
I.14 As Baseline.
I.15 As Baseline.
I.16 As Baseline.
B.17 After the show, 80% of materials are re-used or recycled. Technical systems are maintained, reused or sustainably returned.
I.18 As Baseline.
I.19 Vehicle mileage associated with the tour is tracked and recorded.

3 Advanced
A.1 The production's Green Book Advanced standard is stated as part of the initial invitation to everyone involved.
A.2 The Green Production Agreement contains a clear divestment and ethical funding statement.
A.3 All supply contracts, tender documents and contracts require Green Book Advanced standard to be met.
A.4 A Carbon Budget is set, and the Sustainability Champion trained in using a Carbon Calculator.
A.5 As Baseline.
A.6 As Baseline.
A.7 Sets are designed with modular components for easy reuse.
A.8 A Carbon Calculator is used to track the production's footprint.
A.9 Sets are made for easy disassembly to allow for recycling of materials
A.10 100% of materials in the production have a previous life, are from 100% recycled content, OR ...
A.11 All new materials are accredited carbon zero.
A.12 The production uses no toxic or environmentally harmful production materials.
A.13 The production only uses electric vehicles, rail, cycles, or public transport.
A.14 As Baseline.
A.15 As Baseline.
A.16 As Baseline.
A.17 After the show, 100% of materials are re-used or recycled. Technical systems are maintained, reused or sustainably returned.
A.18 An Ecological Impact Assessment is carried out for any outdoor locations used.
A.19 A Carbon Calculator is used to understand the impact of each leg of the tour.

Who does what? Baseline

Use the links to go straight to resources in the Toolkit.

		Producers	Directors & Designers	Production Managers	Production Staff, Makers, Suppliers
Invitation	B.1	Reference Green Book Baseline standard as part of the initial invitation to all team members.			
Production Agreement	B.2	Prepare a Green Production Agreement, which all team members sign. → link	Sign Green Production Agreement.	Sign Green Production Agreement.	Sign Green Production Agreement.
Team	B.3	Appoint the full team early to allow for collaboration on sustainability.	Welcome early collaboration. Foster trust and collective working.	Provide the team with information about in-house resources.	
Sustainability Champion	B.4	Appoint a Sustainability Champion → link to guide the team and maintain Materials Inventory. → link	Support the Sustainability Champion in helping the team meet targets.	Support the Sustainability Champion in helping the team meet targets.	Support the Sustainability Champion in helping the team meet targets.
Budget & Schedule	B.5	Set budget and schedule to support sustainable working. → link		Help set budget and schedule. Establish sustainable data & communications. Co-ordinate sustainability meetings.	Provide insight on suggested changes to budget and time needed based on previous experiences.
Concept	B.6	Call an early meeting with makers, so the whole team can work on achieving the vision sustainably.	Include sustainability in conceptual thinking. Work on the concept to reduce late change. Do more with less.	Co-ordinate team to collaborate on sustainability in early concept meeting.	Attend early meetings to help achieve the creative vision sustainably.
Development	B.7	Call a 'Green Card' meeting of the whole team to review sustainability and agree actions. link	Be flexible. Collaborate to realise ideas sustainably. Prefer reused / shared resources. Avoid late change.	Co-ordinate 'Green Card' meeting to review sustainability and agree actions. → link	Attend 'Green Card' meeting to help review sustainability and suggest actions to improve.
Evaluation	B.8	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link
Making	B.9			Ensure Sustainable Workshops guidance is understood and agreed by all. → link	Follow Sustainable Workshops guidance. → link
	B.10	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Help ensure 50% of each category of materials (set, props, costumes etc) has a previous life. → link	Help ensure 50% of each category of materials (set, props, costumes etc) has a previous life. → link	Ensure 50% of each category of materials (set, props, costumes etc) has a previous life. → link
	B.11		Minimise virgin materials. Source sustainably where possible. Source all plastics sustainably. → link	Co-ordinate team to minimise virgin materials, & source sustainably, including all plastics. → link	Minimise virgin materials. Source sustainably where possible. Source all plastics sustainably. → link
	B.12		Don't insist on products which break the guidance.	Ensure Harmful Materials guidance is understood by all. → link	Avoid Harmful Materials where possible. → link
	B.13		Specify essential props and materials early. Avoid last-minute deliveries.	Co-ordinate across teams to minimise deliveries. Avoid packaging where possible.	Co-ordinate across teams to minimise deliveries. Avoid packaging where possible.
Technical	B.14		Prefer modular systems. Resist unnecessary technical upgrades. Use natural acoustic if possible.		Technical teams follow guidance in chapter 8, reducing energy through switch-off routines etc. → link
Costumes	B.15		Prefer reused. Source responsibly. Specify natural materials.		Follow Costumes guidance to maximise reuse, and source & manage costumes sustainably. → link
Review	B.16	Call a Sustainability Review, and share lessons learnt.	Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.
Disposal	B.17		Help plan in advance how 65% of materials can be reused, donated, repurposed, recycled or stored.	Co-ordinate to ensure that 65% of materials are re-used or recycled.	Help ensure that 65% of materials are re-used or recycled. Dispose of technical equipment sustainably.
Outdoors	B.18	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link
Touring	B.19	Follow Green Book guidance on Touring. Minimise freight. → link	Follow Green Book guidance on Touring. Minimise freight. → link	Follow Green Book guidance on Touring. → link	Follow Green Book guidance on Touring. → link

Who does what? Intermediate

Use the links to go straight to resources in the Toolkit.

		Producers	Directors & Designers	Production Managers	Production Staff, Makers, Suppliers
Invitation	I.1	Reference Green Book Intermediate standard as part of the initial invitation to all team members.			
Production Agreement	I.2	Prepare a Green Production Agreement, which all team members sign. → link	Sign Green Production Agreement.	Sign Green Production Agreement.	Sign Green Production Agreement.
Team	I.3	Appoint the team early and connect them with other teams. Provide sustainability resources. → link	Work collectively. Collaborate with other teams to share resources, materials & equipment.	Share sustainability information. Share resources, materials & equipment with other teams.	Collaborate with other teams to share resources, materials & equipment.
Sustainability Champion	I.4	Appoint a Sustainability Champion → link Support the team in carbon awareness training. → link	Support the Sustainability Champion in helping the team meet targets.	Support the Sustainability Champion in helping the team meet targets.	Support the Sustainability Champion in helping the team meet targets.
Budget & Schedule	I.5	Set budget and schedule to support sustainable working. → link		Help set budget and schedule. Establish sustainable communications. Co-ordinate sustainability meetings.	
Concept	I.6	Call an early meeting with makers, so the whole team can work on achieving the vision sustainably.	Include sustainability in conceptual thinking. Work on the concept to reduce late change. Do more with less.	Co-ordinate team to collaborate on sustainability in early concept meeting.	Attend early meetings to help achieve the creative vision sustainably.
Development	I.7	Call a 'Green Card' meeting of the whole team to review sustainability and agree actions. → link	Be flexible. Collaborate to realise ideas sustainably. Prefer reused / shared resources. Avoid late change.	Co-ordinate 'Green Card' meeting to review sustainability and agree actions. → link	Attend 'Green Card' meeting to help review sustainability and suggest actions to improve.
Evaluation	I.8	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link	Contribute to Materials Inventory listing the source of ALL materials, and their planned disposal. → link
Making	I.9			Ensure Sustainable Workshops guidance is understood and agreed by all. → link	Follow Sustainable Workshops guidance. → link
	I.10	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Help ensure 75% of each category of materials (set, props, costumes etc) has a previous life. → link	Help ensure 75% of each category of materials (set, props, costumes etc) has a previous life. → link	Ensure 75% of each category of materials (set, props, costumes etc) has a previous life. → link
	I.11		Help source all other materials sustainably, using lowest carbon options. → link	Co-ordinate team to source all other materials sustainably. → link	Source all other materials sustainably, using lowest carbon options. → link
	I.12		Help makers avoid Harmful Materials. Avoid polystyrene, PVC and tropical hardwood. → link	Share Harmful Materials guidance. Help team avoid polystyrene, PVC and tropical hardwood. → link	Avoid Harmful Materials, including polystyrene, PVC and tropical hardwood. → link
	I.13		Specify essential props and materials early. Avoid last-minute deliveries. Prioritise local suppliers.	Track all vehicle mileage. Prioritise local makers and suppliers.	Co-ordinate across teams to minimise deliveries. Avoid packaging. Prioritise local suppliers.
Technical	I.14		Prefer modular systems. Resist unnecessary technical upgrades. Use natural acoustic if possible.	Encourage sustainability collaboration between technical and other team members.	Technical teams follow guidance in chapter 8, reducing energy through switch-off routines etc. → link
Costumes	I.15		Prefer reused. Source responsibly. Specify organic textiles with organic dyes. → link		Maximise reuse. Source & manage responsibly. Specify organic textiles with organic dyes. → link
Review	I.16	Call a Sustainability Review, and share lessons learnt.	Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.
Disposal	I.17		Help plan in advance how 80% of materials can be reused, donated, repurposed, recycled or stored.	Co-ordinate to ensure that 80% of materials are re-used or recycled.	Help ensure that 80% of materials are re-used or recycled. Dispose of technical equipment sustainably.
Outdoors	I.18	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link
Touring	I.19	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link

Who does what? Advanced

Use the links to go straight to resources in the Toolkit.

		Producers	Directors & Designers	Production Managers	Production Staff, Makers, Suppliers
Invitation	A.1	Reference Green Book Advanced standard as part of the initial invitation to all team members.			
Production Agreement	A.2	Prepare a Green Production Agreement with a clear divestment and ethical funding statement. → link	Sign Green Production Agreement.	Sign Green Production Agreement.	Sign Green Production Agreement.
Team	A.3	Appoint team early. Write Green Book standard into all tenders and contracts.	Work collectively. Collaborate with other teams to share resources, materials & equipment.	Share sustainability information. Share resources, materials & equipment with other teams.	Collaborate with other teams to share resources, materials & equipment.
Sustainability Champion	A.4	Appoint a Sustainability Champion trained in carbon Calculators. Set a carbon budget. → link	Support the Sustainability Champion. Work with the team to understand and achieve the carbon budget.	Support the Sustainability Champion. Work with the team to understand and achieve the carbon budget.	Support the Sustainability Champion. Work with the team to understand and achieve the carbon budget.
Budget & Schedule	A.5	Set budget and schedule to support sustainable working. → link		Help set budget and schedule. Establish sustainable communications. Co-ordinate sustainability meetings.	
Concept	A.6	Call an early meeting with makers, so the whole team can work on achieving the vision sustainably.	Include sustainability in conceptual thinking. Work on the concept to reduce late change. Do more with less.	Co-ordinate team to collaborate on sustainability in early concept meeting.	Attend early meetings to help achieve the creative vision sustainably.
Development	A.7	Call a 'Green Card' meeting of the whole team to review sustainability and agree actions. → link	Design using modular components for easier reuse of components. → link	Co-ordinate team to design with modular components for easier reuse. → link	Assist designers in modular design for ease of reuse. → link
Evaluation	A.8	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Supply data for carbon calculation. Use carbon evaluation to inform design decisions. → link	Co-ordinate data for carbon calculation. → link	Supply data for carbon calculation. → link
Making	A.9		Support design for disassembly, for easy recycling. → link	Ensure Sustainable Workshops guidance is understood and agreed by all. → link	Make sets to modular systems for easier reuse. Make for disassembly for easier recycling. → link
	A.10	Help the team resolve questions and reach decisions so as to embody the creative vision in a sustainable show.	Help ensure all materials (set, props, costumes etc) have a previous life, OR ... → link	Help ensure all materials (set, props, costumes etc) have a previous life, OR ... → link	Ensure all materials (set, props, costumes etc) have a previous life, OR ... → link
	A.11		... are accredited carbon zero. → link	... are accredited carbon zero. → link	... are accredited carbon zero. → link
	A.12		Help makers ensure the production uses no toxic or environmentally harmful materials. → link	Co-ordinate the team to ensure the production uses no toxic or environmentally harmful materials. → link	Ensure the production uses no toxic or environmentally harmful materials. → link
	A.13		Help ensure the production uses only electric vehicles, rail, cycles, or public transport.	Co-ordinate the team to ensure the production uses only electric vehicles, rail, cycles, or public transport.	Help ensure the production uses only electric vehicles, rail, cycles, or public transport.
Technical	A.14		Prefer modular systems. Resist unnecessary technical upgrades. Use natural acoustic if possible.	Encourage sustainability collaboration between technical and other team members.	Follow Technical guidance. Make modular rigs for easy disassembly. → link
Costumes	A.15		Prefer reused. Source responsibly. Specify organic textiles with organic dyes. → link		Maximise reuse. Source & manage responsibly. Specify organic textiles with organic dyes. → link
Review	A.16	Call a Sustainability Review, and share lessons learnt. Share data from carbon calculation.	Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.	Help the Sustainability Champion collate data. Attend the Sustainability Review, and share lessons learnt.
Disposal	A.17		Help plan in advance how 100% of materials can be reused, donated, repurposed, recycled or stored.	Co-ordinate to ensure that 100% of materials are re-used or recycled.	Help ensure that 100% of materials are re-used or recycled. Dispose of technical equipment sustainably.
Outdoors	A.18	Follow Green Book guidance on Outdoor / Site Specific shows. → link	Follow guidance on Outdoor / Site Specific shows. → link	Commission an Ecological Impact Assessment for outdoor locations. → link	Follow Green Book guidance on Outdoor / Site Specific shows. → link
Touring	A.19	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link	Follow Green Book guidance on Touring. Minimise freight. Track vehicle mileage. → link

sustainable productions
TOOLKIT

Toolkit Contents

- *The Toolkit brings together resources and industry expertise in working sustainably. This is an ongoing project, in which we aim, over time, to fill gaps and provide even coverage. The Green Book welcomes further input in developing Toolkit resources.*
- *Resources in the Toolkit are shared in good faith, but no liability can be taken for them. Theatre-makers must assess their usefulness and value for themselves.*

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With special thanks to Matt Noddings for his help in compiling this section, and to the many theatre-makers who have contributed their expertise. Their names are listed in the acknowledgements.

1 Typical Green Production Agreement

THE PRODUCTION

Production:

Theatre / Location:

Opening date:

GREEN BOOK STANDARD : Baseline / Intermediate / Advanced (circle one)

We will work collectively to achieve the above standard as set out in the Theatre Green Book : Sustainable Productions. Together, we will achieve the creative vision for this production through parameters that reflect the reality of the climate crisis.

We have read and understood the principles of the Theatre Green Book. We understand what this means for our practice, and what we can expect from our colleagues and collaborators.

To achieve the standard, we will work collaboratively, trusting our colleagues' input, and treating all members of the team with respect. We will nurture a working culture in which there is no place for bullying, which promotes transparency and inclusion, and sees diversity as the norm.

If the production is failing to achieve any part of the standard, the team will collectively agree action to ensure the standard is met in full.

THE TEAM

(all team members to counter-sign)

Producer:

Venue:

Funder / backer:

Director:

Designer:

Lighting designer:

Sound designer:

Production manager:

Set maker / supplier:

Props:

Costumes:

Stage Manager:

(Others):

Sustainability Champion:

Dated:

2 Sustainability Information for Teams

Producers or venues should keep the following information available, and provide it to teams at the start of each show:

- Shows also in production at the same venue, or appearing before or after the planned production, with the names and contacts of team members.
- In-house stored materials, components, furniture, props, costumes.
- Storage facilities in local / other theatres or stores with which the producer or venue has a sharing arrangement.
- Local sources for sustainable materials, products and supplies.
- Local hire and supply companies for sustainable props, costumes, technical equipment or supplies.
- Regularly used hire and supply companies who can streamline deliveries, or use sustainable transport for deliveries.
- Local second-hand shops or facilities for supply or disposal.
- Local workshops.
- In-house standards for disposal of sets etc, with details of companies with contracts for salvage and disposal.
- Staff members who have had climate literacy training.

3 Sustainability Champions

The Sustainability Champion's role is to:

- Collate the Materials Inventory (for Baseline and Intermediate productions), or manage the Carbon Calculator (on Advanced productions).
- Lead the post-show evaluation of the production against its Green Book target.
- The Sustainability Champion doesn't 'own' sustainability for a production. Sustainability is a shared responsibility. Everyone involved must take ownership of the role they play in contributing to a sustainable show. Nor must the Sustainability Champion be made to feel like a policeman. In a successful and collaborative team, each member will hold themselves to the sustainability commitment the team has made, and will support their colleagues in doing the same.
- The Sustainability Champion is there to contribute and support, to help think through problems and brainstorm solutions, to point team members to advice, and act as a conduit in making sure the team acts as a unit on sustainability matters.
- Production Managers are obviously well-placed to fulfil this role, since it aligns with much of their other work. However, Production Managers already carry a huge burden of responsibility for Health and Safety and other matters.
- Anyone in the team who can contribute commitment and knowledge of sustainability is well-placed to fulfil the role of Sustainability Champion.

4 Carbon Calculators

- A Carbon Calculator is a tool to help people work out the amount of carbon emissions associated with a design, action or material. By entering simple pieces of information, such as an amount of materials to be used, the calculator returns the amount of carbon this would entail.
- Over time, the emergence of easy-to-use and accurate carbon calculators will help production teams track more precisely how much carbon their designs and processes use. They will help compare the carbon footprints of different options, so as to support decision-making. Understanding shows' overall carbon footprints will help theatres set targets for future productions, and align them with net zero pledges.
- Tracking data on shows will help build up the databases needed to develop widespread, accurate calculators.

Carbon calculators

The following calculators are currently available:

<https://juliesbicycle.com/faqs/faq-carbonfootprint/>

<https://www.creativecarbonscotland.com/carbon-management/tools-and-resources/>

<https://www.gabi-software.com/international/index/>

https://pre-sustainability.com/legacy/download/EI99_Manual.pdf

PowerTrack: www.FocusTrack.co.uk/powertrack

Mossy Earth: mossy.earth/

Life cycle analysis tools

[PRé | Fact-based sustainability \(pre-sustainability.com\)](#)

[SimaPro | The world's leading LCA software](#)

5 Climate Literacy Training

- Working sustainably needs teams to understand thoroughly the drivers for sustainable working, and the principles behind it. Widespread climate literacy training is essential if the sector is to move rapidly towards more sustainable making.
- Julies Bicycle and Creative Carbon Scotland may be able to give advice on how to access Climate Literacy / Carbon Awareness training. Training resource is also available at:

https://juliesbicycle.com/resource_hub/resources/climate-literacy-101/

Training is also available from:

E-Learning - The Carbon Literacy Project

<https://carbonliteracy.com>

<https://carbonliteracy.com/organisation/e-learning/>

Carbon literacy (keepsotlandbeautiful.org)

<https://www.keepsotlandbeautiful.org/climate-change/climate-challenge-fund/climate-change-engagement/carbon-literacy/>

The Carbon Literacy Project | Manchester Climate Change

<https://www.manchesterclimate.com/involved/the-carbon-literacy-project>

Carbon Literacy Training | EAUC

https://www.eauc.org.uk/carbon_literacy_training3

Carbon Literacy - HOME (homemcr.org)

<https://homemcr.org/about/sustainability/carbon-literacy/>

Carbon Literacy Training in Business | Virtual College (virtual-college.co.uk)

<https://www.virtual-college.co.uk/courses/compliance/carbon-literacy>

Training - Cynnal Cymru - Sustain Wales

<https://cynnalcymru.com/training/>

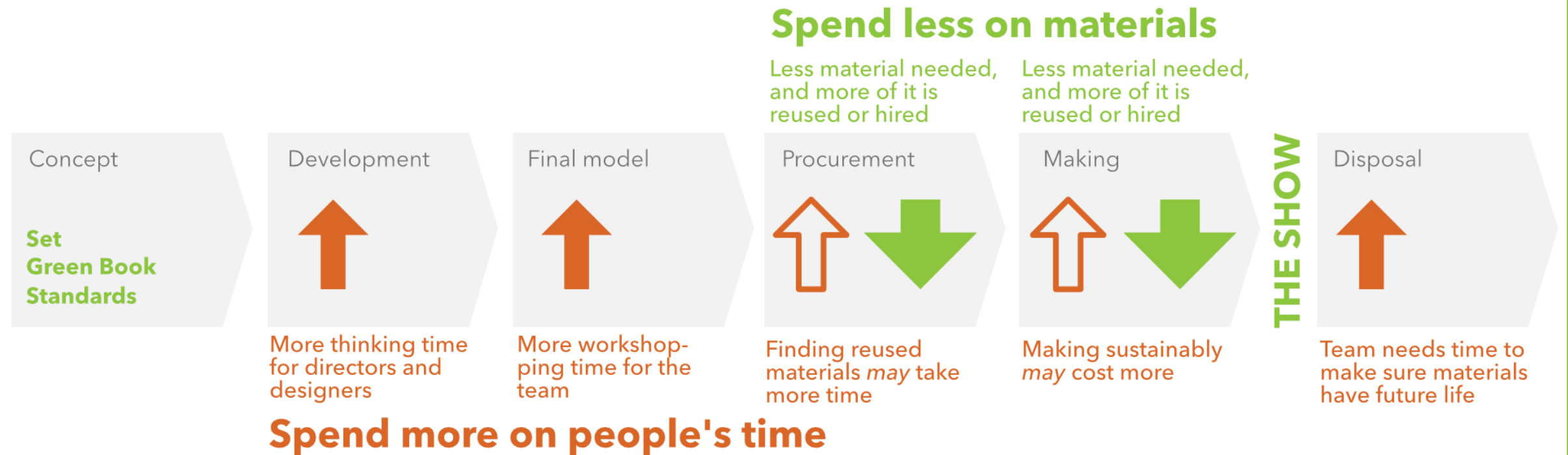
6 Budgeting for Sustainability

Sustainability doesn't always cost more. It's a budget shift from things to people:

- A sustainable design should involve less material (for example fewer, perhaps simpler sets).
- More material will be reused or hired.

But:

- Designers and teams need more time to think and workshop time.
- Costumes and props staff need time to source sustainably.
- Everyone needs time to dispose of shows sustainably.



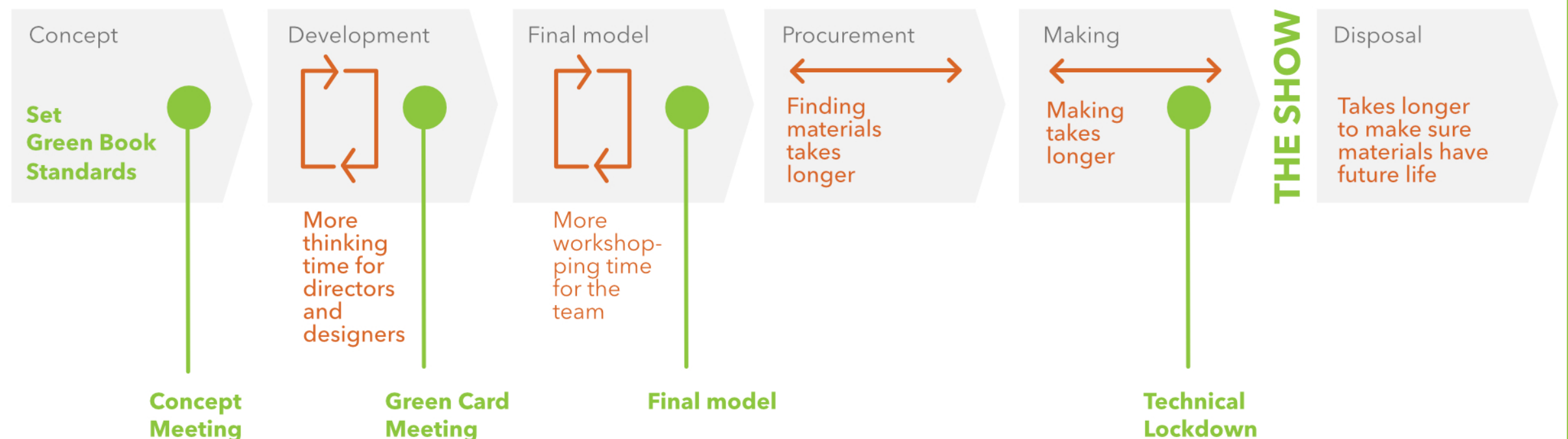
7 Scheduling for Sustainability

Scheduling for sustainability requires some milestones:

- The Concept Meeting
- The Green Card Meeting
- The Final Model
- Technical Lockdown to limit late change

Between them, teams need more time to develop concepts, and to workshop the design to its most sustainable form.

The period between Green Card and Final model is the most important.



8 Materials Inventory

General

- A Materials Inventory is not an accurate tool like a Carbon Calculator, but is much easier for the team to use. It allows the team to see where the materials in a show come from, and what will happen to them when the show is over. The Green Book recommends their use for Baseline and Intermediate productions.

Green Book guidance sets clear targets for sourcing and disposal.

Baseline Productions

- 50% of materials should have had a previous life
- 65% of materials should be reused or recycled afterwards.

Intermediate Productions

- 75% of materials should have had a previous life
- 80% of materials should be reused or recycled afterwards.

Advanced Productions

In Advanced productions, all materials should have had a previous life and should be reused or recycled afterwards.

Calculating Percentages

The materials in a production should be assessed as follows:

- Set and scenery: by weight (where known) or number (if weight not known)
- Costumes : by sq.m (manufactured costumes), or number of items (ready to wear costumes)
- Props : by weight (where known), or number of items (where weight not known)
- Technical equipment : by weight (general & stage equipment) and number (lights etc)

The production should reach the target in each category.

Teams should take a sensible view of how to cluster items by number. For example, for props, one ‘item’ might be a set of teacups and saucers, a sofa, or a tree. For costumes, one item might be a three-piece suit, or a pair of jeans. For technical, one item might be a light, or set of gels.

- The aim is not to ‘game’ the system so as to ‘pass’. It’s to give the team an honest understanding of how responsible the production is.

Examples

Alongside is a worked example of a Materials Inventory summary page. On the following pages are worked examples of Supporting Inventories for Set and Scenery, Props, Costumes, and Technical.

Production:	<i>Example</i>
Location:	<i>Nottingham</i>
Opening date:	<i>1st June 2021</i>
Green Book target:	<i>BASELINE</i>

Set and Scenery

	Target	% of reuse / recycling (set and scenery whose weight is known)	% of reuse / recycling (set and scenery whose weight is not known)	Target met?
B10: % having a previous life	50%	41%	0%	<i>No, neither category meets target, need to review</i>
B17: % having a further life afterwards	65%	91%	100%	Yes

Costumes

	Target	% or reuse / recycling (manufactured costumes)	% or reuse / recycling (costumes and items ready to wear)	Target met?
B10: % having a previous life	50%	N/A	50%	Yes
B17: % having a further life afterwards	65%	N/A	80%	Yes

Props and Furniture

	Target	% or reuse / recycling (props whose weight is known)	% or reuse / recycling (props whose weight is not known)	Target met?
B10: % having a previous life	50%	88%	29%	<i>Yes, estimate that overall this exceeds 50%. However, if we were going for 75% target we might need to reconsider some items</i>
B17: % having a further life afterwards	65%	94%	93%	Yes

Technical

	Target	Technical equipment by weight	Technical equipment by item	Target met?
B10: % having a previous life	50%	79%	15%	<i>New fresnel lights, need to consider sourcing from a hirer or asking venue if they have stores</i>
B17: % having a further life afterwards	65%	100%	85%	<i>Yes, vast majority of materials disposed of responsibly, easily exceeds 50%</i>

8 Materials Inventory cont'd

SET AND SCENERY		ITEM		SOURCE			DESTINATION			
	<u>item</u>	<u>material</u>	<u>notes</u>	<u>quantity (kg)</u>	<u>previous use</u>	<u>previous use notes</u>	<u>transport</u>	<u>disposal</u>	<u>future use</u>	<u>transport</u>
Main inventory (weight known)										
1	e.g. floor decking : textured plywood	sheet plywood, texture finish	25 sheets, FSC certified	75	no	Sourced by set builder	lorry from merchant to set-builder	recycling company	yes	lorry to warehouse
2	e.g. floor base : Steeldeck	Steeldeck	Weight requested from rental company	100	yes	Hired	Lorry from rental company	store	yes	nil
3	e.g. staircase (centre)	mixed ply and steel frame	Weight estimated, found in storage	50	yes	taken from storage	vans from storage to venue	back to storage	yes	van back to storage
4	e.g. suspended structure	from the performance before ours. not sure material - metal and ply sheets?	Weight estimated	40	yes	already in venue from performance using the stage before us	none	refuse	no	
5	e.g. stones	slate pieces, assume unrecycled.	40 cages of stones, approx 5kg per cage	200	no	Bought online	delivery van from retailer	donated to garden centre	yes	van to centre
		TOTAL WEIGHT (kg)		465	% from reused or recycled source		41%	% reused or recycled afterwards		91%
quantity (number of units)										
Other objects and items (weight not known)										
1	e.g. wire cables for suspended structure	stainless steel plus fittings	ordered online, weight not included in manufacturer's specs	8	no	ordered online	delivery van from retailer	sale to second-hand market	yes	eBay collection
		TOTAL NUMBER		8	% from reused or recycled source		0%	% reused or recycled afterwards		100%
Not included and other notes										
1	e.g. Nails, screws and small fastenings excluded									
2	e.g. Wire cages holding stones included (small, weight unknown)									
3	e.g. staircase to side of stage - not possible to weigh, not sure of materials. However, we didn't buy new so doesn't negatively impact targets.									
4	e.g. Veneer stickers for ply floor excluded									

NOTES

- 1
- Put everything possible in the 'weight known' section. Weights can be found through estimating, asking makers / set builders, looking at product / material specifications, or weighing on scales.
- 2
- Other objects are for significant items whose weight can't be estimated or checked. If there are several such items, try to group them in elements of roughly similar size.
- 3
- Exclude small - medium objects whose weight isn't known, but which are not new.
- 4
- Exclude fixings, fastenings and small objects.

8 Materials Inventory cont'd

PROPS & FURNITURE		ITEM		SOURCE			DESTINATION			
<i>item</i>		<i>material</i>	<i>notes</i>	<i>quantity (kg)</i>	<i>previous use</i>	<i>sustainable or other source</i>	<i>transport</i>	<i>disposal</i>	<i>future use</i>	<i>transport</i>
Main inventory (weight known)										
1	e.g. hand-made benches	timber	weight of materials requested from maker	100	yes	timber from maker's stores, previously used in other productions	lorry from maker workshop	back to maker for disassembly and reuse	yes	lorry to maker
2	e.g. plastic foliage	plastic	ordered online, weight from product specs	50	no	ordered online	lorry from retailer	send to storage	yes	lorry to storage
3	e.g. green bench	plastic/steel frame	weight from product spec from online retailer	26	no	ordered online	lorry from set hire	disposal (not recycled)	no	N/A
4	e.g. office desks & chairs	x10 chairs	approx weight based on typical weight of an office chair ~45 kg	450	yes	office hire company	lorry from hire company	office hire company	yes	lorry to hire company
5	e.g. outdoor table	metal? Found in second hand shop	Weight estimated based on similar table on Ikea website	10	yes	bought from second hand store	vans from suppliers	disposal (not recycled)	no	N/A
		TOTAL WEIGHT (kg)		636	% from reused or recycled source		88%	% reused or recycled afterwards		94%
<i>quantity (number of units)</i>										
Other objects and items (weight not known)										
1	e.g. model trees and plants	plastic	from storage	20	no	eBay	van from retailer	send to storage	yes	van to storage
2	e.g. Cushions for chairs and benches	foam, fabric	not sure of weight, ordered online from gumtree	6	yes	gumtree	collected on foot	resell on gumtree	yes	collected by buyer on foot
3	e.g. Plastic foliage	plastic	bought from second-hand shop, not sure of weight. About 2 boxes worth	2	yes	second hand shop	cycle delivery	disposal	no	N/A tbc
		TOTAL NUMBER		28	% from reused or recycled source		29%	% reused or recycled afterwards		93%
Not included and key notes										
1	e.g. Nails, screws and small fastenings excluded									
2	e.g. Misc. small objects - small amount, all sourced from stores									
3										

8 Materials Inventory cont'd

COSTUMES		ITEM		SOURCE			DESTINATION			
<i>item</i>		<i>material</i>	<i>notes</i>	<i>quantity (m2)</i>	<i>previous use</i>	<i>sustainable or other source</i>	<i>transport</i>	<i>disposal</i>	<i>future use</i>	<i>transport</i>
1	Manufactured costumes <i>None</i>									
2										
		TOTAL AREA (sq m)		0	% from reused or recycled source		N/A	% reused or recycled afterwards		N/A
<i>quantity (number of units)</i>										
1	Costumes and items ready to wear	Denim	<i>bought from eBay</i>	2	<i>no</i>	<i>online retail</i>	<i>DPD</i>	<i>throwing out</i>	<i>no</i>	<i>N/A refuse</i>
2		Cotton	<i>actor's own</i>	1	<i>yes</i>	<i>actor's own</i>	<i>actor travel</i>	<i>actors to keep</i>	<i>yes</i>	<i>actor transport</i>
3		Cotton	<i>internet purchase</i>	3	<i>no</i>	<i>unsustainable source, contains harmful materials</i>	<i>vans from suppliers</i>	<i>actors to keep</i>	<i>yes</i>	<i>actor transport</i>
4		From costume store	<i>from costume store</i>	3	<i>yes</i>	<i>from stores</i>	<i>in venue</i>	<i>return to stores</i>	<i>yes</i>	<i>in venue</i>
5		Mixed	<i>borrowed</i>	1	<i>yes</i>	<i>from friend of actor</i>	<i>actor travel</i>	<i>return to owner</i>	<i>yes</i>	<i>public transport</i>
		TOTAL NUMBER		10	% from reused or recycled source		50%	% reused or recycled afterwards		80%
Not included and key notes										
1	<i>e.g. Socks, underwear etc</i>									
2	<i>e.g. Fabric dye, ties, thread etc not included, minimally used</i>									
3										

8 Materials Inventory cont'd

TECHNICAL		ITEM		SOURCE			DESTINATION			
<i>item</i>		<i>material</i>	<i>notes</i>	<i>quantity (kg)</i>	<i>previous use</i>	<i>sustainable or other source</i>	<i>transport</i>	<i>disposal</i>	<i>future use</i>	<i>transport</i>
Technical equipment by weight										
1	e.g. steel frame for rig	stainless steel	using parts from previous rigs	50	yes	using parts from previous rigs	already in workshop	back to maker for disassembly and reuse	yes	lorry to maker
2	e.g. hanging cables for rig	ordered online - weight from manufacturer specs		15	no	ordered online	lorry from retailer	keep in venue for future use	yes	keep in venue
3	e.g. 4x mic stands	hired - weight from product specs ~2kg each https://www.thedjshop.co.uk/ultimate-support-jamstands-js-mc100-tripod-microphone-stand.html		8	yes	hired	van from rental stores	return to rental	yes	van from rental stores
		TOTAL WEIGHT (kg)		73	% from reused or recycled source		79%	% reused or recycled afterwards		100%
<i>quantity (number of units)</i>										
Technical equipment by item										
1	e.g. new fresnel lights	new	ordered online	10	no	ordered online	delivered by EV (manufacturer's)	keep in venue for future use	yes	N/A
2	e.g. Lighting gels	plastic	from storage, (say) 2 packs of 10	2	yes	storage	in venue	dispose	no	N/A refuse
3	e.g. Lighting gels (new)	plastic	ordered from supplier, 6 no.	1	no	eBay	delivery van from retailer	add to storage	yes	keep in venue
4	etc									
		TOTAL NUMBER		13	% from reused or recycled source		15%	% reused or recycled afterwards		85%
Not included and key notes										
1	e.g. Misc. cables, batteries etc									
2	e.g. Bulb, lighting stand etc replacements during show for in-house lighting - managed by venue, couldn't track									
3	e.g. This inventory does not include permanent in house lighting units and systems, lighting desks etc, only the additional items sourced for this production									

9 Meeting, Reviewing, Sharing

Green Concept Meeting

- The Green Concept meeting is a chance to explore early thinking and get the measure of how the vision can be developed in a sustainable way.
- It isn't a matter of rejecting or criticising ideas. Instead, a collaborative discussion can review, question and share thoughts so that the design can be taken into the development stage with a clear shared understanding of the issues around delivering it sustainably.
- The Green Concept meeting should include makers and production staff, so as to view the concept holistically, and involve the whole team in a collaborative process from the outset.

Green Card Meeting

The Green Card meeting – a development of the familiar White Card – is the team's chance to:

- Review where the design is in general environmental terms.
- Assess it against its Green Book standard.
- Work collectively to develop the idea towards the most sustainable possible outcome, ensuring that it meets Green Book targets.
- Clearly list actions and decisions made.

The Green Card meeting is chaired by the Sustainability Champion, who will share notes and actions after the meeting.

Post-show Evaluation

Theatre's journey towards more sustainable practice is a steep learning curve for the whole sector. It needs teams to:

- Reflect on their experiences of making a show sustainable.
- Honestly assess what worked and what didn't.
- If targets were missed, to make a collective review of how things could have been done differently.
- Share the results of their review.
- Collect and share data for the future shift to carbon budgeting.

The Post-Show evaluation is chaired by the Sustainability Champion, and must be attended by all team members. Most will have moved on to other shows, but unless learning and sharing are prioritised, theatre's progress towards sustainability will be slower and more painful.

10 Modelling Tools and CAD

CAD

- CAD allows designers to test multiple options and designs, building detailed models that avoid waste from white card models. As the use of CAD grows, it will also become easier to combine models from different design teams: allowing lighting and set designers to model and test ideas in the same file, for example. In future, as materials stores and virtual catalogues develop, it may also be possible to download digital files for specific objects and products.
- Sketch up for modelling without a model box that allows you to design quickly and then export to CAD etc [SketchUp Pro Software](#) | [Create 3D Model Online](#) | [SketchUp](#)
- Vectorworks also allows sketch modelling and the 2D/3D drawing and modelling [3D Design Software - Fully Integrated BIM](#) | [Vectorworks](#)
- AutoCAD for draughting [AutoCAD for Mac & Windows](#) | [2D/3D CAD Software](#) | [Autodesk](#)
- Cinema 4D for 3D visualisation [Cinema 4D Overview!](#) - Maxon

Modelling

- Biodegradable Foamcoare available in Black and White which will breakdown by 100% within 1 to five years due to its unique "bio resin formulation";- conventional foamboard will not biodegrade for 80 to 450 years
- <https://www.graphicsdirect.co.uk/products/white-biodegradable-foam-centred-board>

Model box database

<https://www.dropbox.com/sh/fou00qa7hcuwy8m/AAD53NX4qpakH0VYKw2cNUm3a?dl=0>

Printing

- 3D printers utilising heat or lasers use 50 to 100 times more electricity than traditional production methods to make an object of equal weight.

However many now use Bioplastics as a printing material

<https://www.3dnatives.com/en/3d-printing-sustainability-220420194/>

11 Workshops Guidance

General

- Switch to a renewables energy supplier.
- Reduce energy use in lighting and heating. The best tariffs are 100% renewable electricity, all of which is generated by or for the supplier, not just traded under REGO certification. For more info, go to: <https://www.which.co.uk/news/2019/09/how-green-is-your-energy-tariff/>
- Minimise the carbon footprint due to transport / deliveries. Try to keep suppliers as local as possible. Make single large orders to reduce deliveries.
- Have separate waste bins in the workshop for recycling/general rubbish.
- Support good waste disposal practices. Agreement with suppliers can be signed where equipment can be returned to be repurposed and refurbished.
- Use electric tools only, with rechargeable batteries or mains connection.
- Use painting wash-up units that separate reusable washing water from wastewater.
- Use water-based paints with low VOC content.
- Avoid environmentally harmful detergents, like 1,4-Dioxane, Sodium Laureth Sulphate, Bleach and Formaldehyde. Look for Eco-label certification or similar.
- Discourage the use of polystyrene, polycarbonate/acrylic and PVC tapes.

Metal workshop

- Only use water based cutting fluid.

Other Useful Resources

<https://www.bectuartdepartment.co.uk/what-we-do/work-groups/sustainability>

12 Reuse and Recycling

Reuse and Recycling within Theatre

- Theatre and performance already has a strong hire & reuse model for technical and other equipment, as well as for costumes and some props.
- Sets and scenery are more challenging, because every set is bespoke, and set design involves Intellectual Property rights.
- The following generic set components should always be reclaimed and reused:
 - Floors
 - Flats
 - Generic architectural components such as generic doors, windows, stairs

Resources for Reuse and Recycling within Theatre

Some materials and components can be reused and recycled within theatre:

- Theatre stores are an obvious resource.
- Networks of theatre-makers (production managers, set builders, store managers, costume supervisors etc) have a wealth of expertise about productions and materials being used across towns and cities, and may be able to set up connections between shows.
- Theatre and performance already has a strong hire model for technical and other equipment, and a developing infrastructure of organisations for reuse and recycling, that include:

<https://www.set-exchange.com>

<https://www.re-sets scenery.scot>

<https://www.greenclover.com/recycle/>

<https://www.setasidestorage.co.uk/recycling/>

<https://www.prophire-north.co.uk/scenery-recycling/>

https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1518691260.pdf

<https://www.propworks.co.uk>

<https://cama.co.uk>

https://www.theatreinventory.info/VideoLibrary/theatre_inventory_database.htm?ms=AUQ%3D&st=MQ%3D%3D&sct=MA%3D%3D&mw=MjQw

<http://www.stagestock.com/>

<https://costumeinventory.wordpress.com/category/theatre-inventory-resources/>

open workshop facility: <https://www.edinburghopenworkshop.co.uk>
leefilters.uservoice.com/knowledgebase/articles/823824-recycling-polyester-gels

Open Reuse and Recycling

However, it is hard to establish effective reuse and recycling if networks are limited to a small industry like theatre. In addition, the aim for materials should be not only for a single reuse, but to have a number of lives:

- A piece of set might get reused as it is.
- It might be modified & reduced in size.
- It might be modified again by a smaller company, or someone outside theatre.
- It might be broken into constituent good-sized, good-quality materials and reused for something completely different.
- Eventually, it might be so battered and small that the only use for it is to be chipped - but it will have had a long, useful life first.

Wider reuse and recycling resources include:

- Online materials sharing - networks like Freecycle, GumTree, local Facebook groups etc
- Second-hand shops and antique fairs stock and take a wide range of materials
- Donated materials available through local charities, schools and events networks

The following may also give useful information:

WEEE Recycling Information: www.hse.gov.uk/waste/waste-electrical.htm

The Restart Project: therestartproject.org

<https://thefirstmile.co.uk/>

Home - Envirowaste (envirowastemanagement.com)

<https://www.kiculture.org/ki-books/>

Making for Reuse and Recycling

- Reuse and Recycling are much easier if everything on a stage is designed and made in such a way that it can be easily disassembled for reuse (see next pages).

13 Modular Design

- Production often use similar core structures like walls and doors, blocks, building-fronts and basic scenic elements. A culture of reusing or adapting generic versions of these structures – ‘modular components’ – across multiple productions will reduce the volume of materials that theatre productions consume, and therefore carbon emissions. When working with these components, the creative teams’ focus can be on taking modular units and working out how to adapt, combine and clad them.
- Modular framing systems can replace welded steel framers for sets with a system that can be reused like Steeldeck.

ModTruss | Modular Construction System | Triple E

<https://triplee.ltd/products/modtruss/>

Layher UK | High Quality Scaffolding Systems

<https://www.layher.co.uk>

14 Making for Disassembly

General Principles

- Common fastening methods, like spot welding, strong adhesives and nail plates may be quick and easy to assemble, but make it hard to disassemble and reuse materials.
- Making for disassembly means:
 - simple product structure
 - modular design and components
 - reversible methods of fastening
 - improve the ease of part / component separation
 - consideration for easy recognition of disassembly point
 - dismantling without force
 - easy to access cluster of contaminating materials prior to mechanical separation
 - clear labelling of parts
 - drawings and instructions to track how to disassemble
- Making for disassembly requires the maker to think in advance how the component will be disassembled. The five most commonly reported sources of complexity in disassembly operations are:
 - accessibility by hand or tool
 - the positioning position required by hand or tool
 - the force required
 - the range of non standard tools required
 - the base time required to complete the task
- Design for materials to be used as full sheets, minimising the need to cut and shape boards to bespoke sizes that are not well suited for future usage. Standard sizes are easier to reuse.
- Use a minimised number of uniform mechanical connections that can be easily separated or disjoined. This includes snap fit fasteners and removable screws or nails instead of glues and staples.

15 Sustainable Sourcing

Avoid Virgin Materials

- There are few completely sustainable new materials. Most materials have an environmental impact through manufacture and transport, quite apart from their impact on scarce mineral or natural resources.
- Avoid specifying virgin materials, identifying instead materials that are reused, repurposed, rented, recycled or zero carbon. In particular, virgin steel has a very high carbon footprint and recycled equivalents will greatly reduce emissions.
- Only once sources of reused and recycled materials have been explored, should theatres use virgin materials in their productions. If they do, it is important to make sure they are sourced as sustainably as possible.

Specifying Materials

- If raw (virgin) materials are required, specify based on lowest possible carbon option. This can be checked using free online Environmental Product Declaration databases or in manufacturer information. Natural materials typically perform better than man-made or synthetic – such as timber in preference to metals and plastics. Plastics can be reusable, recyclable or compostable
- Use natural materials as alternatives: for example, varnishes, dyes and lacquers, raw oils, petroleum free wax, PVA adhesives, bio paints with low VOC content, biodegradable or paper-based tapes and chalk.

Specifying Timber

- Timber has a substantially lower carbon footprint than steel and other structural materials typically used on shows. However, it is important to specify and source it as sustainably as possible.
- Timber is more likely to be sustainably forested and sourced if it has FSC or PEFC certification. Record the procurement route and certification and consult the UK Government Timber Procurement policy for more information on certification.

- The following is an example of an inclusive specification clause:

All timber and wood based products must be from legal and sustainable sources, as defined by the UK Government Central Point of Expertise on Timber (CPET), be sourced from European forests, and be delivered to the workshop with full chain of custody.

Chain of custody schemes recognised as meeting the above include:

- *Programme for the Endorsement of Forest Certification (PEFC)*
- *Forest Stewardship Council (FSC)*
- *Grown in Britain (GiB)*

PEFC: www.pefc.org/find-certified

FSC: <https://info.fsc.org/>

GiB: www.growninbritain.org/directory

What is Chain of Custody ?

- Chain of Custody certification is a way of tracking certified material from the forest to the final product to ensure that the material contained in raw timber or timber-based products can be traced back to certified forests.

Timber Origin

- UK and European timber
 - has had to travel less far
 - is more likely to have been forested sustainably
 - is easier to validate through full chain of custody
- Specifying PEFC, FSC or GiB-certified timber from European sources is most likely to produce wood that's been grown and forested sustainably.

Timber Products and Sheet Materials

- Request Environmental Product Declarations (EPDs) from timber suppliers to compare carbon footprints ('the equivalent CO2 value') of different options. You can quickly check and compare EPDs for many timber products using the ICE Inventory of Carbon and Energy database. Typically, Particle Board, Glulam, Laminated timber, and

Fibreboard have lower carbon footprints than plywood, chipboard or OSB, but this varies depending on the product.

- Confirm with suppliers or in manufacturer specifications that all structural timber meets, as a minimum, Formaldehyde release class E1 to BS EN 14080:2005 and has a confirmed absence of prohibited wood preservatives/biocides to BS EN 13986:2004.
- 64% of particleboard and OSB is UK-produced, with the remainder mostly coming from mainland Europe. No plywood is produced in the UK, with only 20% coming from mainland Europe.

Adhesives

- If the choice is given, alternative methods to traditional adhesives are preferable. This includes naturally-based adhesives such as Lignin, Soya Protein, Brettstapel, dowellamination etc. Supplier/manufacturer information should be recorded to facilitate these materials being reused or recycled later. This should include data sheets, or any restrictions noted in product specifications that might be imposed by adhesives, treatments and finishes that would affect particular methods of recycling or use as a fuel in gasification, biochar, anaerobic storage or other process.

Batteries

- For battery use and disposal, see:

juliesbicycle.com/wp-content/uploads/2019/10/Better_Batteries_Guide_2011.pdf

Gaffer Tape

<https://www.lemark.co.uk/gaffer-tape/magtape-ultra-matt-gaffer-tape/#tab-id-4>

See Costumes, Props and Lighting for other sustainable alternatives.

Advice on waste and materials can also be found here: <https://www.kiculture.org/ki-books/>

16 Harmful Materials

- Key materials to avoid are Polystyrene, PVC, virgin steel, and tropical hardwood.
- Discourage the use of polystyrene and polycarbonate/acrylic.
- Eliminate the use of harmful chemicals including aerosols, parabens, triclosan and PVC.
- Ensure plastics are reusable, recyclable or compostable.
- Avoid environmentally harmful detergents, like 1,4-Dioxane, Sodium Laureth Sulphate, Bleach and Formaldehyde. Look for Eco-label certification or similar.

17 Special Effects

- Dry ice : Check to ensure that fluids and fuels used are non-toxic or environmentally harmful by following HSE COSHH assessment guidelines⁵.
- Snow : Snows and confetti should be from recycled material that is biodegradable or recycled after the show. Neither glitter nor 'eco-friendly' glitter is safe for the environment.
- Fire : Use of solid fuels should be avoided. Nitrogen-based fireworks can be sourced which are cleaner.
- Automated parts, wind machines etc : Power electrically and maintain carefully as with other lighting and AV equipment.

18 Scenic Art

Easy Wins

- See the Scenic Art Guild's 3 bucket system video 3 Bucket system.
- Reuse paints.
- Reuse (or recycle) metal tins.
- Use eco roller trays and brushes.
- Use water-based paints with lowest possible carbon footprint.
- Shop locally.
- Avoid using chemicals wherever possible.
- See Scenic Art Guild of America (www.scenicguild.org) water- and time-effective guidance on cleaning roller sleeves.
- Nails and Tacks are reusable fixings as opposed to staples and brads. Where appropriate can nails and tac be used and reused.

Products

- Use natural varnishes, dyes and lacquers, raw oils, petroleum-free wax, PVA adhesives, bio paints with low VOC content, biodegradable or paper-based tapes and chalk.
- Try eco clay paints (though they are expensive). Makers include:
 - Lakeland : www.lakelandpaints.co.uk
 - Celtic Sustainables : www.celticsustainables.co.uk
 - Eico : www.eico.co.uk
- Bristol Paint (www.bristolpaint.com) has a lower carbon footprint as a UK company than ROSCO, which is USA based.
- Bristol Paint make a range of eco brushes and roller trays : <https://www.bristolpaint.com/brushes>
- Explore traditional & natural size and powder paint.
- Explore flour and water solution for indoor use on papier-mâché which dries 'rock hard'.

Avoid

- PVA (polyvinyl acetate) paints, chemical glazes and two-part fillers.
- Glitter
- Harmful plastics and chemicals, including aerosols, parabens, triclosan and PVC.

19 Props

General

- It can be worth asking how props would have been made before plastic-based materials became widespread.

Large sculptural shapes

- Large shapes are normally cut or carved from polystyrene, and textured or coated. Polystyrene is hard to use sustainably. The first step, therefore, is to be sure the item is absolutely required artistically.
- If it is, consider whether it can be made from organic materials such as timber. Alternatively, Jesmonite, a plaster and acrylic-based alternative, may be worth exploring.

Upholstery

- Foams for upholstery can be replaced by the use of capock, coir, or horse hair as traditional stuffings. Make sure the production team understand this will be a slower process requiring greater skills by the maker, and may cost more. Some further work is needed fully to review the sustainability of these alternatives.

Reuse

- Some props or furniture may be able to be used directly in a new production. More often, items will need to be repaired or altered in some way. Soft furnishings may need to be replaced to fit a colour scheme or aesthetic. Props may need to be aged or reshaped. Make sure the production team are aware of the time and costs involved in reuse, in planning budgets and schedules.

20 Costumes

Design of costume for a production needs to build in sustainability , with designers and costume supervisors collaborating on ways to reduce unsustainable practice through the design of the costumes.

Sourcing

- Re use of costumes is a great practice and theatre costume stores, Hire companies and second hand retailers should be the first ports of call for finding costumes if appropriate for the design.
- Theatres with costume stores should consider sharing or hiring stock to other local theatres to increase usage and sustainable value of the stored costumes.
- It should be noted that second hand shopping is not as readily refundable or exchangeable as high street shopping and that the items that are unused after fitting will need to be stored/returned to the second hand market or donated to make this sustainable. Extra time is needed to be built in for this.
- Where it is not possible to use pre used clothing consider retailers environmental policies and the fabric that the garment is made from.
- There are several trading standard certifications that may indicate good standards: GOTS, GRS, OEKO-TEX, Fairtrade (see the costume directory for an extensive list).

Making Costumes

- Where possible use recycled or sustainable fabrics.
- Look out for:
 - GOTS certification
 - GRS (global recycling standards)
 - OEKO-Tex standards
- Use the principles of Reduce, Recycle, Repurpose, Recycle.
- Show the designer fabric from any existing stored "deadstock".
- Consider re purposing fabric from an existing garment.
- When buying new fabric try to source from local suppliers (e.g., for Manchester: Huddersfield woollen mills, Biddle Sawyer silks in Manchester or Bennets Silks in Stockport).
- Buying from sample books, not shops, cuts travel .
- Make it known to your fabric suppliers that you are improving your sustainable practice and are keen to buy from them if they stock fabrics that are environmentally conscious and have been manufactured with ethical working practices.

- If there is an option of a washable fabric for costumes, choose that to cut down on dry cleaning.
- Keep fabric scraps for recycling, you can send to a fabric recycler or take them to retailers such as Marks and Spencer, other stores or H&M who will recycle. Encourage freelance makers to do similarly.

Sustainable Suppliers

Try and buy sustainable haberdashery and fabric, such as:

- Gutermann 100% recycled thread
- <https://haberdasherbee.co.uk/shop/> - plastic free sewing tools all carefully sourced with eco friendly materials and manufacturing methods.
- <https://www.offsetwarehouse.com/> -all the fabric and haberdashery sold is either ethical sourced, environmentally friendly or both.
- <https://www.dragonflyfabrics.co.uk/product-category/eco-fabrics/> -environmentally friendly fabrics.
- <https://lamazifabrics.com/> -great selection of sustainable Tencel, Modal and Cupro as well as organic and OEKO-TEX certified fabric.
- <https://www.cuddleplushfabrics.co.uk/> -specialised in absorbent, stay dry and waterproof fabrics and stock bamboo and organic cotton.
- <https://www.organiccotton.biz/store/> -Welsh based company, based in an eco friendly estate selling organic fabrics and bamboos.
- <https://cloud9fabrics.com/> -100% certified organic cotton based fabrics, ethical sourced and dyed with eco-responsible low impact inks.
- <https://www.fabworks.co.uk/> -organic cotton and eco friendly wool.
- <https://www.raystitch.co.uk/collections/organic-fabric> -organic fabric.
- <https://www.myfabrics.co.uk/sustainability.html> -recycled fabric, haberdashery (lots of buttons!), certified organic cotton and they commit to CO2 offsetting.
- <https://sewmesunshine.co.uk/collections/organic-fabrics> -organic and OEKO-TEX certified fabric.
- <https://www.greenfibres.com/product/337/organic-and-natural-fabrics.htm> -organic, natural fabrics and raw materials.
- <https://www.greenfibres.com/product/337/organic-and-natural-fabrics.htm> -organic fabric

- <https://www.whaleys-bradford.ltd.uk/fabrics/section-z-organic-fabrics> -eco-friendly, organic and recycled fabric.
- <https://www.clothhouse.com/> -organic cotton
- <https://botanicalinks.bigcartel.com/product/satin-silk> -organic silk and natural dyes
- <https://www.thehempshop.co.uk/fabrics.html> -organic hemp fabrics
- <https://www.macculloch-wallis.co.uk/> -organic trims and recycled haberdashery
- www.thenewcrafthouse.com -East London initiative that sells dead stock from design houses, saving it from landfill.
- <https://www.lancasterandcornish.co.uk/silkribbons> -naturally dyed silk/bamboo ribbons
- <https://www.futurefabricsvirtualexpo.com/> - is an online research and sourcing tool.
- <https://akindcloth.co.uk/> -A curated collection, A KIND CLOTH chooses fabrics which manufacturing processes have a low impact to the environment, and are certified accordingly - GOTS, OEKO-TEX, BCI, LENZING, ECO-VERO to name a few.
- <https://www.goodfabric.co.uk/> -sustainable fabrics and haberdashery
- <https://www.wildorchardfabric.uk/> -animal cruelty free and polyester free fabrics as well as plastic free packaging and haberdashery.
- <https://amothreads.com/> -deadstock fabrics with a small selection of recycled fabric
- <https://www.sineadkido.com/the-costume-directory> -a well researched directory that can help to connect people to sustainable suppliers. (HIGHLY RECOMMEND HAVING A READ)
- www.simplystem.co.uk - sell home compostable garment bags

Alteration to Costume Design during tech and preview

- Tech and previews are when costumes are first seen on set and in a group. Amendments to Costume design often happen at this stage.
- Major costume alterations such as remakes or rebuys made at this point are often done with the least sustainable practice due to time constraints and dwindling budget. The benefit of major changes should be weighed against the less sustainable practice necessitated to achieve these changes.

20 Costumes (continued)

Costume Organisation

- Organising a set of costumes may include using disposable plastic garment and shoe bags. Consider using re usable cloth dress and shoe bags instead.
- If hirers send costumes in plastic garment bags , make sure to keep them and return the costumes in the same bags at the end of the run.
- Hangers: when garment hangers become broken or of no use , recycle at a dry cleaners rather than sending to landfill.
- Have a store of bags to shop with in the wardrobe dept instead of buying new ones.

Laundry

- Try to wash items at 30 degrees, as it is suggested that this temperature uses 40% less energy than washing at 40 degrees. This will also reduce damage and shrinkage to the fibres which will lengthen the lifespan of the item. Use shorter cycles to reduce energy usage and protect the fabric from degradation.
- Avoid the shredding of micro plastics/fibres
 - Wash items in laundry bags to catch microfibers
 - Install a Filtrol or Lint LUV-R to your washing machines discharge hose. (<https://filtrol.net/>)(<https://environmentalenhancements.com/store/index.php/products/products-lint-filter>)
 - Use a Guppyfriend bag to wash your clothes in (<https://en.guppyfriend.com/>)
 - Use a Coraball in the drum of your machine (<https://coraball.com/>)
 - Don't use a tumble dryer. Tumble dryers have been proven to increase microfiber shredding.
 - When buying new washing machines, make sure they have an inbuilt filter such as XFiltra.
 - Wash full loads. The less space to move around the less shredding occurs.
 - Do not wash unnecessarily.
 - Use Natural fibres. Natural fibres still shred micro plastics, due to processing, but at a much lower rate than synthetic.
- An extra spin, in the washing machine, will cut down drying time.
- For drying, use a drying cabinet rather than a tumble dryer. They seem to use a similar amount of energy to run, but a drying cabinet is

much more gentle of clothing so is very unlikely to cause shrinkage and damage and the items will require less ironing after being dried.

- If using a tumble dryer use dryer balls to help speed up drying and naturally soften clothing. Don't add more wet clothing mid-cycle as this will increase the drying time of everything. Dry similar fabric types together and shake clothing out before transferring. This is reduce wrinkles and make sure nothing is knotted or twisted. Try and make sure the dryer is in a well ventilated room.
- If a dehumidifier is used to aid drying, use the water collected for your steam iron.
- On all laundry equipment, make sure to clean filters, hoses and fans regularly to reduce risk of fire and improve efficiency.
- Clean machines regularly to keep them working well. For natural washing machine cleaning:
 - Use distilled white vinegar to wipe around the door and seal.
 - Soak drawer in hot water and scrub clean
 - Spray vinegar inside machine (where you removed the drawer) and clean away any build up or mould.
 - Replace drawer and add a couple of cups of vinegar
 - Add baking soda/bicarbonate of soda or soda crystals into the drum and put on a hot wash (60 degrees or above)
 - Open door and drawer and allow to dry (overnight if possible)
- For cleaning any other surfaces, all of the brands listed below also make environmentally friend household sprays and hand soaps etc.

Dry cleaning

- Don't dry clean more than necessary.
- Where possible, use an o-zone treatment instead of dry cleaning.
- Send dry cleaning in a sturdy reusable bag and ask for it to be returned each time.
- Return all hangers to the dry cleaning company.
- Try and organise for your dry cleaning to be done on a day when the collection van is in your area already.
- Consider hand washing or steam cleaning or ozone treatment for garments that you would often dry clean.
- See if your dry cleaners offer wet cleaning or cleaning with Co2 solvents to avoid the more toxic perchloroethylene (PERC)

- Send dry cleaning in fabric dress bags and ask the dry cleaners to return in the same bags. Return any hangers not needed to the dry cleaners.

- Aim to improve your sustainable laundry practice show by show as you learn more by trialing new methods. Take it step by step and get input from all members of the wardrobe team.

Laundry Product Suppliers

Splosh

Welsh based company with a "closed loop recycling system". All their products are vegan, septic tank safe and made with natural ingredients that are not tested on animals. They sell household cleaners, laundry products and toiletries. You can initially buy a plastic bottle from them that has a lifetime guarantee attached and after that refills are sent through the post in concentrated pouches. By removing the water from the product (you add it at home) more of the product can be sent in each pouch (which usually holds about 4 bottles worth of concentrate) which reduces the carbon footprint of deliveries. Once the pouches are empty they can be sent back to Splosh where they will either be cleaned, refilled and sold at a discounted price or broken down within their own factories to be made into new products that they intend to sell in the future.

They are a relatively new company that is still piloting the best way to process their plastic waste. Initially all pouches that were returned to them were refilled but they soon realised that often these pouches would leak which is why they have created the "closed loop recycling system" so they deal with their plastic from start to finish. The pouches have been known to break in extreme temperatures.

The products clean very well and leave clothes fresh and stain free. You also buy directly from the manufacturer which keeps the price low.

Smol

Another UK based cleaning company. Smol are plastic free where possible and any plastic used is made from fully recyclable, 100% post consumer recycled plastic and is refillable. The cardboard used for the packaging is from Forest Stewardship Council approved forests (which means the board comes from responsibly managed forests) and the ink used for printing is vegetable based, which means they take less energy to recycle. Smol are leaping bunny accredited.

Smol technology means that they can clean just as well as other household laundry products but with fewer chemicals. Fragrance is added with ethically sourced essential oils.

The Fabric condition is 100% animal fat free and the laundry tabs are in water soluble and biodegradable pouches.

20 Costumes (continued)

The packaging carries a hazardous to aquatic life warning (as does Splosh), but this is due to stringent EU label requirements. The product is sent out highly concentrated, which reduces the carbon footprint, which is why they must have this labelling. Once the product is diluted it is no longer classed as hazardous. This labelling is needed in case of a catastrophic/undiluted/concentrated exposure to the environment by which a large amount enters the waterway, such as in an industrial accident.

Smol is also purchased directly from the manufacturer.

Ecover

Ecover is a Belgium based company of 40 years. They work to seven main beliefs-

1. Clean plastic- Ecover are working hard to close the loop by recovering and reusing as much packing as possible. They are also looking for new biodegradable materials so they can move away from plastic all together. Ecover launched a bottle in 2014 which was partially made of plastic recovered from oceans, beaches, canals and other waterways. All of the bottles are 100% recyclable.
2. Clean water- Ecover stopped using phosphates in their products in 1979! To put that into context it was only written into EU law in 2017. As well as not using phosphates in their products, Ecover keep a very close eye on their water footprint every year and work on new ways to reduce their footprint further, including researching how ingredient producing crops are grown, concentrating products and using new cleaning devices within the factory to reduce water waste during production. In 2019 Ecover launched a washing up liquid made using 25% waste ingredients from beer brewing processes in Belgium. (water & ethanol)
3. Clean design- all packaging is designed with a less is more ideal. All packaging, including dyes, are recyclable. They created a limited edition bottle that was inspired by the marine micro-organisms that are most at risk by the plastic problem. The bottle featured a distinctive hole pattern which is inspired by lightweight yet robust skeletal structures called diatoms and radiolarians. This structure creates a bottle that uses less plastic than a traditional design and is strong enough to be re-used again and again. The design even won a gold award at the 2015 German Design Awards.
4. Clean sourcing- Ecover try to source as locally as possible. If they can't find ingredients close to their factory in Melle, Belgium then they try to order from mainland Europe. They also order enough to fill the truck being used for delivery, reducing the number of deliveries needed. All palm oil and palm kernel oil they source is certified by Roundtable on Sustainable Palm Oil (RSPO), which certifies that all the suppliers plantations and processes are not contributing to deforestation. They are also looking for sustainable alternatives to sustainably reduce their need for palm oil. All suppliers must also adhere to a strict code of conduct.

5. Clean ingredients- Ecover use mainly plant based ingredients that are biodegradable. They have started to move away from palm oil due to the devastating problem of deforestation and instead they have moved towards French grown rapeseed oil, which has reduced their use of Palm oil by 200 tonnes a year. They have also cut out their use of petroleum based products after finding that a yeast present in beehives has similar surfactant properties. They then experimented and worked with leading universities and research institutes to create a patent breeding ground for the yeast. Ecover are vegan friendly and Leaping Bunny certified.

6. Clean Fragrances- all their fragrances are at least 50% naturally derived and all synthetic components biodegrade.

7. Clean manufacturing- the factory that produces their products is made from 90% recycled or renewable materials. They have a green roof that attracts local wildlife and blends into the environment. They are aiming for a zero- carbon footprint but are focusing on reducing it by using renewable energy. They also set themselves a target that by the end of 2020 that all their waste would either be recycled or composted meaning that none of their waste went to landfill.

Ecover also have refill stations in local shops nationwide and sell their products in large 5 litre boxes that reduce packaging.

Method

Originally American, now owned by Ecover but still based in Chicago. All manufacturing and bottling happens under the same green roof (it's literally covered in greenhouses which supplies the local area with produce) and half its energy is created by a large wind turbine and sun tracking solar trees.

They follow all the same ethos's as their parent company and are accredited by Cradle to Cradle certified. They also offering refill pouches which reduce plastic waste further. They also offset any carbon footprint they create with a financial incentives to suppliers to help they create greener practises.

EcoZone

This affordable, UK based, environmentally and sustainable companies credentials boast plant based ingredients, palm oil free, septic tank safe, natural and organic ingredients that are pet friendly, vegan, safe for aquatic life, cruelty free and part of Allergy UK as well as Nature Watch Foundation.

Fill Refill Co

Fill Refill Co is a family run business in Northamptonshire focusing on refillable eco laundry and household cleaning products that reduce packaging waste. Supplied in 500mL screen-printed glass bottles and jars, 10L bag-in-box, 20L post consumer recycled (PCR) refills and returnable bulk 200L (they can also do 600L & 1000L) containers that they pick up and refill for a zero-waste closed loop solution.

They are accredited by Made in Britain, 1% for the planet, Plastic free, ISO 14000 family environmental management, Allergy UK, Vegan, Sedex and they are a Living Wage member. They have also collaborated with Planet Minimal who uses electrical vehicles to deliver products using reusable containers.

Faith in Nature

Faith in Nature is a UK based company which creates vegan, cruelty free products using 100% natural products in recycled and recyclable packaging. They have a closed loop system where you can return the 5l and 20l refill bottles to them where they will be ground down and made into new bottles for them to use.

Bio-D

Bio D is a company based in Hull. They are accredited by Cruelty Free International, The Vegan Society, Allergy UK and they are the only green cleaning company to whose products meet commercial food preparation standards (BSEN1276). They have complete traceability on their ingredients so they can ensure that they are ethically and sustainably sourced. The bottles are made from 100% recycled materials and are recyclable and they offer refill stations.

Seventh Generation

Seventh Generation is an American company that is produced in US, Canada, Mexico and Europe. Its parent company is Unilever.

They are plant based and use essential oils for fragrance, no synthetic dyes or colours and recyclable packaging that is also made from recycled plastic. They are certified by *Oregon Tilth Certified Organic (OTCO)*, B Corp, USDA biobased product, Leaping Bunny, FSC, Rainforest Alliance, Cotton Incorporated and Clean Well.

Dropps

A Philadelphia based company that started off making cotton yarn and moved into detergent to find the best ingredients to care for their product. They claim to be the inventor of the laundry pod. They use eco-friendly ingredients, don't test on animals and have low waste/ compostable packaging. The pod is made from a water soluble casing called Polyvinyl alcohol (PVOH), which dissolves upon contact with water and is consumed by microorganisms.

Well Earth Goods

Well Earth Goods is a US based company that sells a plastic free laundry detergent strip. The strips are biodegradable, vegan, made from eco friendly ingredients, plastic free and its lightweight nature reduces transportation fuel consumption and carbon emissions by 94% compared to the country's leading brand detergents.

20 Costumes (continued)

- <https://www.biggreensmile.com/> -is an online store with a lot of variety in stock.
- <https://www.ethicalsuperstore.com/> -another online green supermarket

Maintenance/Sewing

- Encourage strong hand and machine sewing skills to allow for lasting repairs.
- Staffing levels need to be adequate to allow for all day to day operations (dressing, laundry, paperwork, maintenance, shopping etc) as well as emergencies and repairs. If staffing levels are too low then there won't be enough hands available and the repair will need to be done quickly and may not last, resulting in replacing costumes more frequently.
- When a costume is no longer wearable, remove all usable haberdashery to be reused and keep good sections of fabric for future repairs. Then dispose of the rest of the item appropriately (specialist fabric recycling, high street recycling schemes etc).
- Always repair before rebuying/making.
- When cutting, plan pattern/block piece placement to least amount of fabric wastage.

Disposal of Costumes

- Employ a wardrobe staff member to re distribute the costumes in an appropriate way, including;
 - Returns to hirers
 - Returning to stock or in house costume hire dept
 - Donations to local Homeless shelters/food banks,
 - Donations to organisations for interview clothes (eg Smart Works).
 - Donations to am dram groups or HE Drama courses
 - Donations to charity shops
 - Resale to performers
 - Resale to public via online stores such as eBay, Deop, Etsy etc
 - Resale via dress agencies
 - Take unusable remnants and garments to a recycling centre.

Evaluation

- Have a catch up with everyone involved about which processes have worked for everyone and how these can be improved on next time. Each production will have different requirements and challenges and need adaption to processes.
- Try to share experiences of what has worked and what didn't with other costume departments and freelancers.
- Get a better knowledge of issues around climate change and unsustainable practice, carbon literacy courses such as the one run by MAST are available free of charge.
- Use costume resources and associations such as
 - The costume directory
 - Julies Bicycle production guide
 - We are Albert
 - Bectu resources , webinar "can costume go green ?"
 - Wardrobe chronicles
 - CITEA
 - Conscious Costume (US)

21 Lighting

Gobos

www.mobilebeat.com/create-your-own-gobo-in-4-easy-steps

General

- Increase the use of Pre Vis for LD's, this relies heavily on design deadlines being met to allow time for 3D model and of course enough ideas from rehearsals to formulate anything worthwhile in the virtual world.
- Borrow practicals from other LDs or Theatres where possible
- Glass cleaner can be made with vinegar and water
- Do you need canned compressed air, or could you invest in a workshop compressor?
- use rubber anchor bands to secure the extension cables

Deliveries

- Have more onsite storage than relying on weekly van runs, and resist one off's to get that piece of kit
- Think about whether any "emergency" kit really needs to be rush ordered, or if it can wait a day or two to be delivered with other items rather than requiring a van of its own.
- If possible, coordinate deliveries with other departments
- Standardise procurement of LED tape, connectors and consumables, for cost efficiencies as well as avoiding silo orders and ideally from veritable suppliers, rather than just the cheapest from Amazon, as budgets may have required.

PVC Tape

- Move away from PVC tape unless absolutely necessary and continue to explore plug labelling alternatives.
- Reusable cable ties and bungees are better. Some business waste companies will recycle cable ties at their end of life
- [ADMIRAL Staging | T-Fix 4cm 50 pieces](#)
- Cloth ties are better still
- Chalk pens to mark out positions on stage for lighting equipment till positions have been set during the rehearsal process, instead of using lots of PVC plastic tape.

- Paint pens to mark-up lighting rigged onto scenic elements instead of single use PVC plastic tape. Paint pens were also used to mark-up the standard rig of lighting equipment permanent positions instead of PVC plastic tape.

Gel

- Re-use gel whenever possible
- Consider whether you REALLY need a specific colour, or whether a similar one that's already in stock would do
- Leave Gel behind at the final venue on a tour, to add to their stock
- When gel burns out or fades, bag it up and offer it out to local schools, nurseries & kids' clubs - they love it for crafting
- Failing that, Lee Filters are recyclable (as Dry Mixed Recyclables)
- Consider using dichroic filters instead of gel for long term installations
- Use rechargeable batteries if needed for set/prop practicals, torches, & other equipment

Power Consumption

- Use lower wattage lamps where possible (500W instead of 650W for units in studio settings, or 375W in S4s. Do you really need 1200W in your Cantatas in the main house, or would 1000W do?)
- Fade up lights when focussing, and try focussing at 80%, or even less!

Hire

- Where possible, request that suppliers send items via electric fleet, or carbon neutral courier.
- Use the closest hire provider you can find
- Ask for their sustainability policy
- When hiring, try and ensure enough spares are included to cover the full run - to avoid the additional carbon cost of having replacements shipped out.

Procedures

Establish procedures for working in an energy efficient way. This includes switch-off routines: 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; turning off dimmer racks, PSUs, drivers and other tech overnight.

Prevent a culture of continual upgrades and bespoke items. This could include accepting older equipment models

Waste

Ensure safe channels available for refurbishing or disposing of electronic equipment

Follow best practice in disposal of waste. For electrical equipment, this includes recycling blown bulbs and equipment. Efforts can be made to work with suppliers to take back equipment to be repurposed and refurbished.

Consider how materials can be reused, donated, repurposed, recycled or stored for future use at production completion. This includes bespoke lights and equipment, screens, stage lighting gels, practicals etc.

Identify possible sustainable disposal routes. For AV this could include contracts agreeing to refurbish and mend broken equipment.

22 Outdoor & Site Specific Productions

Choosing a Site

- Careful selection of a site is the most powerful tool for working sustainably. A site with a power supply and running water massively reduces the impact. Being close to a good transport infrastructure significantly reduces the audience's and the team's carbon footprint. Consider a shuttle bus to and from the nearest station, for example.

Protecting the Site

- Some sites may be environmentally fragile, or support ecosystems that need protections. In that case it will be necessary to carry out an Ecological Impact Assessment (see next section).
- For all sites, it will be necessary to ensure that the site is left in at least the same condition as it was before the show.
- Still better, a production should be seen as an opportunity to improve ecology and biodiversity, for example by cleaning up waste, removing rubble, improving soil or planting.

The Production

- The production may cause damage during the fit-up and get-out. Trees may need to be protected, as will the ground, and the site planned to minimise impact and damage. Particular thought should be given to vehicular access and parking.
- Setting up stages, seating and facilities for a single show is a challenge for sustainability. Ensure everything is hired, and will be reused. Ensure the most sustainable forms of transport are used to deliver and construct facilities. Plan deliveries and collections so that journeys are kept to a minimum and vehicles do not travel half empty.
- Some sites may lack power and other facilities. Fossil-fuel generators are inefficient and polluting and should be treated as the solution of last resort. Ensure that generators are not over specified, so that they are running significantly under capacity. Consider power budgets for each show. Use a smaller generator for the fit-up period when power usage can be more carefully planned. As an alternative, explore connection to existing power supplies, or the use of renewable sources. Make sure water and waste facilities are provided sustainably.
- Remote sites may require a high mileage in transport for deliveries. It is all the more important to streamline deliveries so as to minimise the transport miles associated with the production.

Opportunities

- Outdoor work has opportunities to minimise the energy needed for show lighting or acoustics, by relying on natural light and acoustics.
- Shows in natural settings can connect audiences with local ecologies, strengthen communities, and highlight climate issues.

The Audience

- Audience transport to remote locations may be a challenge for sustainability. Work with local transport companies to provide public transport links or shuttle buses if possible. Provide facilities for cyclists. Offer shared transport from local towns or villages, using sustainable vehicles.

Ecological Impact Assessments

- Putting on productions in natural settings can have a unique impact, but also risks harming the ecology of those settings, whether through the impact of the show itself, or of bringing an audience to a usually empty landscape.
- Transport, catering, seating, temporary structures and services systems are all capable of harming natural environments.
- If planning a show in such a setting, it is therefore essential first to carry out an Ecological Impact Assessment to determine:
 - That no lasting damage will be done.
 - What precautionary measures need to be taken to avoid damage.
 - What needs to be done after the show to restore – or improve – the ecology and biodiversity of the location.
- Ecological Impact Assessments will measure biodiversity, identify risks, and identify necessary actions. They are typically carried out by professional ecologists, who are members of the Chartered Institute of Ecological and Environmental Management (CIEEM).
- Although mostly aimed at building developers, useful guidance can be found here:
<https://www.biodiversityinplanning.org/about/what-is-an-ecological-assessment/>
<https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1.pdf>

- 'Advanced' standard productions should commission an Ecological Impact Assessment for all natural settings.
- If the site or production is targeting 'Baseline' or 'Intermediate' standard, or does not merit a full-scale Ecological Impact Assessment, it is still essential to consider all aspects of a production's impact on the site and its surroundings:
 - Will it take place during breeding/nesting seasons?
 - Will flora or fauna be disturbed?
 - Will the added noise or lights disturb wildlife?
 - If generators are used, where is the smoke going and can refuelling be managed without spills?
 - Farm animals are quite sensitive. Consideration should be given to their welfare as well as to that of local fauna.

23 Touring

General principles for all Touring Productions

- Consider how to reduce material requirements and volumes for touring so as to minimise the numbers of vehicles required and weight of material to be moved. Flat-packing items reduces the numbers of vehicles needed.
- Rather than tour everything the production needs, research which items could be supplied or hired at the next venue. For example, rigs may already be available at receiving venues.
- In preparing for a tour, reduce or eliminate packaging for transportation, with any unavoidable packaging reusable, biodegradable or recyclable.
- Move away from the use of carbon or diesel vehicles. This will become easier as the UK 2030 ban on petrol and diesel cars rapidly influences develop of alternatives and a more accessible electric vehicle network.
- Support cast, crew and staff to access productions using rail and public transport, budgeting for time and cost of tickets as necessary.
- Discuss Green Book standards and minimum requirements with receiving venues. Encourage venues to adopt similar practices and share local knowledge that may support the production to be recreated sustainably. This might include details of in-house systems and floors (saving transportation of bespoke rigs and set pieces), local suppliers and makers who can locally rebuilding of simple objects and local transport networks, electric charging infrastructure and similar.
- Networks of touring venues and consortia can improve sustainability by working together. This includes sharing freight, storage and sharing knowledge and contacts to help deliver shows sustainably.
- Remaking shows in new locations, with local sourcing can be a powerful way to reduce carbon footprints and contribute to local economies on tour. Designers should provide clear instructions for set pieces and lighting systems where local crews will need to build them. Flexibility should be embedded: consider use of commonly available materials, set pieces, or be open to variety in dimensions and objects based on local availability.
- Collaborate with touring consortiums to find resources and teams in different locations – including sets, crew, performers and venues. For smaller productions, co-operating with other arts companies to share touring schedules and combine transport can improve flexibility and reduce delivery requirements when booking sites, festivals and venues.

- Where possible, design lighting rigs based on the smallest equipment list of the receiving houses to avoid hiring & touring unnecessary kit
- Coordinate with the final destination for a tour regarding the dismantling/recycling of a set, rather than assuming it needs to be brought back home.

Intermediate Standard Productions

- In addition to the general guidance, 'Intermediate' Standard productions should track all vehicles mileage associated with the production.

Advanced Standard Productions

- 'Advanced' Standard shows should use carbon calculators to help with decision-making. Common questions may centre on use of different transport options for long international tours, understanding whether carbon will be saved by recreating sets or building locally, or gauging whether local audience travel has a greater carbon footprint than adding stops to tours. If this information is not available, for example on Baseline and Intermediate shows, productions teams should use seek to maximise sustainability of the most feasible option open to them. This means using the principles in the Green Book:
 - Maximise local sourcing at each stop of the tour, but only where local materials can be sourced which are reused/recycled and will be used again.
 - Minimise the freight requirement for everything else. These should still follow Green Book principles of sourcing and disposal, and foldable, light and flat-pack designs should be considered to reduce the number of vehicles needed to move between venues;

Acknowledgements and Thanks

How the Green Book has been prepared

Theatre has been working to reduce its carbon footprint and embed sustainable practice into its productions for many years. Many of the people who have pioneered such efforts have been involved in the development of this document, or their work has been foundational to it.

The Green Book has been prepared through an extensive period of interviews, focus groups and consultation with dozens of theatre-makers, as well as a survey of nearly 200 practitioners. This process has been coupled with an extensive literature review of guidance on green theatre – including work by Broadway Green Alliance, Creative Carbon Scotland, Culture Declares Emergency, Freelancers Make Theatre Work, ISAN, Julie’s Bicycle, SiPA, White Light and more – to develop a database of recommendations for greener theatre processes. These recommendations have then been organised by their relative impact on reducing carbon emissions, the ease with which theatre-makers believe they can be implemented (at the time of writing) and the stakeholders and groups whose involvement would be needed to achieve them. The Green Book brings this information together in one place, and sets out simple standards and systems to make shows more sustainably.

A Bibliography is included on the next page.

Future versions of the Green Book

The Green Book draws together the understanding of best practice sustainable theatre-making at the time of writing. However, ‘best practice’ will evolve and develop as understanding of sustainable theatre-making grows, research sheds light on new opportunities and challenges, more options for low carbon and reused materials become available, and the wider political and infrastructure landscape unfolds.

Recommended standards and targets will be refined as part of this process, as will many of the principles and goals.

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We apologise if any names have been missed. Very many others have helped by answering questionnaires, and joining sustainability groups convened by the many theatre organisations, companies and freelance collectives who are working for sustainability, and whose thinking has contributed to this guide. We know many more would have liked to help this initiative if time had allowed, and look forward to their thoughts and feedback.

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Other Resources

Further information on sustainable theatre can be found at:

<https://juliesbicycle.com>

<https://www.creativecarbonscotland.com>

<http://sipa.global>

<https://ecostage.online>

<https://wearealbert.org>

<https://www.broadwaygreen.com/about-us>

Other useful guides and resources:

<https://www.bectuartdepartment.co.uk/what-we-do/work-groups/sustainability>

Advice on waste and materials can be found here:

<https://www.kiculture.org/ki-books/>

Books

A Practical Guide to Greener Theatre : Introduce Sustainability into your Productions, Ellen E Jones, Routledge, 2013

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
