

The title 'Green Screen' is written in a large, bold, black sans-serif font. The text is centered and overlaid on a cluster of orange and yellow autumn leaves. Two black camera icons are positioned on either side of the text, appearing to be part of the scene. The background features a white space with a grey dotted pattern that forms a wide, diagonal beam of light originating from the top right and pointing towards the center.

Green Screen

Helping London's film and TV industry
take action on climate change



Contents

1. Foreword Boris Johnson, Mayor of London	2
2. Introduction	4
3. Why take action?	6
4. How big is our carbon footprint?	7
5. How can we cut emissions by 60 per cent?	8
6. Practical Recommendations	9
6.1 Management and Leadership	9
6.2 Ventilation, air conditioning, heating and hot water	12
6.3 Lighting	14
6.4 Minimising Travel Emissions	15
6.5 IT and AV equipment	15
6.6 Boiler renewal and controls	16
6.7 Buildings and electrical insulation	16
6.8 Power factor correction	17
6.9 Greater cooperation between studio and production	18
6.10 Sound and camera	18
6.11 Location filming	19
6.12 Procurement and disposal/recycling	20
7. Success stories	21
8. Thinking more broadly	25
9. Carbon calculator for production planning	26
10. Thank you!	27
Appendix 2: sample letter to suppliers	29
Appendix 3 Where to go for further information and help	30
Appendix 4: How is technology having an impact?	32
Appendix 5: Methodology	34
A5.1 Scope of screen production footprint analysis	34
A5.ii Methodology principles: overall footprint	35
A5.iii Methodology principles: studio emissions	35
A5.iv Methodology principles: production company emissions	35
A5.v Methodology principles: location-shooting emissions	36
A5.vi Methodology principles: post-production emissions	36
A5.vii Methodology principles: conversion factors used	37

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www.london.gov.uk

enquiries 020 7983 4100
minicom 020 7983 4458

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1. Foreword

Boris Johnson, Mayor of London

The film, television and commercial industries are estimated to directly contribute an income of £13.6 billion to London's economy. However, influence goes far beyond this, as they arguably have an unparalleled opportunity to influence the general public.

This guide contains really practical information on how to reduce energy use, reducing emissions and saving you money in the process.

We can make London the world's greenest place to film. This is not about compromising the quality of productions or hampering creative endeavour. Many of the actions require little effort to implement, they just need your leadership to achieve change.

The screen production industry in London produces around 125,000 tonnes of carbon emissions each year - 125,000 tonnes is equivalent to approximately 24,000 London homes. This excludes distribution and exhibition of films and programmes, or production office travel.

We can take action on climate change, cut our energy bills, and play a role in creating the new low-carbon economy. In an industry known for being progressive and creative, this is one way in which studios, producers, and talent can take the lead.

Boris Johnson
Mayor of London

'London is the world's greatest film city! At Film London we have helped transform the capital into one of the world's most film-friendly film cities. Everyone needs to play their part to reduce carbon emissions and tackle climate change, but people working in film and broadcasting are in a unique position to inspire and educate audiences of millions with this vital message. It is

extremely encouraging to see key players from across the film and broadcast industry showing leadership and commitment to produce an action plan to reduce climate change emissions.'

Adrian Wootton
Chief Executive, Film London



2. Introduction

London's creative industries are celebrated the world over and are visible contributors to the capital, both economically and culturally. There is a huge appetite in the television and film production industry to tackle the environmental issues we now face. The Mayor of London and Film London responded to this by supporting the production of this Green Screen Guide, which is tailored specifically to the screen production industry.

Green Screen is the result of many people in the industry coming together to inspire change and really make a difference.

The Green Screen Guide focuses on production, and there is the potential to expand this to the distribution, exhibition or sales of films and programmes.

Film London and the London Filming Partnership

Film London is the capital's film and media agency. The Arts Council England, the London Development Agency and the UK Film Council fund it. Film London aims to promote, develop, facilitate and sustain filming of all types in London.

In 2005, Film London launched the London Filming Partnership, representing a commitment from everyone involved in London film and media production to encourage filmmaking in the city.

The work of the London Filming Partnership is steered by an Executive Task Force and supported by an Advisory Committee, both comprised of key stakeholders from the industry and the public sector. The aim is to make sure that location filming in London is efficient and successful, thus maximising the benefits that a thriving television and film production industry can bring.

See www.filmlondon.org.uk/lfp for more information.

'Having just initiated a green campaign at Ealing Studios, we are delighted to support and endorse the Green Screen campaign. From the moment we decided to make Ealing more earth friendly, Film London and the Mayor's office have given us enormous encouragement. We are very pleased to be part of this initiative to ensure the film industry has a healthy future.'

Barnaby Thompson, Head of Studio, and James Spring, Managing Director, Ealing Studios

At every stage of a production, carbon emissions savings can be made. From the moment research begins, scripts are printed, sets constructed - through to capture and post production. Green Screen is about recognising the daily realities of the screen production industry and suggesting steps to reduce the industry's environmental impact.

First things first

The first step in reducing emissions is to understand what has the biggest impact on the industry's carbon footprint.

The Mayor's Office and Film London, in partnership with The Carbon Trust and their expert carbon consultants, worked with many production companies and studios to estimate the carbon footprint of the screen production industry. Audits of real-life situations were taken and this information was then scaled up using reliable indicators such as the number of employees in different sectors of the industry, the size of studios and the number of location filming days. By definition any mapping exercise is indicative. We believe however that this process has created one of the first mappings of its kind within the industry and will help prioritise areas for further reduction initiatives.

The appendix contains more information about the methodology and assumptions used.

3. Why take action?

Take the lead

London is the third busiest production centre in the world after Los Angeles and New York and in recent years filming on the capital's streets has risen dramatically. Attracting inward investment from filming makes an important contribution to London's global competitiveness and the Mayor's economic recovery plan for the capital.

Because of this huge influence, and because of the significant public subsidy the industry enjoys (fiscal support, grant-in-aid, National Lottery funding, the licence fee, gifted spectrum), the screen production industry recognises it has both an opportunity and obligation to play a leadership role in helping to address the issue of climate change.

Save money

Being green saves you money.

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

The financial pressures being felt throughout the capital by companies big and small combined with rising energy prices, means that there is an urgency to take action.

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

Attract talent

Many leading directors, actors, and other creative talents have a strong personal interest in this area and are increasingly influencing decisions about where films are made on the basis of the strength of the environmental credentials of a particular country, city or studio. If London can become the greenest place to film this will create a new commercial advantage at a time when competition from other location capitals is intense.

'The film industry has never been noted for its green credentials and no industry can afford to ignore environmental sustainability if it is to survive.'

David Parfitt, Producer, Trademark Films

Who is this guide for?

The Green Screen Guide is for anyone working in London's screen industries, from small independent production companies to large studios and broadcasting corporations.

'This guide aims to take you through some of the most practical and effective ways to reduce your energy use and make London's TV and film production greener – whilst also saving you money. It complements the Location Filming in London Code of Practice (www.filmlondon.org.uk/cop), a voluntary code for all filmmakers that sets out best practice advice and guidance on the statutory obligations to which all those engaged in filming must adhere.

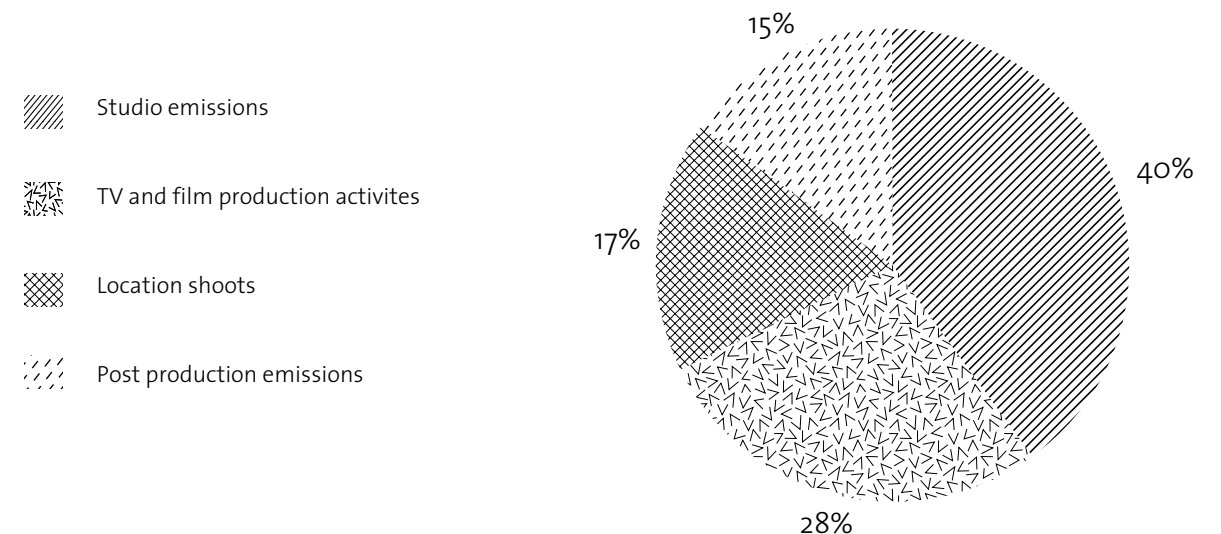
4. How big is our carbon footprint?

In order to enable a reduction in London's screen production industry's carbon emissions, our starting point was to measure where the emissions are coming from. Working with the industry, we were able to identify the main problem areas that provided us with a picture of where best to focus our efforts to achieve the most effective results.

The total carbon footprint of London's screen production industry is approximately 125,000 tonnes a year¹. This is roughly equivalent to the annual emissions from almost 24,000 homes.

This figure does not include emissions from international or employee travel, or those associated with the distribution, sales and exhibition of films and programmes.

Total screen industry emissions = 125,000 tonnes/year

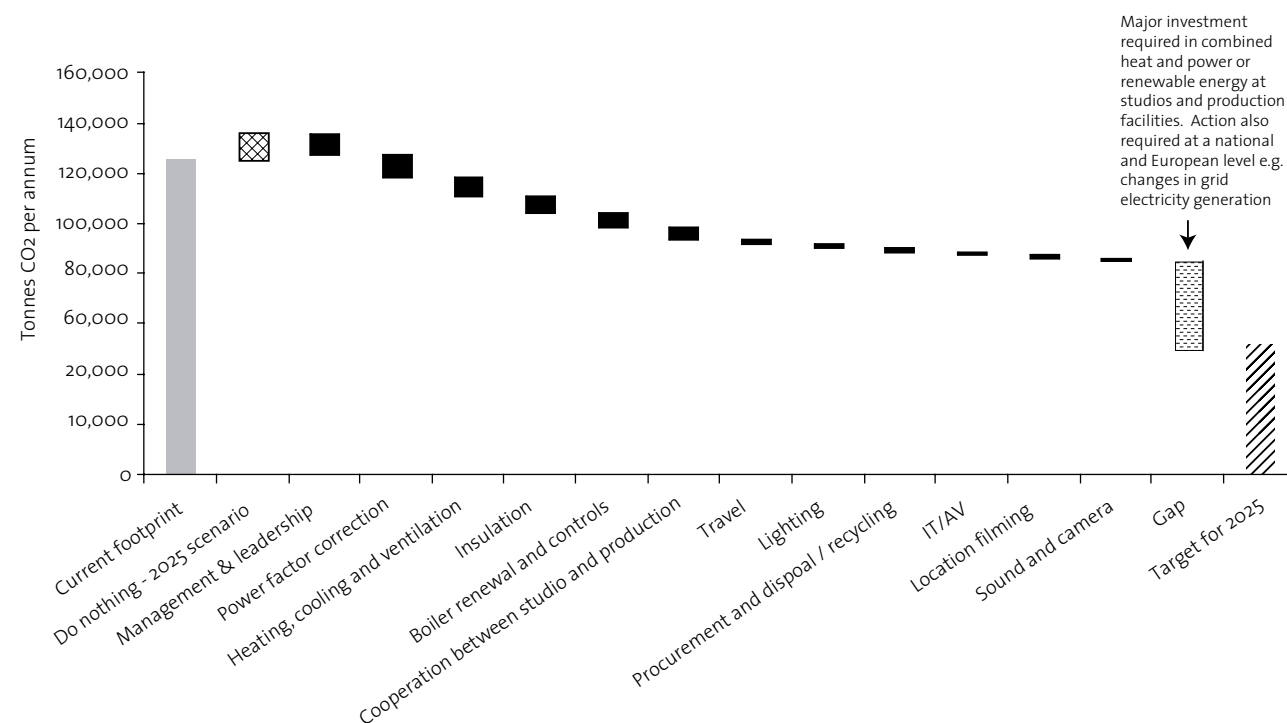


¹This estimate was derived from a number of industry case studies and data sources. In keeping with London's Climate Change Action Plan (<http://www.london.gov.uk/mayor/environment/climate-change/ccap/index.jsp>), international travel and general employee travel is not included. However, travel directly relating to production activity, such as couriers and travel to/from London based location shoots has been included. Due to the lack of historical data, 2007 has been taken as the base year for the calculations used in this report. More information on sources can be found in the appendix.

5. How can we cut emissions by 60 per cent?

Without action, emissions and fuel bills will grow. There are plenty of things we can do to decrease the environmental impact of screen production - both on location and in studio environments, without sacrificing artistic quality.

Total savings identified to 2025*



*The 'do nothing' - 2025 scenario assumes that film industry emissions grow in line with London's commercial and public sector growth. Recommendations regarding each of the measures in this chart are listed below.

6. Practical Recommendations

Where do I start?

One of the biggest challenges is deciding where to start.

You can start with the quick wins to spark ideas and get people moving in the right direction.

Or find out which actions would have the biggest impact and start there.

The Green Screen Guide identifies key action areas that are likely to have the greatest impact in terms of the carbon savings that can be achieved. It also tells you where you can make financial savings. Where initiatives require financial investment, we have calculated the expected amount of time it will take for the savings to pay back the investment.

6.1 Management and Leadership

Effective leadership from the top, combined with grass roots engagement, is the best way to achieve change.

Staff can make significant savings in all filming environments by adopting standard 'good practice'. However, without top down support these efforts are unlikely to be sustainable – the greatest savings will come from senior industry figures setting the tone early in the production process and inspiring their colleagues.

Some actions that Studio Heads, Directors and Producers can champion are listed below.

SAVING = 5 to 7 per cent of carbon emissions from this area of the footprint

- **Conduct a carbon footprint survey**, to work out your company's individual footprint. It's important to know where most of your emissions come from so that you can prioritise reductions. The Carbon Trust offers free surveys to identify high areas of carbon emissions, and help you develop an action plan to reduce them (www.carbontrust.co.uk or call: 0800 085 2005).

Over the past year and a half ITV Productions has introduced a systematic measurement of its carbon footprint that is externally verified as part of its corporate responsibility report. It is this measurement that has formed the baseline upon which ITVP has pledged to reduce its corporate energy use by 15 per cent by the end of 2012 and increase recycling from 30 to 50 per cent by 2009.

- **You can't manage what you don't measure:** record your company's energy consumption (where possible to hourly detail), to identify peaks in usage. Where building management systems are installed, use these to record plant operation. Comparing this to energy usage can identify significant savings (eg high recorded energy usage could be as a result of heating/cooling/ventilation operating continuously or outside of necessary hours). Be aware that changes in energy consumption might be because of the weather, so it might be useful to monitor the temperature outside too.
- **Write an action plan** to articulate your goals and targets. Outline your plan to achieving those targets and define responsibilities. More information on action plans and how to draft one can be found at http://www.carbontrust.co.uk/energy/startsaving/tech_energy_management_implementation.htm
- **Involve staff:**
 - Set out the basic 'green' standards expected for staff and crew. This can be as simple as specifying that lights are switched off, waste minimised and recycled when possible (and providing the means to do this) heating and cooling settings are always correct/ switched off when spaces are not in use, and paper is printed on both sides, and on two pages per sheet where possible.

- Designate 'green' responsibilities to specific staff members. Global Action Plan www.globalactionplan.org.uk offers short training for environmental champions who then disseminate the lessons they learn.
- Ask technical staff (typically those that control high energy consuming equipment) if there are ways of using the equipment more efficiently in order to consume less energy or if they are aware of emerging technologies that may have a positive impact.

The BBC is introducing an environmental champions' network. The plan is to recruit 300 champions that can offer advice on recycling waste, ensure PCs and lights are turned off, grey water is recycled and encourage the use of bicycles.

- **Write 'green' policies into contracts where possible:** this will ensure that your suppliers are also working with you to reduce the impact of your purchases on the environment. Sign up to the Mayor's Green Procurement Code - <http://www.greenprocurementcode.co.uk/> - for help with designing a green procurement policy for non-technical goods and communicating your approach to staff and suppliers. Top tips for green procurement are included at the end of this document.
- **Consider purchasing 'green tariff' renewable electricity:** this will help support the adoption of renewables technologies, but may not in itself lead to a direct reduction of UK carbon emissions. Therefore sourcing green tariff electricity is not a substitute for the other actions suggested in this document.

Did you know... A Londonwide switch to double-sided printing could save 17.5 billion sheets of A4 paper every year, enough paper to wrap around the earth four times?
(Carbon Trust, Brother UK)

Individual productions

- **Make a 'carbon budget' during pre-production planning:** carbon budgeting is a good way to manage energy, materials use and carbon emissions. The Mayor's Office, Film London and the Carbon Trust have developed a TV and Film Carbon Calculator to develop an initial carbon footprint for a single production and highlight areas where emissions could be reduced. Set a budget as you would for your financial costs and try and plan the production around both your financial and carbon budget. Make this a challenge to your creative team. More information on the carbon calculator can be found at the end of this report.
- **Write an energy management policy:** this could include specific energy targets and policies and will allocate clear energy management responsibilities.

6.2 Ventilation, air conditioning, heating and hot water

SAVING = 10 to 12 per cent of carbon emissions from this area of the footprint

All areas

- don't run cooling at same time as heating – avoid using electric heaters
- check thermostats are carefully situated (ie away from drafts and direct sunlight)
- regularly check airflows from ventilation systems and ensure filters are clean in air handling units
- reduce your immersion thermostat to 60 degrees Celsius. Do not reduce the temperature of stored hot water below 60 degrees as this increases the risk of the Legionella bacterium
- install insulation on internal appliances, and with external walls, windows and roofs (Investment required. Payback estimate = 1-2 years)
- check regularly for dripping taps and fit washers where needed.

Office, rehearsal and control room areas

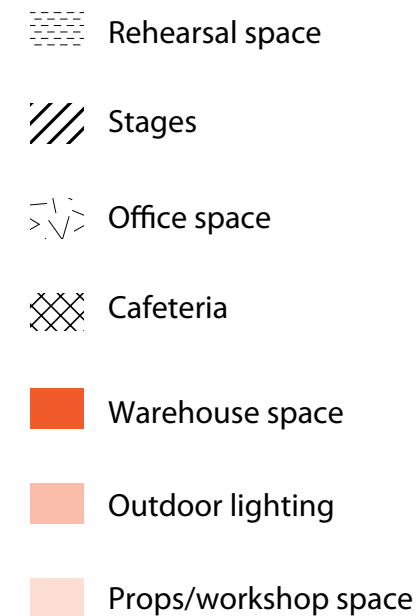
- reduce temperature for nighttime hours (eg set heating in frost protection mode)
- set thermostats for lower temperatures in workshops and storage areas
- install a 'deadband control' between heating and cooling so that neither is turned on until temperatures are outside acceptable levels of comfort (typically 19 - 24 degrees Celsius.)

Studio spaces

- where health and safety allows, make sure air conditioning systems are not operating in well-ventilated studio spaces eg during set construction
- review operational times and parameters for heavy use equipment, including chillers eg install automatic controls to reduce over ventilation
- install air quality sensors and temperature sensors (Investment required. Payback estimate = 1-2 years)
- fit a modern Variable Speed Drive (VSD) to control the supply fan motors of any oversized motors (Investment required. Payback estimate = 1-2 years).

Did you know... A dripping tap can waste as much as one litre of water per hour? In one week that's enough to fill a bathtub.

Split of studio emissions by area



6.3 Lighting

SAVING = 10 to 11 per cent of carbon emissions from this area of the footprint

External lighting

- switch to energy efficient bulbs – swap standard tungsten bulbs with low energy CFL bulbs or replace external lighting with LEDs (Investment required. Payback estimate = 2.5 years)

Internal non-studio lighting

- change tungsten lamps used in general lighting applications for compact fluorescent or other low-wattage alternatives (Investment required. Payback estimate = 2.5 years)
- set timer switches, fit occupancy sensors and lighting control systems to reduce energy use in infrequently used areas eg stairwells and restrooms. (Investment required. Payback estimate = 1 year)
- turn off decorative and non-essential lighting particularly in unoccupied areas
- to maximise natural light, clean fixtures, diffusers and windows regularly.

Lighting/Studio location lighting

- ensure all non-essential lighting is switched off between shoots (ie during break periods)
- use high efficiency Compact Fluorescent Lighting (CFL) wherever possible, which reduces power demand by around 60 per cent as well as HVAC cooling needs. Fluorescent lighting provides ten times more light per wattage compared with

standard tungsten and is expected to last up to 10,000 hours compared to 500 hours for tungsten lamps (Investment required. Payback estimate = 2.5 years)

- use dimmers to rest lights between scenes rather than switching individual lights on and off (Investment required. Payback estimate = 1 year)
- replace flickering, dim and burned out lights (Investment required. Payback estimate = 1 year).

Did you know... Lighting an office overnight wastes enough energy to heat water for a thousand cups of tea? (Carbon Trust, Brother UK)

6.4 Minimising Travel Emissions

SAVING = 10 per cent of carbon emissions from this area of the footprint

Staff:

- use public transport where timings and safety allows
- encourage car sharing
- travel by rail domestically rather than flying where possible
- use video conferencing where face-to-face meetings are not essential.

Suppliers:

- minimise the frequency of deliveries/ collections through better planning
- use cycle couriers
- reduce touring volumes by using trusted local partners, eg use local lighting rigs
- procure local food produce
- use email or Royal Mail rather than couriers for non sensitive/non urgent mail.

6.5 IT and AV equipment

SAVING = 9 to 10 per cent of carbon emissions from this area of the footprint

- turn off computers, monitors, printers and photocopiers when not in use, overnight and on weekends. If you can't switch off the entire computer, turn off the monitor and printer and avoid using screen savers
- set photocopiers to energy saving mode
- unplug video players, television monitors and other similar equipment with stand-by mode when not in use
- when buying computers, monitors, printers, and photocopiers, look for models with good energy-efficiency ratings that can switch to a power-saving mode when not in use (Investment required. Payback estimate = 3-5 years).

Did you know... Switching off non-essential equipment in an office overnight saves enough energy to run a small car for 100 miles?

6.6 Boiler renewal and controls

SAVING = 8 to 10 per cent of carbon emissions from this area of the footprint

- switch to high efficiency/condenser boilers and convert oil boilers to gas. New boilers are over 15 per cent more efficient. Boilers have an official efficiency rating of A to G, with 'A' being the most efficient. (Investment required. Payback estimate = 5 years)
- service your boiler annually
- turn down your thermostat by one degree. On average this can save up to eight per cent on heating costs
- use automated controls (rather than manual); install thermostatic valves on wet radiators (Investment required. Payback estimate = 1.5 years).

6.7 Buildings and electrical insulation

SAVING = 7 to 9 per cent of carbon emissions from this area of the footprint

The age and size of the building, along with other factors, determines the investment required and payback period for these recommendations. However, many are likely to payback the investment within two years.

- ensure building insulation is brought up to minimum standards and improve further where practical
- consider additional insulation to each floor level to reduce the impact of heat gain rising through buildings
- improve insulation of hot water storage (tank and pipe) and electric heating cupboards.

6.8 Power factor correction

SAVING = 7 to 8 per cent of carbon emissions from this area of the footprint

Power factor correction is the process of adjusting the characteristics of electric loads in order to optimise the efficiency of the power supply and reduce electricity costs. It is possible to purchase equipment to correct power factors. This equipment is generally worthwhile investing in for studios or productions that have a heavy use of motors or other energy-intensive equipment being used on a fairly constant basis.

- correcting the power factor of buildings can be a very quick and inexpensive way of making energy and financial savings: it is cheap to install and will have little impact on operations. A power factor survey is needed to find out where these savings can be made
- following power factor correction, electrical equipment will need to be tested and possibly adjusted. Power factor equipment needs to be reviewed at least every twenty years or following significant equipment or layout changes (Investment required. Payback estimate = 3 years).

KEY INSIGHT: Working together to set environmental policies

Production companies often treat studios as another location environment, bringing in their own contractors and suppliers – sometimes duplicating services such as waste management and catering. Equally studios don't always provide environmentally friendly facilities or services, making it hard for producers to lower the environmental impact of their production.

Studios can create policies that place environmental practices at the heart of operations. A policy could commit the studio to reduce its own environmental impacts, as well as requiring production companies using its facilities to reduce their environmental impact during their on-site production activities.

Environmental policies typically:

- provide guidance on best practice in managing energy, waste, water and transport
- include a statement of commitment, signed by the head of the company (CEO, president, chair)
- set environmental targets for the next financial year
- contain a plan with actions, responsibilities and deadlines for reaching the target.

6.9 Greater cooperation between studio and production

SAVING = 5 to 10 per cent of carbon emissions from this area of the footprint

Studios:

- provide recycling and energy management facilities for production companies and others using the studio and provide information on carbon saving opportunities
- provide production companies with accurate meter readings to help them improve their energy management.

Productions:

- ask if the studio in which you are filming has recycling and energy management facilities and, where budget allows, use facilities that are available.

6.10 Sound and camera

SAVING = 4 to 5 per cent of carbon emissions from this area of the footprint

- unplug video players, television monitors and other similar equipment with stand-by mode when not in use
- when purchasing or hiring technical equipment, ask about energy-efficient alternatives or enquire about more efficient ways to use technical equipment (Investment required. Payback estimate = 3-5 years)
- where quality allows, use digital processes for filming and sound recording.

6.11 Location filming

SAVING = 5 per cent of carbon emissions from this area of the footprint

- when planning a location shoot, find out whether it is possible to use locally available power sources to reduce the use of generators
- encourage the use of fluorescent lights for work areas on location e.g. wardrobe, art, etc.

- plan the production so that only the trucks and technical equipment needed for the day's shoot travel to the location
- ensure fuel-efficient driving techniques and vehicles are employed. See <http://www.theaa.com/aattitude/driving-truths/environment/index.jsp> for more information.

Chart 1: Split of location shoot emissions

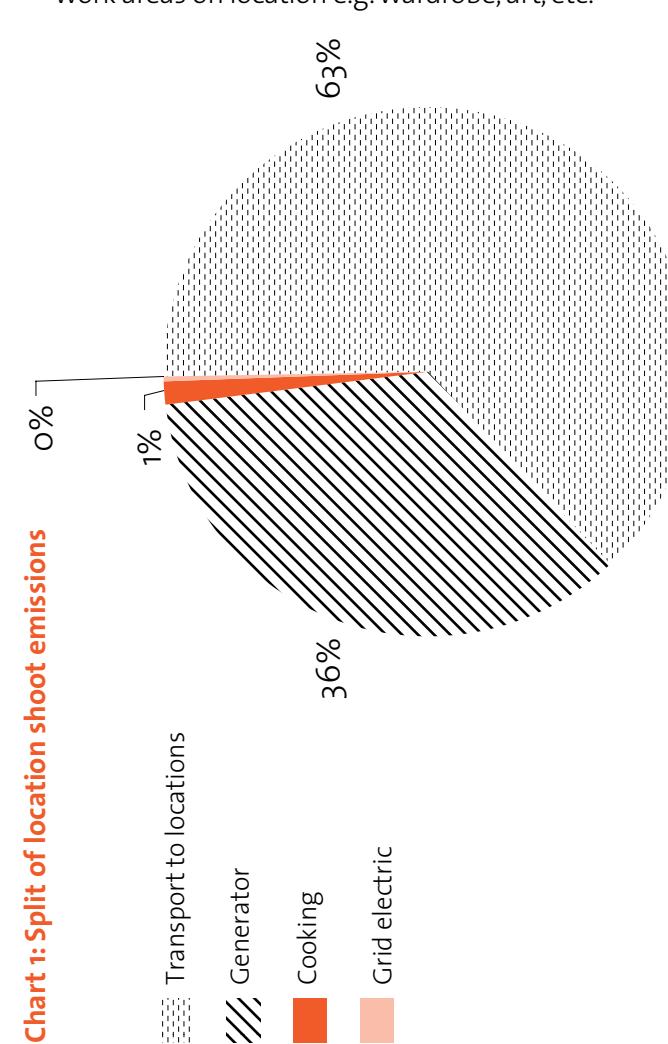
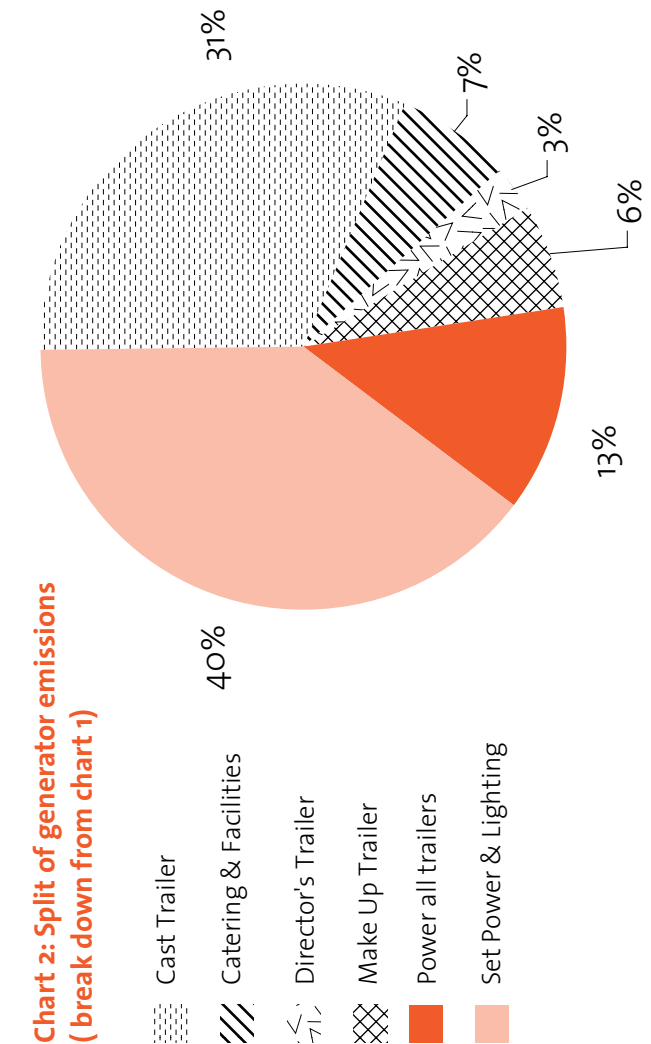


Chart 2: Split of generator emissions (break down from chart 1)



6.12 Procurement and disposal/ recycling

SAVING = 1 per cent of carbon emissions from this area of the footprint

Disposal and recycling

- encourage the arts department to find methods of set construction which enable easy dismantling and recycling
- avoid the use of unrecyclable materials, such as polystyrene, expandable foam and MDF board
- aim to use washable plates and cups where possible and biodegradable where not; try to avoid disposables in order to reduce landfill waste.
- dispose of your Electronic Waste and Electrical Equipment correctly - Since July 2007, under the WEEE (Waste Electrical and Electronic Equipment) directive all businesses need to dispose of equipment in a sustainable way. When you purchase electronic equipment ensure your supplier specifies in the contract how these items need to be disposed at the end of their life cycle
- follow the 'waste hierarchy' of REDUCE, REUSE, RECYCLE, DISPOSAL. Aim for higher reuse and recycling rates
- implement recycling schemes for:
 - sets, props and costumes, as these can often be sold and reused
 - batteries, as these release toxic materials in landfill

- light bulbs and lamps - many suppliers will collect dead bulbs
- aim to separate as much waste as possible. This can take slightly more effort in temporary locations, but can be achieved by using well marked receptacles.

Procurement

Use your buying power to support green suppliers and products.

- sign up to the Green Procurement Code. See the 'top tips for green procurement' at the end of this document and www.greenprocurementcode.co.uk for more information
- try to purchase non-VOC paint: Toxins released from VOCs (Volatile Organic Compounds) in paint release low-level toxic emissions. Most paint manufacturers now produce one (or more) non-VOC variety of paint. Look for VOC content on labels: usually listed in grams per litre, this can range from 5 to 200
- wherever possible, source timber from sustainable forests. Look for the Forest Stewardship Council certification
- buy 100 per cent recycled paper
- avoid using bottled water as much as possible, and on location environments use fewer larger bottles rather than personal bottles for everyone
- hire or use second hand costumes where possible
- if materials must be dry-cleaned, seek suppliers with environmental practices.

7. Success stories

Blue Peter audits energy use as first step to reducing emissions

Blue Peter and the BBC are keen to reduce their carbon footprint and as part of the Mayor of London's Green Screen programme Blue Peter was audited to collect data on the carbon emissions involved in its production. The audit provided useful information on energy use, carbon emissions and identified excellent saving opportunities. The main recommendations coming out of the audit were to:

- upgrade existing T8 fluorescent bulbs to LED tube lights - this could reduce electricity use by 50 per cent and save almost 1.5 tonnes of CO₂ each year
- reduce energy use from IT equipment by setting up sleep/hibernate modes when not in use during the day, switching them off out of hours and upgrading existing PCs - altogether, this could save around 1.3 tonnes of CO₂ per year
- reduce office temperature by one degree - this could save more than 0.6 tonnes of CO₂ each year
- turn off studio lighting when not in use - this could save around 23 tonnes of CO₂ each year
- reduce background cooling when the studio is not occupied - 1.8 tonnes of CO₂ could be saved each year
- conduct a power factor survey to correct the power factor of the Blue Peter studio. This could generate CO₂ savings of at least eight tonnes.

'The Green Screen report into the carbon emissions of Blue Peter has provided the BBC's Environmentally Sustainable Productions project and Blue Peter itself with a very useful set of data which has helped us begin the process of working out what we can do to make our productions more environmentally efficient.' **Charles Simmonds, News Director and leader of the BBC's Environmentally Sustainable Productions project**

Using rechargeable batteries saves 93 per cent of the cost of disposables.

A major news studio was annually spending c£25K on disposable batteries to power the wireless talk back units used by floor managers. Disposables were used due to lack of confidence in rechargeable batteries, and the perceived risk of failure during live transmission.

However, following a successful trial, it was discovered that battery technology has evolved sufficiently to provide the necessary reliability, and senior management sanctioned the switch over. The investment in suitable rechargeable batteries cost £1.5K, and is delivering per annum savings of around £23K.

Recycling at 3 Mills: studios and production companies working together

3 Mills Studios has instigated a procedure with London waste contractor Bywaters to provide production companies with a comprehensive recycling service.

On site compactors and localised recycling bins enable the segregation, collection and recycling of a range of waste materials, including paper, cardboard, plastics, glass, metals and even timber.

Improved waste management is essential to reducing carbon emissions. Materials contain 'embodied' emissions, which are released if they are sent to landfill. By following to the 'waste hierarchy' of Reduce, Reuse and Recycle, these emissions can be reduced, if not avoided.

The service offered by Bywaters at 3 Mills gives production companies using the studios a significant boost in reducing carbon emissions from waste materials.

'3 Mills Studios has been developing green initiatives for some time. We are delighted to support this campaign and to encourage and help companies using 3 Mills Studios to review their own procedures for global benefit. With a little forethought we can all look forward to an environmentally friendly future.'

Derek Watts, Studio Executive, 3 Mills Studios

Recycling and reusing sceneries and props - generating cash from waste

During the production of Lesbian Vampire Killers, Skyline Productions took advantage of a new service being offered to the screen industry in London. Scenery Salvage collect, from a location or studio, any unwanted scenery, which they then sort into reusable, recyclable and non-recyclable material streams.

Reusable items, subject to production approval, are photographed and catalogued and put on the company's website (www.scenerysalvage.com) for re-sale back to the industry at competitive rates. Recyclable items are broken up in to their constituent materials, ie timber, metal, plastic, textile, polystyrene, carpet etc and then processed for recycling through major recycling companies in Europe.

The basic principle is that the extra costs of disposal are covered by what can be resold from the production. In theory, it is possible to actually make money. Scenery Salvage therefore offers the screen production industry a sustainable outlet for its set materials and unwanted scenery which may otherwise be disposed of to landfill – a more carbon intensive and, increasingly, more costly option.

The company also operates PropSupermarket – a facility for warehousing unwanted props and marketing them back to the industry which is done via a website (www.propsupermarket.com). What this means for productions is that they can clear costly prop rooms quickly and efficiently and

receive a revenue from the sale proceeds of the stored props. The amount of revenue is dependant on the value and saleability of the items.

Metering and monitoring energy use: you can't manage what you don't measure!

Monitoring emissions and energy use, and targeting reductions where they'll have the biggest impact, lies at the heart of any effective approach to reducing carbon emissions.

However, this is only possible if energy can be accurately metered and recorded frequently. This relies on the studio having suitable metering in place.

Ealing Studios has the capability to provide weekly electricity meter readings to production companies using its studio spaces, thereby offering those productions much greater visibility and control over their studio energy use and associated emissions.

Pinewood Studios: Reducing carbon emissions through building international street scenes in London

Pinewood Studios plans to build 'Pinewood', a living and working community for the creative industries situated adjacent to the studios, between 2010 and 2021. Pinewood will have 'atmospheric streetscapes' inspired by a variety of popular filming locations including New York, San Francisco, Amsterdam and Paris. These will be real streets inhabited by real people, with up to 1,400 sustainable dwellings powered by renewable energy.

Pinewood Studios estimates that filming at Pinewood could potentially reduce the carbon emissions of a typical film, television production or commercial by up to 77 per cent, by running on low carbon energy and providing opportunities for filmmakers to avoid carbon intensive travel associated with location filming outside of the UK.

This estimate is based on a carbon footprint assessment of a hypothetical film or television drama (representative of a typical small to medium scale production). The carbon profiles of the film, both with current facilities and with Pinewood, were determined using Arup's carbon footprinting tool, a robust methodology that integrates different resource streams into a dynamic model using full life cycle emission factors. The traditional scenario included shooting overseas on location with post-production in the UK using conventional energy sources. The Pinewood scenario included shooting in the Pinewood 'filming streetscapes' with

post-production at Pinewood Studios using renewable energy sources.

The overall carbon emissions could be reduced by up to 77 per cent compared to traditional filming methods. Of this reduction,

- forty-four per cent comes from a reduction in air travel and air-freight
- ten per cent comes from reducing the number of nights spent at hotels and other accommodation while filming on location by filming at Pinewood instead
- three per cent comes from reduction in road transport due to easier access to production facilities (staff and crew commuting, equipment road freight and transport of daily 'rushes')
- forty-three per cent comes from completing the filming and post-production at Pinewood Studios and ensuring that streetscape filming and Pinewood Studios' facilities are powered by low carbon sources of energy.

8. Thinking more broadly

'Because we've waited, because we've turned our backs on nature's warning signs and because our political and corporate leaders have consistently ignored the overwhelming scientific evidence, the challenges we face are that much more difficult.... Much of the vision – is complicated. But that's unavoidable.'

Leonardo DiCaprio

The actions represent a set of first steps forward. To achieve the scale of emissions reductions necessary to avoid catastrophic climate change (see the Stern Review http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm or the London Climate Change Action Plan <http://www.london.gov.uk/mayor/environment/climate-change/ccap/index.jsp>), more fundamental changes will need to happen.

One way of achieving this is through encouraging top talent to set a good example on set. If the top talent takes a smaller trailer space and gives up private vehicles, the rest of the cast are likely to be inspired to follow the lead. Conversely, bad examples will also have an impact on how production staff will act.

'The challenge is fundamental. It's not just about cleaner cars or energy-efficient light bulbs. It's about changing the DNA of our businesses.'

Zac Goldsmith in the above interview with Leonardo DiCaprio

Stars also have influence beyond those they work with – being in the public eye presents a unique opportunity to demonstrate environmental concerns, for example by seeking alternatives to fast/large cars at off-screen showcase events which may have a wide public influence.

9. Carbon calculator for production planning

The carbon footprint of a specific production is determined mostly during pre-production – through the numerous decisions made in lighting, staging, set design and so on.

To help you understand the environmental implications of these decisions, we have developed a carbon calculator to estimate the carbon footprint of each of the main production areas. This is intended to highlight which areas in a given production are the biggest creators of carbon emissions. Using the advice and guidance in this document can significantly help reduce this footprint.

If you don't know a specific piece of information or a question doesn't apply, then you can leave it out and the calculator will still be able to calculate a footprint based on the information you have put in.

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

Sample input page

What is the production budget?		£s
How many actors will be involved in the production?		No
What is the total number of crew, production team, extras, etc?		No
If the production is being filmed outside the studio, how many different locations will be used for shooting?		No
What is the total distance between the locations and the studio?		km
What will be the final running time of the production (programme or film)?		hours
How many days are designated for... • Pre-production • Production • Post-production		days
What is the size of the studio?		m2

10. Thank you!

It would not have been possible to develop this programme without the incredible engagement from London's screen production industry. Our particular thanks go to:

- 3 Mills Studios
- AEAT
- BBC
- Carbon Trust
- Channel 5
- Ealing Studios
- Film London
- Framestore
- Greening the Screen, New Zealand
- ITVP
- London Remade
- National Trust
- Pinewood Studios
- Skyline Productions
- Sky
- The London Filming Partnership
- Working Title Films

Appendix 1 Top Tips for Green Procurement³

Green procurement needn't be complex. Use this action plan to implement green purchasing in your workplace through a simple step-by-step process:

- Do you need to buy it in the first place? Can existing products or equipment be used instead of buying new goods? Can you hire or share instead of purchasing?
- Appoint an environmental champion to spearhead your green procurement strategy
- Agree green purchasing objectives and integrate them into a simple green procurement policy that clearly states your intentions. Make sure this fits in with your environmental policy
- Get top level support for your objectives from the chief executive or finance director
- Communicate your strategy and processes to staff and suppliers so they are clear on what is expected of them
- Regularly review your purchases to assess their impact regarding emissions to air and water, waste to landfill, resource use and environmental quality
- Engage existing suppliers who may be able to provide products or services to fit in with your new procurement policy. Seek their feedback before targeting new suppliers or contractors. Ask your supplier for sample products
- Source green alternatives. Product listings are available from the sustainable product directory on the Green Procurement website
- Incorporate green procurement criteria into all key contracts, starting with those that are high spend, have a high environmental impact and are easily influenced. This includes: energy and water efficiency, recycled content, reusable packaging and products, no hazardous chemicals and sustainably managed timber such as Forest Stewardship Council (FSC) certified
- Award new contracts on the basis of value for money and whole life costing, not the lowest price. This takes into account whole life costs; green purchases may lower operating or disposal costs. Choose products that use less energy (minimum A-rated energy efficient), have a long life span and can be easily repaired or reused
- Implement contracts and monitor performance, including the environmental benefits of your new product or service
- Improve performance such as minimising delivery frequency and miles and reducing packaging

Appendix 2: sample letter to suppliers⁴

Use the sample letter to suppliers below to encourage more environmental practices in your supply chain.

Dear Valued Supplier,

In response to current environmental concerns and the need to conserve our valuable natural resources, <Producer/Studio > is committed to reducing the amount of waste generated in our productions. Our commitment will result in improved stakeholder satisfaction, potentially reduced operating costs, and a better quality of life for us all.

A portion of the waste we generate comes from products and packaging we obtain from you and other suppliers. We hope you will be able to help us reduce this waste wherever possible. We believe that we can both benefit by reducing waste and that the result will be a more sustainable relationship between us. If you would like to join us in our commitment to reducing waste, we would welcome the opportunity to speak with you about a mutually beneficial programme.

Specifically, we are looking for:

- opportunities to eliminate or minimise packaging by volume and weight by reducing packaging of the products we buy from you
- opportunities to purchase products with reusable packaging, products and packaging that use significant amount of recycled materials in their manufacture, and products and packaging that are recyclable in the majority of current recycling programmes
- We are analysing the changes we can make now and in the future and are looking to establish baseline information we can build upon. Please tell us what initiatives you have taken to prevent waste and inform us of your future plans.

Thank you for your assistance in our waste prevention efforts. Please call if you have any questions.

Yours sincerely,

³ Source: Mayor of London's Green Procurement Code www.greenprocurementcode.co.uk

⁴ Source: Live Earth environmental guidelines, 2007 (adapted)

Appendix 3 Where to go for further information and help

Management and Leadership

www.carbontrust.co.uk	To book in a carbon footprint survey
www.globalactionplan.org.uk	Global Action Plan offers short training for environmental champions who then disseminate the lessons they learn
www.greenprocurementcode.co.uk	The Mayor's Green Procurement Code
www.greenelectricity.org	A website to help compare green electricity tariffs
www.ema-online.com	Environmental Media Association, an LA based organisation created in 1989 to inform those in the entertainment business with resources, facts and links to environmentally friendly applicable products, services, technologies and also provide everyday green lifestyle tips
http://www.energysavingtrust.org.uk/	Energy Saving Trust is an excellent source of advice (although primarily domestic focused, advice is easily applied to the work environment)
www.envirowise.gov.uk	LDA Envirowise offers free, independent & confidential advice and support, and links to numerous sources of further information. If you are not sure what help you need, are just starting out or would like to simply discuss your options, the Envirowise Advice Line (0800 585794) can point you in the right direction
www.greeningthescreen.co.nz/	NZ filming has created some excellent guidelines on green filming behaviour

Minimising Travel Emissions

www.theaa.com	Website with a route planner – this can be used to calculate the mileage to set. The website also contains tips on green driving practices
www.greencarsites.co.uk	Online resource guide if looking to minimise the effects of motoring on the environment. The latest industry news and information on UK is available – info on electric, hybrid, alternative fuel and very efficient conventional diesel and petrol cars
www.tfl.gov.uk	Up to the minute travel info with a journey planner to help you journey from A to B using public transport. Details on the Low Emission Zone.
www.transportdirect.com	Transport Direct provides journey planning and emissions calculations for national travel

Recycling

www.recycle-more.co.uk	A recycling information site. Local recycling sites can be sourced
www.ukcra.com	UK printer cartridge recyclers association
www.scenerysalvage.com	Company that where possible collects and recycles scenery
www.plasticwaste.co.uk	A company offering a free nationwide collection service for all plastic waste
www.communitywoodrecycling.org.uk	National wood recycling unit
www.communityrepaint.org.uk	Paint recycling service and outlet for unwanted and re-useable paint
www.london-recycling.co.uk/reporting/weee.php	Information on the WEEE directive
www.reducereuserecycle.co.uk	Good website for information on how and where to reduce, reuse and recycle in London and in the rest of UK
www.freecycle.org	Recycling network
www.traid.org.uk	Textile Recycling for Aid and International Development - committed to protecting the environment and reducing world poverty through recycling
www.londonremade.com/greening-the-office	London Remade Solutions can assist businesses in reducing the waste they produce; reusing office items; starting up or improving office recycling

Location Filming (also see the travel and recycling sections)

www.film london.org.uk/cop	Film London's Code of Practice for advice on location shooting
www.greencarsites.co.uk	Online resource guide if looking to minimise the effects of motoring on the environment. The latest industry news and information on UK is available – info on electric, hybrid, alternative fuel and very efficient conventional diesel and petrol cars

Procurement

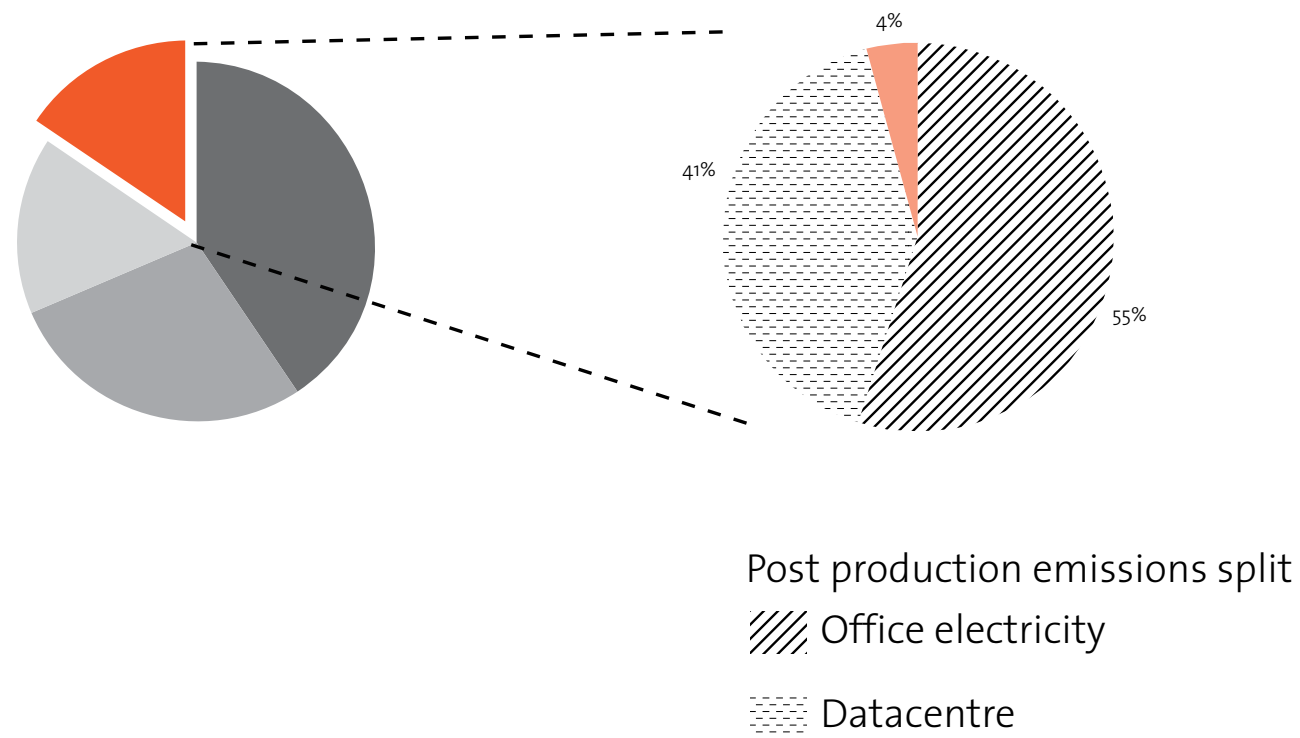
http://www.fsc-uk.org	The Forest Stewardship Council has information on sustainable forestry
www.greenprocurementcode.co.uk	The Mayor's Green Procurement Code

Appendix 4: How is technology having an impact?

Off-site data centre energy consumption contributes almost as much to the footprint as offices and equipment used in post-production

All screen industry areas
125,000 tonnes CO₂

Post production
14,000 tonnes CO₂



Increased demand and sophistication is balancing improvements in technologies. As digital technology continues to advance its capabilities, the role of post-production will become increasingly important. The reduction in materials used in construction and special effects will achieve savings in embedded carbon consumption. However, based on recent patterns, it is possible that the broad volume of studio filming is unlikely to be affected.

Due to the emissions from computing power and data centres, post-production activity is by no means emissions free – with increased demand for data storage matching efficiencies in computing power.

For example the time to render CGI images hasn't changed much in the last decade: with image quality and complexity of effects progressing at much the same rate as improvements in hardware. Technology drivers include:

- exponential increases in Graphics Processing Units (GPU) processing power
- dramatic increases in parallel central processing unit (CPU) power
- increases in storage and memory speed and size.

There is also expected to be a long-term footprint reduction as filming technologies switch from film to HD, and as the film industry moves towards digital cinema. However, the converse may be true in the short term until digital storage capacities improve, and quantifying the life cycle

emissions of filming and digital technologies has been outside the scope of this study.

Finally, industry definitions are expected to continue to blur, in particular as films, TV and computer gaming increasingly overlap. A broader view of entertainment industry emissions may be required in the future.

Did you know... Perhaps one of the most overlooked energy consumers in the value chain is in data storage? For example, data centres account for almost half the entire footprint of post-production. Significant strides are being made in data centre efficiency, so it is important that you are asking your off-site data storage providers to supply energy consumption information. These costs are ultimately passed on, so encouraging their efficiency will result in financial savings.

Appendix 5: Methodology

A5.1 Scope of screen production footprint analysis

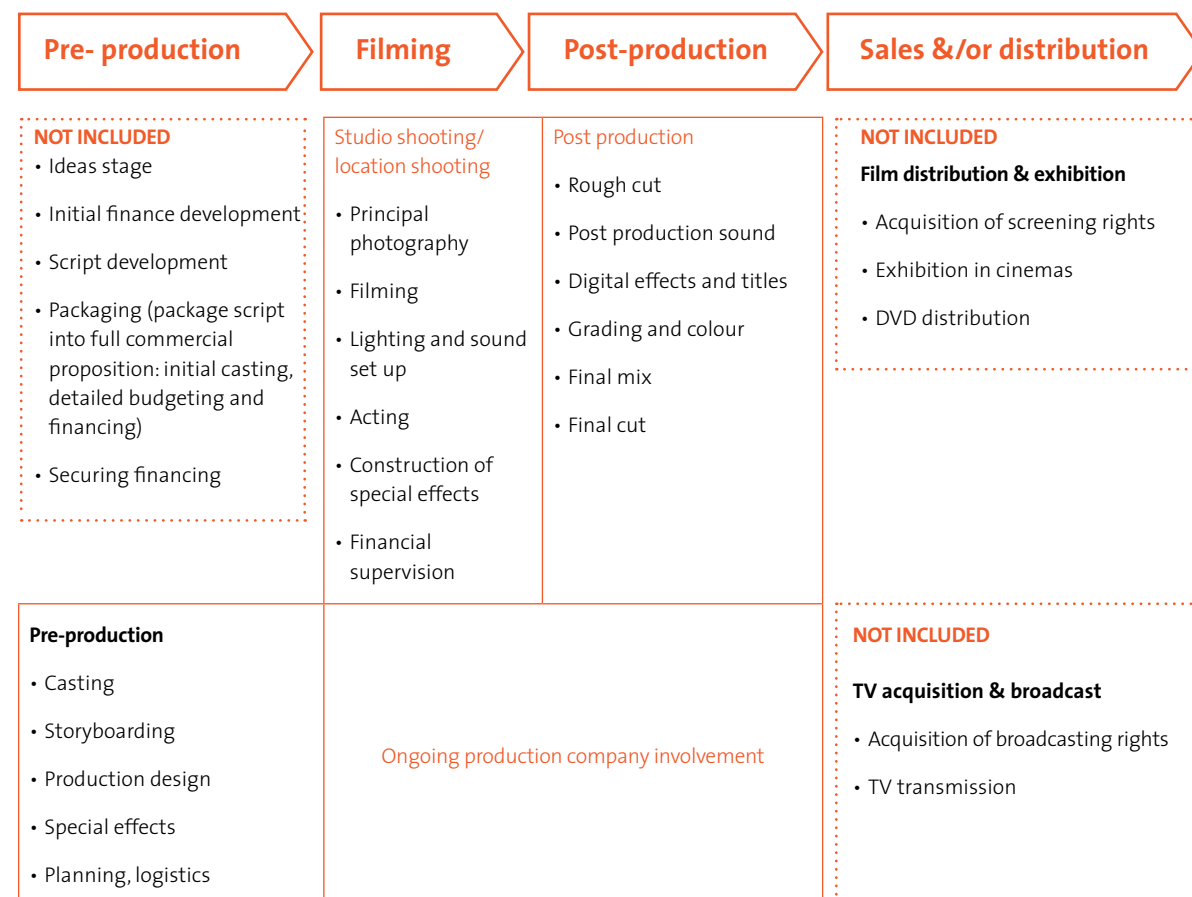
This report has looked at screen production across the value chain of production activities from pre- to post- production.

Excluded activities

- Dashed boxes in the diagram below are activities that are not included in the scope of the footprint analysis.
- **Staff journeys to work.** Although this has not been factored into the footprint calculations, recommendations on travel emissions reductions have been included

as this can be a very significant area, particularly for larger production companies. See notes in Travel section for more information.

- **Embedded emissions** – this relates to waste materials and emissions related to water use. Variability and lack of detailed information relating to materials used, waste disposal routes chosen and water use meant that direct and embedded emissions relating to these sources could not be accurately calculated. However, these emissions sources are likely to be small in the context of the overall carbon footprint for TV and film production in London.



A5.ii Methodology principles: overall footprint

In order to scale up the audit data to estimate a footprint for the entire screen production industry in London, the following assumptions were used:

- percentage utilisation of studio space was estimated at 100 per cent
- the total stage space of London studios is 77,096m².

A5.iii Methodology principles: studio emissions

Footprint calculation framework:

$$(\# \text{ studio stages}) \times (\text{size of stages}) \times (\text{average emissions/stage m}^2)$$

Data sources:

- Film London information on studio stages (supplemented by company website)
- average emissions from studio audits
- specific data from studio audits relating to detailed emissions sources.

Assumptions and comments:

- studio emissions will vary across technologies and age/type of building facilities. Several stages were included in the averaging, to smooth this out
- similarly, because size and number of stages has been used as the scaling mechanism, this assumes that the proportion of office and related spaces is of a broadly similar proportion to stage area, across all studios

- Pinewood studios have been included in this report as it is a facility that sells itself as being within easy reach of London, although we acknowledge it is not a London-based facility.

A5.iv Methodology principles: production company emissions

Footprint calculation framework:

$$(\text{Average emissions/employee}) \times (\# \text{ employees working in production})$$

Data sources:

- skillset industry employee data (2006 employment census)
- emissions from production activity taken from Green Screen audits and Sky published data.

Assumptions:

- production data specifically relating to use of studios, post-production houses, or from location shoots, is included in those categories rather than the production figure. Thus 'production emissions' primarily relate to office and non-filming travel activity
- although the budget and scale of an entire production varies significantly, the relationship between production office emissions and FTE employees is much more consistent. This provides a further degree of confidence in the averaging approach taken here
- sub-regional employee data is calculated by applying national splits in occupations

to regional totals. Thus this data assumes that London employment splits are similar to national averages. Since London is by far the largest employer, this will be broadly accurate.

Excluded:

- early pre-shoot activities (such as the arrangement of financing, script development), as they are too nebulous and open ended to be usefully considered.

A5.v Methodology principles: location-shooting emissions

Footprint calculation framework:

$$(\text{average location footprint/day}) \times (\text{\# days location shooting in London})$$

Data sources:

- sea Renue audits of three location shoots
- AEA audits of two film sets and one TV environment
- Film London location shooting days (relates to location shoots where permissions are required).

Assumptions:

- London travel directly associated with the production is included ie staff travel for business purposes during working hours, transportation of materials and equipment
- all filming days in London are included (ie filming done on location by both London and non-London companies).

Excluded:

- non-London and international travel and transportation of materials and equipment
- non-London filming days ie days filmed by London companies outside of London.

A5.vi Methodology principles: post-production emissions

Footprint calculation framework:

$$(\text{average emissions/employee from audits}) \times (\text{\# employees in post production in London})$$

Data sources:

- Skillset industry employee data (2006 employment census)
- average emissions from Global Action Plan audit of Framestore.

Assumptions:

- total FTEs for London region counted in Skillset post-production employment database. Given freelancers may work less than full time employees, it has been assumed that the companies audited as part of this work have an employee: freelancer ratio that is in line with the industry average
- the environments audited as part of this work are sophisticated specialist post-production houses, which may have slightly higher IT/data centre demands than the industry average. This means that the total post-production emissions figure estimated in this report might be slightly higher than if smaller post-production houses had been used

- the sub-regional employee data contained in the Skillset census was calculated by applying national splits in occupations to regional totals. This data assumes that London employment splits are similar to national averages. Since London is by far the largest employer, we expect this to be broadly accurate.

Excluded:

- staff journeys to work
- emissions outside of the post-production environment eg bikes, runners and couriers.

A5.vii Methodology principles: conversion factors used

Energy type	Factor (kg CO ₂ /kWh gross)	Source
Electricity (grid)	0.523	Defra conversion factors
Electricity - CHP	0.295	
Electricity (onsite renewables)	0.000	
Natural gas	0.185	

Transport type	Factor (kg CO ₂ /km)	Source
Car/Taxi	0.21	Defra conversion factors
Bus/coach	0.09	
Rail	0.06	
Underground	0.05	
Motorbike	0.11	
Walking/Cycling	0.000	
Van	0.27	
Flight – long haul international	0.12	
Flight – short haul international	0.14	
Flight – domestic	0.17	

Waste	Factor (tonnes CO ₂ /tonne)	Source
General Waste	0.447	Carbon Trust

Other formats and languages

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

Public Liaison Unit

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Chinese

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Vietnamese

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

Greek

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

Turkish

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

Punjabi

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

Hindi

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

Bengali

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

Urdu

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

Arabic

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

Gujarati

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

GREATERLONDONAUTHORITY

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