

# EBU

OPERATING EUROVISION AND EURORADIO

## TR 069

# GREEN PRODUCTION: WASTE GUIDE FOR BROADCASTERS

## Strategic Report

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# Contents

1.	Introduction .....	4
2.	Energy .....	6
3.	Sets .....	8
3.1	Physical Sets .....	8
3.2	Virtual Sets .....	10
4.	Costumes .....	10
5.	Catering .....	11
7.	Contributors to this report.....	12
Annex A:	Case Study on waste management on a 2021 production in Wales .....	13
A1.	Summary of key recommendations:.....	13
A2.	Waste streams: .....	13
A3.	Set disposal:.....	14
A4.	Thoughts and Challenges: .....	14

## Green Production: Waste Guide for Broadcasters

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### 1. Introduction

The legal definition of waste varies between nation-states, the EU and the US Environmental Protection Agency. In business terminology, ‘waste’ is often described as ‘not achieving 100% of purchases and investments’<sup>1</sup>. Waste elimination is the process of getting rid of the wastage of energy, water and resources in manufacturing and agriculture.

A profitable application-based process is designed to eliminate and prevent unneeded expense by focusing on the profitable implementation of resource optimization and replenishment. This sort of process is based on the work of Walter Stahel and it is described by Jonathan Scott in his work (e.g., ‘The Sustainable Business’ and related texts, 2007, 2010, 2018) as the process of removing unneeded inputs in production systems at all stages from extraction (e.g., mining, farming, etc.) to the point of sale and afterward (customer usage), for the purpose of maximizing efficiency, reducing resource use, lowering costs and increasing profits.

In business terminology this is translated as ‘100% of inputs equalling 100% of outputs’ (i.e., 100 tonnes of resources produce 100 tonnes of product). It should be noted that much of Scott’s work is based on the observation that businesses successfully implementing Circular Economy (CE) principles unanimously agree that waste elimination should be introduced into operations and systems before CE practices are applied<sup>1</sup>.

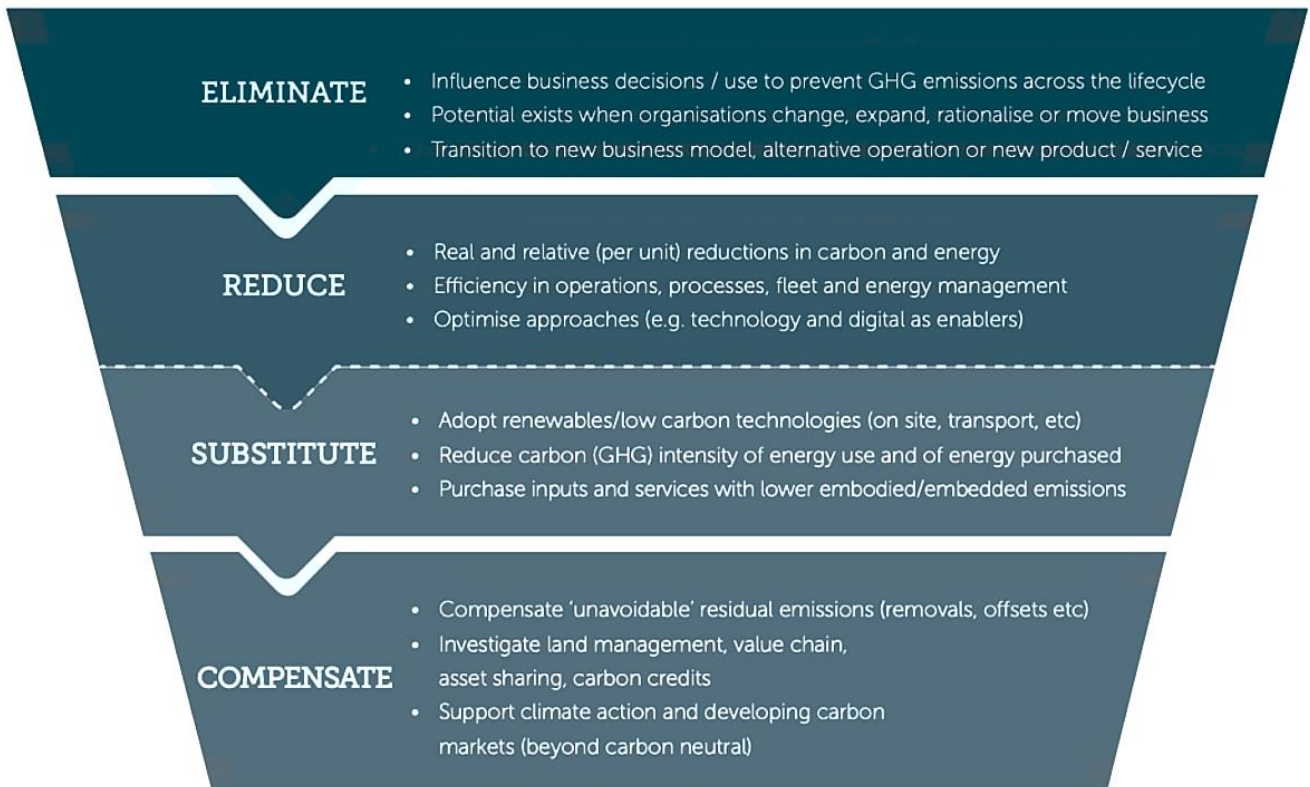
The last phase of the linear industrial economy is the process of organizing the disposal or elimination of waste by third parties<sup>1</sup>.

Zero waste is often seen as a synonym for CE, waste prevention strives to eliminate future waste and costs by designing objects (and inventing materials and molecules) that can easily be reused, repaired and remanufactured continuously for as long as possible<sup>1</sup>. IEMA’s Greenhouse Gas (GHG) Management Hierarchy<sup>2</sup>, is shown in Figure 1; its decarbonisation approaches are like those of the CE.

Waste prevention practices can be added into supplier contracts such that, for example, the suppliers must take back the waste from their products or services. This type of clause helps to emphasize wastage in a process, and it acts as an incentive to minimize waste because the suppliers would logically neither want to take large amounts of waste back or to find ways of disposing of it.

<sup>1</sup> [https://tech.ebu.ch/docs/events/2021/sustainability\\_summit/CE\\_definitions\\_branded\\_CERC\\_CEA.pdf](https://tech.ebu.ch/docs/events/2021/sustainability_summit/CE_definitions_branded_CERC_CEA.pdf)

<sup>2</sup> <https://www.iema.net/resources/blog/2020/12/02/the-challenge-of-net-zero-pathways-and-principles>



**Figure 1: IEMA's GHG Hierarchy**

Waste management can be part of our Scopes 1, 2, or 3, depending on where they enter our work stream<sup>3</sup> and therefore requires measurement. Many broadcasters are adding this to their Scope 3 footprint as part of their net zero strategy. In RTÉ this has involved consideration of information from various indirect sources including suppliers.

In Germany, the working group 'Green Shooting'<sup>4</sup> has agreed upon the following common standards for dealing with waste in productions<sup>5</sup>:

- **Substances harmful to the environment:** Formaldehyde, PVC, solvent-based paints, polystyrene, melamine, isocyanates, phthalates, toluene, brominated flame retardants (BFR) and other environmentally harmful substances and materials are only to be used in decorative construction in justified, exceptional cases. These exceptional cases must be documented and justified in the final report, including an indication of the volumes used.
- **Plastic:** Single-use plastic should generally be avoided in all areas and replaced by more environmentally friendly solutions. There is an obligation to refrain from using disposable plastic tableware (plates, cutlery, cups) at every production site and in all offices. This also applies to plastic bottles (exception: PET reusable bottles).
- **Waste separation:** The resulting waste will be separated at least into the categories paper / glass / plastic or yellow bag / metal / organic waste at each production site, all studios and in all offices.

In North America, the Green Spark Group has many resources and toolkits to help productions become sustainable and greener. They have a guide to help bring sustainable practices into the production

<sup>3</sup> <https://www.compareyourfootprint.com/difference-scope-1-2-3-emissions/>

<sup>4</sup> <https://www.100gruenproduktionen.de/kriterien/>

<sup>5</sup> Members are large German production companies; broadcasters such as ARD, SWR and ZDF, film sponsors and associations, which jointly pursue the goal of realizing their productions as environmentally and climate friendly as possible and minimizing CO<sub>2</sub> emissions.

and it is sectioned by areas such as catering, costumes and sets, etc. Sustainability needs to be considered, included and communicated from the outset, and follows the concept of sustainability by design. Therefore, for example, the following questions are asked upfront:

- Did you set goals and distribute sustainability memos that communicate your sustainability objectives to cast and crew?
- Can you identify the senior person accountable for sustainability (e.g., Line Producer, Production Supervisor...) and for implementing agreed sustainability goals<sup>6</sup>?

The European cultural channel ARTE carried out a project in its cafeteria at its Strasbourg headquarters to measure food wastage and identify its main causes. Countermeasures were taken and as a result, food wastage was reduced from 150 g per meal per person to an average of 80 g. This means that for the staff who dine there, a total of 28 kg of waste per day can be avoided, which has a direct impact on the cost of organic waste recycling.

ARTE also conducted an audit in 2020 to measure other types of waste (paper, glass, residual waste) at its Strasbourg HQ. An action plan based on the results is currently being developed.

**Annex A** has a case study on waste management for a production based in Wales and it covers many aspects of waste.

This report cannot address the whole of waste management in detail, as the topic is huge, and certain areas, e.g., catering and costumes should individually be looked at in-depth. Nevertheless, the aim here is to provide high level information to better understand waste management strategies, looking at some of the best practice in the industry and where more information and guidance can be sought.

## 2. Energy

According to Professor McLachlan<sup>7</sup>, in 2021, 84% of the world's energy continues to come from fossil fuels. There are many possible sources of renewable or low-carbon energy, such as nuclear, hydropower, wind, solar, geothermal, biomass (burning plants for energy) and biofuel (making liquid or gaseous fuels out of plants).

Several tidal power stations are in operation, and experiments are under way with wave and ocean current generation. But, among all of these, the only two with the capacity to scale up to the staggering amount of energy we utilise are wind and solar. Despite impressive growth (doubling in less than five years), wind provides only 2.2% of all energy, and solar 1.1%<sup>7</sup>.

One saving grace, which suggests a complete transfer to renewable energy could be possible, is that a lot of the energy from fossil fuels goes to waste. Firstly, extraction, refining and transport of fossil fuels accounts for approximately 12% of all energy use. Secondly, fossil fuels are regularly burnt in highly inefficient ways, for example, in internal combustion engines in cars. A world based on renewable energy would need half as much energy in the first place<sup>7</sup>.

The potential solar and wind resource is huge, and exploitation costs have fallen. Some have argued we could transition to fully renewable energy, including transmission lines and energy storage as well as fully synthetic liquid fuels, by 2050. However, we need to hurry. Renewable power plants take time to build, and industries take time to scale (Dr R. Freeman, 2021)<sup>8</sup>.

<sup>6</sup> <https://www.greensparkgroup.com/>

<sup>7</sup> <https://theconversation.com/climate-explained-how-much-of-the-worlds-energy-comes-from-fossil-fuels-and-could-we-replace-it-all-with-renewables-167190>

<sup>8</sup> <https://theconversation.com/heres-what-it-would-take-to-end-emissions-from-fossil-fuels-170815>

Switching to renewable energy solves the problems of fuel and climate change, but not those of accelerating resource usage. Building an entire new energy system requires a great deal of material, some of it rare and difficult to extract. Unlike burnt fuel, metal can be recycled, but that won't help while building a new system for the first time. Research concluded that although some metals are scarce (particularly cobalt, cadmium, nickel, gold and silver), "a fully renewable energy system is unlikely to deplete metal reserves and resources up to 2050". There are also opportunities to use alternative, more common materials at some loss of efficiency<sup>8</sup>.

Wasteful consumption is another issue. New technologies (e.g., robots, drones, the internet) and economic growth has led to increased use of energy and resources. The rich use a disproportionate amount of energy, and they model excessive consumption and waste that others aspire to, including the emerging rich in developing countries. Research analysing household-level emissions across European countries found that the top 1% of the population with the highest carbon footprints produced 55 tonnes of CO<sub>2</sub>-equivalent emissions each, compared to a European median of 10 tonnes<sup>8</sup>.

Therefore, as European Public Service Media organizations, we must consider not only moving towards greener energy but also the ways and amounts of energy we use. The ISO 50001 standard was developed to support organizations committed to efficient energy management to address their impact, conserve resources and achieve cost and emissions reductions<sup>9</sup>.

Certified to ISO50001, Irish broadcaster RTÉ, by increasing energy efficiency by 51.8%, has exceeded the targets set for the public sector in the National Energy Efficiency Action Plan (NEEAP) - to increase energy efficiency by 33% by 2020. The following factors have been central to RTÉ's successes in energy management:

- Energy metering and monitoring to identify areas for energy use improvement.
- Building Management System development to ensure efficient system operations & scheduling.
- Extensive use of renewables, including LED lighting, high efficiency heating and cooling systems.
- Investment in energy projects, such as photovoltaic solar panel roof projects.
  - To date this photovoltaic solar panel system has generated 81 MWh of renewable electricity; the equivalent of powering the production lighting and air conditioning requirements of 58 'Late, Late Shows'.

The ARTE headquarters in Strasbourg (ARTE GEIE) obtained ISO 50001 certification in 2016 and improved its energy efficiency by 25.25%. Its annual consumption decreased from 8.2 GWh in 2013 to 4.87 GWh in 2020, with a 57.9% reduction in gas consumption and a 30.7% reduction in electricity consumption. Factors for its success in energy management are:

- Analysis and optimisation of the most energy consuming activities.
- New energy supplier with 100% renewable energy since 2021.
- Raising awareness among employees.
- Energy is now a key criterion for procurement policy.
- Use of LED lighting in the studios.

At Pinewood Studios in the UK, they monitor their energy use and try to use it sustainably, reducing their consumption, changing behaviours and taking advantage of technologies such as LED lighting and solar panels. 100% of the electricity sourced by the Studios is purchased from renewable sources.

They encourage everyone working on their sites to conserve energy wherever possible by:

<sup>9</sup> <https://about.rte.ie/sustaining-rte/rte-and-sustainability/>

- turning off lights when they leave an area;
- powering down electrical equipment that doesn't need to be on;
- shutting windows whilst air conditioning is in operation.<sup>10</sup>

Great Point's Seren Stiwdios (formerly Pinewood Studio, Wales) complex in Cardiff, UK, is powered by a wind turbine, so in-studio productions are being powered entirely by a renewable energy source. Post-Production electricity supplies can also be switched to a 100% renewable supplier.

Most of the lighting in the studio complex - and up to 95% of on-set lighting is LED. The use of low power equipment (not only lighting but low power screen technology, FX, etc.) not only reduces the energy needed to operate it but, for example, requires less or no energy for cooling the set. A recent production that used the facilities also installed permanent electric vehicle charging points at Seren Stiwdios, which were free to use by cast and crew and that have been left on site as an investment for use by other productions. This is additional encouragement for people to make the switch to electric or hybrid vehicles.

Accommodation and Travel Coordinators can prioritise hotels in the Cardiff area that are confirmed as running on 100% renewable energy.

ITV Studios in the UK have several ongoing energy initiatives. For offices they are procuring renewable energy tariffs for their entire global property portfolio. For location power (production) they are exploring proof of concept projects for using batteries, hybrid set ups, and green hydrogen, etc., as alternatives to diesel generators. Focusing on their studios and location hire, they are adding clean power requirements to contract RFPs and supplier questionnaires. In the studios, working to encourage the uptake of albert's Studios Scorecard project that guides studio facilities to provide mains power fed from renewable energy tariffs and/or on-site renewable power generation as best practice.

### 3. Sets

A set can be defined as 'artificially constructed scenery used in theatre, film and TV'<sup>11</sup>.

Production sets vary enormously, and they can be anything from the location/place itself being the set, to indoor physical sets (in studios and a variety of indoor spaces), to outdoor physical sets, or even to virtual sets (green screens and other newer methods).

#### 3.1 Physical Sets

The footprint of sets and scenery can be responsible for almost 50% of the production waste. The Royal Court Theatre in London, alone, uses 30 tonnes of steel, timber and boards per year to create its sets. To make sets and scenery, the industry primarily uses steel, softwood, plywood and plastics. The types of materials required for each production changes significantly between productions, but in general, items include doors, windows, stairs, floors, walls and furniture. Some materials are particularly damaging, through their extraction and production or through chemical harm. These include polystyrene, PVC, unrecycled steel and tropical hardwoods (all data: Buro Happold and Renew Theatre, 2021)<sup>12</sup>.

On the other hand, whilst wood from sustainable sources is more widely available than before, sustainable set construction can be an obstacle. It can be challenging to find FSC (Forest Stewardship

<sup>10</sup> <https://pinewoodgroup.com/pinewood-today/sustainability>

<sup>11</sup> [https://en.wikipedia.org/wiki/Set\\_\(film\\_and\\_TV\\_scenery\)](https://en.wikipedia.org/wiki/Set_(film_and_TV_scenery))

<sup>12</sup> <https://workspace.ebu.ch/display/GREENPRODUCTION/documents>



Council) certified wood in the northeast US that meets the demanding requirements of film and set construction. There are two chief constraints to using a sustainable wood source; the first is the cost (FSC wood is about 25% more expensive than standard wood). The second is the limited choice. This is the result of several factors; a certified sustainable provider (FSC for example) must have the entire supply chain certified, not just the wood. This includes the grower, the broker and the transporter. Additionally, storing the wood is problematic; for every cut, the vendor would have to have enough space to stock a duplicate of sustainable quality. Finally, vendors have several wood certifications that they may choose from: FSC, PEFC, SFI; that have their own certification process, fees, and paperwork. It is very complicated for the vendors who must choose among the certifiers, not to mention the added cost of using the certification label and their membership fees.

On the upside, with the emergence of LEED construction<sup>13</sup>, certified woods are being stocked more readily. Another positive achievement is the progress made on low or no-VOC (volatile organic compounds) paints. Such paints are now being offered in a greater variety of colours and saturations than before at prices that are competitive with standard paints<sup>14</sup>. Further measures consider whether certain coatings can be removed from sets and to design sets for easy dismantling into parts of discrete material types for reuse, recycling or putting into correct waste streams.

Broadcasters that have a green production strategy or that have their productions certified are constantly evolving their physical sets to reuse them where possible. Those that cannot are finding ways to recycle their sets or to donate them to others who could use the sets. There has also been a great deal of innovation in the sets themselves - lightweight, dismantlable (flatpack), and use of innovative materials (e.g., recycled cardboard) to help the transport energy and sustainability journey in this realm.

Independent facility The VECTAR Project (formerly Z Film Studios) in Stockport work with Vectar board, a type of cardboard, and is the first studio and post-production facility in the UK dedicated to being carbon neutral<sup>15</sup>. Vectar board is manufactured in Sweden by a company that has a sustainable forest heritage and whose forestry techniques go beyond those of the FSC. The trees are not cut down to make the board, but branches and leaves are taken instead, leaving the trees viable.

The cardboard was put to the test during a shoot, in which it was used to construct a set with walls and a full ceiling. The crew was able to mount a 20 kg mirror to the wall with little issue. Vectar board is also fireproof, can be painted in the same way as wood, and has the same strength as MDF. Versions that are more flexible, more waterproof, etc., can be developed by changing the glue, wood or leaf content of the board. Production speed can also be improved. 'Legacy' sets (sets built to remain in the studio) are usually built over three weeks in various off-site locations and are then assembled in the studio, where they remain indefinitely. These sets are light, easy to transport, and easier to assemble and disassemble.

Other physical sets recycling and rental entities include:

**Set-exchange** - a 'freecycle' platform to list sets and scenery for re-use. It works similarly to platforms such as Gumtree.<sup>16</sup>

**Circul'Art 2** (Film Paris Region/Ecoprod) - renting sets and props. See:

[https://www.youtube.com/watch?v=MP\\_HL30LKiU&list=TLGG56Xqd25rUbgyNDA4MjAyMQ](https://www.youtube.com/watch?v=MP_HL30LKiU&list=TLGG56Xqd25rUbgyNDA4MjAyMQ)

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<sup>13</sup> <https://leed.usgbc.org/>

<sup>14</sup> [http://www.greenproductionguide.com/wp-content/uploads/2014/04/pga\\_green.pdf](http://www.greenproductionguide.com/wp-content/uploads/2014/04/pga_green.pdf)

<sup>15</sup> <https://wearealbert.org/2022/02/25/sustainable-sets-and-props-made-out-of-cardboard/>

<sup>16</sup> <https://set-exchange.com/>

### 3.2 Virtual Sets

A film set that needs custom pieces will often throw them out once they finish their production. Landfills are the third-largest source of human-related methane emissions in the United States, and the single-use set pieces contribute to inflating them. One way to reduce the carbon footprint of a production is to use a virtual environment. No wood or plastic will be wasted in the process of creating a virtual set. The virtual set has no physical boundaries that it must conform to; a production can be more creative while simultaneously not generating waste<sup>17</sup>.

Another huge cause of carbon emissions is travel. Flights produce over 900 million tonnes of CO<sub>2</sub> worldwide and cars produce over 1.5 billion tonnes of CO<sub>2</sub> in the US alone. Using a virtual set does not only save money due to travel costs, but it also reduces the carbon emissions of a production. If a production does not have to continuously transport cameras, equipment, set pieces, and crew and cast members to new locations, their carbon emissions are reduced. A virtual environment can place a person anywhere. A film's creativity does not have to be stifled because it does not have the money to travel, or because it has the wish to reduce its carbon footprint. A virtual set has many advantages, but one of the largest is sustainability<sup>17</sup>.

Every film and TV show depends on electricians, carpenters, designers, and all sorts of other specialized labourers and artisans working in offices and workshops in support of actors, writers, directors, and camera people. Though we tend not to think of the entertainment industry as an *industry*, with all the outputs that that entails, it does a significant amount of environmental damage.

According to BAFTA, one hour of television produced in the UK, both fiction and nonfiction, produces 13 tonnes of CO<sub>2</sub>. That is almost as much CO<sub>2</sub> as an average American generates in a year. A 2006 UCLA study found that the California film and television industry created 8.4 million tonnes of CO<sub>2</sub>, whilst the amount for the entire US film and TV industry was 15 million tonnes.<sup>18</sup>

In addition to the impact of day-to-day operations, there are more notable examples of productions that have actively harmed the environment. Crew on 2017's *Pirates of the Caribbean: Dead Men Tell No Tales* allegedly dumped chemical waste while filming in Australia, potentially tainting local water, whilst 2015's *Mad Max: Fury Road* damaged sensitive areas on the African Atlantic coast while filming, endangering local reptiles and cacti<sup>18</sup>.

Virtual sets tend to generate less emissions than using geographic locations, however, large virtual sets can use huge amounts of electricity, and we need to measure the emissions and find ways to make the use of them cleaner. This work has started, and we will report on it when complete.

RTÉ has video walls that reduce the need for physical sets. This allows the studio scene to change virtually, eliminating the need for physical resources.

ITV Studios are gathering case studies based on several productions (Drama/Entertainment/Sports) that have used Virtual Sets and XR technology, comparing costs, schedule impact and carbon footprint against the equivalent use of physical sets/location filming.

## 4. Costumes

The costume industry is inherently wasteful. A typical film or TV drama will consume more clothing than the average person uses in their lifetime, and it will produce more waste in a week than the average household does in a year. However, there are costume designers, buyers and designers that

<sup>17</sup> <https://www.pfinix.com/sustainable-virtual-sets>

<sup>18</sup> <https://www.vice.com/en/article/3kxjvk/behind-every-film-production-is-a-mess-of-environmental-wreckage>

are making changes to the way they work, to reduce waste, make it more sustainable and improved for everyone across the supply chain. Here are some top tips from albert:<sup>19</sup>

1. **Set a pre-loved precedent:** On modern jobs, commit to buying as much pre-used clothing as possible before hitting the high street.
2. **Make a donation:** Look for ways to repurpose clothing, fabrics and office supplies at the end of a shoot.
3. **Rags to riches:** Request recycling facilities for fabrics to ensure unwanted items can have a new life ahead of them.
4. **Fashion labels:** Check the credentials of the fabric you buy, Fairtrade and Organic, EU ECO-label or Cradle to Cradle.
5. **Colour with care:** Choose naturally dyed fabrics which have less of a negative impact on the environment.
6. **Down the drain:** Use filters to stop synthetic microfibres entering the water system, every time you wash clothes.

Other ways that can help reduce costume waste:

- Look out for the water consumption used in making clothes, as it can vary widely. Try to use those which have low water usage. For more information, you can listen to the BBC's "More or Less" podcast.<sup>20</sup>
- Working with organizations like WRAP<sup>21</sup>. They take all forms of textiles and clothing to create a CE for them.
- Circul'Art 2 (Film Paris Region/Ecoprod) is also an organization that collects old costumes to repair and rent, donate or repurpose. See:  
<https://www.youtube.com/watch?v=BljyQKeKWRk&list=TLGG3RnBV0xX9kUyNDA4MjAyMQ>

RTVE donated part of the props of the series 'La Caza Tramuntana' to a film and theatre school, giving them a second life. This practice is not common with costumes, but it is with computers and technical equipment. RTVE's Corporate Social Responsibility policy regulates the free transfer of these assets to non-profit institutions.

BAFTA's albert has a link to a useful green [Costume Directory](#) compiled by Sinead Kidao.

## 5. Catering

If food waste was a country, it would be the third largest emitter of greenhouse gases after the USA and China. After energy and travel, one of the biggest changes that can be made to reduce a production's impact is to look at the catering choices being made. Opting for a caterer that can offer majority plant-based meals for the cast and crew and that can reduce the need for disposable crockery and cutlery (at least outside of a pandemic) will be help to reduce the footprint as much as possible (and possibly the budget too).<sup>22</sup>

<sup>19</sup> <https://wearealbert.org/production-handbook/in-your-role/costume/>

<sup>20</sup> <https://www.bbc.co.uk/sounds/play/p0ckr93c>

<sup>21</sup> <https://wrap.org.uk/taking-action/textiles>

<sup>22</sup> <https://wearealbert.org/2020/09/07/waste-not-want-not-how-to-cut-food-waste-on-set/>

Food waste is not always a consideration for busy production managers who might see this as the role of the catering team. However, there are a number of things that can be thought about to minimise food waste<sup>22</sup>:

- **Negotiate** - make it a condition of the contract. Make sure it's clear with the caterers from the outset to minimise food waste. Clear communication before confirming the caterers will help.
- **Pre-order** - one of the odd upsides to new working ways (due to Covid) is that a lot of productions are pre-ordering food for cast and crew. This can hugely reduce food waste, as food is cooked to order.
- **Take home** - could food leftovers from catering be taken home? Talk to the caterers to see what's possible.
- **Become a food waste hero** - is it possible to help distribute food in your local area? Is there an organization that can help redistribute it?

ITV Studios are trialling an on-site composter for food waste from its Catering and Art Department. The compost is then used to feed fruit trees, also on-site. Production teams are encouraged to consider why 'eating less meat' can help protect the planet, which has led to meat free days for catering.

RTÉ's supplier sources local, seasonal vegetarian / vegan food where possible. Waste which cannot be prevented is composted. In 2018 single use plastics were eliminated from its restaurant operation. Prior to Covid 19 it provided food to charities whilst within shelf life. This prevented the food from becoming waste. This involved a corporate social responsibility project, with a taxi company that delivered the food each evening to a night shelter.

RTÉ's catering contractor has arranged with its suppliers to take back containers, creating a circular impact of reuse of the containers. This has resulted in the following example of waste prevention:

Product	Week 1 (kg)	Week 2 (kg)	Week 3 (kg)	Week 4 (kg)
Cardboard boxes	16.3	10.9	15.4	15.2
Plastics - fruit packaging, bags, etc.	1.4	1.5	3.8	2.1
Coffee grounds	14.7	11.4	15.3	18.7

One of RTVE's main TV shows, MasterChef, of which there are three versions: MasterChef, MasterChef Celebrity and MasterChef Junior, donates the ingredients that are not used by the contestants to charities. The message is repeated in each programme and this helps to create awareness against food waste.

## 7. Contributors to this report

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## Annex A: Case Study on waste management on a 2021 production in Wales

### A1. Summary of key recommendations:

- Clear messaging about waste/recycling to cast and crew via memos and posters.
- Easy to use recycling facilities in place in studio and on location. People are busy and tired and systems need to be easy and convenient to use to separate their waste.
- If possible, have a recycling marshal or two to encourage people to sort their waste into the correct bins and to re-sort where necessary.
- Food waste: it is vital to separate and collect food waste from any compostable plates and cutlery, as if it gets into other waste streams it contaminates them.
- If possible, process food waste and compostables through Anaerobic Digestion, turning them into biogas and thence electricity, which can be fed into the National Grid.
- Collect statistics and success stories around this and share them with crew to encourage support.
- Vegetarian and vegan meal choices are to be encouraged - use posters illustrating the impact of those meal choices in terms of CO<sub>2</sub> emissions.
- Employ a positive approach at all times; being prescriptive and authoritarian doesn't work!
- Liaise with caterers to ensure they have a good focus on sustainability, by sourcing local produce and cooking great vegetarian and vegan options. The caterers were happy to support our food waste recycling initiative.
- Donate food to a local charity supporting rough sleepers (NB. this must be done through a legally approved company, in this case our caterers, Antonio's TV & Film Catering, based in S. Wales).

### A2. Waste streams:

We aimed to recycle or reuse as much of our waste as possible:

- Food, through anaerobic digestion.
- Paper and card.
- Metals (in a metal skip, or by donation).
- Wood (in a timber skip, or by donation).
- Glass.
- Hard plastics.
- 'Stretchy plastic' (type 2 and 4), through a local company, Capital Valley Plastics in S. Wales, that turns it into damp proof membrane for the building trade.
- Polystyrene, through a local company that compacts it and sends it to be processed back into plastic beads, which can be made into new items.
- Clean polystyrene recycled by GM Polystyrene in S. Wales, to be processed and turned into new plastic products e.g., garden furniture.
- Crisp packets, recycled through two companies - one to raise money for the Parkinsons UK charity, the other processes them into blankets for rough sleepers.
- Covid PPE, including face masks and nitrile gloves, was sent away to be recycled through [Terracycle](#) and [ReWorked](#). Covid aprons were recycled with our 'stretchy plastic' collection.

- Stunt rigging ropes, recycled by [Extreme Rigging](#) (based in Wales), which sends them back to the original manufacturer who breaks them down into their original high tensile fibres and makes them into new products such as body armour. If these ropes go into landfill they never rot away and are virtually impossible to destroy, so recycling and reuse is very important.

You can read more about the Welsh Government's commitment to recycling in their Beyond Recycling policy [here](#).

### **A3. Set disposal:**

Planning is vital!

We gave away lots of our sets. For example, construction materials go to local schools and colleges, polystyrene trees and large set drapes go to local theatre groups.

We stored some items for reuse.

Most props are hired in, but those bought are either stored for future use, sold, or donated.

Similarly, we hire in as many costumes as possible, and sell off many of those bought and also donate items to charity shops.

NB. We used a lot of previsualisation of sets, to maximise the efficiency of the final builds and minimise waste.

### **A4. Thoughts and Challenges:**

With more time and a dedicated budget, we could have further minimised our waste.

Managing waste on *location* comes with another set of challenges! We managed to keep our recycling systems in place while on location (including all food waste) but it required large amounts of tenacity and enterprise, especially when filming in the more remote areas of Wales.

Extra time needs to be factored in during set disposal to re-home items, and it is helpful to have one or two crew members who can focus on set disposal.

Ideally, set materials should be stored between productions, ready for reuse. Is this something that studios could offer as part of their facility? It makes more sense for set disposal to be embedded within a permanent resource (studio) rather than as an afterthought of a transient one (production). This comes down to planning during the design stage of new or re-designed studios, plus allocating a studio staff member to oversee it.

Encourage everyone to keep asking questions, making connections and sharing networks to solve problems.