



# **Environmental Sustainability Guidelines**

Exploration of a sustainability model for pan-national co-productions within film and television

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# Content

- 1. Sustainable guidelines for all departments ..... 4
- 2. Accommodation..... 5
- 3. Animation ..... 7
- 4. Arts and set design..... 9
- 5. Camera..... 11
- 6. Casting ..... 13
- 7. Catering ..... 15
- 8. Costume & wardrobe..... 17
- 9. Hair & makeup..... 19
- 10. Lighting..... 21
- 11. Location transportation..... 23
- 12. Location travel ..... 25
- 13. Post-production ..... 26
- 14. Power and electricity ..... 28
- 15. Production transportation ..... 30
- 16. Production travel ..... 32
- 17. Props ..... 34
- 18. SFX..... 36
- 19. Sound ..... 37
- 20. Studio ..... 38
- 21. Virtual production ..... 40
- 22. Appendix ..... 42



# 1. Sustainable guidelines for all departments

## DESCRIPTION

This section outlines the different sustainable options that each department can consider for a film production.

## IMPLEMENT SUSTAINABILITY

- Have a Green Steward on set- he will help ensure people are following best practices on set and act as a point of coordination, e.g. using reusable water bottles and saving plastic from recycling and landfill! They also manage the calculators.
- Challenge other departments to a competition about who can keep their carbon footprint the lowest- or reduce their print the most (percentage wise)
- Go paperless as much as possible.
- Reduce use of disposable items.
  - Bring your own water bottle / mug / thermos.
- Turn off equipment and gear when not in use. Avoid standby mode.
- Keep energy and material consumption low.
  - Coordinate across departments on how to save energy and resources.
- Use green options for mode of transportation to set and on set.
  - No idling policy.
- Comply with the production's environmental policy.
- Track and measure the ratio between 'rented vs purchased'.
- Track and measure how much will be donated to charity, reused or recycled.
- Set designers should seek funding from industry innovation initiatives, in which they test parametric design and digital fabrication techniques with leading designers and makers to make the process more sustainable.
- Get familiar with the recycling strategy and how to handle waste properly.
  - Donate or recycle equipment and materials that are no longer in use.
  - Collect and handle special or hazardous waste for proper disposal.
- Clean up, collect all materials, and do not leave trash behind.
  - Make sure to leave a location in the same condition as upon arrival.
- Keep order and structure in the production storage.
  - Avoid buying unnecessary new materials by keeping an overview of inventory.
- Create a data policy and procedure to clear files down e.g. delete rushes or rehearsal footage when no longer needed. This could also include information on how many places you might want something saved.
- Encourage, motivate, and inspire each other to stick with the sustainable plan.

## 2. Accommodation

### DESCRIPTION

This section outlines the different sustainable options when choosing accommodation for crew and cast at production locations.

### OPTION 1: GREEN HOTELS OR ECO HOTELS

*HOTELS THAT HAVE ONE OF THE FOLLOWING CERTIFICATIONS*

- LEED
- Green Globe
- TripAdvisor Green Leaders
- Green Key Global
- EarthCheck
- EMAS or EU Ecolabel certification
- ISO 14001 or other type I certifications (ISO 14024)

### OPTION 2: HOTELS WITH SUSTAINABLE GOALS

- Rainwater recycling
- Less-frequent laundry
- Solar panels for electricity
- Non-plastic/reusable bottles or watering station.
- Electric or hybrid vehicles for transportation.
- Thermostats with occupancy sensors
- Linen from natural materials
- Furniture from sustainable materials
- Reusable cups and utensils in the rooms
- Toiletries from green suppliers
- Recycling options for guests
- Locally sourced food

### OPTION 3: HOTELS WITHOUT SUSTAINABLE GOALS AND GREEN CERTIFICATIONS

- Closest proximity in km/green route (Google map)
- Opt for less frequent laundry and housekeeping.
- Use video calls instead of in-person meetings.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

**RECYCLING**

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling:
  - Used batteries
  - Consumables
  - Plastic bottles
  - Paper
  - Plastic wrapping

**APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 3. Animation

### DESCRIPTION

This section outlines the different sustainable options related to the animation department.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Reuse or rent equipment and gear from previous productions.
- Work with conscious brands and encourage others to improve sustainability practices.

### OPTION 1: ANIMATION SOLUTIONS WITH MINIMAL IMPACT

- Choose energy-efficient equipment, software, and technologies to decrease energy consumption.
  - Use LED lighting.
  - Optimize computer settings to reduce power consumption.
  - Use energy-efficient servers for rendering and animation.
  - Choose low-power graphic cards for rendering.
- Schedule rendering during off-peak hours to reduce strain on the power grid.
- Use distributed rendering to distribute tasks across multiple machines.
- Use version control systems to avoid unnecessary re-rendering.
- Use cloud-based storage.
- Digital animation techniques to eliminate the need for physical materials.
- Use virtual reality (VR) or augmented reality (AR) tools to simulate environments and scenes.

### OPTION 2: ANIMATION SOLUTIONS WITH MORE IMPACT

- Use non-toxic or biodegradable materials (water-based paints, eco-friendly solvents etc.) for physical props and models.
- Power sources (generators) running on electricity or biofuel.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.

### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation



## 4. Arts and set design

### DESCRIPTION

This section outlines the different sustainable options related to the animation department. This section outlines the different sustainable options for materials and items used by the arts department for set building and design for productions.

### GENERAL GUIDELINES

- If it is essential for the set design to be of a certain material, the best option is to purchase it second-hand or loan it from another studio, theater, etc.
- If materials have to be transported from another location or country, use the most sustainable means of transportation.
- Once the set is taken down, it should be donated to another production or charity store or any other organization.
- If the set cannot be used again, it should be recycled.
- Any packaging or wrapping for the prop that cannot be reused should be recycled.
- A general rule should be to use props made with the lowest carbon footprint, sustainably produced or have green labels.

### OPTION 1: NATURAL OR BIODEGRADABLE MATERIALS AND REUSE

- Use furniture and fixtures made of bamboo or other natural wood.
- Use natural paints and dyes for decorating sets.
- Use natural fabrics like cotton and hemp for props made with fabric.
- Use digital design tool from a provider that follows ESG or CSRD.
- Collaborate with socially and eco-conscious vendors and suppliers.
- Source or loan materials or set parts from other studios or productions.
- Purchase props from charity shops or second-hand stores.
- Use LED lighting.
- Use natural food for props such as fruits and vegetables instead of plastic.
- Use paints that are VOC-free. VOC is Volatile Organic Compounds.
- Use sustainably sourced timber.
- Use materials with green labels like FSC, Green Seal, EcoLogo, etc.

### OPTION 2: REUSE OR USE LOCAL MATERIALS AND ELEMENTS

- Purchase set design elements from local vendors.
- Consider modular designs for sets so that they can be reused.
- Use locally produced items.
- Use paints with low VOC.
- Procure props and materials from local charities or second-hand sources.
- Source props from local vendors and nearby vendors.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.

- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

**RECYCLING**

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling in the arts and set design department:
  - Used batteries
  - Consumables
  - Plastic bottles
  - Paper
  - Plastic wrapping
  - Paint

**APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 5. Camera

### DESCRIPTION

This section outlines the different sustainable options related to the camera department.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Record in daylight if possible.
- Reuse or rent equipment and gear from previous productions.
- Use rechargeable batteries.
- Consider editing choices that use less energy. For example, reducing the level of brightness, or lower grading options. These will need to be part of wider creative choices but are worth bearing in mind.

### OPTION 1: DIGITAL RECORDING

- Record digitally on a hard drive.
- Quality. Record in HD1080p rather than 4K (unless you are definitely going to distribute your footage in 4K).
- View digital dailies directly from the hard drive or the digital systems.
- Complete digital camera reports.

### OPTION 2: TRADITIONAL RECORDING ON FILM

- Use “SUPER 35” film material, as it stores more per recording.
- Avoid using raw films.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production’s environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling in the camera department:
  - Foils
  - Used batteries
  - Broken/non-working hard drives
  - Electronics
  - Consumables
- Return, reuse or donate leftover films.
- Reuse film cans and turbines.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 6. Casting

### DESCRIPTION

This section outlines the different sustainable options when casting talent for production.

### GENERAL GUIDELINES

- Hold casting/audition at a location accessible by public transport.
- Call local talent for auditions.
- If casting is held at a casting office/location, ask the candidates to opt for public transport to arrive at the casting location and provide them with public transport options to the location.
- Communicate with attendees about using public transport to the location.
- If public transport options are unavailable, ask candidates to choose the most sustainable mode of transport.
- Where possible, casting should be done remotely or with a limited number of attendees.

### OPTION 1: CASTING LOCAL TALENT

- Call talent/candidates based in the local area to the production/casting location.
- Provide candidates with public transport options to commute to the casting location.

### OPTION 2: REMOTE CASTING

- Remote casting via Zoom or Microsoft Teams.
- Share casting files through greener solutions like NoUSB and cloud storage.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling:
  - Used batteries
  - Consumables
  - Plastic bottles
  - Paper
  - Plastic wrapping

### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 7. Catering

### DESCRIPTION

This section outlines the different sustainable options related to food and catering services.

### GENERAL GUIDELINES

- Ensure balanced healthy meals.
- Work to reduce food waste and handle waste and recycling.
- Aim to reduce disposable waste. Encourage the cast and crew to bring their own reusable drinking bottle and mug/thermos.
- Hire catering from a bio-caterer and look for eco-label certification.

### OPTION 1: PLANET FRIENDLY EATING AND MINIMIZE RESOURCE CONSUMPTION AND WASTE

- Serve organic, seasonal, fair trade, free-range and local plant-based meals.
- Use reusable dishware and cutlery.
- Use water dispensers and reusable beverage containers to refill reusable mugs/thermos and bottles.
- Use reusable/compostable tablecloths, decorations and takeaway containers (bagasse (sugar cane) / palm leaf / PageWise European grass).
- Supply coffee, tea, condiments, sauces etc. in bulk and serve in bigger containers.

### OPTION 2: HEALTHY MEALS AND REUSABLE MATERIALS

- Prioritize plant-based meals with healthy veggies proteins.
- Avoid excess animal protein, saturated fats, and processed foods.
- Avoid supplying straws and selling of/serving from beverage cans.
- Use bamboo/compostable cardboard/FSC dishware and cutlery.
- Supply coffee, tea, condiments, sauces etc. from reusable packs.

### OPTION 3: THE LEAST SUSTAINABLE

- Establish a meatless day of the week.
- Use post-consumer recycled content dishware and cutlery.
- Avoid using coffee pods.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.

- Keep food/recycling/general waste bins near the catering area - keep them tidy and with correct signs for easy sorting.
- Dispose of food waste with a biogas plant or composting.
- Organic food packaging. Look for bioplastic. Do not use plastic-lined paper items.
- Use reusable bags and packaging. Purchase products with reusable transport packs or recyclable packaging. Avoid individually plastic wrapped snacks.
- Donate unused food, such as Too Good To Go or Olio.

### **APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

<b>Option chosen</b>	<b>No. of units</b>	<b>No. of days</b>	<b>Calculation</b>



## 8. Costume & wardrobe

### DESCRIPTION

This section outlines the different sustainable options related to the Wardrobe department. Included is general advice for Wardrobe followed by a sustainably listed order of options, as well as ways to engage and collaborate across the production.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use.
- Use electricity- and water-saving washing machines and dryers. Clean green.
- Reuse or rent equipment from previous productions. Choose local suppliers.
- Use rechargeable batteries. Avoid plastic storage/hangers.
- Set a percentage quota to limit new clothing purchases.

### OPTION 1: REUSE

- Rent/buy second-hand costumes. Avoid buying new clothes.
- Reuse or recycle costumes after production.
- Repair damaged clothing instead of replacing it.

### OPTION 2: SEW/SHOP SUSTAINABLY

- Choose Eco-label fabric/clothing color, fair trade certificates, or local suppliers (fair trade certificates, GOTS, FairTrade and Organic, EU ECO-label or Cradle to Cradle and Oeko-Tex 100).
- Use organic cotton, hemp, bamboo, and linen.
- Avoid new materials made from petroleum, such as vinyl and polyester.
- Use gentle-staining methods or natural dyes.

### CLEANING

- Use Eco-label detergent free from phosphates and fragrances.
- Wash at low temps, 30 degrees is recommended and set washer and dryer eco-modes.
- Use shorter washing cycles.
- Avoid fabric softener.
- Avoid dry cleaning. Use PERC-free or CO2 cleaning.
- Avoid tumble-drying costumes, instead use drying cabinets which will also reduce the need to iron.
- Avoid the shredding of microplastics/fibers:
  - Wash items in laundry bags to catch microfibers.
  - Install a Filtrol or Lint LUV-R to your washing machine discharge hose.
  - Wash full loads. The less space to move around the less shedding occurs.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.

- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

**RECYCLING**

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Reuse garment bags and hangers.

**APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 9. Hair & makeup

### DESCRIPTION

This section outlines the different sustainable options related to the HMU department.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Reuse or rent products from previous productions. Choose local suppliers.
- Avoid single-use products. Use rechargeable batteries.

### OPTION 1: CLEAN PRODUCTS AND REUSE

- A well-balanced stock of wigs and hair pieces that can be reused, restyled, and repaired.
- Digital wigs and hair stock cataloguing systems should be kept and constantly updated to maximize the use of items already in existence.
- Use non-toxic, eco-label, microbead-free, ethically and organically made products and not tested on animals (cruelty-free).
- Use eco-label detergent for cleaning.
- Reusable and refillable makeup and product containers.
- Reusable and washable cloths, pads, towels etc.
- Sustainable bamboo makeup applicators (mascara wands, toothbrush etc.)

### OPTION 2: FOCUS ON RECYCLING

- Avoid products with perfume.
- Use biodegradable/compostable wet wipes and non-plastic cotton buds.
- Recyclable plastic applicators.
- Biodegradable/compostable nappy bags for dirty consumables.
- Recyclable makeup and product containers.

### OPTION 3: LEAST SUSTAINABLE OPTION

- Do not use aerosol spray cans or petroleum-based synthetic chemicals.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Order in bulk or use a single supplier.
- Buy refillable products with recyclable, biodegradable, or compostable packaging.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 10. Lighting

### DESCRIPTION

This section outlines the different sustainable options for the lighting department.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Record in daylight if possible.
- Reuse or rent equipment and gear from previous productions.
- Make sure to gather and collect all croc clips on set.

### OPTION 1: ENERGY EFFICIENCY AND REUSE

- Use LED lights.
- Reuse permanent color effect glass.
- Utilize drapes, heavy twill, or reusable rags for blackout.
- Use rechargeable batteries and include charging stations in the light package.
- Make charging stations available on set.

### OPTION 2: ENERGY AND MATERIAL ALTERNATIVES

- Use CFL lights.
- Use reflectors and Styrofoam to set various light points from one light source.
- Use dimmers.
- Choose recyclable black wrap or black plastic for blackout.

### OPTION 3: OTHER ALTERNATIVES

- Use energy A-rated lights.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling in lighting department:
  - Lamp filters and foils
  - Light bulbs
  - Batteries
  - Consumables
- Reuse or donate color foils.
- Special waste: energy-saving lamps that contain mercury.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 11. Location transportation

## DESCRIPTION

This section outlines the different sustainable options related to location transportation.

## GENERAL GUIDELINES

- Use eco-friendly small vehicles. Share with other departments.
- Drive efficiently. Only run/heat vehicles/trailers when needed.
- Certifications: Ecolabel, ISO type I, EMAS, Ökoprofit, ISO 14001, klima:aktiv, EURO 5.

## OPTION 1: SUSTAINABLE TRANSPORTATION

- Use public transport, bike, or ride-share to get to set/do scouting.
- Use public transport to get equipment to the location.
- For vehicles prioritize electric.
- On set, use bikes or electric or solar-powered golf carts for transport and commute.
- Use bicycle couriers whenever possible. Avoid small pickups with big trucks.
- Plan travel and shopping to minimize trips and mileage.
- Park to ensure that vegetation and crops will not be damaged.
- Use vehicles with green diesel option.

## OPTION 2: LESS SUSTAINABLE

- Avoid idling and heating/cooling when stationary.
- Use CNG, biofuel or eco-certified vehicles.
- Apply eco-driving principles, to optimize the km/fuel ratio.
- Use biofuel for trucks/vehicles transporting equipment.
- Use environmentally friendly taxi companies/ delivery companies.
- Avoid filming on steep slopes (over 20%) to minimize the risk of erosion.

## OPTION 3: LEAST SUSTAINABLE

- Use hybrid vehicles. Avoid diesel.
- Wait in the office (not in the car).
- Be mindful of erosion, biodiversity, and water supplies.
- Avoid running over wildlife, creating noise pollution, or driving off-road.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Recycle engine oil and antifreeze.

- Use paperless travel documents.

### **APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

<b>Option chosen</b>	<b>No. of units</b>	<b>No. of days</b>	<b>Calculation</b>



## 12. Location travel

### DESCRIPTION

This section outlines the different sustainable options related to location traveling.

#### OPTION 1: REDUCE TRAVEL

- Consolidate meetings, scouts, casting sessions, to reduce travel.
- Work remotely as far as possible to replace travel expenses and emissions.
- Hire locally.

#### OPTION 2: TRAVEL GREEN

- Travel by train instead of aircraft if possible.
- Ask for electric or hybrid cars.

#### OPTION 3: FLY SUSTAINABLY

- Establish a strategy to minimize the number of flights (not every weekend).
- Ask production to purchase travel offset tickets.
- Fly crew on direct flights.
- If flights are necessary, use scheduled flights instead of private planes.

#### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

#### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Use paperless travel documents.

#### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 13. Post-production

## DESCRIPTION

This section outlines the different sustainable options to consider for the post-production.

## GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Make a plan with producer, distributor and other actors who work with launch for which contexts you prioritize participating in and can travel to in an environmentally friendly conscious way.

## OPTION 1: DIGITAL SOLUTIONS

- Digital solutions for script notes etc. and digital post-production workflow systems. Exchanging reports and rough cuts digitally saves energy as well as costs for courier and shipping.
- Low-energy solutions for online footage transfer.
- Prefer studios powered by electricity from renewable energy sources.
- Consider editing choices that use less energy. For example, reducing the level of brightness, or lower grading options. These will all need to be part of wider creative choices.

## OPTION 2: ALTERNATIVES

- Evaluate the environmental work with the team.
- Delete virtual file contents when no longer needed.
- Recyclable paper for notes and reports if necessary.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Recycle or donate old equipment when upgrading - fx for film schools.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.



Option chosen	No. of units	No. of days	Calculation

# 14. Power and electricity

## DESCRIPTION

This section outlines the different sustainable options for power sources for productions.

## GENERAL GUIDELINES

- For on-location power usage, explore the options for using green generators or having a mix of green generators and diesel generators.
- A general rule is to have devices, appliances and gadgets using power and electricity to be switched off when not in use.
- A general rule is to have devices, appliances and gadgets using power and electricity to be charged during off-peak hours.
- The electrical department should explore the availability of open-access grid shapes and how to share them or be connected to them in the relevant locations.

## OPTION 1: ON LOCATION: EXTERIOR

- Hydrogen Power Unit, such as GeoPura, for recording or live broadcasting.
- Use green energy generators such as the Voltstack portable generators.
- Use lithium-ion battery packs ranging from 10kWh to 100kWh.
- Opt for hybrid generators with both diesel and electric options.

## OPTION 1: ON LOCATION: INTERIOR

- Opt for production locations powered by green sources such as wind, solar, hydrogen and biomass.
- Opt for buildings with shared renewables. or community grids.
- Opt for buildings with green energy certifications like DGNB, LEED & BRREAM.
- Use electrical appliances with A+, A++ and A+++ labels.

## OPTION 1: OFF LOCATION

- Opt for locations with alternative power sources such as solar and wind.
- Opt for buildings with shared renewables or community green grids.
- Opt for buildings with green energy certifications like DGNB, LEED & BRREAM.
- Switch off electricity, when appliances and electrical devices are not in use.
- Use electrical appliances with A+, A++ and A+++ labels.

## OPTION 2: ON LOCATION: EXTERIOR

- Opt for hybrid generators with both diesel and electric options.
- Use diesel generators with emission control devices, such as catalytic converters, diesel particulate filters, selective catalytic reduction systems, and exhaust gas recirculation systems.
- Avoid overloading the generator/system.
- Use recently serviced generators and make sure diesel deposits are removed.
- Maintain the correct coolant temperature.

### OPTION 2: ON LOCATION: INTERIOR

- Switch off electrical devices and power supply when not in use.
- Avoid overloading the grid.
- When possible, charge equipment during off-peak hours.

### OPTION 2: OFF LOCATION

- Switch off electrical devices and power supply when not in use.
- Avoid overloading the grid.
- When possible, charge equipment during off-peak hours.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production’s environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Waste electricals and devices should be taken to the e-waste disposal centers.
- Electricals and devices should be checked for reusability in another production or be given to other productions.

### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 15. Production transportation

## DESCRIPTION

This section outlines the different sustainable options when choosing transportation options for crew to production locations, production office(s), to events and location scouting.

## GENERAL GUIDELINES

- When choosing the mode of transport, the production crew should prioritize less polluting and lower-impact modes of transport for purposes like commuting to the production office, scouting, commuting to locations. and in general, any production-related transport.
- If public transport options are not available, electric cars or plug-in hybrids can be opted for along with carpooling and ride-sharing services.
- Meetings, scouting, casting, etc. should be done remotely or with a limited number of attendees.

## OPTION 1: PUBLIC TRANSPORTATION FOR COMMUTING

### *OPT FOR THE FOLLOWING MODES OF TRANSPORT*

- e-buses or double-decker e-buses
- Electric trains

## OPTION 2: PRIVATE VEHICLES

- Electric cars with carpooling
- Plug-in hybrid cars
- Bikes
- e-bikes
- Carpooling
- Ridesharing

## OPTION 3: ALTERNATIVES

- Video calls and online meetings, where applicable, instead of commuting.
- Hybrid meetings where participants are not required to be present in-person.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Recycle paper tickets.



## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 16. Production travel

## DESCRIPTION

This section outlines the different sustainable options when traveling to production locations.

## GENERAL GUIDELINES

- When choosing the mode of transport, the production crew should prioritize less polluting and lower-impact modes of transport for purposes like commuting to the production office, scouting, commuting to locations. and in general, any production-related transport.
- If public transport options are not available, electric cars or plug-in hybrids can be opted for along with carpooling and ride-sharing services.
- Meetings, scouting, casting, etc. should be done remotely or with a limited number of attendees.

## OPTION 1: PUBLIC TRANSPORTATION FOR COMMUTING

- e-buses or double-decker e-buses
- Electric trains

## OPTION 2: PRIVATE VEHICLES

- Electric cars with carpooling
- Plug-in hybrid cars
- Bikes
- e-bikes
- Carpooling
- Ridesharing

## OPTION 3: ALTERNATIVES

- Video calls and online meetings, where applicable, instead of commuting.
- Hybrid meetings where participants are not required to be present in-person.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Recycle paper tickets.



### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 17. Props

## **DESCRIPTION**

This section outlines the different sustainable options for materials and items used as props in productions.

## **GENERAL GUIDELINES**

- If it is essential for the prop to be of a certain material, the best option is to purchase it second-hand or loan it from another props department.
- If the prop has to be transported from another location or country, use the most sustainable means of transportation.
- After the prop is used, donate it to another production or charity store or any other organization.
- If the prop cannot be used again, it should be recycled.
- Any packaging or wrapping for the prop that cannot be reused should be recycled.
- A general rule should be to use props made with the lowest carbon footprint, sustainably produced or have green labels.

## **OPTION 1: NATURAL OR BIODEGRADABLE MATERIALS AND REUSE**

- Use furniture and fixtures made of bamboo.
- Use electric vehicles for scenes with driving or transport.
- Use natural fabrics like cotton and hemp for props made with fabric.
- Source or loan props from other productions and television studios.
- Purchase props from charity shops or second-hand stores.
- Use LED lighting.
- Use natural food for props such as fruits and vegetables instead of plastic.
- Use reusable packaging for food items such as polymer tetra packs.
- Use metal, bamboo and other reusable materials instead of plastic materials.

## **OPTION 2: LOCALLY SOURCED**

- Purchase props from local vendors.
- Use locally produced items.
- Use props made from locally made fabrics.

## **COLLABORATE ACROSS THE PRODUCTION**

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.



## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Specific items for recycling in the props department:
  - Used batteries
  - Consumables
  - Plastic bottles
  - Paper
  - Plastic wrapping
  - Paint

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 18. SFX

## DESCRIPTION

This section outlines the different sustainable options related to the SFX department.

## GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Reuse or rent equipment and gear from previous productions.

## OPTION 1: PROTECT THE ENVIRONMENT

- Constantly try to use products with as little environmental impact as possible.
- Plan ahead to ID hazards and prevent environmental damage.

## OPTION 2: BIODEGRADABLE OPTIONS

- SNOW: use biodegradable artificial snow
- FIRE: use propane and water-based smoke.
- Avoid hazardous materials/disposable products. Protect nature.

## OPTION 3: SAFETY

- Do not incinerate any petroleum-based materials, including plastics, rubber, and diesel fuel.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Recycle scraps.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 19. Sound

### DESCRIPTION

This section outlines the different sustainable options related to the sound department.

### GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Reuse equipment and gear from previous productions.
- Use rechargeable batteries for devices.
- Reuse memory cards.

### OPTION 1: DIGITAL RECORDING

- Record sound digitally.
- Complete digital sound reports.
- Use rechargeable batteries and include charging stations in the sound package. Make charging stations available on set.

### OPTION 2: TRADITIONAL RECORDING

- Record on tape.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Special items for recycling in sound department:
  - Foils
  - Used batteries
  - Packaging
  - Consumables

### APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 20. Studio

### DESCRIPTION

This section outlines the different sustainable options related to the studio.

### GENERAL GUIDELINES

- Turn off equipment when not in use and avoid standby.
- Use rechargeable batteries/power strips/LED lighting.
- Reuse or rent equipment.
- Avoid disposable and plastic products.
- Promote local workers and suppliers.

### OPTION 1: GREEN POWER SUPPLY AND MINIMIZE RESOURCE CONSUMPTION

- Utilize mains electricity, preferably renewable. Avoid generators.
- Use eco-labelled materials/cleaners/printers/lightbulbs/electronics/monitors.
- Use natural light/ventilation.
- Buy products in concentrates/bulk to reduce packaging waste.
- Ensure available or install electric vehicle charging options.
- Ensure proper insulation/heating systems.
- Avoid printing, use digital solutions.

### OPTION 2: ECO-FRIENDLY OPTIONS

- Avoid purchasing products made of PVC or coated with foil.
- Bio-fuel for generators.
- Set printers to print duplex when necessary. Use energy-efficient inkjet printers.
- Use vegetable sponges and recyclable cloths.
- Replace chemical cleaners with non-toxic, biodegradable alternatives.

### OPTION 3: LEAST SUSTAINABLE OPTION

- Use laptops instead of desktop computers with separate screens.
- Promote public transit/ride sharing.
- Publicize environmental efforts.

### COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.

### RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.
- Donate office supplies to local charity/school

- Ask the studio service provider for equipment that enables the selective collection of waste (packaging), containers for disposing of paint water, a container for wood, etc. and/or food waste composting and a sorting system.
- Ensure that the sets are built with a concern for the environment, from the initial phase to dismantling. Ensure leftover materials are collected & recycled.

**APPLICATION**

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department. The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

# 21. Virtual production

## DESCRIPTION

This section outlines the different sustainable options related to the VP department.

## GENERAL GUIDELINES

- Turn off equipment and gear when not in use. Avoid standby mode.
- Reuse or rent equipment and gear from previous productions. Also consider renting out LED walls and other stage equipment.
- Optimize scheduling by moving VFX aspects to pre-production. A greater volume of VFX will be done before principal photography finishes with the overall goal to shorten the schedule.
- Use rechargeable batteries.

## OPTION 1: PRACTICE SUSTAINABILITY

- Prioritize partnerships with organizations dedicated to promoting sustainable practices.
- Implement long-term sustainability goals and targets for the production processes to lay a foundation for continuous improvements.
- "Reduce, reuse, recycle"-philosophy. Whenever possible opt for reusing and recycling materials, props, and equipment.
- Scan real-life environments and recreate these environments virtually to use later for reshoots. Reduce the need to travel back to location for reshoot.
- Run modules independently as smaller setups are more resilient. The current battery technology is not capable of operating required power levels for large size virtual sets.
- Incorporate stock footage and user-generated content.
- Choose studios that have a green power supply.

## OPTION 2: SUSTAINABLE EQUIPMENT AND TECHNOLOGY

- If buying, invest in durable equipment with a long lifespan.
- Use LED-powered lights.
- Exploit 3D capture of existing props or other set components through photogrammetry.
- Use 5G connectivity allowing mobile devices to transfer large volumes of data at high speed. Quicker transfer of footage after shooting allows for more rapid reviews and edits which helps compressing timelines.
- Use a projector to project backgrounds onto screens as an alternative to the visual environments on LED screens.

## COLLABORATE ACROSS THE PRODUCTION

- Read and comply with the production's environmental policy.
- Communicate and plan with other departments how to keep energy consumption low.
- Share knowledge and support the production to improve sustainability measures.
- Understand and comply with social sustainability policy of the production regarding health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being.





## RECYCLING

- Implement and comply with waste, recycling, and reuse systems.
- Separate rubbish for easier recycling and try to avoid it altogether.

## APPLICATION

In the table below record the selected options from above, along with the number of units used for the option. This provides the basis for calculating the CO<sub>2</sub> impact for the department.

The calculation can be done in the additionally provided workbook.

Option chosen	No. of units	No. of days	Calculation

## 22. Appendix

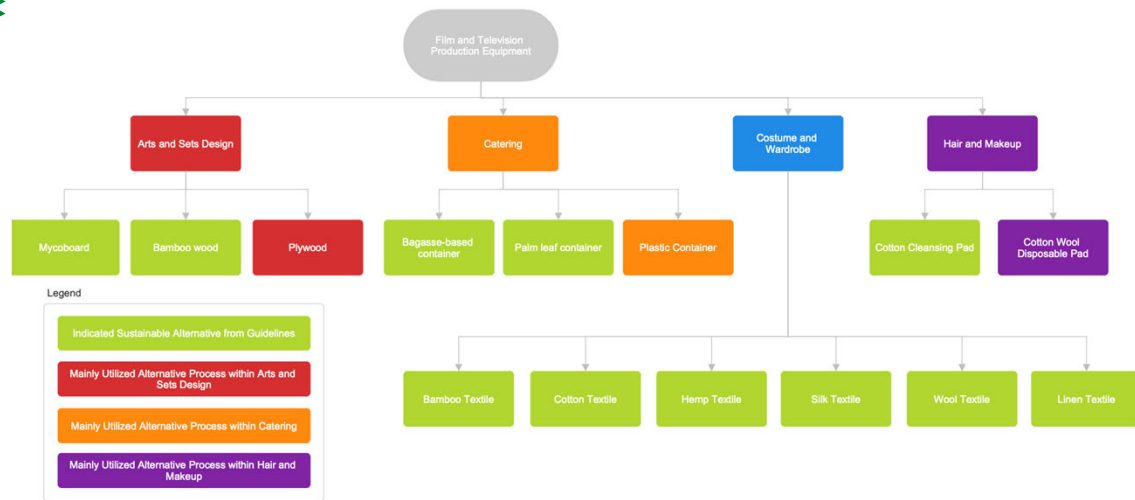
The guidelines have been established based on merging, compiling and qualifying already existing guidelines. Overall, we did not have the possibility to verify the environmental benefits of the different options. However, for a number of choices in arts & set design, Catering, Costume and wardrobe, and Hair and makeup, the master student Marián Fenton Aguilar performed Life Cycle Assessment of the materials of different choices in order to qualify the choice. The results are presented in the powerpoint presentation.

Marián Fenton Aguilar  
S206460  
Stig Irving Olsen

# LCA for TV & Movie Production

## Objectives

- Evaluate the reliability of existing industry guidelines for sustainable film production.
- Analyze the environmental impact categories relevant to film production using SimaPro software.
- Assess the economic and environmental trade-offs of alternative film production practices to propose more sustainable and cost-effective solutions.
- Communicate the findings of the LCA and economic analysis effectively to industry stakeholders for the implementation of improved guidelines and strategies.



**Figure 1.** Film and Television Production Equipment analyzed categories and products. Those displayed in green indicate the processes indicated as “sustainable alternatives” from the compilation of many available guidelines.

## Processes

Process	Use	Input	Amount
Bagasse-based container	Catering	Modified: Core board (RER) core board production   Cut-off, U + 1 kg of: Bagasse, from sugarcane (RoW) sugarcane processing, traditional annexed plant   Cut-off, S	1 kg
Bamboo textile	Costume & Wardrobe	Modified: Fibre, flax, long, scutched (RER) fibre production, flax, scutching   Cut-off, U Bamboo pole (RoW) bamboo pole production   Cut-off, S <b>Instead of</b> Flax straw, dew-retted (RER) flax strae producyion, dew-retted   Cut-off, U	Bamboo pole: 3,98 kg Total: 1 kg
Bamboo wood	Arts and set design	Flattened bamboo (RoW) flattened bamboo production   Cut-off, S	1 kg
Cotton cleansing pad	Hair & Makeup	Fibre, cotton (RoW) fibre production, cotton, ginning   Cut-off, S	1 kg
Cotton textile	Costume & Wardrobe	Textile, woven cotton (GLO)   textile production, woven cotton   Cut-off, S	1 kg
Cotton wool disposable pad	Hair & Makeup	<ul style="list-style-type: none"> <li>Fibre, cotton (RoW) fibre production, cotton, ginning   Cut-off, S</li> <li>Sheep fleece in the grease (RoW) sheep production, for wool   Cut-off, S</li> </ul>	Cotton fibre: 0.5 kg Sheep fleece: 0.51 kg
Hemp textile	Costume & Wardrobe	Modified: Fibre, flax, long, scutched (RER) fibre production, flax, scutching   Cut-off, U + Sunn hemp plant, harvested (RoW) sunn hemp production   Cut-off, S <b>Instead of</b> Flax straw, dew-retted (RER) flax strae producyion, dew-retted   Cut-off, U	Total: 1 kg Sunn hemp: 3,98 kg



Process	Use	Input	Amount
Linen textile	Costume & Wardrobe	Fibre: flax, long, scutched (RER)   fibre production, flax, scutching   Cut-off, S	1 kg
Palm leaf container	Catering	Modified: Core board (RER)   core board production   Cut-off, U Paper mill Pulpwood Waste paper	1 kg
Plastic container	Catering	Polyethylene, low density, granulate (RER) polyethylene production, low density, granulate   Cut-off, S	1 kg
Plywood	Arts and set design	Plywood (RER) plywood production   Cut-off, S	0.002 m3
Silk textile	Costume & Wardrobe	Textile, silk (RoW)   textile production, silk   Cut-off, S	1 kg
Wool textile	Costume & Wardrobe	Fleece, polyethylene (RER)   fleece production, polyethylene   Cut-off, S	1 kg



## Mycoboard

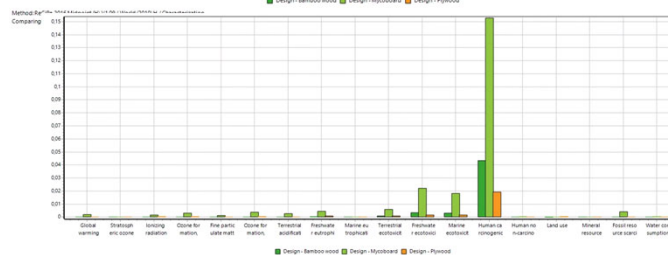
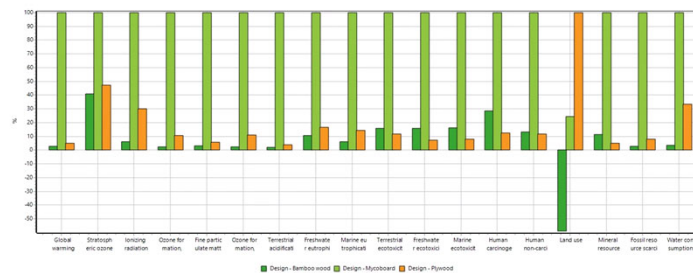
Input	Quantity	Process	Calculated Amount
Substrate	2mm		
Crop waste – Wood chips	38 % of substrate	Wood chips, dry, measured as dry mass (RER)   plywood production   Cut-off, S	123.15 g
<b>Carbohydrate Sources</b>			
Flour	1% of wood chips share	Wheat flour mix (RER)   batter wheat mix production   Cut-off, S	1.23 g
Wheat straw	3% of wood chips share	Winter wheat straw, ground and stored/ton/RNA	3.7 g
Distilled water	62% of substrate	Water, ultrapure (RER)   water production, ultrapure   Cut-off, S	200.9 g
Nylon wrap	Assumed 200 g for 1 roll of nylon	Dummy_Polypropylene-film (oriented) (PP)/kg/RNA	46.3 g
Filter bags	126 125 g bags	Dummy_Filter bags, at plant/US	3,645.83 g
Acrylic glass molds	126 236 g (assumed) molds.	Flat glass, coated (RER)   flat glass production, coated   Cut-off, S	14,868 g
<b>Total</b>			<b>4320 g (assumed as 36*120g)</b>

Inputs on the Mycoboard process assumed and calculated as (Attias et al., 2020).

## Assumptions

- This analysis compares 1 kg of output for all processes, rather than the *Plywood* process that assumes a quantity of 0.002 m3 due to density calculations.
- All processes are simplified and shouldn't be considered as a representative footprint but rather as an estimated guess to compare with mostly used processes within categories and to test what's it's labelled as "sustainable".
- The *bagasse-based container*, *bamboo textile*, *hemp textile* and *palm leaf container* processes are not registered in Ecolnvent, for which alternate processes were modified including the base material of each process.
- The Mycoboard process it's based on the review by (Attias et al., 2020). The process doesn't account for the inoculum in substrate. Input calculations are approximated due to a lack of knowledge of the total output.
- All processes are RER or RoW based. Only the *Cotton textile* process is GLO based.

## Comparison – Design

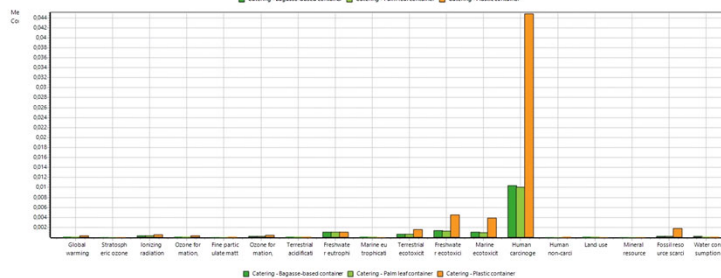
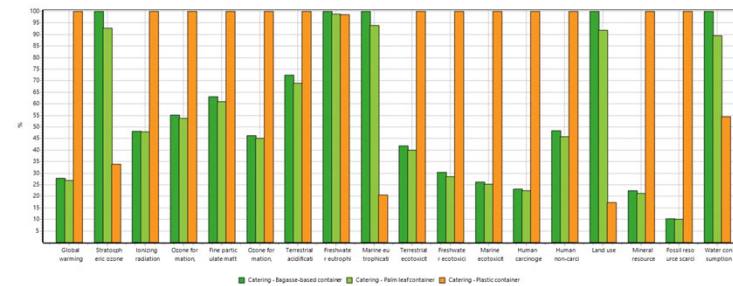


Method: ReCiPe 2016 Midpoint (H1 v1.08) - World 2010+ - Normalization  
 Comparing 1 kg Design-Bamboo wood, 1 kg Design-Mycoboard and 1 kg Design-Plywood

## Interpretation - Design

- The **mycoboard** process has the highest impact along all impact categories but *land use*, where **plywood** has the highest impact.
- Results for the **bamboo wood** and **plywood** processes are similar in all categories, but in the *human carcinogenic* impact category, for which a concrete result can not be given.
- A negative impact for the **bamboo wood** in the *land use* impact category might be due to the ReCiPe method allocating credits for restored or improved land through cultivation, and/or carbon sequestration and land use efficiency.

## Comparison – Catering

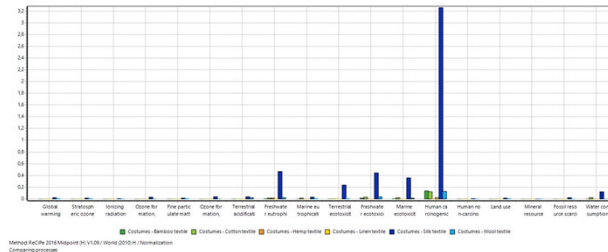
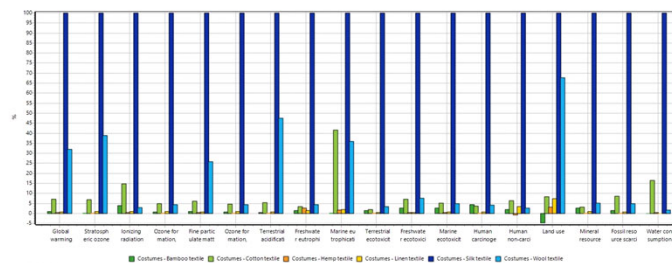


Method ReCiPe 2016 Midpoint (Hv v128) / Impact (2010) / Normalization  
 Container: 1 kg Catering - Bagasse-based container / 1 kg Catering - Palm leaf container and 1 kg Catering - Plastic container

## Interpretation - Catering

- The **plastic container** performs worst in all impact categories but 5, from lower to highest impact: *land use, marine eutrophication, stratospheric ozone, water consumption and freshwater eutrophication*. In the *freshwater eutrophication* the plastic container performs above 95%.
- The **bagasse-based container** performs slightly worse than the **palm leaf container** in all impact categories.

## Comparison – Costume & Wardrobe

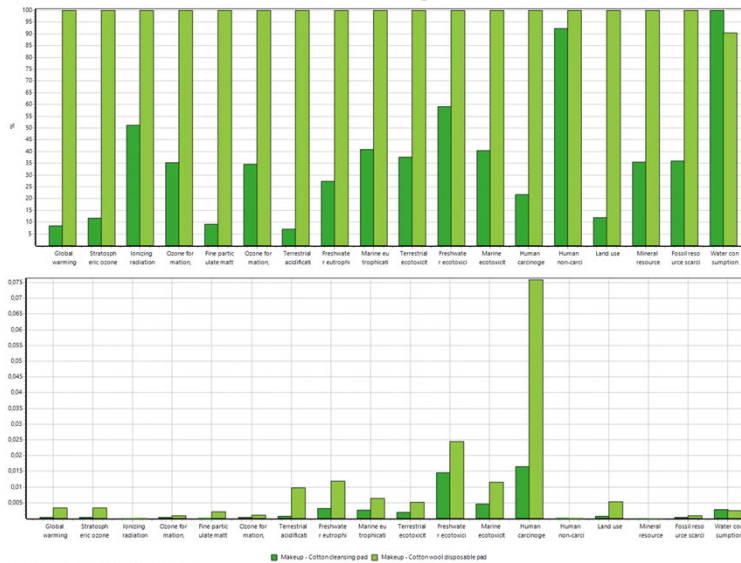




## Interpretation - Costume & Wardrobe

- The main contributor on all 18 impact categories is the **silk textile**, accounting for 100% of the total impact.
- The process with the second highest impact is the **wool textile**, making a contribution of roughly over 25% in 6 of the impact categories, except for *marine eutrophication* where the cotton textile has the second highest contribution (around 40%).
- The better option seems to be **hemp textile**, with a contribution close to 0% in all impact categories but *freshwater eutrophication*, *marine eutrophication*, and *land use*.
- Therefore, the primary hotspots for this comparison are the **silk and wool textiles**.

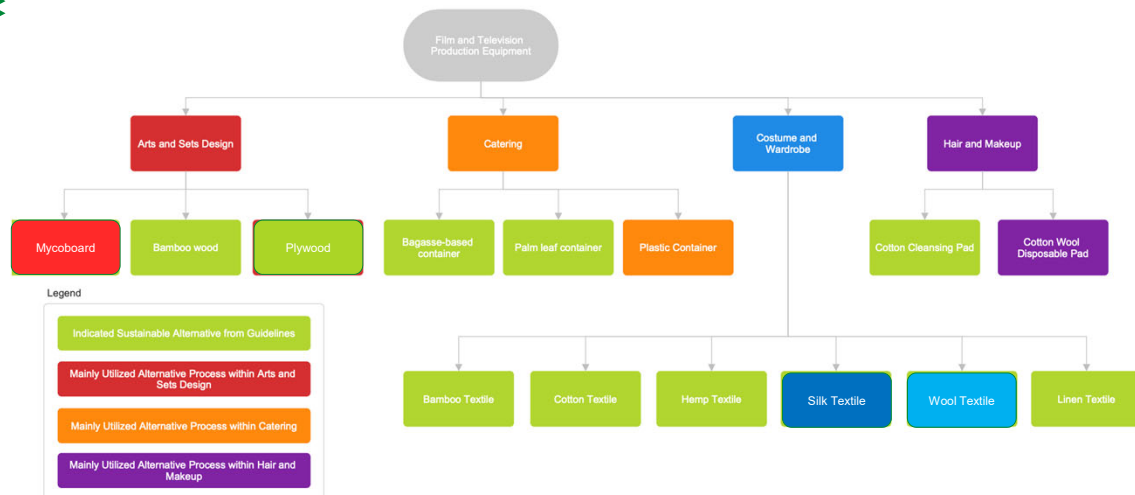
## Comparison – Hair & Makeup



Method: ReCiPe 2016 Midpoint (v1.09) / World 2010+ / Normalization  
 Comparing 1 to Makeup - Cotton-cleansing pad with 1 to Makeup - Cotton wool disposable pad.

## Interpretation - Costume & Wardrobe

- The **cotton wool disposable pads** perform worst in all impact categories, but *water consumption*.
- This difference indicates that the " Sheep fleece in the grease (RoW) sheep production, for wool | Cut-off, S" uses a higher water consumption that "Fibre, cotton (RoW) fibre production, cotton, ginning | Cut-off, S".



**Figure 2.** Film and Television Production Equipment analyzed categories and products. Those displayed in green indicate the processes that performed best after analysis of "sustainable alternatives" from the compilation of many available guidelines.

## Conclusions

- This analysis confirms that in the catering category, the bagasse container and palm leaf container can be considered "more sustainable" alternatives to plastic containers.
- In the costume and wardrobe category, further investigation is needed before labeling silk textile as "sustainable," as it performs significantly worse than all other selected textiles.
- For the hair and makeup category, the reusable cotton cleansing pad has been confirmed to be overall "more sustainable" compared to disposable cotton wool pads.
- As for the design category, plywood does not show a significant difference in performance compared to bamboo wood. Therefore, it can not be labeled as a "less sustainable" option, and this scenario should be further investigated. Additionally, the assessment of the mycoboard product was based on a specific article, and the calculated inputs require further refinement to ensure a more accurate comparison within this category.
- All products were evaluated using simplified assumptions, making this study a preliminary analysis. Further, more detailed studies are recommended for deeper insights.

## References

- Attias, N., Danai, O., Abitbol, T., Tarazi, E., Ezov, N., Pereman, I., & Grobman, Y. J. (2020). Mycelium bio-composites in industrial design and architecture: Comparative review and experimental analysis. *Journal of Cleaner Production*. <https://doi.org/10.1016/j.jclepro.2021.127210>