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Ecological Guide for Public Art in Turku

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Contents

Ecological Guide for Public Art in Turku

Report produced by WAM Turku City Art Museum, edited by Saara Korpela

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1 Towards More Ecologically Sustainable Public Art

This guide aims to safeguard diverse and vibrant public art in the sustainability transformation towards a climate smart circular city, an inclusive society and a thriving natural environment. The guide contributes to the shift towards more sustainable practices in the arts and culture sector.

Ecologically sustainable art has been established as a key objective of the Turku Public Art Policy (2022). The policy sets out five procurement criteria for public art:

- Artistic creativity and aesthetic quality
- Professional competence and technical quality of production
- Integration of the artwork into its environment
- Art production from a sustainability perspective
- Participation and event-based elements in the art project

This guide outlines what sustainable development means in art production, with a particular focus on environmental sustainability. It has been written with an emphasis on public art projects integrated into urban development initiatives and it is primarily aimed at public art commissioners. For each project, the commissioner separately specifies which ecological sustainability criteria apply to the commissioned work. This guide can be applied to a wide range of public art projects.

This guide has been created as part of the Towards More Ecologically Sustainable Public Art project, which has received funding from the Finnish Heritage Agency. Various contributors have provided input for this guide, including regional public art contractors, professional artists, and experts from the City of Turku.

2 Towards Sustainability Transformation

Sustainable development is development that meets today's needs without compromising the ability of future generations to meet their own needs. Sustainability is divided into the following dimensions: economic, social and cultural, and ecological dimension that forms the foundation for the others.

Ecological sustainability can be illustrated through the concept of planetary boundaries. Stockholm Resilience Centre has defined nine key processes that affect life on Earth: climate change, biodiversity loss, land-system change, freshwater change, ozone depletion, particle loading, nutrient flows, new human-made substances, and ocean acidification. The boundaries define a safe operating space for humanity. The more boundaries are crossed, the greater the risk of irreversible changes. In 2023, six out of nine planetary boundaries were exceeded.

This situation is unsustainable and demands significant societal change. This shift is called the sustainability transformation, or sustainability transition, when referring to individual sectors. The term ecological reconstruction is also used for joint efforts on ensuring that institutions and infrastructure can operate without fossil fuels in the future. Since the transformation involves deviating from previous norms, public authorities must ensure that the risks and costs to individuals do not become too high. Therefore, key aspects of the sustainability transformation include shaping expectations, communicating and coordinating changes, alongside various small-scale experiments to test new sustainable lifestyles or technical solutions.

2.1. Legislation and strategies call for ecological sustainability

Since environmental challenges require global action, organisations such as the UN play a key role in formulating international agreements. The Finnish Government is involved in over 100 international environmental agreements, one of which is the Paris Agreement (2015). Its goal is to keep the rise in global average temperature well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C above pre-industrial levels.

At the national level, environmental consideration begins with the Constitution. According to it, nature and its biodiversity, the environment and the national heritage are the responsibility of everyone. Finland's goal to be carbon neutral by 2035 is laid down in the Climate Change Act. To achieve this goal, each sector has prepared its own roadmap towards carbon neutrality.

Construction is a key sector in the sustainability transformation, as construction and buildings are responsible for roughly one-third of Finland's total emissions and half of the emissions from public procurement. Under the new Building Act, developers will be required to prepare a list of

construction products and a climate report for new buildings starting from 2026. At the same time, emission limits will be set for facilities such as business premises, day-care centres and schools.

Cities are also important actors in the transition towards a sustainable society. Turku has taken ecological sustainability into account in various ways: climate and environmental objectives are outlined in the City Strategy and Mayor's Programme, and they apply to the entire city organisation. Turku aims to be carbon neutral by 2029. This is supported by the Roadmaps for Sustainable Development and Circular Economy, the city's Procurement Strategy and the Biodiversity Programme.

3 Ecological Sustainability of Public Art

It is important to assess the ecological sustainability of art productions throughout the entire life cycle of the artwork, from the acquisition and transport of materials to the final disposal of the artwork. It should be noted that from museum's perspective, the lifespan of an artwork typically refers to the period from its unveiling to its final disposal.

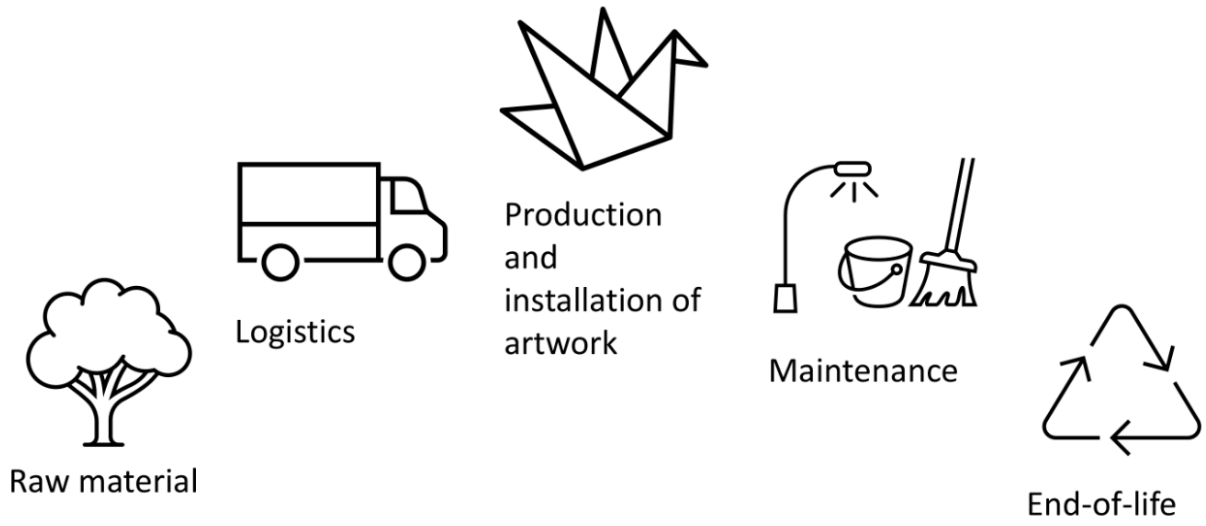

Image 1 Life cycle stages of public art

3.1. Footprints and handprints of artworks

The negative environmental impacts generated during the life cycle are referred to as a footprint. The carbon footprint includes greenhouse gas emissions, while the nature footprint focuses on the impact on biodiversity caused by all stages of the life cycle of the artwork.

The positive impacts that emerge during the life cycle are referred to as handprints. The carbon handprint refers to emission reductions resulting from an artwork. To determine the carbon handprint, it is important to understand the baseline situation – for example, the emissions from city residents without the artwork – and the final situation, where residents' emissions have decreased as a result of the artwork. The carbon handprint also includes greenhouse gas emissions that are absorbed by the artwork. Similarly, the nature handprint of an artwork refers to positive impacts on nature that would not have occurred without the artwork.

Although it may be challenging to measure the positive impacts of an individual artwork, public art can contribute to the city's efforts to advance the sustainability transformation.

Carbon handprint of art productions

- the artwork's direct carbon sequestration and storage (e.g. a growing tree or felled wood)
- using an experimental technical solution that saves energy
- indirect impacts, such as changes in the behaviour of city residents:
    - emission reductions resulting from city residents adjusting their transportation choices to view art located along pedestrian routes or in public transport vehicles
    - emission reductions resulting from behaviour change driven by an enhanced sense of inclusion and agency

Nature handprint of art productions

- restoration of habitats, with the artwork serving as a platform for biodiversity
- removal of contaminants, such as the sequestration of air pollutants, carbon dioxide or nutrients (e.g. plants, paint or biochar as materials of the artwork)
- reducing the amount of nutrients entering the water system (e.g. stormwater management structures, such as retention basins or green walls, designed to absorb and delay runoff)
- indirect impacts, such as reducing dietary emissions

3.2. Assessing the carbon footprint of public art projects

For art productions, the carbon footprint serves as a straightforward and clear indicator of environmental impacts. The carbon footprint measures emissions that contribute to climate change. Climate change amplifies most environmental problems, for example, it accounts for a significant share of the nature footprint. In general, lowering carbon footprint leads to a reduction in all environmental impacts. In addition to the carbon footprint, it is helpful to consider the effects of chemicals used in the art production to gain a complete picture of the total environmental impact.

Emissions assessment helps in understanding and managing the environmental risks associated with art productions. As a result, no material or technique needs to be categorically excluded, as each material can be used in a way that results in lower emissions.

Emissions assessment requires effort and, in line with the principle of proportionality, should only be required for productions that generate significant emissions which can be reduced. These include large-scale spatial works. In contrast, the carbon footprint of wall paintings remains small regardless of their size. Even so, flight travel associated with art productions, or, for example, temperature-controlled transport, can significantly increase their overall carbon footprint.

As depicted in the table below, the carbon footprint of an artwork must be assessed only for quantities that exceed the threshold value. Four aspects are considered: manufacturing of raw materials, production of the artwork, transport and mobility, and the energy consumption of the finished piece. Each category specifies the information required and the level of accuracy expected. For example, you do not need to know the exact weight of the material to the gram or kilogram; an estimate to

the nearest 100 kilograms is sufficient. If the total weight of materials used in an artwork is less than 1,000 kilograms, their carbon footprint does not need to be assessed. However, if gold is used in the artwork, its carbon footprint must always be assessed.

If any of the threshold values in the table is exceeded, the artist should estimate the emissions of that category. You can use the Turku University of Applied Sciences' Environmental Calculator for Public Art, or Green Art calculator. You can also ask the developer or contractor for help with the calculation.

Emission assessment offers valuable insights for both commissioner and artist when planning the artwork and associated travel and transport. It also provides them with information on the scale of the artwork's environmental impact. Making the assessment, or its results, do not exclude any artworks from being acquired. However, if the commissioner chooses a production or solution that results in higher emissions, it must be clearly justified. The procedure can be adjusted or revised at a later stage.

What is being measured?	**What information is required?**	**What level of accuracy is needed?**	**Threshold value: When is an assessment required?**
Raw material manufacturing	Material weight, kg	100 kg	> 1000 kg, or if gold is used
Energy consumption during the production of the artwork	Energy consumed, kWh	100 kWh	> 10,000 kWh
Transport and mobility	Kilometres, km	100 km	> 10,000 km (in total)
	Mode of transport and fuel	Truck/van Flight/passenger car Diesel/electric/petrol	If flights or temperature-controlled transport are involved
Energy consumption of the finished artwork during its display period	Equipment power, W	100 W	> 1000 W
	Operating time of equipment, h	200 h (approx. one week)	> 1 year

3.3. Examples of artworks' carbon footprints

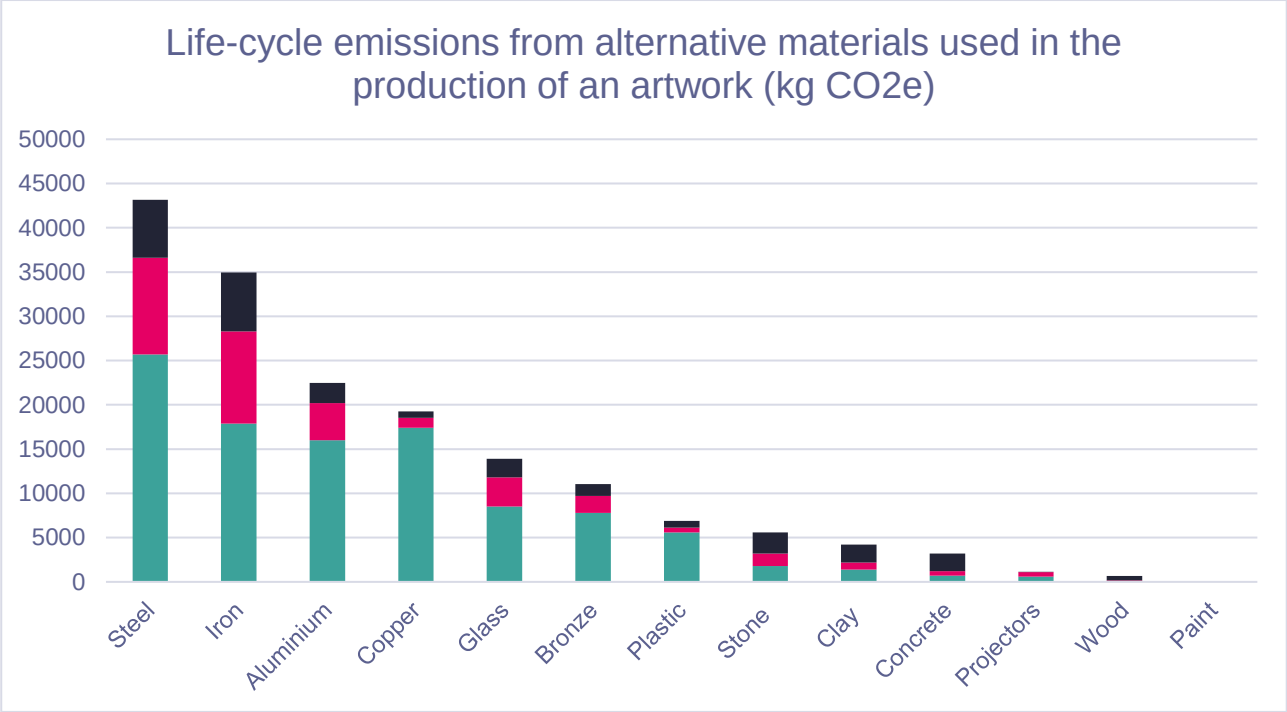

Image 2 An indicative estimate of emissions if the Renaissance artist Michelangelo's 5-metre David sculpture had been made from different materials, painted as an image, or projected as a video on the wall. The green bottom section of the bar represents emissions from manufacturing raw materials, the pink section from the production of the work, and the black section from transport (1,000 km).

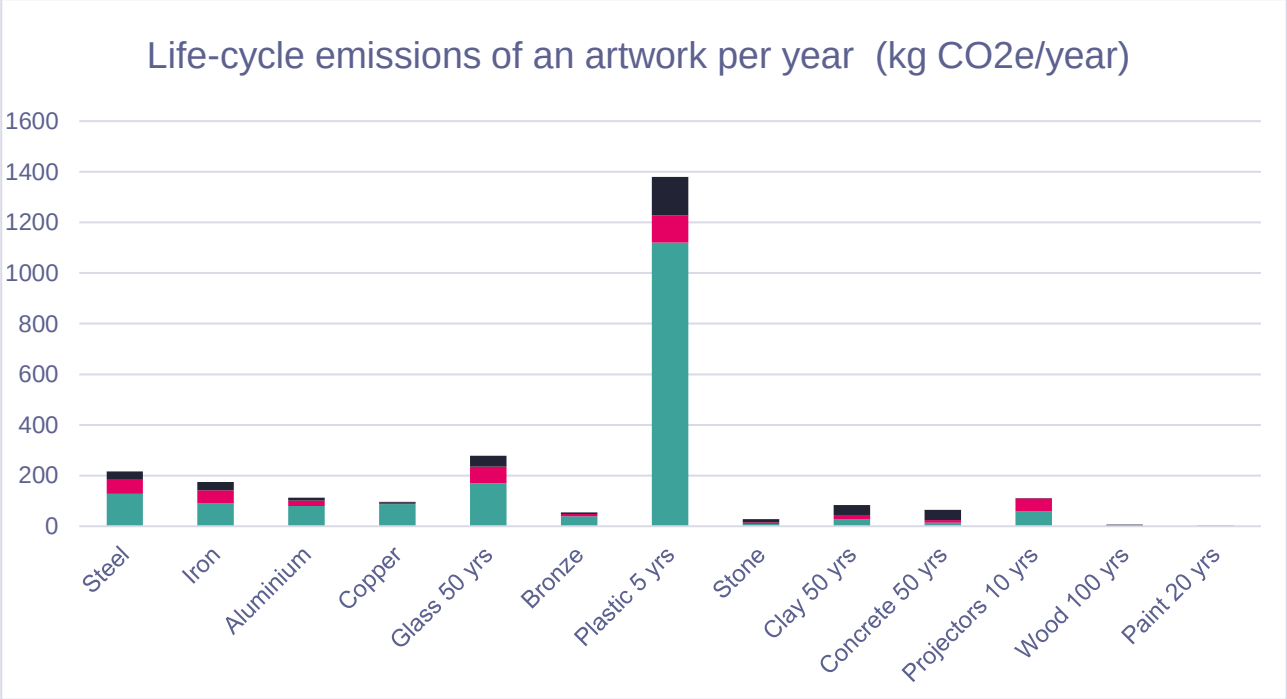

Image 3 The same emissions in relation to the life cycle of the artwork. In this chart, the life cycle is 5 years for plastic, 10 years for projectors, 20 years for painted surfaces, 50 years for concrete, glass and clay, and 200 years for others. For comparison: if the emission limit is set at 16 kg CO2e/m2/year, the emissions of a new six-storey building (4,000 m2) should not exceed 64,000 kg/year. With the exception of a plastic sculpture, the emissions from all works of art are less than 1% of the building's total emissions.

4 Social Sustainability of Public Art

The production of an artwork also includes social dimensions. Further information is available in the ethical guidelines for the arts and culture sector on the Ethical Arts website.

Social sustainability of art productions

- Adequate income
    - does the artist receive sufficient compensation for all stages of their work?
    - how have possible changes in material costs been accounted for?
    - have the materials been produced under socially and ecologically sustainable conditions (no child labour, no conflict minerals)?
- Equality and non-discrimination
    - have artists from minority groups been given the opportunity to participate in the application process (for example, has the call for applications been published in various languages)?
    - is the artwork accessible to a diverse audience?
    - does the placement of the artwork help reduce inequalities between neighbourhoods?
    - is the art participatory?

5 Ecological Sustainability of Public Art Projects from the Commissioner's Perspective

Ecological sustainability should be considered in public art projects from the very beginning. The following list provides guidance on how to incorporate ecological sustainability at different stages of the project.

5.1. Planning the art project

Art museum

- Consults sustainability experts if possible, particularly in the early stages of the project

Developer's organisation

- Communicates the ecological sustainability criteria of the construction project which are relevant to the art project: the building's life cycle, environmental rating and emission limits

Art museum and developer

- Discuss the objectives of stakeholders and explore alternative ways of achieving them

Examples of stakeholder objectives:

- increasing the comfort and attractiveness of the environment
- enhancing the value of the area
- providing employment opportunities for artists
- engaging and empowering residents in climate action

Methods of implementing an art project:

- Purchasing an existing work from an artist
- Commissioning a new, temporary artwork
- Commissioning a new, permanent artwork

- Assess the ecological and social sustainability constraints posed by the physical site, as well as the potential for producing the artwork, considering factors such as:
  - the site's natural environment: are there any protected species, sensitive ecosystems or biodiversity that must be safeguarded from potential harm, such as chemicals?
  - Can the artwork promote biodiversity?
  - What is the blue-green factor of the outdoor area? Could the artwork be integrated into vegetation or stormwater management systems?
  - Does the site produce materials that could be used in the artwork?

- Can the artwork strengthen the site's ecological identity or raise environmental awareness? Can the artwork enhance the sense of agency among users of the space and strengthen their confidence in their ability to take action, for example, in mitigating climate change?

Art project group, led by art museum

- Establishes the criteria and assessment methods for evaluating the ecological sustainability of the art production, and lays them out in the commission brief
- Determines the weighting of ecological sustainability in the evaluation process
- Defines the expected lifespan of the artwork and the technical service life requirements for its components
- If an artwork or solution with greater environmental impacts is selected, outlines the justifications required

5.2. Planning the artwork

Art museum

- Incorporates ecological sustainability into the agreement on the draft as well as the procurement contract

Developer's organisation

- Inform the artist about ecological sustainability when presenting the construction project, including:
  - special features of the environment, such as nearby nature reserves
  - environmental classification rating of the construction project
  - the user's (such as a school's) environmental objectives and values

5.3. Producing the artwork

Art museum

- Ensures that all participants are familiar with each other and that information flows between different stakeholders
- Discusses the ecological sustainability criteria with the artist (materials, environmental product declarations, etc.)
- Instructs the artist to incorporate ecological sustainability considerations into the maintenance manual (properties, replaceability and recyclability of the used materials, lifespan of the artwork, and compliance with ecological sustainability criteria)
- Instructs the artist to obtain environmental declarations and safety data sheets for the materials used, available on manufacturers' websites

Developer's organisation

- Can provide the artist with information on transport and installation companies that meet the sustainability criteria

5.4. Unveiling the artwork

Art museum

- Encourages the public to arrive by walking, cycling or public transport, and schedules the event, considering public transport timetables

5.5. Maintenance and upkeep of the artwork

Art museum

- Conducts annual, systematic maintenance inspections of public art, documenting the process (chemicals: potential to improve environmental objectives in long-term maintenance)
- Strives to use non-toxic, low-emission methods for maintenance and restoration

Property owner

- Ensures that the electricity used for the artwork comes from renewable sources

5.6. Storing and archiving artwork documentation

Art museum

- Includes information provided by the artist in the accompanying documentation, such as the origin of the materials used, and the environmental impact of the artwork
- Documents instructions for recycling materials at the end of the artwork's life cycle
- Ensures that digital content is stored on a low-emission server

5.7. Disposal of the artwork

Art museum

- Removes the physical artwork from the building or urban space once the criteria agreed upon with the artist have been met
- Delivers the artwork materials for recycling in accordance with the specifications outlined in the maintenance manual

6 Ecological Sustainability from the Artist's Perspective

To assess the ecological sustainability of their artistic practice, artists may reflect on the following questions:

- Could my artwork create an ecological or carbon handprint for the city, the developer or local residents? Can I support the sustainability transition through my work?
- What materials and techniques do I use?
- Can any of the materials be harmful to myself or the environment?
- Could I use recycled materials in my work?
- Do I know the amount of emissions generated during the production or processing of the materials I use?
- Do I know how much energy is required to exhibit my artwork?
- Do I collect information on the materials I use, or the energy consumed?
- What factors influence the technical lifespan of the artwork's components? Can it be extended?
- What types of transport and mobility are involved in my work?
    - Transport distances for artworks and materials
    - Commuting
- What kind of subcontractors do I work with?
    - Do the subcontractors have sustainability competence?
    - Can I obtain environmental information on materials and transport from the subcontractors?
    - Are the subcontractors operating with low emissions and supporting biodiversity?

The environmental impact of artworks can be reduced by choosing, for example:

- Non-toxic and low-emission materials
- Less material and lighter structures (e.g. thinner aluminium profiles)
- Similar materials that are less harmful or generate lower emissions (e.g. recycled steel)
- Alternative, more sustainable materials or solutions in place of harmful ones

7 Examples of Ecological Sustainability Entries in Project Documents

A public art commissioner may include ecological sustainability in the project documents using the following example phrases. These model sentences can be used as they are, or they can be modified as needed.

7.1. Ecological sustainability in the commission brief

A section on ecological sustainability is added to the commission brief, such as the call for applications or the competition programme. An example is provided below. One or more sentences can be copied from this example to the commission brief, and used as is or modified if needed:

"**Ecological sustainability**

Both ecological and social sustainability are considered in the production of the artwork, in line with the sustainable development goals of the City of Turku. Sustainable development is one of the five evaluation criteria for the art procurement. Artists are required to commit to the UN Sustainable Development Goals, which for this project means:

Materials

- The artwork is created using materials that align with the principles of the circular economy, and the materials are:
    - Non-toxic
    - Reused or recycled
    - Reusable or recyclable (suitable for disassembly after display)
    - Produced without the use of child labour

Greenhouse gas emissions

- The artist keeps a record of the factors influencing the carbon footprint of their artwork, including:
    - Type and quantity of materials used (e.g. glass, 500 kg)
    - Transport distances and vehicle type (e.g. 100 km by a diesel van)
    - Production methods of the artwork (e.g. melting, firing, welding, painting)
    - Estimated mobility and transport needs related to the production (e.g. 50 commuting trips Helsinki-Turku-Helsinki, transport of the artwork from China/Sweden/South Finland)

Subcontracting

- If the value of the subcontracting exceeds EUR 10,000, the subcontractor must hold an environmental certificate
- Appropriate compensation is paid for the production of the artwork and its components.

Experiments

- The artwork experiments with technological innovations (e.g. low-carbon concrete, circular economy bricks) that have the potential to reduce emissions in the construction sector but are not yet widely adopted
- The artwork contributes to stormwater landscaping, which is carried out with landscape architects.

Placement

- The artwork is placed in a location that encourages residents to use public transport, walk or cycle."

7.2. Considering ecological sustainability in the budget

If a separate budget has been allocated for ecological sustainability, it must be stated in the commission brief and contracts. It can also be mentioned in other communications. The following example phrases may be used as they are or adapted as needed.

"Ecological sustainability budget

The project includes an assessment of the environmental impacts of the artwork (e.g. mobility and transport requirements, use of harmful materials). A separate budget of EUR xxx has been allocated for this purpose. This amount may be paid to the artist, consultant or developer's representative."

"A budget of EUR xxx is allocated for offsetting emissions and providing ecological compensation for the production of the artwork."

7.3. Ecological sustainability in the procurement contract

The sections on ecological sustainability outlined in the commission brief must also be incorporated into the preliminary design contract and the procurement contract.

If the production techniques and materials are known when the procurement contract is finalised, the contract may specify, for example:

"The artist will produce the work of art using the following materials:

- material x, country of origin: y, environmental certificate: z or equivalent
- material y, recycled content approx. z %, country of origin: x”

The following objective may also be included in the procurement contract:

“To preserve or enhance the artistic value of the artwork, the artist has the right to deviate to a reasonable extent from the draft in their final implementation plan. However, any changes must not significantly increase the artwork’s total budget or **environmental impact (such as carbon footprint or chemical load)**.” Any changes to the artwork’s total budget or environmental impact must be agreed upon in writing with the Commissioner before they are carried out.”

8 Glossary

Art commissioner The party that finances an art project and sets the framework conditions for its execution. The completed work will be owned by the commissioner. Several different parties within the city organisation are involved in commissioning public art in Turku.

Biodiversity The variation that occurs at three levels: the diversity and abundance of genes, species and ecosystems. Biodiversity enhances the ability of natural systems to adapt to changing circumstances.

Biodiversity loss Decrease in biodiversity.

Blue-green factor A metric used in urban planning to assess both the quantity and quality of vegetation and surfaces, as well as their ability to manage rainwater, delay stormwater runoff, and help mitigate flood risks on a plot or block.

Carbon dioxide equivalent The warming effect of carbon dioxide or other greenhouse gases on the climate, expressed as the equivalent amount of carbon dioxide. For example, over a 100-year period, the warming effect of 1 kg of carbon dioxide is equivalent to 1 kg CO2e, while the warming effect of 1 kg of methane is equivalent to approximately 28 kg CO2e.

Carbon footprint Greenhouse gas emissions generated during the entire life cycle of a product or service. Unit: carbon dioxide equivalents (CO2e/kg).

Carbon handprint The reduction in other's emissions, resulting from using a product or service, compared to a scenario where the product or service is not used. The reduction in organisation's own emissions is not considered a handprint. Under the Building Act, the carbon handprint also includes the carbon dioxide stored in building materials. The carbon handprint does not reduce the carbon footprint but is always calculated separately.

Carbon negative A situation in which more greenhouse gas emissions are sequestered than emitted.

Carbon neutrality A situation in which the sequestration of carbon dioxide equals its emissions.

Developer The organisation that commissions a construction project from the main contractor.

Ecological footprint The land or water area needed to produce the nutrition, materials and energy consumed by humans and to process waste. Unit: global hectares per person per year (gha/person/year).

Emission factor The amount of emissions generated per unit of product or service produced. For example, 6 kg CO2e per 1 kg of strawberries.

Environmental footprint The environmental impact of a product or service throughout its entire life cycle, measured across 17 different categories. Only defined for a few product groups.

Environmental Product Declaration (EPD) A standardised document that outlines the environmental impact of a product throughout its life cycle. Reporting this information is voluntary. In an EPD, the product's life cycle is typically divided into the following phases: manufacturing phase (A1–A3), use phase (B), and end-of-life or demolition phase (C). For buildings, the construction phase (A4-A5) is also included. An EPD may include the following information:

- global warming potential (GWP)
- ozone depletion
- particulate matter
- acidification
- eutrophication
- land use changes, depletion of natural resources
- freshwater use
- amount of waste generated

Footprint The negative environmental impacts generated throughout the life cycle of a product or service. These impacts can be categorised into specific types: carbon footprint, nature footprint, material footprint, water footprint.

Hazard statement (H-phrase) A standardised statement on the packaging label of a hazardous chemical that describes the hazard associated with the chemical. Precautionary statements (P-phrases) describe measures to reduce or prevent the adverse effects caused by the use or disposal of a chemical.

Life cycle The phases of a product or service, from the acquisition of raw materials to reuse and recycling.

Material footprint The renewable or non-renewable natural resources used throughout the life cycle of a product or service (e.g. excavated aggregates or water consumed). Unit: kg of natural resources per kg of finished product produced, kg/kg.

Nature footprint The negative impact of a product or service on biodiversity throughout its life cycle. The nature footprint encompasses five key factors: climate change, habitat changes, direct exploitation of species, pollution and litter, and the spread of invasive alien species. Although there is no established unit of measurement, the following units are often used: potentially disappeared fraction of species (PDF), mean species abundance (MSA), and habitat hectare.

Net zero A situation in which the sequestration of greenhouse gases equals their emissions.

Planetary boundaries Nine processes that regulate ecosystem stability, identified by the Stockholm Resilience Centre. Limit values have been set for each of these processes. Exceeding them increases the risk of irreversible environmental changes.

Safety data sheet (SDS) A document prepared by a substance manufacturer or importer for professional and industrial users of chemicals. It contains information on the hazards, safe storage, handling and disposal of the chemical, in compliance with the EU REACH Regulation.

Stormwater Rain and meltwater discharged from built-up areas.

Taxonomy, EU taxonomy The EU taxonomy sets criteria for sustainable investments, with the goal of steering both public procurement and private investments toward sustainable objectives. Investments that fall under the EU Taxonomy must contribute to at least one of the following objectives, without significantly undermining any of the others:

- Climate change mitigation
- Adapting to climate change
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Prevention and reduction of environmental pollution
- Protecting and restoring biodiversity and ecosystems

Technical service life Refers to the period during which a specific component of a building or artwork, such as a technical device, remains functional and operational. Once the technical service life has ended, it is appropriate to replace the component with a new one.

Water footprint The amount of water used over the life cycle of a product or service, or the amount used by an individual or group over a specific period, including both direct and indirect (hidden) water use. Hidden water use refers to the water required for growing, producing and using products. For example, the water footprint can be expressed as litres per person per day, or litres per kilogram of product.

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