CONSAT GREENS GUIDELINES FOR FOR FOR FOR

GUIDELINES FOR ECO-FRIENDLY PRODUCT DEVELOPMENT







Introduction

Consat AB's operations must demonstrate good environmental stewardship of such quality and performance that the demands and expectations of our customers and other stakeholders are met in full. We must reduce our own environmental load and that of our customers and endeavour to contribute to a more sustainable society through conscious environmental efforts. Increasing knowledge and raising awareness about the environment provides our personnel with the ability to consider environmental aspects in their assignments and thus meet targets and requirements.

The purpose of this guide is to provide tips and ideas about what can be done and what we should think about to help improve the environmental aspects of products, services and systems when working with product development. While the manual is intended as a guick introduction to environmental matters, it can also be used as a simple checklist to help develop solutions with a better green performance. Because it's a relatively brief document, it does not provide any in-depth analyses; indeed, some of the advice and tips may be perceived as contradictory. But of course, one part of the product developer's role is to balance various demands and seek further knowledge whenever necessary.

Political demands and two important principles provide a basis for evaluating environmental load – the principles of precaution and sustainable development.



Minimising total environmental load

By assessing the environmental load for the entire product life cycle, it's possible to judge where improvements should be introduced and which solutions are preferable. A life cycle analysis (LCA) is the study of a product's cradle-to-grave environmental impact.

By using LCAs, the company is able to reduce costs and environmental impact over the long-term by gaining:

- Decision support data for the choice of materials during product development.
- Knowledge of the product's environmental impact and its total energy turnover.
- Identification of the product's principal environmental impact.
- A comprehensive supply chain review.
- Data for the Environmental Product Declaration and the Declaration on Climate Change.

Listed below are a number of environmental aspects for consideration during the various phases of a product's life cycle.

THE EXTRACTION OF RAW MATERIALS AND ENERGY

- The use of virgin materials almost always consumes more of the earth's and the environment's resources than the use of recycled materials.
- Different ways of extracting a raw material or a specific material can have significantly different environmental impacts.
- Use of energy and fossil fuels etc. consumes the earth's resources and causes emissions to atmosphere and water.

PRODUCTION

- The use of materials water and energy consumes the earth's resources.
- If production waste is minimised, so too are the costs for raw materials and the impact of material extraction per product.
- Emissions of dangerous substances pose a threat to our health and the environment.
- Unsuitable materials and additives may cause allergies and lead to health problems in the production chain.

PRODUCTION USE

- Emissions of carbon dioxide, hydrocarbons, NOx etc. from e.g. power stations or internal combustion engines affect climate, health and the environment.
- The use of materials water and energy consumes the earth's resources.
- Noise pollution affects human and animal health.
- Unsuitable materials and additives that people come in contact with may cause allergies and lead to health problems.

FINAL DISPOSAL

- Unsuitable materials hamper recycling and may lead to air and water pollution.
- The right choice of material simplifies recycling, which conserves the earth's resources.

Selecting materials

Because different materials can have widely different characteristics in terms of both performance and production, the selection of materials is one of the main factors that determine a product's environmental load. Thus, selecting the right material for the right application and rejecting unsuitable materials is extremely important. Regardless of the product under development, it's important to select materials and components that:

- Do not contain substances that are harmful to the environment or health or which make use of such substances in their production and/or extraction.
- Easy to recycle

It's difficult to say in general terms which materials are better or worse than others in terms of the environment. In some cases, it's difficult or even impossible to follow every recommendation; a good example is the mercury in low-energy lamps, which is an extremely dangerous environmental toxin. We list below a number of simple rules of thumb for the most common material categories in industry, even though material selection also depends a great deal on circumstances.

METALS

High-strength steel or light metals such as aluminium are good choices in mobile applications as their low weight contributes to reduced fuel and/or energy consumption. Most metals used in the manufacturing industry are alloys of various kinds. While alloys can have superior qualities regarding durability and corrosion resistance etc., they are often more difficult to recycle.

POLYMERIC MATERIALS

As a first choice, select either of the thermoplastics polyethylene (PE) or polypropylene (PP). Manufacturing of thermoplastics have fairly low environmental load and they have good recycling characteristics.

BE WARY OF CHEMICALS

Chemical additives are used to improve a material's properties. Many chemicals used as additives in various applications can have effects on the environment and health that are not fully defined. Thus, the precautionary principle would suggest that chemicals be avoided as far as possible.

AVOID ADHESIVES

Avoid adhesives. The use of adhesives can impair a material's recyclability. They also often have negative effects on the workplace environment.

USE RECYCLED MATERIALS

Endeavour to use recycled material. This results in lower resource and energy consumption compared to the use of virgin materials. It's also important in a longer perspective that we demand recycled materials to the greatest extent possible Without demand there will be no supply and it will become more difficult to construct a functioning recycling system.



Design for low resource consumption

STREAMLINE RESOURCES

When developing new products and processes, it's important from economic and environmental standpoints to minimise resource exploitation. When developing new products and processes, it's important from both economic and environmental standpoints to minimise resource exploitation.

MINIMISE THE CONSUMPTION OF MATERIALS

Always endeavour to make use of raw materials effectively. Production waste must always be minimised by recycling raw materials in production. If the amount of raw materials required for a product, can also be minimised without a loss of quality, purchasing costs and the environmental loads associated with the extraction of the material will also be reduced.

MINIMISE ENERGY CONSUMPTION

Energy consumption is a key factor from both cost and environmental standpoints. It's important to avoid solutions that require energy intensive processes as energy conversion involves major environmental impact, and energy is in short supply.

MINIMISE WATER CONSUMPTION

Regardless of the local availability of water, consumption should be minimised as it always entails some degree of water pollution and disruption to nature's hydrological balance. To prevent pollutants from reaching nature, waste water and process water must pass through sewage treatment works where further chemicals are added in the purification process. This brings additional costs and increased environmental load, which could be avoided to a certain extent through lower water consumption.

REDUCED RESOURCE CONSUMPTION DURING USE

A significant part of total resource consumption takes place when a product is used. Reducing the energy requirement for transportation, vehicles and buildings are focus areas as they entail carbon dioxide emissions and constitute a significant contribution to climate change. Rising oil and energy prices provide room for cost reductions in connection with energy efficiency improvements. In addition to energy and/or fuel, resources are also used up in the form of spare parts and consumable materials. Differing requirements for sustainable development are often difficult to combine, which leads to contradictions. For example, scarce rare-earth metals are often required in electronics and heat-resistant alloys in such things as permanent magnets. This demands a balance between developing a product with a long service life and developing one that does not consume resources that are most scarce. If we are to handle Conflict minerals 3TG (Tin, Tantalum, "Tungsten" and Gold) and Cobalt, complete transparency and traceability is required in the entire supply chain.



Design for low emissions

Various emissions are discharged to the environs throughout a products life cycle, e.g:

- Extraction slag products, by-products, minerals.
- Manufacturing discharges from processes, solvents in paints and adhesives.
- Use exhaust fumes, waste oils and gases from the material.

Final disposal – when plastic components and oils degrade or are incinerated, dangerous substances may be released into the air, water and soil.

Remember that noise is also an emission.

Raw materials extraction

Remember to:

- Select materials that do not entail major emissions during extraction.
- Select recycled materials to avoid some of the emissions that are inextricably associated with the extraction of virgin materials.
- Choose materials manufacturers and suppliers who live up to environmental standards.

Manufacturing

Remember that:

- Painting, cleaning and bonding often involve solvents that evaporate.
- Pressing and welding give rise to dust and oil mist.
- The heating of kilns and process baths gives rise to carbon dioxide and NOx.
- Pickling, degreasing, stabilisation and phosphating involve discharges to water which in turn require chemical treatment in industrial wastewater treatment plants.

Use

Remember to:

- Minimise the product's emissions.
- Reduce the product's energy/fuel consumption.
- Use liquids with a low environmental impact.
- Reduce environmentally disruptive substances that will be released during use.
- Pay attention to how materials smell as it may mean that they contain substances harmful to health.
- Reduce noise.

Final disposal

Remember to:

- Reduce the amount of environmentally disruptive substances in the material to facilitate recycling and reduce the amount of waste products.
- Design for recycling through a high degree of simple demountability to make sure that as little of the product as possible ends up in a refuse tip or nature.

Facilitate recycling

AVOID HARMFUL MATERIALS AND SUBSTANCES

All materials and substances that must be removed for safe final disposal in refuse tips have negative effects on the economy and environment. By avoiding such harmful materials when developing products we will also avoid the negative economic and environmental effects. Therefore, remember that:

- Harmful materials mean high environmental loads and entail high final disposal costs.
- Harmful materials can contaminate other materials that are suitable for recycling.
- For energy recovery to function as an alternative to recycling, no disruptive substances may jeopardise the emission values of recovery installations.
- Gaining general acceptance for products that contain harmful and hazardous substances can be problematic. A typical example is low energy lamps containing mercury.

FACILITATE DRAINAGE AND REMOVAL OF HAZARDOUS WASTE

Systems in our products that contain fluids and materials that must be removed for waste disposal should be safe and simple to disassemble.

This includes:

- Nipples for fluid drainage.
- Reservoirs with a flat, labelled lowest point.
- Labelling for drilling holes if drain nipples are lacking.
- Hazardous waste such as batteries, fluids, electronic devices etc. must be accessible and designed for removal.

RECYCLE MATERIALS IN THE PROCESS

All manufacturing creates production waste, a resource to make use of through recycling. Bear in mind when recycling in manufacturing processes:

- Design components and manufacturing processes to minimise production waste.
- Collect production waste for recycling.
- Endeavour to achieve the highest grade production waste possible for recycling if it cannot be used in the process.
- Recover the material's energy value if its quality is so low that it has no other remaining value.



DESIGNING COMPONENTS TO FACILITATE MATERIALS RECYCLING

Regardless of the materials we use in our products, it's important to consider recycling right at the design stage. In particular, remember to:

- Design to facilitate quick removal; the faster the disassembly, the more economical it is and thus more likely that recycling takes place.
- Enhance demountability and sortability by separating dissimilar materials to the greatest possible extent.

METALS

To facilitate metal recycling, be sure you remember to:

Design to enable the removal of high-value metals, chiefly copper, aluminium and magnesium, before fragmentation.

 In cases where metals are joined, make sure they are suitable for recycling together. This applies especially to alloys of various kinds.

POLYMERIC MATERIALS

To facilitate polymer recycling, be sure you remember to:

- Enable sorting, reduce destruction costs and disassembly time by avoiding disruptive materials and using as few different materials as possible.
- Identify the materials included by labelling the components effectively to facilitate the recognition of different materials when dismantling.
- To enable composite material recycling and reduce removal time, minimise the number of fasteners and make them easy to remove.
- Avoid surface treatment as coated materials are generally difficult to recycle.
- Use recycled materials wherever suitable, for example in non-visible applications that are not subject to excessive stress.





TRANSPORT TO OR FROM WORK OR ASSIGNMENTS

The practical choices currently available for getting to and from work, customer visits or consultancy assignments are difficult to influence. This often depends on where people live in relation to the workplace and what other commitments they have in connection with their journeys, e.g. visiting the office, dropping off/picking up at daycare, gym visits etc. However, public transport is in general preferable to one's own car in terms of the environment. This is especially true for short trips in built-up areas. The very best choices for the environment are of course walking or cycling.

BUSINESS TRAVEL

In the case of business travel by car, try to plan ahead and use car sharing when several people have the same destination. Preferably, go by rail rather than air where possible e.g. trips between Gothenburg and Stockholm.

ON-LINE MEETINGS

Even better for the environment is to avoid travelling and replace physical meeting with on-line meetings. Necessary tools are available for all Consat employees.





Purchasing

SELECTING SUPPLIERS

Because comparable products and services can have different environmental loads depending on manufacturing methods and approach, it's important to keep tabs on how, where, from what and by whom purchased goods are made. Many manufacturers have discovered that the biggest load caused by their products from a life-cycle perspective take place upstream in the supplier chain, i.e. in the manufacture of components, raw materials and other goods used in the manufacture of their own products. This is perhaps not so surprising considering that modern production chains are often long and contain many operators along the way. Only one of these operators can be responsible for the biggest single environmental impact, so many of them will inevitably be located in positions in the chain where the greatest impact has already happened. Thus considering the environment when selecting a supplier means we can minimise the product's environmental impact without having to change our own work appreciably.

CERTIFICATION

Certification is a way of showing customers and other stakeholders that the operation complies with certain standards. Certification can apply to an organisation, a product, a service or anything else for which it is important to demonstrate compliance with set standards. For the purchaser, it can be very useful to see the certificates different suppliers possess to find out how a company functions without having to devote too much time identifying different options.

ECO-LABELLING

Eco-labels come in all shapes and sizes, but their common denominator is demonstrating that the labelled product meets certain standards regarding environmental impact or production method. Just what these standards are differs from label to label. Thus it's useful to look for different labels depending on what we think is important. For example, there are labels that show a cultivated product has been produced without artificial fertiliser and other declarations that present a product's climate impact in the form of a limited life cycle analysis, etc.

SET STANDARDS

One way to influence the supplier chain is to set clear standards when purchasing. This allows us to create a demand for environmentally sustainable and socially responsible operations and products while also reducing the overall impact of our own product. The need to set quality standards to improve sustainability in our own products is something many see as self-evident, but it can also be helpful to set standards for other aspects with the supplier, such as environmental impact.

REQUEST INFORMATION

For a product to be as eco-friendly as possible, we need information about its entire life cycle. As mentioned above, the greatest environmental impact often takes place upstream at suppliers of e.g. raw materials. Therefore it's important to gather information about the products we're considering to procure. For example, it can be useful to know precisely which substances are used, their content in the product and how they are produced. Not only will this clarify the environmental aspects of the product, the information can also be useful from other standpoints such as minimising the risk of unwittingly using allergenic or carcinogenic substances that people might come into contact with. Therefore, it's important to ensure access to various documents such as safety data sheets.











THINGS TO REMEMBER WHEN PURCHASING

- Check whether suppliers are environmentally certified.
- Eco-labels are useful for finding out whether a product is a good choice.
- Set standards. This will not only provide the properties we seek but also create demand for good products.
- Request information. This will let us know the impact our own product will have and enable us to predict the risks associated with various alternative purchases.

Software

Ν K G Е С

The fact that hardware design, the choice of material and performance etc. all affect a product's environmental impact has been addressed several times in this document. It's easy to forget that software also influences a product's environmental performance. Because software usually governs hardware behaviour, there are important environmental aspects to consider when developing software, especially with regard to energy saving. Optimised software means efficient products, and this has positive financial and environmental effects.

Machinery and other products often comprise a number of subsystems. Rarely will all subsystems need to operate at full output or even operate at the same time. It's therefore possible to save energy without reducing product performance by writing software that puts inactive systems in standby mode, hardware permitting, when not in use or needed at the time. In many cases, system hardware must anyway be adapted to function in this way as switching on and off causes wear on electronic and mechanical components.

Remember the following when developing software:

- Create optimised products by optimising software as well as hardware.
- Write software so as to achieve energy savings by allowing inactive systems to enter standby mode.
- To the greatest possible extent, set software standards that ensure hardware energy consumption is kept low by using standby mode, sleep mode and start-up performance etc.
- Where possible, introduce functionality that makes realtime energy consumption apparent and which guides the user towards energy-efficient operation.
- Where it's possible to influence functional requirements. functions must be designed such that the overall solution is as energy efficient as possible.





Sustainability for Consat Group

Creating sustainable products and services that last year after year is a matter of course for us. It is our conviction that investments in sustainability are a prerequisite for creating a long-term profitable and responsible business.

SUSTAINABILITY ORGANISATION

Sustainability is an integral part of Consat Group's operations and a fundamental driver of our long-term success. Sustaina-bility work is based on ownership directives and is controlled by the Group's CEO in collaboration with the CEOs of subsidiaries. The teams meet regularly and set individual and common goals and follow up the development of sustainability work. Collaboration also takes place with other functions in the organisation, such as central business development, purchasing and HR functions.

POLICY DOCUMENTS AND INSTRUMENTS

Consat Group has an overall Code of Conduct and various common policies that describe how the business should be conducted in an ethically, socially and environmentally sustainable way. The Group's Code of Conduct is the overall steering document for sustainability work and actions and is applied to employees as well as suppliers and other partners. It is based on the UN Global Compact's ten principles and guides employees, members of the board, agency staff and suppliers in how they are expected to act regarding, among other things, human rights, working conditions, the environment and business ethics. Employees are encouraged to report any knowledge or suspicion of serious deviations from the Code of Conduct or of crimes committed by persons in a managerial position.

In addition to the Code of Conduct, the Group has implemented a number of policies that, for example, address areas such as gender equality, sexual harassment, diversity, work environment and purchasing. All policy documents are available to employees in the internal document portal.

Each company is responsible for implementing the Code of Conduct and other policies in its own operations. All managers are obliged to ensure that employees have knowledge of the code of conduct and work in accordance with it. Every year, employee surveys are conducted with the aim of being developed and improved. This is done by allowing our staff have a say in the workplace, colleagues and managers.

In addition to the above-mentioned instruments, the parent company is ISO certified according to ISO 9001 and ISO 14001. The audits have shown good results, which confirms that the Group has well-functioning routines and processes.

Consat Group does not conduct any activities that are subject to permits and notification requirements in accordance with the Environmental Code.

EXTERNAL INITIATIVES AND ORGANIZATIONS

Consat Group steers and targets operations in line with the UN's global goals Agenda 2030. The Group has an ambition to join the UN Global Compact, which is an initiative to coordinate issues regarding human rights, working conditions, responsibility regarding environmental issues and anti-corruption. Through participation, we commit to transparently integrate and report sustainability work in our operations.

Our membership in CSR West Sweden is an opportunity to receive useful support with knowledge deepening and exchange of experience in the field of sustainability.

The long-standing collaboration with the partner companies in NetGroup Engineering opens for dialogue and collaboration on the issues together with other actors in our network.



Sustainability Goals

SUSTAINABILITY PROJECTS

Per December 2022 Consat Group reaches 87%	Cons
sustainable projects by category 1 in the business portfolio.	Goal:
Defined categories:	Cons
sustainable	Goal:
partially sutainable	Cons

not sustainable

GOALS & TARGETS

Consat Engineering AB
Goal: 3, 9, 11, 12
Consat Telematics AB
Goal: 7:3, 9:4, 11:2, 11:A
Consat Sustainable Energy Systems AB
Goal: 2, 7, 8, 9, 11, 13



Employee Survey

GREAT PLACE TO WORK®

Consat prioritise being a really great workplace and as part of our efforts, we have chosen Great Place to Work® as our strate-gic partner!

Great Place to Work® is an independent consulting company operating in 90+ countries around the world. Every year, more than 10,000 organisations are assessed using the same methodology

- · We are assessed from two perspectives, using:
- Employee engagement survey Trust Index ™
- Organisational assessment Culture Audit ™

These tools give us a current view of our organisation and show both how you experience your workplace and leadership, as well as what readiness we have to become a "Great Place to Work®".

With the help of the assessment we can continue our internal development work and we compare ourselves with other really good workplaces and industry averages.

BRIEF RESULT OF 2022 SURVEY, CONSAT AB INCLUDING ABROAD COMPANIES

Response rate 87% (168/193) Consat Trust Index ™ 80% Extern Trust Index ™ benchmark 2021: Engineering companies 80% Sweden Index 56%

COMMENT GPTW

"80% is a STRONG result" & "All in all, this is a very good place to work"

Work is now ongoing with continuous improvement by identifying focus areas, analyzing and implementing measures in weak areas.



FOR MANY

passion is a sudden burst of emotion that eventually wanes and disappears.

FOR CONSAT

being passionate about technology has been a core part of the company's DNA since its inception.

FOR YOU

a relationship with Consat is a passion that lasts regardless of whether you are a customer, a partner or an employee.

Consat has been in business since 1986 and is one of Sweden's biggest privately owned engineering and technology consultancies with offices in Stockholm, Gothenburg, Oslo, Montreal and Sydney. We operate in IT and software development, ITS for public transportation, automation, product and production development and in particular the fields of energy efficiency and environmental technologies. Our strength lies in theimplementation of cross-functional and innovative projects!

Eco-friendly development often not only requires sound knowledge of environmental technology but also industry-specific experience within the technical field concerned.

If you need help or advice, please don't hesitate to visit our website or contact our switchboard for help in reaching the right specialist skills for your needs.

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Consat is certified for both environment and

