

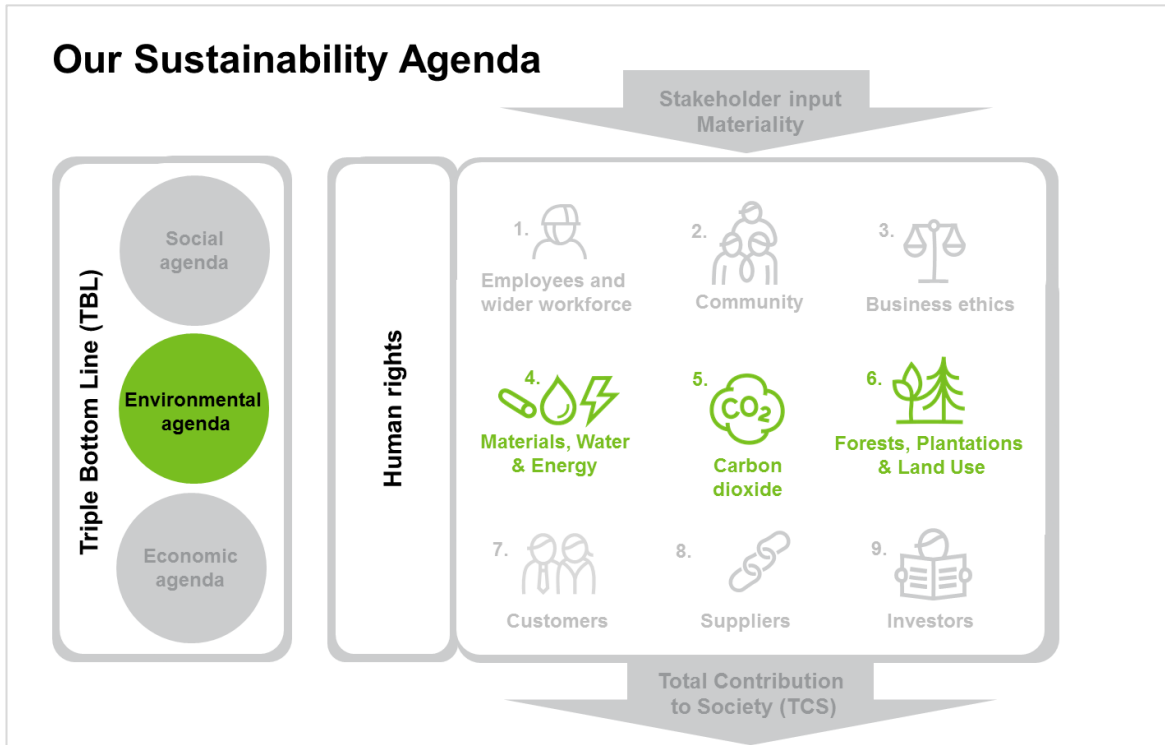
# Environmental guidelines

June 2017



# Environmental guidelines

Our Environmental agenda and the relevant policy objectives guide our environmental work, which is part of our broader approach to sustainability.



**Materials, Water & Energy**

This priority area is guided by our *Sustainability Policy*.

The Materials and Water policy objectives define action to promote efficient resource usage, and ensure our forest-based products and services lead the transition towards a circular bioeconomy.

Read more on **page 3**.

**Carbon dioxide**

This priority area is guided by our *Policy for Energy and Carbon* to ensure we use our unique position as a leading renewable materials company to combat global warming by reducing our direct and indirect fossil CO<sub>2</sub> emissions.

Read more on **page 9**.

**Forests, Plantations & Land Use**

This priority area is guided by our *Wood and Fibre Sourcing, and Land Management Policy*.

It encourages sustainable forest management through responsible sourcing and land use to safeguard forest health and productivity.

Read more on **page 16**.

## About the Environmental guidelines

These Environmental guidelines provide a comprehensive overview of our policy objectives and how we work to achieve them for our three environmental priority areas.

The document includes a dedicated chapter on each environmental priority area and their relevant policy objectives. The issue of Human Rights, which is a fundamental part of all aspects of our Sustainability Agenda, is included in each of the three priority area chapters of this document.

# 1. Materials & Water Policy Objectives: Environmental and resource stewardship

## Our contribution as a renewable materials company

Global warming, water scarcity, excessive consumerism, population growth and urbanisation are global megatrends that are increasing pressure on natural resources, such as finite materials and water.

Responding to these challenges, Stora Enso is developing products and services that are based on renewable and recyclable raw materials from sustainably managed forests and plantations (see [page 16](#)). We promote material efficiency throughout our operations to reduce environmental impact, financial costs, and to make our operations more resilient to resource scarcity and the impacts of global warming. Chemical safety is an essential aspect of our work in delivering on Materials and Water objectives.

Stora Enso was the first paper and packaging company to sign the United Nations Global Compact's CEO Water Mandate, to express our commitment to prioritise water resource management and create and realise sustainable water strategies.

## Our policy objectives explained

- 1. We comply with all applicable legal and regulatory obligations in the countries where we operate.**

### Materials and Water

Stora Enso operates at the heart of the bioeconomy and we see the bioeconomy as an integral part of achieving a circular economy, where growth is decoupled from the use of finite natural resources.

As a global company operating in a resource intensive sector, we comply with national legislation and regulations. The emissions and effluents generated by our mills are regulated by the relevant authorities, with limits set through environmental impact assessments and permitting processes that take into account local conditions and legislation. Our mills monitor their compliance with these permits and requirements, as do the relevant environmental authorities.

Due to our geographical footprint, key regulations are driven by European Union (EU) policy developments and the implementation of EU directives into national legislation. Important regulations in this respect are the EU's Best Available Techniques (BAT) Reference Documents with limits for effluents and emissions to air, and the BAT conclusions for large combustion plants relevant to board, pulp, and paper mills.

We produce various products covered by specific safety regulations including food contact materials, material for toys, packaging for pharmaceuticals, and construction materials. Our in-house product safety and quality control systems cover our processes from product development and raw material sourcing all the way to the delivery of the finished products. We follow food contact legislation and demands relating to food safety and our units producing sensitive packaging materials follow Good Manufacturing Practice, a set of widely recognised guidelines also incorporated into EU regulations. We also oblige our suppliers to comply with our product safety requirements.

Through memberships in national and regional industry associations, international organisations, and Non-Governmental Organisations (NGOs), we follow and engage in the most relevant policy developments. This includes the Industrial Emissions Directive (IED), the Waste Framework Directive, and the Packaging and Packaging Waste Directive, and the EU Circular Economy Package.

## **Chemicals**

We follow all relevant chemicals related laws designed to protect both public health and the environment including for instance Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), EU regulation on the production and use of chemical substances, and the Global Harmonised System (GHS) classification and labelling of chemicals from the United Nations and the biocidal products regulation.

Our proactive engagements ensure timely awareness and support future compliance. A list of most relevant memberships is included on [page 8](#).

### **2. We respect the local environment where we operate.**

We always respect the local environment and we mitigate adverse local environmental impacts from our industrial operations. Our environmental work primarily takes place at our mills and includes the systematic handling of the locally relevant environmental issues related to water, materials, chemicals, and energy efficiency.

We require systematic chemical safety procedures to be implemented in all production units, and plantations as well as throughout our value chain.

### **3. We continuously improve our sustainability management processes and performance.**

Local environmental stewardship is supported by third-party certified environmental management systems, which ensure continual improvements according to ISO 14001 and focus on the most prioritised local environmental issues. Stora Enso was one of the first companies in our industry to adopt third-party audited environmental management systems.

We consider environmental management systems as our primary means to drive continuous improvements in processes and environmental performance. All Stora Enso's industrial operations must implement and maintain third-party certified environmental management systems<sup>1</sup>.

Locally adapted environmental management systems also provide the foundation for internal performance review and the basis for dialogue with stakeholders.

### **4. We help customers be sustainable; through our renewable and recyclable products and services we contribute to a low-carbon and resource efficient society.**

We are developing our expertise to help our customers to be more sustainable. Our product portfolio includes various boards for printing and packaging, several pulp grades, wood-based products for construction, energy pellets, paper products made from virgin fibre and recycled paper, and lignin, which can be used to replace fossil and other non-renewable material based products.

We seek partnerships with key stakeholders and customers to bring new renewable and low fossil carbon products to market, which will help customers to reduce their indirect emissions and improve their sustainability performance. We promote customer engagement at our Innovation Centre for packaging and our Design studios, which are collaboration spaces to inspire new ideas and innovation for consumer benefit.

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<sup>1</sup> By June 13 2017, the following packaging plants work with implementation of third party verified EMS: Arzamas, Balabanovo, Lukhovitsy (will be certified in 2018). Murow sawmill will receive ISO 14001 in March 2018.

We provide sustainability information to our customers on standardised platforms e.g. Sedex and Ecovadis that enable online access to several key areas of sustainability data. Our ecolabel awarded products offer our customers an opportunity to excel in their environmental performance.

We collect product-specific life cycle inventory data (LCI) for use in life cycle assessments (LCAs), which are in practice mostly conducted by our customers or brand owners. The environmental performance of our paper, consumer board and containerboard products is reported in line with the voluntary Paper Profile initiative.

We ensure that our products meet the relevant product safety requirements. Our Consumer Board and Packaging Solutions divisions' ISO 22000, FSSC 22000 Food Safety System Certification and the US Food and Drugs Administration (FDA) product safety management systems ensure that we apply a systematic approach to food safety issues.

## **Materials**

Resource scarcity requires global society to act to avoid long-term environmental consequences. Consumer awareness of such trends and their sense of social responsibility are growing, which increases pressure on companies to focus more on environmental responsibility throughout their supply chain. This development, combined with new legislation, is driving our customers to use more renewable and recyclable raw materials to create more sustainable products.

The use of renewable forest-based resources – both virgin and recycled fibre – helps to secure our raw material supply, as we rely less on finite resources. Primary fibre is used for materials used for products with special product safety requirements such as food packaging, toys, and pharmaceuticals.

Stora Enso's packaging materials are fully recyclable. We promote recycling of our products and belong to relevant Extended Producer Responsibility (EPR) schemes to collect and recycle our products in different countries. The efficiency of product end-of-life options, waste collection and material recovery (recycling) depends on the local conditions, infrastructure of the national collection schemes and recovery systems. All packaging materials and products produced by Stora Enso fulfil the requirements of European Packaging and Packaging Waste Directive.

Stora Enso is a significant user of Paper for Recycling (PfR). Through cooperation with local authorities and waste management companies, and by managing our own collection facilities, we secure a sufficient supply of PfR from industrial, commercial and domestic sources.

Our work with material efficiency promotes the circular economy through our emphasis on the efficient use of raw materials, process residuals reduction, the reuse of fibre, and the creation of business opportunities and revenues from process residuals and by-products.

## **Chemicals**

We are emphasising chemical safety in our innovation and business development processes, such as extraction technologies for sugar and lignin and cellulose modification in micro-fibrillated cellulose (MFC), when we bring new biochemical products to the market.



**5. We engage with our stakeholders to ensure that our sustainability approach and communication remain material.**

We actively engage with national and international experts and other stakeholders to enhance our understanding of rapidly developing issues and topics. In terms of materials, these include changing requirements on waste, process residuals, chemical safety, and customer and societal interest in products and solutions that are based on renewable and recyclable forest-based raw materials. Emerging water topics include water scarcity assessment, water risk management and water accounting.

**6. We use natural resources with care through the optimised use, re-use and recycling of water and materials. We ensure the environmentally responsible treatment or disposal of waste.**

**Materials**

Stora Enso's production processes generate various residuals and waste, including ash, green liquor dregs, lime mud, wastewater treatment sludge and wood handling waste during production. Materials such as black liquor, bark and sawdust are used in our internal bioenergy generation, pulp production, and for wood pellet and chipboard manufacturing.

We constantly look for innovative ways to reuse materials that would otherwise end up as waste. Residuals such as ash and sludge are also used for landscaping, landfill, road construction, agricultural purposes or brick manufacturing.

We ensure that hazardous waste is safely processed at suitable facilities, and report on hazardous waste disposal in accordance with the relevant regulations.

Our environmental management systems include on-site management procedures for handling of chemicals, waste and residuals. Expertise and best practice related to improving the utilisation of process waste and residual materials are shared within the company by expert networks focusing on materials, PfR and chemical safety. This work include process waste reduction projects and monitoring of collaboration opportunities with external partners to increase the value from material streams.

Our performance measurement for process waste and residuals primarily focusses on the beneficial use of process residuals, revenues from residuals, by-products and new products as well as operational efficiency.

**Water**

Water plays a central role in our production, heating, cooling and cleaning processes, and for generating renewable electricity from hydropower. Our main raw material sources, forests and plantations are dependent on rainwater for their growth. In addition, the transportation of process and utility water uses energy, which affects our Energy and Carbon Agenda.

While Stora Enso handles relatively large amounts of water, only around 4% is consumed in our production processes through evaporation and with products and waste – almost 96% of the water we use is returned back to the local environment. The majority of our production units are located where water is relatively abundant, but global water scarcity may still impact our operations through our supply chains, and as regulations on pollution, recycling, and water pricing are tightened. We monitor these developments, along with regulatory and market trends in water issues

We are committed to reducing the impacts of our water use and to minimise any impacts on water quality. We have applied the Global Water Tool devised by the World Business Council for Sustainable Development (WBCSD) to assess water related risks at our production units, and we actively follow the latest water footprint methodology developed by researchers and standardisation bodies. We also actively support and participate in international and local initiatives related to water in our operations and in neighbouring communities.

Our process water is purified by wastewater treatment plants before being safely discharged in accordance with all regulatory requirements, whereas cooling and other non-process water is typically clean enough to be safely released without treatment.

We recycle water within our mills whenever possible, to reduce the need for water intake. Reducing our water demand with regards to heating, cooling and pumping also helps us improve the energy and water efficiency in production, and makes the purification of the remaining wastewater more efficient. Our work with water stewardship includes mapping of water flows to drive the wider efficiency work.

## **7. We choose like-minded partners guided by our Supplier Code of Conduct to find solutions that reduce our environmental impact.**

All potential suppliers, except private family forest owners, must go through a pre-qualification process, which includes signing the Stora Enso Supplier Code of Conduct (SCoC) before being considered for a contract. From 2016, wood supply purchases and forest management services, materials, goods and other services have been covered by our SCoC. In addition to enforcing our SCoC, we engage with our suppliers to help them address sustainability topics.

As a downstream user of chemical products, we strive to substitute substances of high concern based on the relevant legislation.

### **Human rights implications**

We respect the human rights of all our stakeholders in our decision-making processes and our actions – as outlined in Stora Enso's Statement on Human Rights. We consider human rights with regards to local environmental implications, impacts and due diligence to prevent, mitigate or remedy.

Specifically in the area of materials and water, we respect the following human rights in accordance with our commitment to the International Bill of Human Rights:

- a. **The right to water and sanitation** – Excessive water use by industrial facilities and plantations may negatively impact on the human rights of local communities by reducing their access to water and sanitation.
- b. **The right to human health** – Unauthorised emissions, discharges or damage to the natural environment from industrial operations may impact surrounding communities' members' and the general public's human rights to life and health.

Human Rights impacts are identified and addressed through Environmental and Social Impact Assessment (ESIA) requirements for our new or significant changes to facilities and plantations.

Air, water and soil emissions/effluents are governed through regulatory permitting and monitoring as well as considered in the local environmental management system related to the industrial or forestry operations. These assessments involve comprehensive stakeholder consultation and analyses to avoid negatively impacting stakeholder rights.

## How do we report on our progress

To collect information from our organisation and to ensure the accurate and transparent reporting we use a state-of-the-art web-based reporting tool.

### Materials

We report data on process waste to landfill, the use of PfR and the creation of hazardous waste in our annual Sustainability Report. We have established a KPI on process residuals utilisation and we publicly report the revenues derived from residuals and by-products including income from waste management services.

### Water

We transparently report data on water withdrawal and consumption in our annual Sustainability Report. This includes both the use of process and cooling waters, as well as water consumed at our industrial operations. Discharges of process water, phosphorus, nitrogen, COD and AOX are transparently reported on an annual basis, both on a mill level and as consolidated group figures.

### Chemicals

Chemical related incidents and accidents with relevance for Lost Time Accidents (LTA,) and incidents and non-compliances related to environmental performance are monitored internally.

### Environmental costs and investments

Financial costs related to the prevention, reduction and control of environmental impacts are transparently reported in our annual report, together with the relevant environmental investments. The group's revenues derived from residuals and by-products, including tall oil are also transparently reported in our annual Sustainability Report. We use a global reporting system to collect information from our organisation for benchmarking, target follow-up and other reporting purposes.

## International engagements most relevant for progressing our materials and water agenda

- a) The Alliance for Beverage Cartons and the Environment (ACE)
- b) ProCarton
- c) EUROOPEN - The European Organization for Packaging and the Environment
- d) Business for Social Responsibility\* (BSR)
- e) The European Confederation of Woodworking Industries represents (CEI-Bois)
- f) Confederation of European Paper Industries (CEPI)
- g) Corporate Leaders Group\*(CLG)
- h) CEN Working Groups
- i) ISO Working Groups
- j) UN Global Compact (UNGC)
- k) World Business Council for Sustainable Development\* (WBCSD)
- l) World Green Building Council (WGBC).

\* members of the "We Mean Business" alliance



## 2. Energy & Carbon Policy Objectives: Combating Global Warming

### Our contribution as a renewable materials company

As a leading renewable materials company with products derived from sustainably managed forests, tree plantations, responsible sourced fibre and carbon neutral biomass – we are in a unique position to combat global warming.

### Proactive action on global warming

A proactive and holistic approach to decreasing our dependency on fossil fuels and reducing our direct and indirect fossil CO<sub>2</sub> emissions will create new business opportunities and help us manage our costs and risks.

We support the ratified COP21 Paris agreement to keep the global rise in temperature well below 2°C compared to pre-industrial temperatures. Our commitment is to drive down fossil fuel use so that we get as close to zero as possible within the decade through technically and commercially feasible means.

### Our policy objectives explained

- 1. We comply with all applicable legal and regulatory obligations in the countries where we operate.**

As an international company operating in an energy intensive manufacturing sector, we are subject to diverse and complex legislation and regulations. Due to our geographical footprint, much of this is driven by the EU Clean Energy for All Europeans package, the Energy Union, and the implementation of EU directives and regulations into national legislation. Through our engagement with national and regional industry associations, international organisations, and NGOs, we follow and actively contribute to the most relevant policy developments. This proactive engagement ensures timely awareness and supports future compliance. Table 1 summarises the most relevant EU policies and policy developments related to Energy and Climate. A list of our most relevant memberships on an international level is included on [page 14](#).

Table 1: Key aspects of the 2020 Climate and Energy Package and legislative proposals for 2030

2020 Climate and Energy Package	2030 Climate and Energy Framework (Proposal)
20% cut in greenhouse gas emissions (from 1990 levels) – binding.	40% cut in greenhouse gas emissions (from 1990 levels) (see ETS and ESD) – binding.
20% of EU energy from renewables – binding, national targets.	27% of EU energy from renewables – binding EU wide target.
20% improvement in energy efficiency.	30% improvement in energy efficiency – binding EU wide target, no national targets.
Directive on the promotion of the use of energy from renewable sources.	Directive on the promotion of the use of energy from renewable sources – recast. <i>Includes sustainability criteria for biomass.</i>
Directive on energy efficiency.	Directive on energy efficiency – recast.
EU Emission Trading System (ETS – phase 3) – 21% reduction from 2005.	EU Emission Trading System (ETS) – 43% reduction from 2005.
Directive on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (ESD sectors in EU to contribute 10% from 2005; national non-ETS targets from 2005).	Effort Sharing Decision (ESD) sectors in EU to contribute 30%, proposal includes proposed national targets.
	Proposal to integrate emissions and removals from land use, land use change and forestry (LULUCF) into the climate and energy framework.

**2. We proactively raise awareness of the role of forests and our renewable products in achieving a low-carbon society. We work with customers and other stakeholders to substitute fossil-based and other non-renewable materials.**

Trees act as carbon sinks by sequestering CO<sub>2</sub> from the atmosphere and storing it as carbon in their biomass. The accumulated carbon is then stored in our wood, paper, board and other products. Our products are often also recyclable many times over, and they typically have a lower fossil carbon footprint than products primarily made from non-renewable materials. Furthermore, at the end of their useful life, wood-fibre-based products can be utilised for high efficiency bioenergy generation.

We forge partnerships with industry associations, international organisations, and NGOs to improve understanding and share evidence that our products and activities contribute to combatting global warming. Key to these efforts are science-based life cycle considerations that can help quantify our sequestration and substitution effects.

We work together with key stakeholders and specifically with customers to bring a product portfolio to the market that will help them a) to reduce their indirect emissions b) increase use of renewable materials and c) improve their overall sustainability performance. For example, we facilitate customer engagement in our Innovation Centre for packaging, which is a collaboration space to inspire new ideas and innovation for consumer benefit.

### **3. We continuously improve energy efficiency and strive towards energy self-sufficiency at our mills.**

Most of our production processes are energy intensive. Therefore, we strive to make systematic improvements through an energy efficiency best practice network. Stora Enso “Energy Hunters” are energy efficiency experts that support our mills by evaluating and promoting energy savings projects. Our mills and units are expected to propose potential projects to reduce electricity or heat consumption, or replace fossil fuels with alternative fuels. Each year, we select the best 30-40 projects for funding from the Stora Enso Energy Fund, which has been active since 2008. The payback time for our investments is typically 1 to 2 years.

Our mills apply third-party certified management systems and provide the necessary resources and information to support our systematic work to improve energy efficiency and reduce CO<sub>2</sub> emissions with the help of voluntary management systems standards such as ISO 50001 for energy efficiency and ISO 14001 for environmental management.

### **4. Our Wood and Fibre Sourcing, and Land Management policy describes our commitment to sustainable forestry which ensures viable and growing forests as a carbon sink, and the supply of renewable and carbon neutral raw material<sup>2</sup>.**

See chapter 3 “Wood and Fibre Sourcing, and Land Use Policy Objectives” for details on our sustainable forest management.

Growing trees absorb carbon dioxide (CO<sub>2</sub>) from the atmosphere and together with our products act as carbon sinks. In sustainably managed forests and plantations, new generations of trees replace those that are logged, to sequester more CO<sub>2</sub> from the atmosphere. Sustainable forest management therefore incrementally increases the carbon sink while supplying renewable and carbon neutral raw materials.

We believe that sustainable forestry can play a crucial role in combatting global warming. We emphasise the need to use all the parts of harvested trees as efficiently as possible. The most valuable round wood is used to make products such as building materials. Sawdust is pressed into wood pellets for energy generation by residential and industrial customers. Residuals from sawmills and other round wood are converted into pulp, which is used to make renewable packaging, paper and biomaterials products. The remaining by-products, such as bark and branches, can be used as a valuable source of renewable energy.

### **5. We increase the share of biomass and other low-carbon fuels whenever technically and commercially possible.**

Biomass, such as forest-based production residuals from our mills, can be used to generate carbon neutral bioenergy. Around 80% (2016) of the total CO<sub>2</sub>e emissions from our mill operations originate from carbon neutral biomass<sup>3</sup> sourced inside and outside the company. However, the use of biomass can be considerably more expensive compared with some fossil fuels. In addition, availability throughout the year is not always assured and conversion may require heavy capital expenditure. Therefore, we systematically review our energy systems for technical and commercially viable ways of phasing-out our dependency on fossil fuels in favour of biomass or low fossil carbon alternatives including externally sourced residuals. The Stora Enso Energy Hunters programme and the Stora Enso Energy Fund support our efforts in phasing-out fossil fuels.

As with any capital investment at Stora Enso, any potential improvements are subject to defined investment processes, criteria and approvals.

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<sup>2</sup> Recommendations on Biomass Carbon Neutrality, WBCSD and NCASI, 2015.

<sup>3</sup> Excluding logistics

**6. We aspire to develop supply chains for non-fossil fuels for our operations where they do not exist.**

We operate in some countries where we are dependent on the use of fossil fuels to meet our energy needs. In such countries, we investigate the feasibility of developing biomass or alternative low fossil carbon energy supplies, which contribute towards a gradual shift away from fossil fuels in that particular market.

**7. We minimise cost and risk when sourcing supplementary energy, with a preference for low-carbon energy sources**

We rely on supplementary energy supplies, particularly for electricity, and it is important that supply risks are considered and that supplies are price competitive. Consequently, Stora Enso is a minority shareholder in the Finnish energy company Pohjolan Voima Oy (PVO), which owns shares in the Finnish nuclear power company Teollisuuden Voima Oyj (TVO). Our mills in Sweden are primarily supplied with electricity from nuclear power. In Finland, however, the nuclear electricity supply is complemented by fossil (just over 10%) and renewable energy (close to 30%).

Wind and solar energy are being monitored as an option to further decarbonise our emissions. However, due to fluctuation in availability of wind and solar energy the adoption in energy intensive industrial processes depends on viable large scale storage technologies.

**8. We supply low fossil carbon energy that helps decarbonise local and national energy systems when technically and commercially feasible.**

Our integrated facilities often have the potential to share surplus low fossil carbon energy with local and regional partners. Where technically and commercially feasible, such partnerships can contribute significantly to meeting climate objectives – for Stora Enso, as well as local and national objectives. For example:

- We supply approximately 4 000 GJ district heating to private and public customers.
- The Montes del Plata pulp mill, which is 50%-owned by Stora Enso, produces from biomass some 5% of Uruguay's total electricity consumption.
- Stora Enso's Langerbrugge Mill provides the local Volvo Car Gent plant with water heated by surplus renewable energy for building heating, which has reduced the plant's annual emissions by 15 000 tonnes of fossil CO<sub>2</sub>.

We continuously search for partnerships that can use our surplus of low fossil carbon energy.

**9. We work with customers and selected suppliers to find solutions that reduce our direct and indirect fossil CO<sub>2</sub> emissions.**

All potential suppliers must go through a pre-qualification process, which includes signing the Stora Enso Supplier Code of Conduct (SCoC), before being considered for a contract. As of early 2017, over 92% of our suppliers had signed our SCoC. We engage with our suppliers to help them address sustainability topics.

## **10. We actively engage in research & development and seek partnerships that help combat global warming.**

Innovation is essential in helping us achieve our ambitions – both in terms of developing new and improving existing products, and optimising our production processes.

We have traditionally had a strong focus on research and development at our mills and our Research Centres in Imatra (Finland), Karlstad (Sweden) and Mönchengladbach (Germany). We have an Innovation Centre for biomaterials in Stockholm (Sweden) and have invested in a bio-refinery demonstration plant in Raceland Louisiana (USA), using as feedstock agricultural biomass waste such as bagasse from sugar cane.

We also engage in innovation-focused strategic partnerships with three leading Nordic academic institutions; the Chalmers University of Technology in Gothenburg (Sweden), KTH Royal Institute of Technology in Stockholm (Sweden), and Aalto University in Helsinki (Finland).

### **How we report on our progress**

We publicly report on our greenhouse gas (GHG) emissions in three categories:

**Scope 1** – Emissions from sources we directly own or control, including on-site energy generation and processes, power boilers, lime kilns, on-site transportation.

**Scope 2** – Emissions related to the purchased electricity and heat consumed in our operations.

**Scope 3** – Emissions from other indirect sources along our value chain, reported as CO<sub>2</sub> equivalent estimates.

Our pulp, paper, board, saw mills and converting facilities report CO<sub>2</sub> emissions quarterly for scopes 1 and 2. A group-level estimate for scope 3 emissions is updated biannually. Our carbon footprint accounting is based on guidelines provided by the Greenhouse Gas Protocol of the World Resources Institute and the World Business Council for Sustainable Development (WBCSD).

We publically disclose our GHG emissions and climate strategy in our annual Sustainability Report and to CDP, an organisation that primarily gathers this information to support financial decision making for investors.

In 2016, CDP included Stora Enso in its Climate A List, in recognition of the company's actions and strategy to reduce emissions. In addition, we were one of 112 companies to be included, as a supplier, in the 2016 global CDP Supplier Climate A List. Furthermore Stora Enso was, as a customer, the only Nordic company to be included in CDP's Supplier Engagement Leader-board. Our full CDP disclosure is available through CDP's website.

We also report on energy self-sufficiency and the percentage of fossil and biogenic CO<sub>2</sub>-emissions.

### **Our target is to reduce fossil fuel CO<sub>2</sub> emissions per saleable tonne of pulp, paper and board by 35% by 2025 from a 2006 baseline.**

In 2007 Stora Enso established its first target and by doing so became one of the few companies in the world to do so at that time. The target was updated in 2012 and includes pulp, paper and board mills (sawmills and corrugated units are not included as their emissions are small compared to the other units) which account for almost 90% of our Scope 1 and 2 CO<sub>2</sub> emissions. The target covers fossil CO<sub>2</sub> emissions but no other greenhouse gases less relevant to our operations, such as N<sub>2</sub>O and CH<sub>4</sub>. The target is followed up quarterly and performance is reported in the group interim reviews and in our annual Sustainability Report.

## **Our group-wide target is to reduce specific electricity and heat consumption per saleable tonne of pulp, paper and board production by 15% by 2020.**

The base year for this target is 2010. Specific energy consumption is influenced by structural factors (such as production line closures or conversions to new products in our mills), product portfolio choices (some of our new products are more energy intensive, but have overriding environmental benefits), operational issues on production lines and energy efficiency actions.

### **Science-based target**

As a member of the "We Mean Business" coalition, Stora Enso signed a pledge to combat global warming by committing to a science-based emission reduction target by the end of 2017. The target will include Scope 1 and 2 emissions and align with the so called sectorial decarbonisation approach for pulp and paper<sup>4</sup>. Scope 3 emissions will be included as a qualitative target.

To collect information from our organisation and to ensure the accurate calculation of our Scope 1 and 2 and biogenic CO<sub>2</sub> emissions, we use a state-of-the-art web-based reporting tool which is an accredited provider to the CDP. The tool uses reported energy data in combination with the relevant CO<sub>2</sub> emissions factors to consolidate CO<sub>2</sub> emissions from unit-level up to group-level.

The tool contains carbon data and all other environmental and energy related information for benchmarking, target follow up and reporting purposes.

### **Reasonable Assurance**

Stora Enso has externally assured the Group's annual sustainability reporting since 1998. In 2015 we became one of only a small number of companies in the world to achieve Reasonable Assurance<sup>5</sup> for our direct and indirect fossil CO<sub>2</sub> emissions data – Scope 1 and 2 in accordance with the International Standard on Assurance Engagements 3000 (revised).

### **International memberships most relevant for progressing our Energy and Carbon agenda**

- The Alliance for Beverage Cartons and the Environment (ACE),
- Business for Social Responsibility\* (BSR),
- Confederation of European Paper Industries (CEPI),
- Corporate Leaders Group\* (CLG),
- European Biomass Association (AEBIOM) and
- The European Confederation of Woodworking Industries represents (CEI-Bois),
- The Forest Dialogue (TFD),
- The Sustainable Biomass Program (SBP),
- World Business Council for Sustainable Development\* (WBCSD),
- World Green Building Council (WGBC),
- WWF.

\* members of the "We Mean Business" alliance

<sup>4</sup> Sectorial decarbonisation approach, version 8, February 2017.

<sup>5</sup> There are two main levels of external assurance for sustainability reporting – Limited Assurance and Reasonable Assurance. Limited Assurance states that no audit evidence has been found to suggest that the subject matter is not in accordance with the relevant standards in all material respects. Reasonable Assurance on the other hand, involves a more comprehensive audit and declares that the subject matter is actually in accordance in all material respects. Reasonable Assurance brings sustainability data on a par with financial data, and therefore provides greater credibility.



## Human rights implications<sup>6</sup>

We are committed to respecting the human rights of all our stakeholders in our decision-making processes and actions – as outlined in Stora Enso’s Statement on Human Rights. A number of those human rights may be directly impacted, either positively or negatively, by our energy and carbon-related activities.

It is our firm intention to drive down fossil fuel use even more over the next ten years so that we get as close to zero as possible using technically and commercially feasible means. This will contribute to minimising the negative impacts and increasing the positive impacts related to the human rights implications of our energy and carbon emission activities outlined below:

- a) **The rights to life and health** – Climate change-related natural disasters, which can be exacerbated through fossil CO<sub>2</sub> emissions, can impact the human rights to life and health.
- b) **The right to water and sanitation** – Climate change-related floods and droughts, which can be exacerbated through fossil CO<sub>2</sub> emissions, can adversely impact the human right to an adequate quality and quantity of water for domestic use and food production purposes.
- c) **The right to an adequate standard of living** – Climate change-related impacts on ecosystem services, which can be made worse through fossil CO<sub>2</sub> emissions, can adversely impact the human right to achieve an adequate standard of living of those impacted and their dependents.
- d) **The right to liberty and security** – Climate change-induced or exacerbated natural disasters can adversely impact the human right to physical and economic security, which risks creating climate refugees.

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<sup>6</sup> In accordance with our commitment to comply with the requirements of the UN Guiding Principle on Business and Human Rights.

### 3. Wood and Fibre Sourcing, and Land Management Policy Objectives

#### Our contribution as a renewable materials company

Global challenges such as population growth, the increasing demand for agricultural land, and the widening gap between wood supply and demand, require us to use forests, plantations, and other natural resources even more efficiently, and to produce more raw materials from less land. The need to conserve natural ecosystems is also increasing, which demands new ways of integrating various land uses.

#### Stora Enso wood sourcing

- 37.6 million m<sup>3</sup> sourced in 2016.
- Wood sourced primarily from European forests, from small private forest owners.
- In 2016, 10% of our wood was sourced from our own tree plantations in Uruguay, Brazil, and China.

As a leading renewable materials company, we have an obligation to address these challenges wherever we manage forests and plantations, and ensure that all our wood and fibre is responsibly sourced<sup>7</sup>.

Sustainable forest management safeguards forest health and productivity, helps to combat global warming, and conserves natural ecosystems – whilst securing the long-term availability of our renewable resources.

#### Our policy objectives explained

##### 1. We comply with all applicable legal and regulatory obligations defined in the countries where we operate.

As an international company in a resource intensive manufacturing sector, we comply with relevant national legislation and regulations, as well as international agreements. Through our membership in national and regional forest industry associations, international organisations, and NGOs we follow and engage in relevant policy developments. This proactive engagement ensures timely awareness and supports our future compliance.

Where national laws and international human rights standards differ, we will follow the higher standard. Where standards and laws conflict, we will seek ways to respect international human rights to the greatest extent possible, such as through third-party partnerships.

##### 2. We transparently, constructively and meaningfully engage key stakeholders in forest management planning and practices.

We actively work with our stakeholders to promote sustainable forest management. We engage in active dialogue with local, national and international stakeholders, and create opportunities for local people to benefit from the economic and social impacts of our activities. We are an active member of numerous local and global initiatives, forestry associations, networks, and programmes.

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<sup>7</sup> Stora Enso applies its policy and guidelines in all wood and fibre sourcing operations including:

- Purchases and exchanges of wood and woody biomass including imports and exports
- Forests owned or managed by the company
- Tree plantations owned or managed by the company
- External purchases and exchanges of pulp

Where Stora Enso has an ownership of over 50%, we will directly apply our policies and guidelines. Otherwise we will seek to ensure that similar policies and/or guidelines are developed and adopted by companies in which Stora Enso is a minority shareholder.

### **3. We respect traditional and multiple uses of forests.**

We respect traditional and multiple uses of forests, such as fishing, hunting, and picking wild berries and mushrooms, and recognise that such activities help to preserve each area's distinctive natural, historical and cultural heritage.

### **4. We recognise the unique economic and cultural rights of indigenous peoples, including their legitimate rights to traditional land and land use.**

Recognising the unique economic and cultural rights of indigenous peoples, we promote wood and fibre procurement and forest management practices that respect lands that indigenous peoples traditionally occupy or otherwise use.

### **5. We utilise and promote with forest owners sustainable forest and land management practices which safeguard the health and ecological functions of ecosystems and help conserve biodiversity, soil and water resources. We monitor the condition of forests and results of management activities, and use tools, such as forest certification, to promote and verify sustainable forest management.**

In areas managed by Stora Enso, we use sustainable forest and land management practices that conserve biodiversity, soil (including peat) and water resources, while also safeguarding the health and ecological functions of ecosystems.

We take a long-term approach based on ecological landscape planning methods to provide a sustainable wood and fibre supply, while also conserving and restoring vital ecological features and ecosystem services. We manage the spatial and temporal variability of ecosystems at the landscape level. Important considerations include plant and habitat diversity, mature forest habitats, old-growth forests, natural forest community types and wildlife habitat diversity.

We have systems in place to recognize high conservation values and ensure they are protected. We cooperate with environmental NGOs, government bodies and other stakeholders to improve the science base for the identification and safeguarding such forests.

We strive to use the most appropriate forest management methods for each ecodistrict and site. This may involve maintaining natural disturbance regimes such as regeneration cutting, controlled fires and selective harvesting. Through appropriate silvicultural practices and measures to ensure forest regeneration, we maintain or increase sustainable harvesting, and the quality and quantity of forest products. Intensive forestry practices, such as the planting of exotic tree species and the use of fertiliser, will only be applied after careful planning to ensure that biodiversity is not harmed at the landscape level.

We strive to minimise the risk of damage to forests, for example through wildfire, insects and disease. We do not use persistent biocides, and we strive to minimise the use of other biocides.

We support sustainable forest management and promote forest certification on all land used to supply Stora Enso with wood and fibre. Certification allows us to protect, verify and communicate a broad range of economic, social and environmental values.

## **6. We do not procure wood or fibre that has been:**

- illegally harvested,
- logged in protected areas or areas currently undergoing the official process of designation for protection, unless the logging is clearly in line with national conservation regulations,
- harvested in forests where High Conservation Values as defined by the High Conservation Value Resource Network (HCVRN) and duly interpreted through balanced stakeholder processes are threatened by logging<sup>8</sup>,
- sourced from areas undergoing conversion from forest or other wooded ecosystems to plantations or non-forest uses, unless such conversion is justified on the grounds of net social and environmental gain, or
- harvested in violation of traditional rights or civil rights.

## **7. We utilise traceability systems to ensure that all the wood and fibre we source originates from legal sources.**

We utilise traceability systems to ensure that all the wood and fibre we use originates from legal sources, and we strive to obtain third party verification of these systems through the ISO and/or the Chain of Custody and PEFC Controlled Sources/FSC<sup>9</sup> Controlled Wood schemes.

## **8. We require our external pulp suppliers to follow similar principles in their wood and fibre procurement.**

We require our external pulp suppliers to follow similar principles in their wood and fibre procurement as those we adhere to. This is particularly crucial with regard to the undesirable sources listed under policy objective 6. We aim to have timelines in place for suppliers to attain the required performance levels, and their progress is duly audited through questionnaires and certification documentation.

## **9. We utilise wood in an efficient manner to ensure high added value from resources, promote the recycling of wood and fibre, and use Paper for Recycling when environmentally and commercially viable.**

Using wood efficiently minimises waste and reduces costs. An efficient use of Paper for Recycling (PfR) is an essential part of our strategy to be the renewable material company as that is contributing to an efficient usage of the wood fiber. Stora Enso uses PfR when environmentally and commercially viable. In regions where we have PfR based production we are actively supporting improved collection and recycling of used wood fiber based paper and board products and we secure sufficient supply of PfR for reuse as raw material through contracts with local authorities and waste management companies, and by managing our own collection facilities. We also actively collaborate with paper industry to find ways to further increase the recycling rate.

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<sup>8</sup> Wherever Stora Enso procures wood and fibre we address High Conservation Values primarily through forest management planning, forest management certification, and FSC Controlled Wood certifications.

<sup>9</sup> Trademark license number (Stora Enso Communications) FSC-N001919.

## **10. We design and manage tree plantations as part of local land use and contribute to sustainable livelihoods.**

In 2016, 10% of our wood was sourced from our own tree plantations in Uruguay, Brazil, and China. When establishing new plantations, we use internationally approved principles, such as the Food and Agriculture Organisation's (FAO) Voluntary Guidelines on Planted Forests.

Stora Enso's tree plantations are intensively managed, primarily for specific commercial purposes. We believe that sustainably managed plantations are a key component of a global industrial forest management system, and can enhance local welfare and play an important role in the conservation of native ecosystems. Recognising the increasingly important role of tree plantations in global industrial wood production, we actively promote the development of sustainable plantations and apply a holistic approach in their establishment and management. We design and manage plantations in a landscape context, which recognises them as an integral element of local land use. We do not convert natural forests, protected areas or areas currently undergoing official processes of designation for protection into plantations unless such developments would be in line with the relevant conservation regulations. We use environmental and social impact assessments and other participatory tools to define sustainable land use practices.

We contribute to the improvement of economic conditions and create opportunities for local people to share the economic and social benefits our activities create in the communities where we operate.

## **11. We refrain from the commercial use of genetically engineered feedstock (GMOs). We will perform research and development in this area.**

We refrain from the commercial use of genetically engineered feedstock (GMOs). We will however perform research and development in this area.

In pulping, papermaking, and bio-refining applications we allow the use of commercially available, and commonly accepted, process additives derived from organisms that have been genetically engineered.

When required by specific markets, we will provide products which do not contain additives obtained from organisms that have been genetically engineered.

## Human rights implications

We respect the human rights of all our stakeholders in our decision-making processes and our actions – as outlined in Stora Enso’s Statement on Human Rights (2016), including the International Bill of Human Rights, ILO Core Conventions (Labour Rights) and ILO Convention 169 (Indigenous Peoples).

Specifically in the area of wood and fibre sourcing and land management we respect the following human rights:

- a. **Right to freedom of assembly** – We respect the right to peacefully protest against our operations.
- b. **Right to a fair trial** – In conjunction with the right to freedom of assembly, we will not interfere with the right to due process of protesters arrested for activities regarding our operations, including their right to a fair trial and to be presumed innocent until proven guilty by a competent tribunal.
- c. **Right of self-determination** – We respect the right of “peoples” under international law to freely pursue their own political, social and cultural development on the lands they traditionally own or otherwise occupy, including the special safeguarding of the natural resources on which they rely, in accordance with the Indigenous and Tribal Peoples Convention (International Labour Organisation Convention 169).
- d. **Just and favourable working conditions** – We respect the rights of our employees and our wider workforce to work under just and favourable working conditions, including a safe and secure workplace, in accordance with our Code of Conduct, Minimum Human Resource Requirements, Supplier Code of Conduct, ILO core labour rights conventions, and OHS Toolkit.
- e. **Right to take part in cultural life** – We respect communities’ interests in using lands on which we conduct operations for traditional or cultural activities, including the collection of non-timber forest products, providing they do not interfere with our authorized activities or otherwise violate the law.
- f. **Right to own property** – We will only operate on lands where our land use rights have been conveyed and acquired in accordance with the law, whether formal (common or civil law) or informal (customary law).
- g. **Access to effective remedy** – We respect the right of stakeholders impacted by our activities to seek an effective remedy.



## Appendix – Glossary of terms

**AOX** – Adsorbable organic halogen compounds

**Biodiversity** – The variability among living organisms and ecological complexes, including diversity within species, between species, and in ecosystems.

**Bioeconomy** – Comprising those parts of the economy that use renewable biological resources from land and sea – such as crops, forests, fish, animals and micro-organisms – to produce food, materials and energy (EU definition).

**Black liquor** – Residual product from the kraft pulp process when digesting pulpwood into paper pulp removing lignin, hemicelluloses and other extractives from the wood to free the cellulose fibers.

**Carbon dioxide (CO<sub>2</sub>)** – One of the principle greenhouse gases, which are causing manmade global warming and climate change. Note that greenhouse gas emissions may also be expressed in tonnes of carbon dioxide equivalent (CO<sub>2</sub>e), which is a measure of how much global warming a given quantity of greenhouse gas may cause by using CO<sub>2</sub> as a reference.

**Carbon** – Trees and plants store CO<sub>2</sub> and energy from the sun as carbon in their biomass. Carbon in biomass is known as *biogenic carbon* and the CO<sub>2</sub> formed when biomass is burned is called *biogenic CO<sub>2</sub>*. Carbon in biomass is only ‘recently’ removed from the atmosphere and is destined to return to the atmosphere whether trees are harvested or not. Harvesting alters the timing but as long as the forest carbon cycle is kept in balance (see carbon neutrality), the return of the biogenic CO<sub>2</sub> to the atmosphere does not increase overall CO<sub>2</sub> levels over time. *Fossil carbon*, which has been stored in the earth for millions of years, would however not return to the atmosphere and increase CO<sub>2</sub> levels without human intervention by extracting and combusting it as fossil fuels.\*

**Carbon neutral biomass** – A property of wood or other biomass harvested from forests where new growth completely offsets losses of carbon caused by harvesting.\*

**Chain of Custody (CoC)** – A certified system, today linked to forest certification, to verify the origin of wood between two defined points as part of the verification of the acceptability of wood and fibre sources. Applied to mills and products, CoC can be linked with forest certification labelling, according to rules defined by schemes such as those run by the Programme for the Endorsement of Forest Certification Schemes (PEFC) and the Forest Stewardship Council (FSC).

**Circular economy** – An economy where the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value (European Commission).

**Climate change** – A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods [United Nations Framework Convention on Climate Change (UNFCCC)].

**COD** – Chemical Oxygen Demand, a measurement of the oxygen required to oxidize soluble and particulate organic matter in water.

**Ecological landscape planning** – A methodology used to plan the management of large land areas based on identified ecological features such as hydrology, soils, habitat patches and connectivity, energy pathways and natural disturbance patterns. The resulting information can be used as the basis for plans that meet environmental, social and economic objectives for the lands concerned.

**Ecosystem** – An entire community consisting of plants and animals and their physical environment functioning together as an interdependent unit.

**Endangered species** – Any species that is in danger of extinction throughout all or a significant portion of its range.

**EPR** – Extended Producer Responsibility is a policy approach under which producers are given a significant responsibility (financial and/or physical) for the treatment or disposal of post-consumer products.

**ESIA** – Environmental and Social Impact Assessment

**Forest management certification** – The third-party verification of forest management practices against a predetermined standard.

**Genetic engineering** – The stable modification of an organism's genetic constitution via asexual gene transfer. The resultant organisms are known as Genetically Modified Organisms (GMOs).

**GHS** – Globally Harmonized System of Classification and Labelling of Chemicals is an internationally agreed-upon system, created by the United Nations, designed to replace the various classification and labelling standards used in different countries by using consistent criteria on a global level.

**Global warming** – A gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by greenhouse gas emissions, including CO<sub>2</sub>.

**Greenhouse gas (GHG)** – A gas that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect, which is thought to contribute towards global warming and climate change.

**High Conservation Values (HCVs)** – Outstanding and critical environmental, cultural, biodiversity or landscape values as defined by the HCV Resource Network and duly interpreted through balanced stakeholder processes. The High Conservation Value Resource Network defines six HCVs:

HCV1 – Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).

HCV2 – Forest areas containing globally, regionally or nationally significant large landscape level forests, with naturally occurring species in terms of distribution and abundance.

HCV3 – Forest areas that are in or contain rare, threatened or endangered ecosystems.

HCV4 – Forest areas that provide basic ecosystem services in critical situations (e.g. watershed protection, erosion control).

HCV5 – Forest areas fundamental to meeting the basic needs of local communities (e.g. subsistence, health).

HCV6 – Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

**Indigenous peoples** – The existing descendants of the peoples who inhabited the present territory of a country wholly or partially at a time when persons of a different culture or ethnic origin arrived there from other parts of the world (based on a definition used by the UN Working Group on Indigenous Peoples).

**ISO 14001** – Issued by the International Organization for Standardization (ISO), the ISO 14001 standard specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance.

**Landscape** – A large, heterogeneous land area composed of a cluster of interacting ecosystems (such as woods, meadows, marshes, or villages) that is repeated in similar form throughout.

**Old-growth Forest** – Forest of exceptionally high conservation value due to its combination of very old trees, very large trees, ecologically valuable forest structure, large quantities of woody debris, and species composition representative of the specific ecosystem (ecosite and ecodistrict) in which it is found. Old growth is an ecosite-specific condition that must be identified using locally valid biological criteria.

**Paper Profile** – The environmental performance of our paper and consumer board products is reported in line with the voluntary Paper Profile initiative. This is a uniform declaration presenting product information, covering environmental aspects related to pulp and paper production including product composition and emissions, wood procurement and environmental management as average data within a specific reporting period.

**PfR** – Paper for Recycling

**REACH** – Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH, EC 1907/2006)

**Sedex** – Global not-for-profit membership organisation acting as home to one of the world's largest collaborative platform for sharing responsible sourcing data on supply chains.

**Substitution effect** – The reduction of fossil CO<sub>2</sub> or other greenhouse gasses associated with the use of biomass-based products in place of other materials or products.\*

**Sustainable forest management** – The stewardship and use of forest lands in a manner that maintains their productivity, biodiversity, regeneration capacity, vitality and their potential to fulfil their relevant ecological, economic and social functions at local, national and global levels now and in the future.

**Traceability systems** – Systems which verify the origin of wood by tracking it from forest to the first point where it is received by the company. Traceability systems can be third-party verified through schemes including CoC, ISO 9001, ISO 14001, and the EU Eco-Management and Audit Scheme (EMAS).

**UN Global Compact / CEO Water Mandate** – UN platform involving United Nations, governments, peers, civil society, and business to share best practices and to forge multi-stakeholder partnerships to address challenges related to water scarcity, water quality, water governance, and access to water and sanitation.

\*Recommendations on Biomass Carbon Neutrality, WBCSD Forest Solutions and NCASI, 2013.