



Annual Report 2019

Our sustainability work covers social, environmental, and economic responsibility throughout our value chain, with human rights integrated into everything we do.

Sustainability

Part of Stora Enso's Annual Report 2019



THE RENEWABLE MATERIALS COMPANY



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We create a renewable future with sustainable forestry.



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 Stora Enso's Annual Report 2019

The report contents have been assured by an independent third-party assurance provider with a level of Limited Assurance. A level of Reasonable Assurance has been provided for our direct and indirect fossil CO₂e emissions.

The GRI Index is available at
storaenso.com/gri2019

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Sustainability at Stora Enso

At Stora Enso, sustainability covers the social, environmental, and economic responsibility of our operations. We care for people and the planet – from the forest to innovation, manufacturing, product use, and end-of-life, with human rights integrated into all that we do.



We are the renewable materials company



Our raw material is renewable, recyclable, and fossil-free.



Our products replace fossil-based materials.



Our renewable products contribute to a circular bioeconomy.

Our year 2019

In 2019, we continued to innovate for a renewable future and supported our customers in meeting consumer demand for sustainable products. Here are some of the highlights of our year throughout our value chain.

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Sustainable forestry

100% of our wood comes from sustainable sources where biodiversity values are secured.

➤ Read more on page 48

Employee volunteering

1 771

of our employees were involved in community investment activities during working hours.

➤ Read more on page 22

Working together for safety

Stora Enso arranged a global Safety Week.

➤ Read more on page 19

Leadership performance

84% of our employees reported that their manager was able to create diverse teams.

➤ Read more on page 20



Combatting global warming

Our CO₂e emissions were 25% lower than the 2010 base-year level.

➤ Read more on page 42

Reusing waste

Our utilisation rate for process residuals and waste was

98%

➤ Read more on page 32



Strengthening our human rights due diligence

We identified development areas related to our priority human rights and defined actions to address them.

➤ Read more on page 12



Enhanced culture of speaking up

Our formal grievance mechanism was opened to all stakeholders globally.

➤ Read more on page 27

Supply chain sustainability

We conducted three deep dives to better understand specific supply chains and support suppliers in improving their operations.

➤ Read more on page 60

Integrating sustainability and finance

Stora Enso issued its first Green Bonds in February 2019 collecting

SEK 6 billion

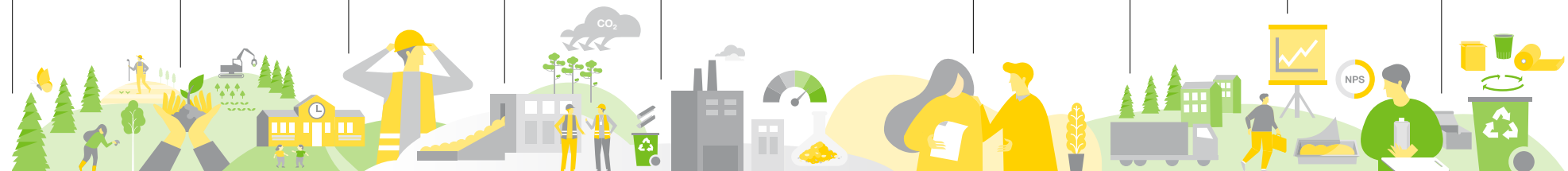
➤ Read more on page 64



Sustainable innovations replacing fossil-based materials

Innovations published during 2019 will replace fossil-based materials in lithium-ion batteries, food packaging, and cosmetics packaging.

➤ Read more on page 56





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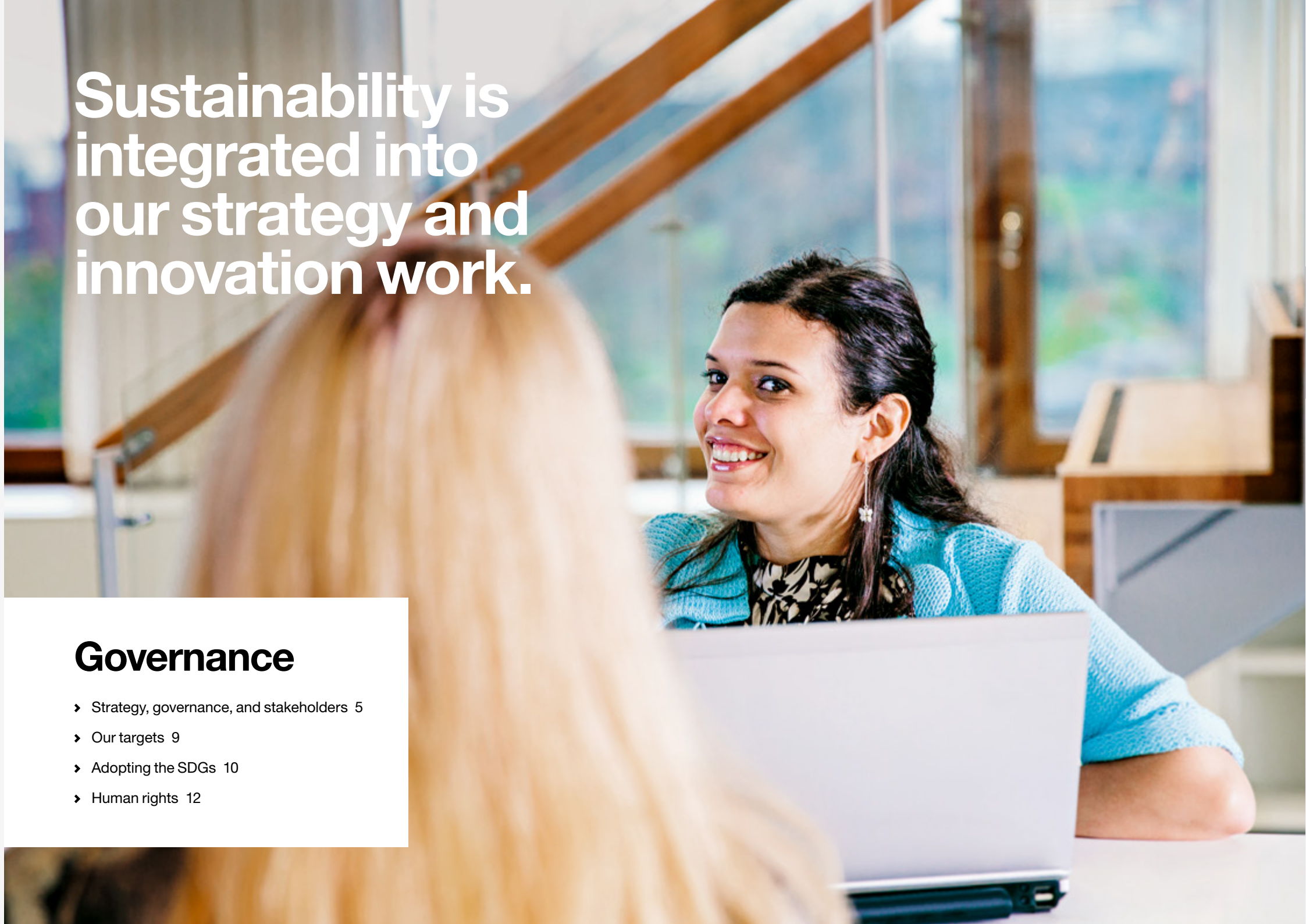
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Sustainability is integrated into our strategy and innovation work.

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Strategy, governance, and stakeholders

The world needs a new approach to materials. Forests play an important role in the transition to a fossil-free, more sustainable world.



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Stora Enso's strategy for growth is based on customer insights and innovation, supported by structured processes and motivated employees, and underlined and encircled by sustainability. The demand for food, clothing, housing, energy, infrastructure, and consumer products continues to increase, driven by global megatrends such as population growth, urbanisation, rising incomes, and changing lifestyles. More people and more consumption mean that the planet's resources are being stretched even further. By replacing fossil-based materials with Stora Enso's renewable solutions, we will help drive the transition from a fossil fuel consuming world into a sustainable future based on the bioeconomy.

By responding to today's challenges and demands for a greener planet, we bring value to our customers, employees, investors, suppliers, and other stakeholders. Sustainability is central to our strategy, innovation framework, and how we support customers with renewable products based on raw materials from sustainably managed forests.

Our Sustainability Agenda encompasses the social, environmental, and economic responsibility of our operations throughout the value chain. The agenda is based on the Triple Bottom Line framework widely used in corporate responsibility work. It addresses the ten sustainability topics identified as material to Stora Enso and our key stakeholders: Employees and wider workforce; Community; Business ethics; Materials, water, and energy; Carbon dioxide; Forests, plantations, and land use; Customers; Suppliers; and Investors. Respect for human rights is considered so integral to our long-term success that it is an overarching theme of our Sustainability Agenda.

In line with the agenda, we have set targets and defined key performance indicators (KPIs) for our sustainability work. Progress is regularly monitored at Group level and via division-level business reviews. Consolidated results on our performance are reported annually in our Sustainability report. Selected sustainability indicators are also reported quarterly in our Interim Reports.

Stora Enso acknowledges the importance of the United Nations Sustainable Development Goals (SDGs) as part of a commonly agreed global ambition to end poverty, protect the planet, and improve the lives and prospects of everyone, everywhere. Read more about our approach to the SDGs on pages 10–11.

Sustainability governance

At Stora Enso, sustainability is promoted by the Board of Directors, the President and CEO (CEO), and the Group Leadership Team (GLT). The CEO holds the ultimate responsibility for the successful implementation of our sustainability strategy.

The Board of Directors' Sustainability and Ethics Committee oversees the implementation of our sustainability strategy and the ethics and compliance strategy. The committee met four times in 2019 and has reviewed the disclosures in this report. The main focus areas of the committee during the year are described in our **Governance report**.

Stora Enso in 2019 summary is available at storaenso.com/annualreport

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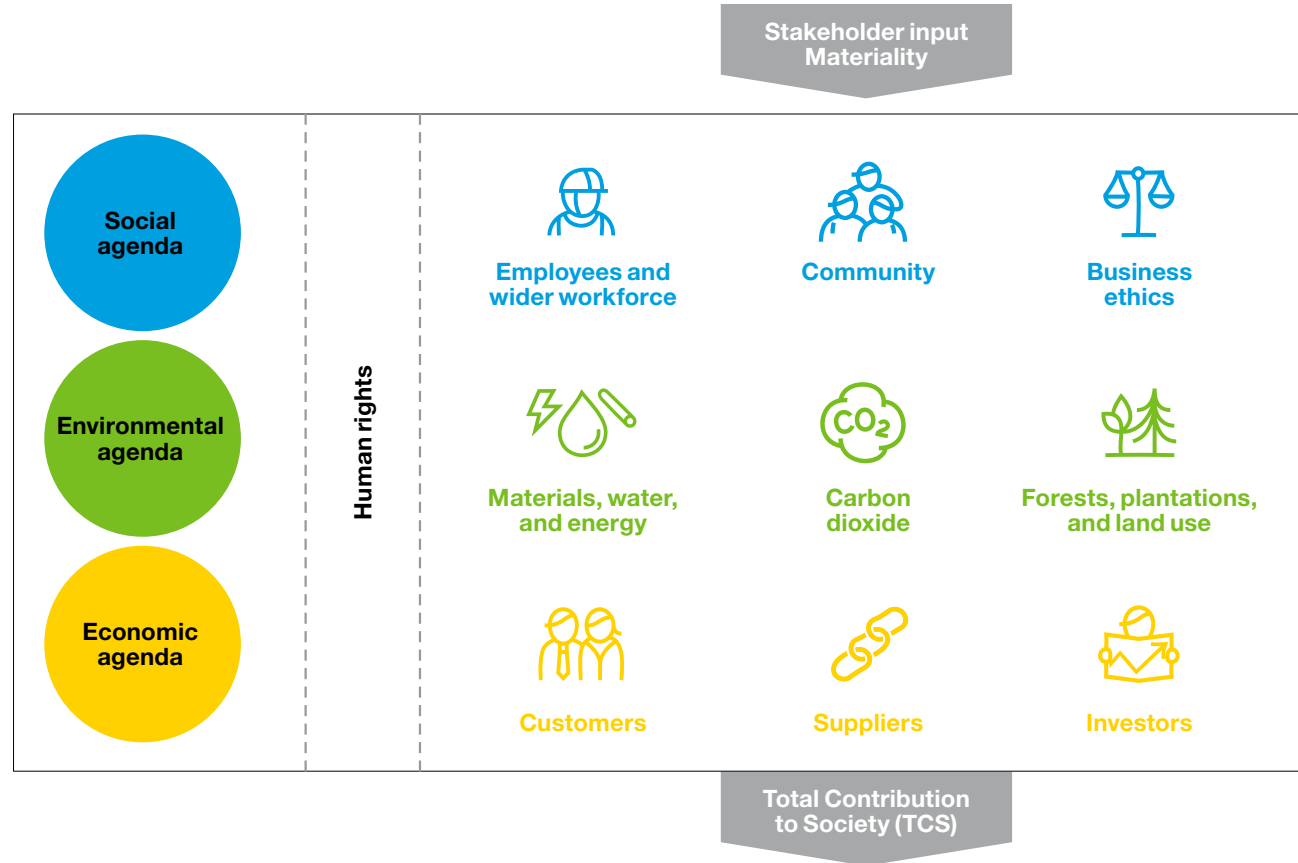
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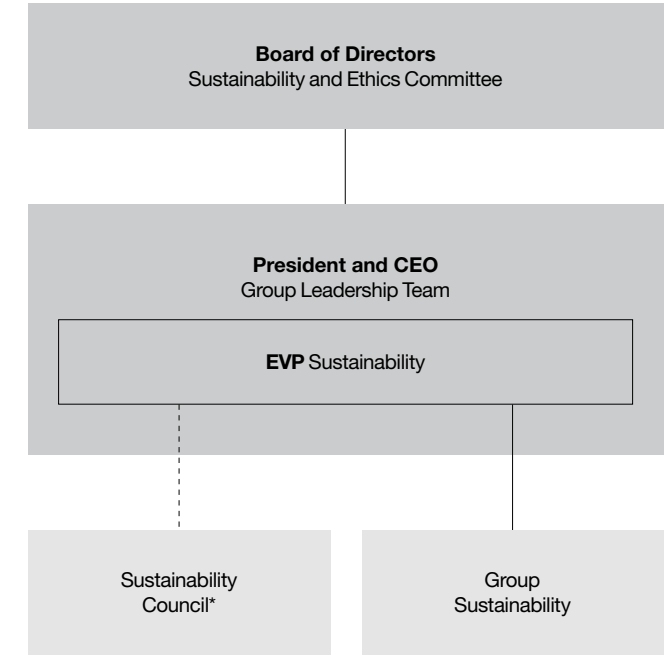
Our Sustainability Agenda is based on the classic Triple Bottom Line model. It addresses the ten sustainability topics identified as material to Stora Enso.

At Stora Enso, sustainability work is led by the Executive Vice President (EVP), Sustainability, who reports directly to the CEO and is part of the Group Leadership Team (GLT). Everyday sustainability topics are managed by our Group Sustainability team together with our Human Resources, Legal, Wood Supply, and Sourcing and Logistics functions, and our divisions. Each of our business divisions has its own Head of Sustainability, who reports directly to the EVP of the division. Other key functions, such as Sourcing and Logistics, have sustainability organisations to support their management teams. The everyday implementation of Stora Enso's Sustainability Agenda is the responsibility of line management supported by functional experts at all levels.

Stora Enso's sustainability work is steered by our Sustainability Council, which includes members from our divisions, our Sourcing and Logistics function, and subject matter experts from our Group Sustainability team. Chaired by the EVP, Sustainability, its work involves sharing good practices and identifying longer-term opportunities and challenges that may require a Group-wide response. The Sustainability Council met ten times during 2019. The GLT is periodically informed of specific sustainability developments, as is the Board of Directors when appropriate, through its Sustainability and Ethics Committee.

Sustainability is one of the performance metrics in the remuneration of GLT members through Short Term Incentive

Sustainability governance at Stora Enso



* Stora Enso's operational sustainability work is steered by our Sustainability Council, which includes members from our divisions, Sourcing and Logistics function, and subject matter experts from our Group Sustainability team.

- - EVP Sustainability chairs the Sustainability Council. Members of the Council report directly to their respective EVP.

programmes. Members of the GLT can be assigned appropriate sustainability indicators. For more information on remuneration, see our [Remuneration Statement](#).

Sustainability governance of joint operations

Our joint operations in Brazil (Veracel) and Uruguay (Montes del Plata) have their own sustainability teams, and sustainability topics are regularly discussed by their boards, which include representatives from their parent companies. Sustainability is also covered by Stora Enso's joint operation steering committees for Veracel and Montes del Plata. In addition, Stora Enso is represented on the board of its equity-accounted investment company Tornator in Finland.

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We are creating a renewable future in the bioeconomy.

Structured sustainability processes

Our Sustainability Policy describes our overall approach to sustainability. At the same time, our code of conduct – **the Stora Enso Code** – and other policies and guidelines on specific sustainability topics further elaborate our approach, while also guiding our employees in their everyday work. As an example, our internal Sustainability Assessment checklist ensures that sustainability is considered in all research and development initiatives and the development of new products. The checklist was developed based on existing sustainability policies, guidelines, and instructions, and it highlights the consideration of sustainability impacts throughout a product's life cycle – from sourcing to end-of-life.

Our policies and guidelines are available at storaenso.com/sustainability.

Stakeholder engagement

Open dialogue with our key stakeholders is crucial if we are to successfully identify concerns, global trends and market expectations. Our stakeholder engagement work is based on both structured and ad hoc interaction, as well as regular surveys on topics such as customer and employee satisfaction and investor expectations. We also obtain important information through formal grievance channels. Engaging with stakeholders on social media is important for us in understanding their opinions and concerns locally around our units, as well as on a divisional and Group level. We actively monitor social media discussions and respond, where appropriate, to stakeholder queries through suitable channels.

Materiality review

Truly material issues do not change annually within our operations, and therefore our Sustainability Agenda and targets are set for the long term. To deepen our understanding of stakeholder perceptions, we carry out specific stakeholder surveys at relevant frequencies.

The consolidated results from our 2017 materiality review confirmed the topics in our current Sustainability Agenda to be the most material for the company. The most important topics for our stakeholders were:

- Global warming
- Sustainable forestry
- Sustainable materials and products
- Human rights
- Business ethics, and
- Responsible sourcing.



Our purpose and values commit us to doing business responsibly.

Other elements in our existing Sustainability Agenda were also considered important. The results were largely in line with previous materiality reviews. This Sustainability report reflects these results.

We use investor and other stakeholder feedback as well as continuous media and social media monitoring, to identify new or emerging topics for our annual sustainability reporting. These topics, often of high interest to certain stakeholders, may change year-on-year. Through focused in-depth stakeholder consultations, our materiality review complements our Enterprise Risk Management (ERM) process with a broader scope of sustainability topics than those identified as the Group's key financial risks and opportunities. Whereas our statutory Non-Financial Reporting in the Report of the Board of Directors includes those sustainability topics that relate to the Group's key risks and opportunities, our longer Sustainability

report also covers topics considered important by stakeholders in our broader materiality review process.

We also prepare our reporting in accordance with the GRI Sustainability Reporting Standards. Our reporting covers all the General Disclosures, as well as the topic-specific GRI Standards we deem material. For more information, see our online GRI Content Index.

Stora Enso supports the concept of purpose-driven disclosure (PDD) in sustainability reporting in order to address the topics most important to the company. PDD draws on the concept and principles of professional judgement applied in accounting and offers a step-by-step process to help companies consider why, for whom, what, how, how much and where to report. Through our representation on WBCSD's Redefining Value Board we support and help develop processes and tools for PDD. The objective is to help companies prioritise in order to

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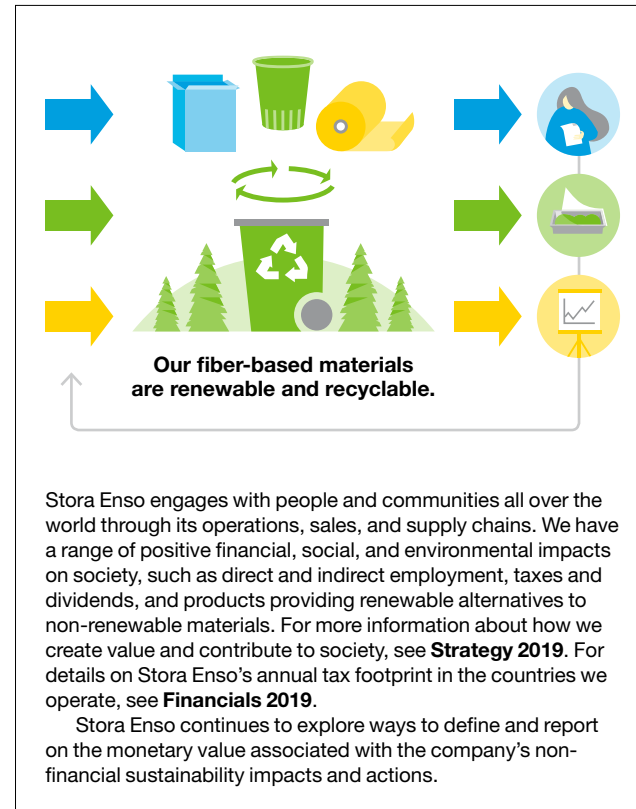
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disclose relevant, useful ESG (environmental, social, and governance) information to investors, and thus to encourage the flow of capital to more sustainable companies and outcomes. So far, Redefining Value PDD achievements include guidance on materiality and the publication of the 'ESG Disclosure Judgement Handbook,' launched in 2019.

Collaboration with non-governmental organisations

Stora Enso actively cooperates with prioritised international and non-governmental organisations (NGOs) and industry associations. We are involved in developing industry practices related to combatting global warming, the circular and bioeconomy, sustainable forestry, human rights, and business ethics, as well as the development of sustainability reporting and assurance. Examples of our collaboration during 2019 can be found below and in the relevant sections of this report.



The Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) recommends a framework for disclosing climate related risks and opportunities that goes beyond current practices. In 2019, Stora Enso joined the WBCSD Food, Agriculture & Forest Products TCFD Preparer Forum. The TCFD Preparer Forums bring leading companies together to develop disclosure roadmaps and seek investor perspectives on TCFD disclosures, including how market participants use the information. Stora Enso continues to support Accounting for Sustainability (A4S) to promote better disclosure of climate risks and opportunities. A4S aims to inspire action by finance leaders to drive a fundamental shift towards resilient business models and a sustainable economy. In addition to investors and regulators, leading companies are also communicating their support for the recommendations through Statements of Support by Accounting for Sustainability (A4S). For more information, see page 44.

Significant stakeholder groups for Stora Enso include:

- Consumers
- Customers
- Employees
- Forest owners
- Policy makers
- Investors
- Local communities
- Media
- NGOs
- Partners and suppliers
- Trade unions

In 2019, Stora Enso actively collaborated with international organisations including:

- Science Based Targets initiative, page 42
- The Ellen MacArthur Foundation, page 34
- The Prince of Wales's A4S Accounting for Sustainability, page 65
- The Prince of Wales's Corporate Leaders Group (CLG), page 45
- Transparency International, page 28
- UN Global Compact, page 68
- We Mean Business Coalition, page 45
- World Business Council for Sustainable Development (WBCSD), pages 7, 10, 14, and 34
- World Green Building Council, page 45
- WWF, pages 49 and 52

About this report

Stora Enso's Sustainability report 2019 is structured to reflect our Sustainability Agenda, with its ten elements addressed through a common four-tier framework:

Opportunities and challenges

These sections examine the external factors and global trends currently affecting the topics included in our Sustainability Agenda. Please note that our corporate risk management assessment appears in **Financials 2019**.

Our policies

These sections set out the strategies and policies we use to address key opportunities and challenges.

How we work

These sections describe the processes, procedures, and systems we deploy to realise our strategies and policies.

Progress

These sections report on our performance during 2019.

External assurance

This report has been assured by an independent third-party provider with a level of Limited Assurance. Given our commitment to combat global warming and related emission data reliability, a level of Reasonable Assurance has been provided for our direct and indirect fossil CO₂e emissions (Scope 1 and 2). For more information on assurance, see page 72.

Our sustainability targets and key performance indicators (KPIs)

| Key performance indicator (KPI) | | | 2019 | 2018 | 2017 | Targets | Progress |
|---------------------------------|------------------------------------|--|--|---|--|--|--------------|
| | Human rights | Implementation of Human Rights due diligence programme | Development areas mapped against the highest priority human rights | Eight highest priority human rights defined | 88% of the human rights actions completed and 100% resolved ¹ | Actions to address the development areas to be completed by the end of 2020 | In progress |
| | Employees and wider workforce | Total Recordable Incident (TRI) rate ² | 7.0 | 6.1 | 7.4 | 5.3 milestone by the end of 2019 New milestone will be communicated in the Interim Report for Q1 2020 | Not achieved |
| | | Leadership Index ³ | 83 | 83 | 81 | 85 by the end of 2022 | In progress |
| | Community | % of working hours and in-kind in community investments (CI) ⁴ | 46% | 50% | 43% | 70% by end of 2023 while also increasing the total CI | In progress |
| | Business ethics | Code of Conduct Index ³ | 84 | 85 | 83 | Positive trend | Not achieved |
| | Materials, water, and energy | Number of significant environmental incidents ⁵ | 9 | 8 | 10 | Zero significant incidents | Not achieved |
| | | Materials: Process residuals utilisation rate (%) ⁶ | 98% | 98% | 98% | Maintain the high utilisation rate of 98% | Achieved |
| | | Water: Total water withdrawal per saleable tonne of board, pulp, and paper (m ³ /tonne) | 61 | 56 | 56 | Decreasing trend | Not achieved |
| | | Water: Process water discharge per saleable tonne of board, pulp, and paper (m ³ /tonne) | 29 | 26 | 26 | Decreasing trend | Not achieved |
| | Carbon dioxide | Energy: Reduction in electricity and heat consumption per saleable tonne of board, pulp, and paper (kWh/tonne) | -2.9% | -3.6% ⁷ | -3.9% ⁷ | -15% by the end of 2020 from a 2010 base-year | Not achieved |
| | | Reduction in CO ₂ equivalents per saleable tonne of board, pulp, and paper (kg/tonne) | -25% | -18% | -21% | -31% by the end of 2030 from a 2010 base-year | In progress |
| | Forests, plantations, and land use | % of the lands owned or managed by Stora Enso that are in wood production and harvesting covered by forest certification schemes | 98% | 96% | 97% | Maintain the high coverage level of 96% | Achieved |
| | Suppliers | % of supplier spend covered by our Supplier Code of Conduct | 96% | 95% | 95% | Maintain the high coverage level of 95% | Achieved |

¹ Stora Enso carried out a Group-wide Human Rights Assessment during 2014. Action plans to address the findings were defined during the first half of 2015. At the end of 2017, process for completion was in place for three Group-level actions, but the completion was carried forward into 2018.

² Number of incidents among our own employees per one million hours worked. Including joint operations Veracel and Montes del Plata.

³ Measured in the annual employee survey.

⁴ New KPI implemented in 2019. Excluding joint operations. Community investments cover cash donations, employee working hours for voluntary community work, and in-kind.

⁵ Environmental incidents involving a non-compliance with environmental legislation or a permit, or a significant stakeholder concern related to environmental performance. For more details, see page 41.

⁶ Utilisation rate for process residuals excluding, for example, tall oil, turpentine, and wood chips.

⁷ Calculation principles for electricity and heat consumption were revised during 2019. The figures for 2018 and 2017 have been restated for comparability.

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Adopting the Sustainable Development Goals

The seventeen United Nations Sustainable Development Goals (SDGs) 2030 address social and economic development issues on a global scale, each with their own set of related targets. All sectors of society, including businesses, are encouraged to work and collaborate on these goals. For business to deliver its contribution, the SDGs must be integrated into company agendas and business strategies.

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Integrating the SDGs into our strategy

In 2018, Stora Enso's Group Leadership Team confirmed the SDGs most strategic to Stora Enso's business: SDG 12, 13, and 15. These are the goals that we have the biggest impact on, and to which our KPIs and targets contribute.

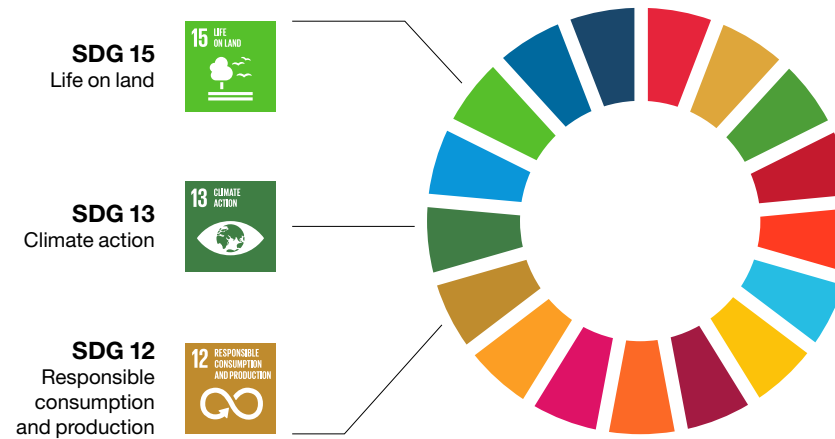
In 2019, we participated in the preparation of the SDG Sector Roadmap as part of our co-chairing of the Forest Solutions Group (FSG) at the World Business Council for Sustainable Development (WBCSD). The roadmap describes the forestry sector's current level of alignment with the SDGs and identifies the key impact opportunities and actions that the sector should take. The Forest Sector Roadmap was launched at the United Nations high-level political forum in New York City in July 2019.

In this chapter, we outline our key impacts in relation to our most strategic SDGs. Stora Enso recognises that it has both positive impacts that contribute to these targets but also negative impacts that it needs to mitigate. Scaling up positive and minimising negative impacts from our operations and value chain is the key to our contribution.

Our reporting on the sub-targets of our priority SDGs is in a [separate online appendix](#).

Our priority SDGs

Stora Enso supports all seventeen SDGs, and the following three goals were identified as the most strategic to our business:



SDG 12 – Responsible consumption and production

Our operations are based on renewable raw materials and sustainable forest management, which contribute to responsible consumption and resource use.

Our wood and fiber-based products help to replace fossil-based materials in society. We promote the circular bioeconomy with new and innovative products. We are investing in innovation and R&D and increasing sales in new applications, products and services. For more information about our new products, see page 59.

Our offering helps to reduce food waste, which is one of the sub-targets for SDG 12, with packaging that is based on renewable

and recyclable materials. With safe and intelligent packaging, we can extend product shelf-life and design right-sized packaging for smaller households to help reduce food waste. We actively work with our customers to improve material efficiency and decrease the environmental impact of our products and related processes.

According to the Confederation of European Paper Industries (CEPI), Europe's overall Paper for Recycling (PfR) recycling rate was 71.6% in 2018. By focusing on EU countries with collection rates below 60%, Stora Enso and the paper industry are actively supporting best practices while these countries establish sustainable collection systems. At the same time, circular design facilitating recyclability is part of our innovation and product development agenda.

Our mills promote material efficiency and enable circular resource use such as PfR as a raw material. Our operations also generate emissions

and discharges that account for our greatest negative impacts related to SDG 12. We work continuously to reduce emissions and discharges from our operations through Best Available Technologies (BAT), our management systems, and our environmental targets.

Our current key Group sustainability target in relation to SDG 12 drives the utilisation of process residuals and waste at our production units, as measured as a process residuals utilisation rate.

Target:
98%
(ongoing target)

Performance in 2019:
98%

Read more in the [Materials, water, and energy](#), and [Customers](#) chapters.

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SDG 13 – Climate action

Global warming entails physical challenges and opportunities relating to forests and plantations due to changing patterns of temperature, wind, and rainfall, which can all be expected to impact our operational environment. Well-managed forests and plantations can make entire

ecosystems more resilient to negative impacts, and even benefit from the positive effects. Trees in sustainably managed forests absorb carbon dioxide (CO₂) from the atmosphere and together with wood-based products act as carbon storage.

Global warming has been identified as one of the Group's key financial risks and opportunities. Stora Enso is committed to the implementation of the recommendations from the Task Force on Climate-related Financial Disclosures.

Our products help our customers and society at large to reduce CO₂ emissions by providing low-carbon alternatives to solutions based on fossil fuels and other non-renewable materials. During 2019, we worked to calculate our total climate impact including

avoided emissions by product substitution and forest sequestration. Read more about our product substitution potential and total climate impact in **Strategy 2019**.

We actively reduce the energy intensity of our operations – and in many places also our dependency on fossil fuels. As the first in our industry, we set ambitious science-based targets in 2017 for reducing our greenhouse gas emissions by 31% from operations per tonne of board, pulp, and paper produced compared to a 2010 base-year, and engaging with our customer-facing staff and suppliers on global warming. We contribute to raising awareness of climate action, as global warming is a central topic in our stakeholder communications.

Target:

-31%

Performance in 2019:

-25%

Read more in the Carbon dioxide, Forests, plantations, and land use, and Customers chapters.



SDG 15 – Life on land

Through the forests we own or manage, the responsible sourcing of wood, as well as our broader influence on forest management practices, we have a direct and substantial ability to drive positive change and make a significant contribution to SDG 15. Well-managed forests

and plantations can make entire ecosystems more resilient to negative impacts, and even benefit from the positive effects. In addition to global warming, biodiversity loss due to unsustainable land use is a global challenge that highlights the need to conserve natural ecosystems.

Sustainable forest management safeguards forest health and productivity, helps combat global warming, and protects biodiversity while securing the long-term availability of our renewable resources. All roundwood, chips, sawdust, and externally purchased pulp supplied to our mills come from sustainable sources. We use a range

of tools to ensure this, and to guarantee the sustainability of each part of the forest management cycle. These tools include forest certification and third-party traceability systems.

As wood is our most important raw material, our Group's key risks cover forests and land use.

Our current Group sustainability target in relation to SDG 15 is to maintain the high coverage of forest certification in our owned or managed land for wood production and harvesting.

Target:

96%

(ongoing target)

Performance in 2019:

98%

Read more in the Forests, plantations, and land use chapter.



Forests are key to global sustainability

To ensure the forest sector continues to grow in line with the SDGs, the World Business Council for Sustainable Development's Forest Solutions Group (FSG) in consultation with key stakeholders published the Forest Sector SDG Roadmap in 2019 to help the sector navigate the challenges and unlock the opportunities that lie ahead.

"The forest sector is in a unique position to significantly influence the global response to many of the challenges that sit at the heart of the Sustainable Development Goals (SDGs), in particular Climate change (SDG 13), Life on Land (SDG 15) and Sustainable Production and Consumption (SDG 12)," says **Filippo Veglio**, Managing Director at the WBCSD.

The Roadmap presents specific actions that forest sector companies can take to ensure forests continue to thrive in 2030 and beyond, while providing low-carbon, renewable, and recyclable solutions to everyday needs.

"In addition to outlining what the sector can do, the Roadmap provides a platform for continued dialogue and aims to inspire and foster collaboration within the sector and across sectors to ensure the potential is realised at the required scale (SDG17)," Veglio says.

As a leading company and co-chair of the FSG, Stora Enso actively contributed to the development of the Roadmap by sharing best practices and providing content expertise and insights throughout the 18-month development process.

Download the full document at ➤ wbcsd.org

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Human rights

Our human rights work is guided by international principles and standards, local regulation, and our company values of 'Lead' and 'Do what's right'.



We identified development areas related to our highest priority human rights and defined actions to address them.

Opportunities and challenges

Proactively responding to global expectations

We always strive to ensure that human rights are respected in all our operations and activities. Many of the human rights challenges we face are deeply rooted in local society and can only be effectively addressed through a long-term commitment and close cooperation with global and local stakeholders.

The UN Guiding Principles on Business and Human Rights highlight that companies have an ongoing responsibility to respect human rights, even where government actions and regulatory frameworks are inadequate. Compliance with these principles requires companies to conduct human rights due diligence procedures to identify, assess, and remedy the human rights risks and impacts of their operations, products, and services. In addition, new legislation is being explored and developed in numerous countries to address human rights due diligence by companies, with modern slavery being one widely covered aspect. Stora Enso supports human rights regulation that puts companies on an equal standing.

Our policies

Embedded in our strategy

Human rights are integrated into our Sustainability Agenda, which is aligned with the ten principles of the UN Global Compact.

Relevant Stora Enso policies on human rights include:

- **Stora Enso Code** – our code of conduct that expresses our respect for human and labour rights.
- **Supplier Code of Conduct** – imposes strict contractual requirements on our suppliers regarding human rights.
- **Human Rights Policy** – sets out our commitment to fully respect human rights throughout our operations and in all relationships involving Stora Enso and expresses our respect for international human rights instruments.

Human rights are also a fundamental part of several internal policies and guidelines such as our **Environmental Guidelines**, **Diversity Policy**, and our **Minimum Human Resources Requirements** for labour conditions.

How we work

Systematic assessment of human rights impacts

Our commitment to respect human rights covers all our operations, including our employees, contractors, suppliers, and neighbouring

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communities. We require that human rights risks and impacts are taken into account throughout our operations, including investment decisions related to mergers, acquisitions, and divestments. Our investment guidelines stipulate that environmental and social risks and impacts, including those related to human rights, must be duly identified, assessed, and addressed prior to approval in projects with business-critical risks.

Stora Enso's key tools for human rights due diligence

Continuous or periodic monitoring with

- Stora Enso Code
- Business Practice Policy
- Minimum Human Resources Requirements for labour conditions
- Supplier Code of Conduct
- Safety standards and tools for all units
- Grievance mechanisms

Project-specific human rights due diligence with

- Investment guidelines
- Environmental and social due diligence for mergers and acquisitions
- Environmental and Social Impact Assessments (ESIAs)
- Community consultations, including Free, Prior, and Informed Consent (FPIC)
- Sustainability Assessment checklist for innovation projects

Environmental and Social Impact Assessments (ESIAs)

We conduct ESIAs for new projects that could directly or indirectly cause significant adverse effects in local communities. Such projects include board, pulp, paper, or sawmills built on greenfield sites, industrial scale plantation projects, and any large-scale investments in or expansions of existing facilities.

An important element of any ESIA involves assessing the operational context from a social impact perspective, including human rights, and establishing dialogues with local residents, members of local organisations, experts, and other stakeholders. This is done through interviews, meetings, workshops, and public hearings. ESIA results give us valuable information on how local communities may be affected by changes in their socio-economic situation and any impacts on cultural heritage, while also setting out implications for community health and safety.

Community consultations

Respecting human rights in land acquisition and management is one of our priority human rights. Community consultations, including Free, Prior, and Informed Consent (FPIC), continue to be a key element in our human rights due diligence and forestry operations in Brazil, Uruguay, China, and Laos, especially concerning land leasing and indigenous peoples' rights. Our forestry employees in Guangxi, China,

work in dialogue with local communities to maintain good relations, and to understand the potential social impacts of our operations. For more information, see page 24.

In southern Laos, in the Saravane and Savannakhet provinces, our trial eucalyptus plantations are located near culturally and ethnically diverse villages. It is essential for us to engage in dialogues in a culturally appropriate way, based on informed consultation and participation, and to obtain community consent for our projects. FPIC is integrated into land identification and acquisition processes, which are implemented together with local communities and authorities. Together with partners, we have developed various FPIC tools to ensure that communities understand the information that is shared with them, and regularly train our employees in community engagement and consultation. We also continue to enhance gender inclusion in land acquisition processes and community consultation meetings, which is an important part of FPIC.

Access to remedy and grievance channels

In accordance with the UN Guiding Principles on Business and Human Rights and our own Human Rights Policy, Stora Enso is committed to remedy situations where our activities have caused

or contributed to adverse human rights impacts. Where violations are committed by third parties with links to Stora Enso through our operations, products, or services, we strive to use our influence together with the relevant stakeholders to ensure that those impacts are remedied. For example, our 50/50 joint operation Veracel in Brazil has worked closely with landless movements and authorities for several years to find and implement solutions to land distribution disputes. Veracel has also helped stakeholders understand their rights to various services, including access to legal support. For more information, see page 25.

Access to grievance mechanisms is one of Stora Enso's highest priority human rights. Our formal grievance mechanism, formerly open to employees in all units and external stakeholders in selected locations, was opened to all stakeholders globally in 2019 to further improve access to anonymous reporting of potential non-compliance. The channel enables any stakeholder to report instances where their rights may have been infringed, or where they have observed potential violations of the Stora Enso Code, including those related to human rights. This service is independently administered by an external service provider. For more information, see page 29.



Community consultations are an important part of our human rights due diligence as they support mutual understanding and build trust.

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We have also established grievance channels in local languages for communities and other external stakeholders associated with our plantations and mill in Guangxi, China. We encourage anyone with concerns to call our anonymous hotline number, write to us, visit us, or talk to our field personnel. Stora Enso's employees are trained to distribute information about our operations in local villages, and to duly process any grievances, even in villages not engaged in any kind of business relationship with the company.

Similar local grievance channels exist for our project in Laos, and our joint operations Veracel in Brazil and Montes del Plata in Uruguay. In Laos, Stora Enso works with communities to raise awareness of villager rights and the channels they can use if concerns arise.

Reporting on our performance

Stora Enso reports on its human rights work annually. We also follow the legal requirements of the UK and, as of 2019, the Australian Modern Slavery Acts. Our annual Slavery and Human Trafficking Statement, which covers the requirements of both Acts, is available at storaenso.com/sustainability. We also follow developments in national legislation to ensure we are compliant with all regulations.

Progress

Updated human rights due diligence

While we respect and consider all human rights important, our highest priority human rights remain the primary focus of our work:

- Health and safety
- Fair employment conditions
- Forced labour
- Freedom of association
- Non-discrimination and non-harassment
- Land and natural resource rights acquisition and management
- Grievance mechanisms
- Children's rights (relevant to the forest sector).

We continued to develop our human rights due diligence programme in 2019. As a first step, to strengthen our strategic focus, we mapped our Group function processes to identify development areas related to our highest priority human rights. Actions to address the findings are expected to be completed by the end of 2020. In addition, we began updating our internal guidelines to better align them with our eight priority human rights.

Due diligence helps us understand and address our impacts on people.



In 2019, Stora Enso was one of the first companies to sign the WBCSD's CEO Guide to Human Rights, in which leading companies in the field of human rights encourage their peers to take action. We also signed the guide's Finland-specific version, which was published by the Finnish corporate responsibility network FIBS. During the year, we also joined a campaign calling for human rights due diligence legislation in Finland, led by the Finnish NGO Finnwatch.

In 2019, we further clarified how human rights are connected to the other topics of our Sustainability Agenda. The related table can be found at storaenso.com/sustainability.

Actions related to our highest priority human rights in 2019 included:

Health and safety

It is our goal that all employees, on-site contractors, and our wider workforce return home safely from a healthy workplace every day. For detailed information on our progress in health and safety, including accident rates, absenteeism, and safety observations, see pages 19–21.

In Guangxi province, **China**, we continued to focus on road safety in rural areas in 2019. For more information, see page 24.

Our joint operation Montes del Plata in **Uruguay** works closely with its transportation contractors to raise awareness of and improve road safety. For more information, see page 26.

Fair employment conditions

We set strict standards for our operations to ensure fair employment conditions for all employees, on-site contractors, and our suppliers' employees. This covers topics such as wages, working hours, and overtime compensation. For detailed information about compensation, see pages 20–21.

How our business impacts people

When Stora Enso grows and harvests trees, makes renewable products, transports materials, or works with suppliers, it has an impact on people. Due diligence is the key to understanding how we can benefit local communities, minimise the risk of negative impacts, and also be prepared to right any wrongs.

"It's our responsibility to understand the impacts our business may have on people. Respecting human rights is not a complicated concept. It's about treating people with decency and respect and asking ourselves 'Does this feel like the right thing to do?'," says **Yiva Stiller**, Human Rights Director at Stora Enso.

Read the full article at storaenso.com/sustainability

For several years, Stora Enso has been monitoring labour rights in its bagasse supply chain in the United States to ensure that working hour schedules do not have adverse impacts on contractor health and safety. For more information, see page 63.

Forced labour

Our commitment to combat modern slavery is expressed in our Human Rights Policy and the Stora Enso Code. We take action to prevent all forms of modern-day slavery, including forced labour and human trafficking, in our operations and supply chains. For more information about how we manage potential forced labour and human trafficking, see our annual [Slavery and Human Trafficking Statement](#).

Freedom of association

We strive to avoid activities that could interfere with the right of our employees, on-site contractors, and our wider workforce to freedom of association and to engage in collective bargaining.

Stora Enso signed a global framework agreement with the labour unions IndustriAll, UniGlobal, and BWI in 2018. Stora Enso and the unions held one collaboration meeting in 2019. For more information, see page 18.

Non-discrimination and non-harassment

Stora Enso does not tolerate any form of discrimination or harassment and we encourage anyone who experiences or witnesses such behaviour to report it. Fostering a culture of diversity and inclusion at Stora Enso addresses these themes and raises awareness within the company. For detailed information about our progress in diversity, inclusion, and gender equality, see pages 20–21.

Land and natural resource rights acquisition and management

We strive to ensure that when acquiring and managing rights to use land and natural resources connected to our operations and supply

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chains, the rights of stakeholders are respected, with a special focus on those of indigenous people.

With the acquisition of Swedish forest assets, Stora Enso is a major forest owner in Sweden (see page 51), and we recognise our responsibilities regarding the rights of Sámi people living in areas that are located on our lands. Stora Enso maintains good relations and cooperation with indigenous Sámi communities in **Sweden and Finland**. Over the years, we have, for example, established special agreements on land use with several Sámi communities in Sweden. For more information on our land use and wood procurement, see pages 48–54.

In **Brazil**, Veracel, our 50/50 joint operation with the Brazilian company Suzano, manages a pulp mill, eucalyptus plantations, and related logistics in southern Bahia State. In 2019, Veracel continued its dialogue with the landless movements and the Bahia State government to address land distribution disputes, and its ongoing implementation of special agreements in response to this issue. Read more on page 25.

Veracel maintains good relations with local indigenous villages, and supports educational, infrastructure, and cultural programmes for 30 Pataxó and three Tupinambá communities. Some of these communities are calling for the expansion of the Barra Velha Indian Reserve. The extension would include hundreds of land properties, including 3 219 hectares of land acquired by Veracel before the indigenous peoples first made claim to the land. At the end of 2019, this case was still being processed by the regional federal court. Veracel remains committed to fully comply with the court's eventual decision.

Grievance mechanisms

Our grievance hotline is available to all employees, on-site contractors, suppliers, and any other external stakeholders that seek access to a confidential grievance mechanisms and effective remedy. For detailed information about our grievance channels and reports received through them in 2019, see page 29.

Children's rights (relevant to the forest sector)

In accordance with the Convention of the Rights of the Child, children younger than 18 years old enjoy special protection of their human rights. Stora Enso supports the Children's Rights and Business Principles developed by UNICEF, Save the Children, and the UN Global Compact, and considers six of these principles directly material to its business: principles 2, 3, 4, 5, 6, and 7. Stora Enso's work on children's rights and business is integrated into our implementation of the UN Guiding Principles of Business and Human Rights framework. In practice, this means that we strive to:

- contribute to the elimination of child labour;
- ensure decent work for young workers, parents, and caregivers;
- ensure the protection, health, and safety of children in all operations and activities;
- ensure that marketing and advertising respects children's rights; and
- prevent or minimise risks and impacts on children's rights due to environmental impacts or the acquisition and management of rights to land and natural resources.

For several years, Veracel has successfully cooperated with the NGO Childhood Brasil to combat child abuse and exploitation in the local municipalities of Belmonte, Porto Seguro, Santa Cruz de Cabralia, and Eunápolis. The goal is to improve the capacity of the municipalities to handle cases of child abuse and adolescent violence through strengthening public policies and providing training to professionals. The outcomes are documented in municipal plans. The municipal plan for Belmonte was completed and delivered to the relevant administrative bodies in 2019.

Stora Enso has a Group-wide internal guideline for the responsible use of children's images and for organising photoshoots involving children. This guideline was updated in 2019.

In 2019, Stora Enso continued to support six schools in cooperation with the Pakistani non-governmental organisation Idara-e-Taleem-o-Aagahi (ITA) in Pakistan. These schools were set up in 2015 to provide education for the 640 children identified as child workers in the supply chain of our previous 35% minority holding in the equity accounted investment Bulleh Shah Packaging

(Private) Ltd. (BSP). The divestment of BSP was completed in 2017 but the school programme, together with Stora Enso's funding for ITA, will remain in place until 2023 when the youngest children will complete compulsory primary school education as required by the state of Pakistan.

Providing training in human rights

In 2019, Stora Enso supported WWF Russia in providing three human rights-related training sessions to various forest sector actors. The goal was to raise awareness of effective interaction with indigenous people and local communities, and to introduce key concepts such as Free, Prior, and Informed Consent (FPIC). For more information about our long-standing cooperation with WWF Russia, see page 52.

In Brazil, Veracel continues training, auditing, and follow-up procedures related to its supplier code of conduct. Additional human rights training is provided to employees working as guards for Veracel's security service provider when they begin employment and then every two years.



Our 50/50 joint operation Veracel supports schools and educational programmes for local indigenous and landless people in Bahia, Brazil.



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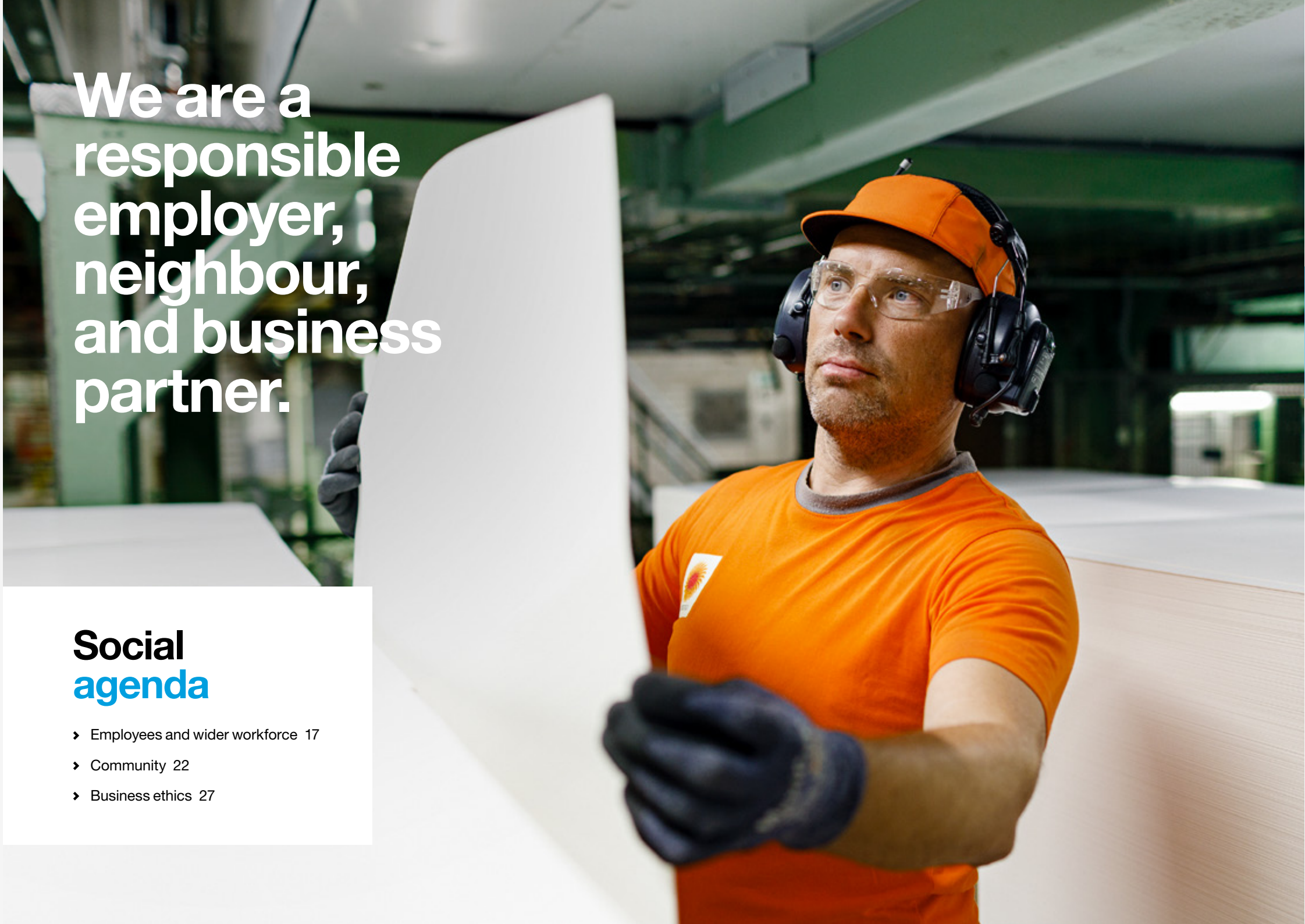
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We are a responsible employer, neighbour, and business partner.

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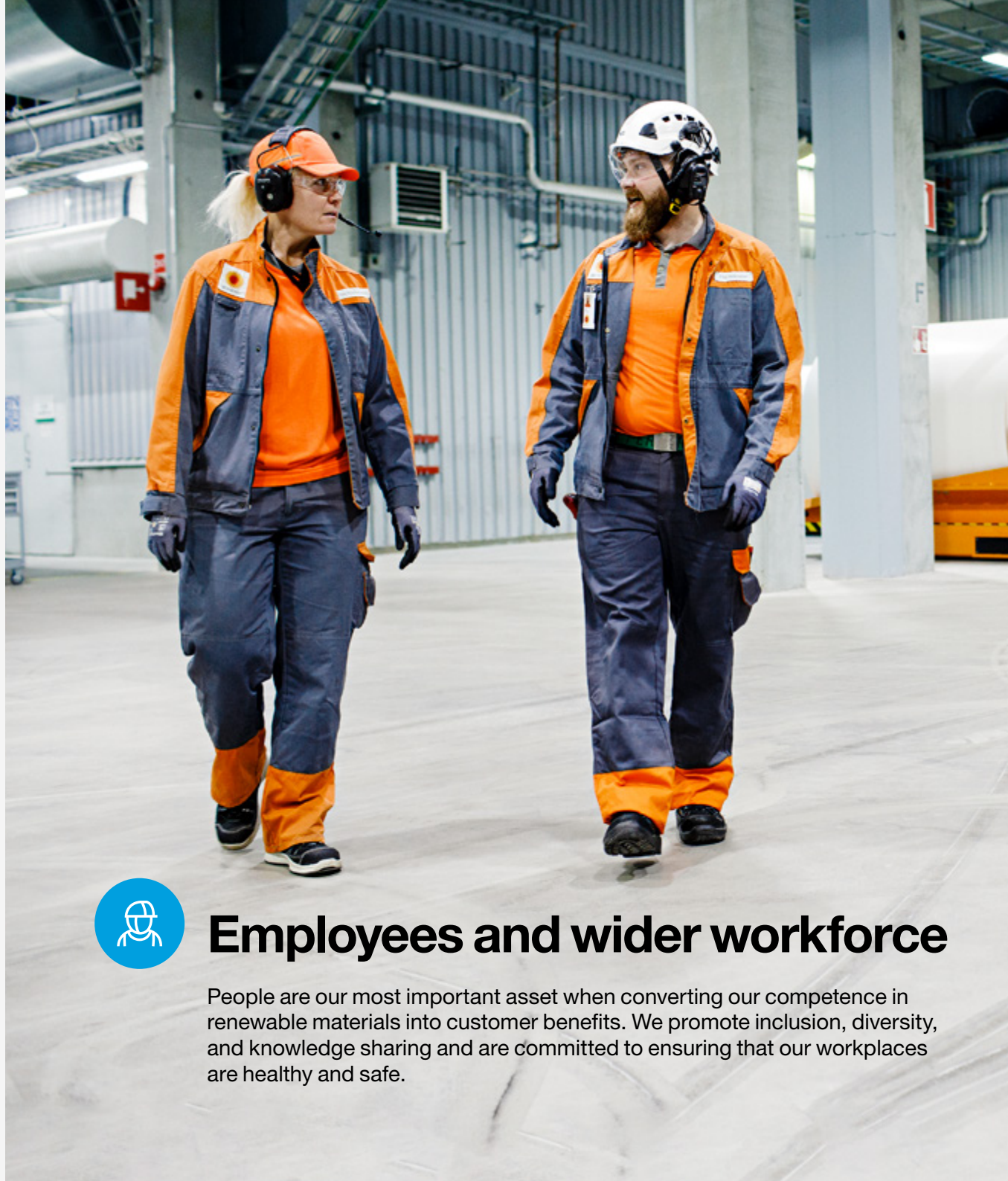
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Employees and wider workforce

People are our most important asset when converting our competence in renewable materials into customer benefits. We promote inclusion, diversity, and knowledge sharing and are committed to ensuring that our workplaces are healthy and safe.

TRI rate
7.0

TRI = Total recordable incident

Leadership Index
83/100

Opportunities and challenges

Change through people

Stora Enso continues its transformation journey as the renewable materials company. Engaged and motivated employees and a capable organisation will enable us to deliver our business strategy.

The development of capabilities in customer insight, innovation, and operational efficiency, as well as the ability to utilise new technologies will be critical for our future success. We need to ensure we have competent and engaged employees when managing our employee turnover and the demographic structure of our workforce in various markets. This will require careful workforce planning and responsible leadership. To be successful and to promote a safe working culture, we need to develop our leadership, organisation, competencies and processes.

Employing people comes with a responsibility to respect human rights. This means, for example, that we must provide a safe workplace free from harassment and discrimination, and support wellbeing at work.

Our policies

Motivated employees and a capable organisation

Stora Enso's People Agenda guides our efforts in creating engagement and motivation among our employees, and to build a capable organisation that can help us realise our business strategy. Key areas in our People Agenda include: strategic workforce planning, talent acquisition, talent management, competence development, leadership development, performance management, people ethics, and health and wellbeing. Read more in **Strategy 2019**.

Stora Enso's Health and Safety Policy defines the objectives for our safety management as well as our governance model on how we manage health and safety topics in practice and how we integrate them into annual planning and reporting.

Other key documents applied in our people and safety management include our:

- **Stora Enso Code** – our code of conduct
- **Supplier Code of Conduct**
- **Minimum Human Resources Requirements** for labour conditions
- **Global Framework Agreement**
- **Diversity Policy**

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How we work

Everybody home safe, every day

Stora Enso's goal is to provide an accident-free workplace. Encouraging a company-wide safety culture means that everyone is responsible for making every workday healthy and safe – from our top management and throughout the company.

Safety management at Stora Enso is based on international standards such as OHSAS 18001 and ISO 45001 but our processes go beyond these requirements. Responsibility for implementing each safety tool and programme in our units lies with line management, supported by local staff and OHS professionals.

Safety and industrial hygiene are managed by the Group Sustainability function. Occupational health including wellbeing is managed by our Group Human Resources function. Stora Enso's Safety Steering Group directs strategic long-term planning at Group level and oversees the work of the Safety Management Team, which develops and aligns Group-wide safety programmes. Our country-level OHS networks in Finland, Sweden, Germany, and China also share good practices and organise training to enhance our safety procedures and competencies. Local OHS committees and working groups at our units provide forums for raising safety-related topics and suggestions.

Our units report monthly on safety performance data, including incidents, absenteeism statistics, and safety observations. Stora Enso also monitors the number of safety incidents among on-site, logistics, and forestry contractors.

Safety training for contractors

Stora Enso's approach to safety extends to contractors, suppliers, and on-site visitors. We encourage everyone to give feedback and provide ideas on how to further improve safety. Additionally, we promote safety among our contractors and suppliers through a dedicated e-learning called Safety Trail. We also emphasise the importance of safety by asking suppliers for information on their safety performance in our tendering process. For more information about our supplier approach, see pages 60–63. We also cooperate closely on safety work with our joint operations in Brazil and Uruguay.

Leadership – driving company culture

Leadership is a key enabler of our strategy as it is the strongest driver for performance, wellbeing and company culture. Our culture is based on our values 'Lead' and 'Do what's right', which we expect our leaders to embrace and demonstrate through their actions and behaviour. We measure our progress on leadership by using a Leadership Index, which is based on the responses of our annual employee survey.

Performance management

Performance management is an important part of engaging and motivating our employees. We set and communicate clear targets for our employees, help them understand how they contribute to our company's success, and provide development opportunities and



Working together for safety

At Stora Enso, we believe that safety starts at the top but that we are all responsible for working safely. In 2019, the importance of safety was reinforced during a company-wide Safety Week, with plenty of different safety activities in Stora Enso units, divisions and offices.

“Our ambitious but reachable goal is zero accidents in all operations,” says **Noel Morrin**, Executive Vice President Sustainability at Stora Enso. “We have come far by halving our total accident rate in the past five years – and compared to a few decades ago, the improvement is tremendous. But we still have a lot of work to do.”

Read the full article at [› storaenso.com/sustainability](https://storaenso.com/sustainability)

regular feedback. Our annual employee performance appraisals are an important component of our performance management.

Diversity

We believe diversity strengthens our competitiveness and we aim to reflect the societies in which we operate. Diverse working teams enable us to explore different perspectives and challenge our way of thinking, contributing to better decision-making. To benefit from diverse working teams, we need inclusive work environments that respect and appreciate individual differences and allow us to embrace the diversity of backgrounds and perspectives of our employees. Dimensions such as skills and experiences, gender, age, cultural background, and personality are important to Stora Enso when we strive for diversity.

Fair working conditions

We care for all our employees and are committed to fully respecting human rights throughout our operations. All Stora Enso units are expected to work systematically to ensure that employees are treated with respect and fairness. Units should also comply with a set of minimum requirements for labour conditions in order to create an environment where employees are both motivated and able to perform their work. These requirements address areas such as working hours, basic employee rights, working conditions, and non-discrimination. Based on a self-assessment conducted in 2019, the vast majority of our production units are in compliance with these requirements, and

units with improvement needs will establish action plans to become fully compliant with the requirements. The next self-assessment will be conducted in 2021.

During the year, we continued to address areas in the Global Framework Agreement that we have signed with the labour unions IndustriAll, UniGlobal, and BWI to strive for a working environment where all our employees are treated with respect and in a fair manner. Stora Enso and the unions held one collaboration meeting in 2019 to review Stora Enso's practices related to the agreement, including labour rights and our Supplier Code of Conduct.

Support in restructuring situations

In organisational restructuring situations, it's important that the impacted employees understand the reasons for the change. Our ambition is to support leaving employees in finding work elsewhere. Support initiatives are often developed on a country or local level to best suit the local circumstances and requirements. Every employee is treated with respect and has access to support throughout the restructuring process.

Leadership is a key factor in strengthening our position as the renewable materials company.

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Health and wellbeing

We believe that the foundation for physical and mental health and wellbeing in the workplace is based on people management, organisation of work, and an inclusive work environment that promotes both physical and mental health. All these factors impact the health and wellbeing, including stress levels, of our employees and need to be addressed to create wellbeing in the organisation. In 2019, we added a new Wellbeing Index to our annual employee survey. The index measures inclusion and organisational factors impacting health and wellbeing in the workplace. During the year, we also launched inclusion workshops which our teams throughout the company are expected to carry out to raise understanding of topics such as inclusive behaviour and diversity in the workplace.

Progress

Enhancing safety performance

Stora Enso reports incidents and accidents using the international Occupational Health and Safety (OHS) definitions when reporting Total Recordable Incident (TRI) and Lost-Time Accident (LTA) rates. This allows the reported rates to be better aligned with international standards and to enable future benchmarking with peers and companies in other sectors. Since 2018, Stora Enso has used the Total Recordable Incident (TRI) rate instead of the Lost Time Accident (LTA) rate as its main key performance indicator (KPI). The TRI rate gives a more comprehensive picture of safety performance as it also includes less severe accidents.

In 2019, our TRI rate increased to 7.0 (6.1 in 2018). Despite our ambition to improve our safety performance, the milestone for 2019 was not achieved. There was a fatal accident at a Stora Enso unit

when a contractor was killed during an equipment maintenance activity in Poland in March. An occupational fatality occurred at Ždírec sawmill in Czech Republic in November involving one of our own employees. The investigation is ongoing. In addition, a fatality occurred at Skutskär Mill in Sweden in November involving a customer's contractor employee. An investigation by the authorities concluded that the fatality was due to a fall from the top of a tanker. The learnings from these tragic events will be acted upon at Stora Enso.

Regarding occupational health, Stora Enso measures illness related absenteeism with a focus on encouraging units to invest in proactive health management. In 2019, illness-related absenteeism amounted to 3.2% (3.0%) of total theoretical working hours.

For Stora Enso, developing trust with employees is critical when it comes to safety issues and discussing safety incidents. In 2019, we introduced the 'Fair and Just' programme, which provides a transparent process to manage the outcome of safety investigations. It also serves as a tool to facilitate the review and discussion of safety incidents and other unsafe behaviour. The aim of the programme is to create a blame-free working environment and a learning organisation to ensure that all our employees are treated in a fair and just manner.

Stora Enso also encourages employees and contractors to identify and report unsafe situations or actions. In 2019, the average number of safety observations reported per employee was 12.7 (10.5).

In November 2019, Stora Enso arranged its first Group-wide Safety Week. The theme was 'Working together for safety' and the aim was to engage our management, employees, contractors and the surrounding community to cooperate in safety actions. Safety Week resulted in a range of activities across all divisions,

including first aid training, emergency rescue training with local fire departments, ergonomics training, as well as health and wellbeing activities.

In 2019, Stora Enso also implemented a global programme to ensure greater consistency in visitor safety inductions at all Stora Enso units.

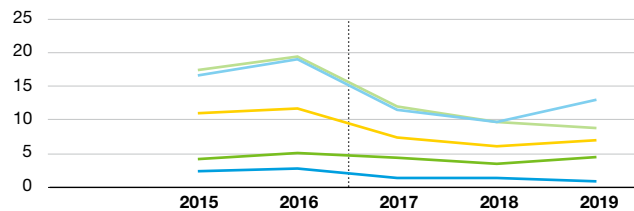
During the year, Stora Enso developed and implemented a safety audit programme to verify the implementation of our safety standards and tools. The programme promotes a common approach, content, and methodology for safety audits. During the year, 43 internal safety audits were conducted throughout Stora Enso units. The audits highlighted common areas of concern such as the 'Logout-Tagout' procedure, risk assessments, permits to work, and the operating of heavy machinery.



We encourage everyone to share feedback and ideas on how to improve safety.

Total recordable incident rates (TRI)^{1 2}

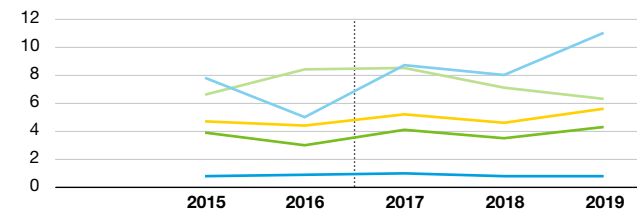
Number of incidents among our own employees per one million hours worked



| | | | | | |
|---------|------|------|------|------------------|------|
| China | 2.4 | 2.8 | 1.4 | 1.4 | 0.9 |
| Finland | 16.6 | 19.0 | 11.5 | 9.7 | 13.0 |
| Poland | 4.2 | 5.1 | 4.4 | 3.5 | 4.5 |
| Sweden | 17.4 | 19.4 | 12.0 | 9.7 ³ | 8.8 |
| Group | 11.0 | 11.7 | 7.4 | 6.1 | 7.0 |

Lost-time accident rates (LTA)^{1 2}

Number of lost-time accidents among our own employees per one million hours worked



| | | | | | |
|---------|-----|-----|------------------|------------------|------|
| China | 0.8 | 0.9 | 1.0 | 0.8 | 0.8 |
| Finland | 7.8 | 5.0 | 8.7 | 8.0 | 11.0 |
| Poland | 3.9 | 3.0 | 4.1 | 3.5 | 4.3 |
| Sweden | 6.6 | 8.4 | 8.5 ³ | 7.1 ³ | 6.3 |
| Group | 4.7 | 4.4 | 5.2 ³ | 4.6 | 5.6 |

¹ For Stora Enso employees, including joint operations. Figures for the four largest countries in terms of the total number of employees.

² Since January 2017, Stora Enso has applied Occupational Safety and Health Administration (OSHA) definitions in the reporting of TRI and LTA rates. Due to this change, the 2015 and 2016 figures are not comparable with 2017-2019 figures.

³ Recalculated due to additional data after annual reporting for 2018.

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Other focus areas in our safety management work during 2019 included:

- Establishing a formal programme to increase the sharing of learnings from previous accidents within the company and to prevent similar accidents from happening again. The learnings are discussed in different forums throughout the company, such as in the Group Leadership team, Safety Steering Group, Safety Management team, and division and mill management teams. In 2019, Stora Enso also adopted a root cause analysis methodology at some of its mills.
- Reviewing resources for safety management and developing the competence of our safety professionals. The review resulted in additional time allocated to the safety work at certain units.

Contractor accidents

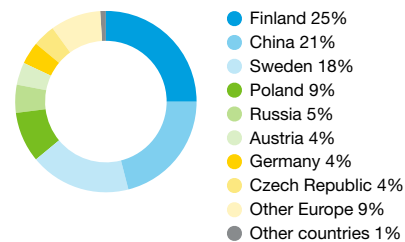
Stora Enso's reporting of contractor accidents has been developed in recent years. Since 2017, contractor accidents are reported in separate categories for on-site accidents and logistics incidents, to allow better comparability with statistics from other companies. Since 2018, proactive measures have been taken when identifying statistically more accidents with some contractors than others. Read more on pages [62–63](#).

Leadership and performance management

Stora Enso's KPI for leadership is the Leadership Index, which is calculated based on our annual employee survey. Our target is to achieve an index of 85/100 by 2022. In 2019, the Leadership Index remained stable at 83 (83). The response rate to our employee survey remained high at 86% (89%).

We continuously invest in the development of our leaders through programmes such as 'Lead Through People' which targets all managers in the company. The Lead Through People programme supports our leaders in developing their leadership skills to drive performance, wellbeing, and company culture. Since 2015,

Employee distribution by country¹



¹ Excluding employees of our 50%-owned joint operations Veracel in Brazil and Montes del Plata in Uruguay.



To benefit from diverse working teams, we encourage inclusive work environments that respect and appreciate individual differences.

approximately 3 000 managers have participated in this programme. During the year, we continued the implementation of Lead Through People training and launched three new modules covering the areas of change management, customer focus, and innovation.

All Stora Enso employees should be involved in at least one formal performance appraisal meeting with their manager each year. In 2019, 90% (91%) of our employee survey respondents stated that they had taken part in a performance review during the past twelve months.

Employee diversity

When asked about diversity in the annual employee survey, 84% (83%) of our employees reported that their management was able to create diverse teams. As for gender diversity among our senior management, 76% were male and 24% female at the end of 2019 (80% and 20% in 2018). The Group Leadership Team had

five female and six male members in 2019. In the 2019 report by [Equileap](#), which assessed gender balance and equality among 3 000 public companies, Stora Enso was ranked number 29 globally and number 1 in Finland. During the year, Stora Enso also received the highest scores in the [FINDIX report](#), which examined the diversity of management teams and board of directors in 89 Finnish companies.

Living wages

Every other year, the global non-profit organisation BSR supports us in defining and calculating living wages in relevant locations. In 2019 we reviewed the current situation in our production units in Brazil, China, Estonia, Laos, Latvia, Lithuania, Poland, Russia, and Uruguay. The results of this study indicate that our units' minimum compensation in these countries is above the living wages defined by [BSR](#).

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Compensation and equal opportunity¹

| | Ratio of highest individual compensation to median compensation ² | | Female employees' compensation compared to male employees ³ | |
|---------|--|------|--|------|
| | 2019 | 2018 | 2019 | 2018 |
| China | 106 | 89 | 91% | 101% |
| Finland | 13 | 15 | 95% | 97% |
| Poland | 19 | 24 | 94% | 87% |
| Sweden | 42 | 43 | 99% | 99% |

¹ Figures for the four largest countries in terms of the total number of employees.

² The ratio shows how many times larger the highest individual annual total compensation, including incentives, is compared to median compensation.

³ Calculated using weighted averages based on gender comparisons within each country's employee categories as applicable. The China 2018 figure based on sample due to data availability and thus not comparable with the 2019 figure.

Share of female employees at Stora Enso

| | 2019 | 2018 |
|--|-------------|-------------|
| Total number of employees at year-end ¹ | 24 390 | 25 880 |
| Share of women among all employees (%) | 26% | 26% |
| Share of women among senior managers (%) | 24% | 20% |
| Women in the Group Leadership Team | 5 out of 11 | 5 out of 12 |
| Women in the Board of Directors | 2 out of 9 | 3 out of 9 |

¹ Excluding employees of our 50%-owned joint operations Montes del Plata and Veracel.

Employee distribution and turnover¹

| | China ⁴ | | Finland | | Poland | | Sweden | | Group total |
|---------------------------------------|--------------------|--------------------|--------------------|--------------------|------------------|--------------------|--------------------|--------------------|------------------------|
| | Female | Male | Female | Male | Female | Male | Female | Male | |
| Number of employees | 2 120 (49%) | 2 190 (51%) | 1 240 (20%) | 5 000 (80%) | 420 (20%) | 1 690 (80%) | 1 070 (21%) | 4 030 (79%) | 24 390 |
| Up to 30 | 640 | 820 | 110 | 550 | 80 | 310 | 150 | 510 | 18% |
| 31–50 | 1 460 | 1 310 | 680 | 2 520 | 230 | 930 | 520 | 1 570 | 52% |
| 51 and over | 20 | 60 | 450 | 1 930 | 110 | 450 | 400 | 1 950 | 29% |
| Number of hires² | 580 (45%) | 700 (55%) | 70 (23%) | 230 (77%) | 30 (27%) | 80 (73%) | 120 (27%) | 320 (73%) | 2 860 |
| Up to 30 | 340 | 440 | 30 | 70 | 10 | 30 | 50 | 130 | 50% |
| 31–50 | 240 | 260 | 40 | 140 | 20 | 40 | 60 | 150 | 44% |
| 51 and over | 0 | 0 | 0 | 20 | 0 | 10 | 10 | 40 | 5% |
| Number of leavings³ | 1 080 (46%) | 1 260 (54%) | 60 (20%) | 240 (80%) | 40 (24%) | 130 (76%) | 60 (23%) | 200 (77%) | 3 670 |
| Up to 30 | 580 | 810 | 0 | 20 | 10 | 30 | 10 | 40 | 46% |
| 31–50 | 490 | 440 | 40 | 80 | 20 | 60 | 30 | 70 | 41% |
| 51 and over | 10 | 10 | 20 | 140 | 10 | 40 | 20 | 90 | 13% |
| Employee turnover | 51% | 58% | 5% | 5% | 11% | 8% | 5% | 5% | 15%⁴ |

¹ Figures for the four largest countries in terms of the total number of employees. Rounded to the nearest 10.

² Hires: numbers of permanent employees joining the company. Excludes hires due to acquisitions.

³ Leavings: numbers of permanent employees leaving voluntarily or due to restructuring, retirement or death. Excludes leavings due to divestments.

⁴ The employee turnover in China is mainly due to Stora Enso China Packaging units where packaging manufacturing operations are relatively labour intensive and the number of employees vary according to seasonality. The high employee turnover in China Packaging units also has a significant impact on the Group employee turnover. The Group employee turnover excluding China Packaging units was 6% in 2019 (7% in 2018).

Our lowest wages compared to local minimum wages¹

Ratio of our lowest wage to the local minimum wage

| | 2019 | 2018 |
|----------------------|------|------|
| Brazil ² | 1.1 | 1.2 |
| China ³ | 1.5 | 1.2 |
| Estonia | 1.0 | 1.1 |
| Laos | 1.2 | 1.2 |
| Latvia | 1.6 | 1.1 |
| Lithuania | 1.5 | 1.4 |
| Poland | 1.2 | 1.0 |
| Russia | 1.4 | 1.5 |
| Uruguay ⁴ | 1.5 | 1.6 |

¹ In most relevant locations based on internal assessment and human rights risks, compared to minimum wage levels set at national, state, or provincial level as applicable. The ratio shows how many times larger our lowest wage is compared to the local minimum wage.

² Including employees of our 50%-owned joint operation Veracel. Ratio for 2018 recalculated for comparability.

³ Due to variations in regional minimum wages, the ratio is calculated as a weighted average for Stora Enso's units in China. The weighting is based on the units' total number of employees.

⁴ Including employees of our 50%-owned joint operation Montes del Plata. Ratio for 2018 recalculated for comparability.





Community

We depend on resilient and thriving local communities wherever we operate, and strive to be a good corporate citizen.



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Total voluntary community investment
EUR 2.7 million

Opportunities and challenges

Benefitting local communities

Companies can improve the quality of life of local communities through active corporate citizenship. Over the long term, such voluntary investments can also generate business benefits for the company in the form of community support and competitive advantage.

Stora Enso's operations depend heavily on resilient local communities for a motivated and competitive workforce, as well as the sourcing of our most important raw material – wood. Therefore, these communities must be able to thrive economically, socially, and environmentally in the long term.

While Stora Enso is a significant employer and taxpayer in many communities, our operations also generate emissions and our tree plantations influence land use in ways that may adversely impact the rights of those communities. Our socio-environmental impacts must be managed responsibly in order to minimise negative impacts, maximise our positive influence, and maintain a constructive community dialogue that ensures our long-term license to operate.

Our policies

A robust framework for our community work

Policies that guide Stora Enso's community relations include our:

- **Sponsorship and Donations Policy**
- **Community Investment Guidelines**
- **Volunteering Guideline** – published in 2019 to encourage our employees to volunteer during their working hours to support charitable causes.
- **The Stora Enso Code** – our code of conduct
- **Business Practice Policy**
- **Human Rights Policy**
- **Tax Policy**

Our joint operations in Brazil and Uruguay have each developed formal procedures for their respective community work to reflect Stora Enso's requirements.

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How we work

Managing social responsibility

In many locations, Stora Enso benefits the local economy as a major employer, taxpayer, and partner to local entrepreneurs. We apply precautionary management actions to mitigate and remedy potential adverse environmental and social impacts on neighbouring communities. These include:

- Environmental and Social Impact Assessments (ESIAs), which are conducted for all new projects that could cause significant adverse effects in local communities. For more information, see page 13.
- Due diligence assessments, which are realised as part of Stora Enso's acquisition and investment processes prior to any critical decision. These assessments cover relevant factors related to environmental, social, and business practices. They play an important role in building our understanding of local operating environments, while also helping us to develop constructive relationships with stakeholders such as governments, business partners, local communities, and NGOs. Any subsequent investment decision must consider our ability to mitigate and manage identified adverse impacts.
- Third-party certified management systems at our production units that apply international standards such as ISO 14001, OHSAS 18001 and ISO 50001.
- Third-party forest management certification for our own forestry operations and suppliers, such as the Forest Stewardship Council (FSC¹) and the Programme for the Endorsement of Forest Certification (PEFC).
- When necessary, restructuring processes and closure of operations realised in cooperation with the authorities to support the communities through related changes, and to create opportunities for new business initiatives.

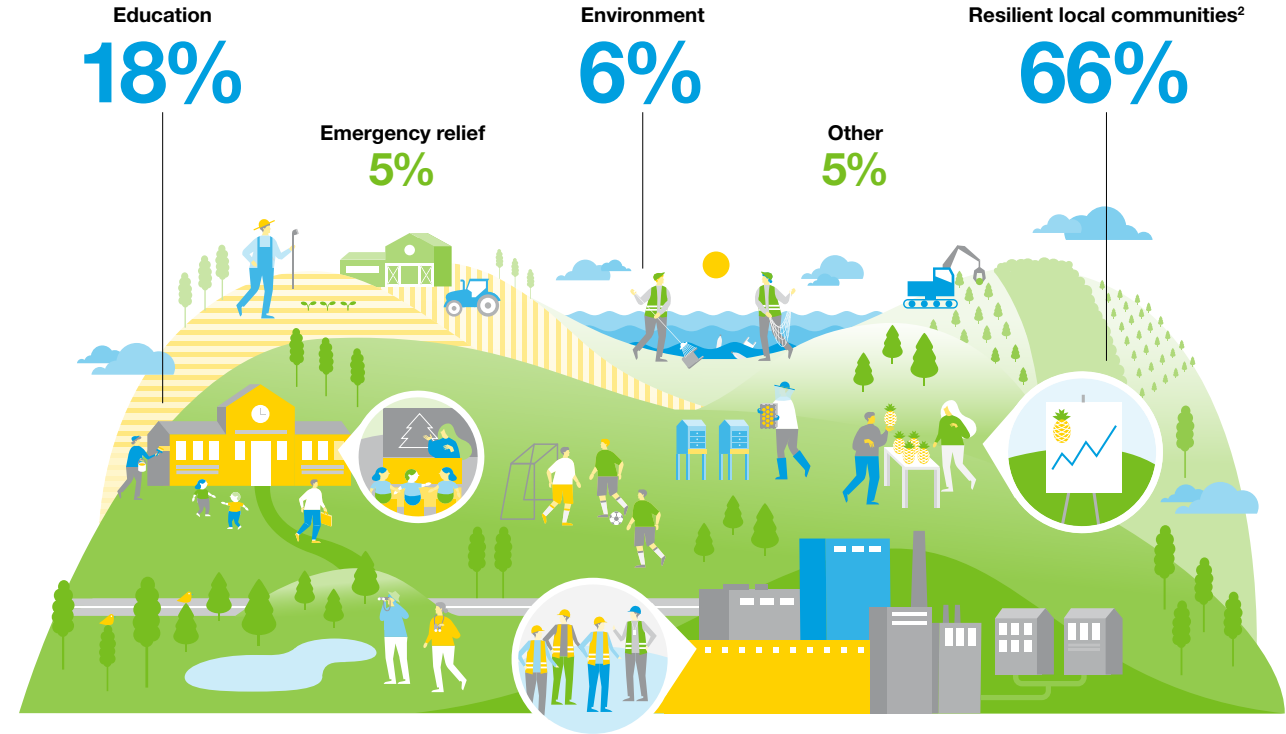
Community investment

In addition to implementing mandatory and regulated contributions to communities, voluntary community investment is an essential part of building a sustainable future for our business. Stora Enso defines voluntary community investment as contributions that involve engaging with local communities beyond our core business and legal responsibility. This is carried out in the form of voluntary donations of cash, working hours, and in-kind for non-profit purposes or non-profit community organisations in accordance with the LBG framework, which is a globally recognised framework for measuring such activities. Stora Enso's community investment projects are managed and funded locally to ensure that the community is the main beneficiary.

Our Group-wide framework for community investment builds on the local community work Stora Enso has carried out over many years. During 2019, we defined the Group's community investment focus areas: Education, Environment, and Resilient local communities. These focus areas will guide our community investment going forward.

We are also starting to more systematically monitor the impact our operations may have on local communities. Our goal is to ensure that we have a positive impact on the communities near our operations.

Voluntary community investment by investment area¹



¹ Total community investment including cash, working hours, and in-kind as defined in the LBG framework. Including 50% of joint operations Veracel in Brazil and Montes del Plata in Uruguay. ² Resilient local communities include LBG framework areas of Economic development, Social welfare, Healthy lifestyle and Arts and Culture.

Encouraging employee volunteering

In 2019, Stora Enso published Group-wide Volunteering Guidelines to enable Stora Enso employees to volunteer eight hours of paid work time annually to charitable causes. Our aim is for this volunteering to be aligned with at least one of our three community investment focus areas.

Progress

Measuring our contribution

Our key performance indicator (KPI) for community investment, developed in 2019, monitors the proportion of inputs made in working hours or in-kind compared with cash donations, excluding our joint operations, with continued growth in our community investment over time. Our target is to increase the proportion of working hours and in-kind contributions to 70% by 2030, excluding joint operations. In 2019, this proportion amounted to 46% (50% in 2018). When including joint operations, the proportion was 22% (24%).

The difference is explained by the nature of community investment projects in Brazil and Uruguay, where programmes tend to be longer-term and often cover wider societal issues with investment needs.

In 2019, the proportion of community investment related to Education was 18%, while the proportion of those related to Environment and Resilient local communities was 6% and 66%, respectively. Total volunteered hours amounted to 8 372 and the number of employees involved in community investment activities during working hours amounted to 1 771 in 2019. The total contribution to communities as defined by LBG was EUR 2.7 million (EUR 2.7 million), including 50% of the community investments by our 50/50 joint operations in Brazil and Uruguay. The total number of Stora Enso's voluntary community investment projects was 441 (453 in 2018), including those facilitated by our joint operations.

¹ Stora Enso Communications' FSC® trademark license number is FSC-N001919

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Together with local schools, Stora Enso employees organised four volunteering activities in Europe in 2019 to plant trees in their communities.

Communities are important stakeholders

During 2019, we engaged with the communities close to our operations in various ways, including agroforestry programmes, educational support, and volunteer activities.

Europe

In Europe, the aim of Stora Enso's community investments is to support local communities in enhancing their attractiveness, with the aim of benefitting our existing and potential future employees. To grow and support our potential labour pool, we participate in programmes that promote education and youth work training, and provide internships and public research opportunities. We also strive to promote local workforce diversity by participating in programmes that facilitate the employment of disadvantaged people and refugees.

To contribute to the everyday vitality of communities, we also financially support local associations, including sports clubs and cultural activities.

In 2019, employees from Stora Enso units in Finland and Austria volunteered their working hours in four tree planting events with the international NGO Plant-for-the-Planet and local schools. The goal was to educate school children on the role of forests in combatting global warming, and to offer them an opportunity to take climate action by planting tree seedlings. Over the course of the year, a total of 2 100 seedlings were planted during nine planting events around the world.

Employees at Stora Enso units regularly organise and participate in nature clean-up events together with local communities. In 2019, six such events were organised in Europe, with 130 Stora Enso employees participating. The amount of collected waste was measured and reported where feasible, according to type, count, and weight.

In 2019, we continued to voluntarily support the Finnish Forest Foundation (FFF) by matching voluntary donations from forest owners, which are linked to the purchase of wood. These donations contribute to FFF's community investment funds that focus on the social aspects

In many locations, Stora Enso is a major employer, taxpayer, and a partner to local entrepreneurs.

of the forestry sector. Activities include inspiring young people to pursue a career in forestry and funding relevant research projects. Stora Enso has supported the foundation since 1995.

Guangxi, China

Stora Enso leases 81 000 hectares of land in Guangxi province, China, of which 27 000 hectares (29 000 hectares in 2018), or 34% (36%) of the total area, is social land leased from village collectives, individual households, and local forest farms. Stora Enso's field staff and social engagement officers speak regularly with local communities impacted by our plantations and mill, and along our transportation routes, to inform them about our operations and to enable them to express their concerns and contribute ideas. Our aim is to identify and understand concerns and risks, so that we are prepared to properly mitigate and remedy them when necessary. For more information about our community consultation work, see page 13.

In 2019, our Beihai Mill's community work included sponsoring the reconstruction of a basketball court, donating supplies to local school children, and organising a beach clean-up. Our forestry operations in Guangxi continued the socio-economic profiling and mapping of local villages. The goal is to identify the needs and characteristics of the communities near our operations to be able to maximise our positive impacts and mitigate any negative ones.

Our forestry operations also run community projects to address challenges in rural villages near our plantations. During 2019, Stora Enso supported 19 community projects that benefitted over 40 000 people. The projects had three main focus areas: drinking water and sanitation, road construction and safety, and sports and cultural development.

In 2019, an agroforestry programme, managed together with the local government and a rural cooperative to alleviate poverty in the area, piloted a poultry farm on part of Stora Enso's plantations. About 23 000 free-range chickens are kept on 3.4 hectares of our plantation land, providing profit for the cooperative which supports over a thousand residents from 487 households. Some residents also receive direct income through employment at the farm.

In 2019, Stora Enso invested in two drinking water projects in neighbouring rural communities. Since 2017, similar projects have benefitted nearly 2 800 people and enabled a significant reduction in the instances of water-related illnesses and the consumption of bottled water in the communities.

Our forestry operations also continued to focus on road safety by providing defensive driving skills to drivers, trialling GPS monitoring of potential aggressive driving, and developing a checklist for regular vehicle inspections.

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Veracel, Brazil

Veracel, our 50/50 joint operation owns 213 000 hectares of land in Bahia, Brazil, of which about half has been reserved for rainforest restoration and conservation and about 79 000 hectares are planted with eucalyptus trees. Veracel also leases 10 000 hectares of land. Supporting income generation and employment in local communities are the top priorities of Veracel's sustainability agenda.

The Pact for the Development of the Discovery Coast, in force since 2012, where the government committed to reimburse the ICMS tax credits paid by Veracel in return for investments in local development programmes, was completed in 2019. Veracel continues to support two local cassava processing plants, which were originally projects within the Pact, to help them become and remain successful, sustainable business units.

For information on Veracel's engagement with indigenous communities, see page 15.



Fighting fire with knowledge in China

Qing Ming ("Tomb-sweeping festival") is a national holiday in China and includes the tradition of setting off fireworks and burning paper money. This tradition is particularly strong in a part of Guangxi where Stora Enso manages eucalyptus plantations.

This year, Stora Enso employees were able to join forces with the local government in order to help raise awareness about the prevention of fires. As a result, forest fires were reduced by 90%.

"The biggest learning for us is that preventing a problem is always better than fixing one. Working together – internally but also with so many external stakeholders – is the best long-term solution," says **Tao Shan**, Head of Land Management at Stora Enso's forest operations in China.

Read the full article at storaenso.com/sustainability

Continuous dialogue with the landless people's movement

Illegal land invasions of private property are a long-running challenge in Brazil that has affected various actors who use land, such as mining companies and farming businesses. In 2019, some stakeholders criticised Veracel for its land use and evictions of landless people from its lands that were illegally occupied. Some areas have been occupied since 2008. While Veracel is not the root cause of the problems that landless people face, it aims to be part of the local solution without taking on the role of the state.

Veracel strives to maintain continuous dialogue with these movements and supports land allocations through the Sustainable Settlements Initiative, launched in 2012. In 2019, the initiative continued to provide farmland and technical and educational support to hundreds of families to improve their incomes. The Sustainable Settlements Initiative is facilitated by the Government of the State of Bahia, and is conducted in cooperation with the National Institute of Colonisation and Agrarian Reform (INCRA) and the representatives of six officially recognised landless people's social movements:

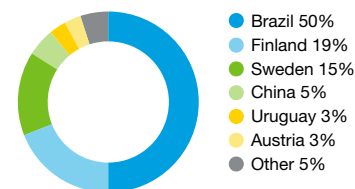
- The Movement of Landless Workers (MST)
- The Federation of Agricultural Workers (Fetag)
- The Movement for the Struggle for Land (MLT)
- The Peasant Resistance Movement (MRC)
- The Front of Free Workers (FTL)
- The Association Unidos Venceremos (Aprunve)

The social movements involved in the initiative have pledged to leave areas occupied since July 2011, while Veracel has agreed not to seek to repossess areas occupied before this date. The initiative relates to a total area of approximately 16 500 hectares of Veracel's lands designated for the settlements to be purchased from the company by INCRA.

Veracel continues to support the transition of families from these settlements to more permanent residencies on the same land, as the legal processes regarding their claim to the land are resolved over time. In 2019, this support included preparing the land for farming purposes, supplying seeds, as well as building and renovating nurseries, flour mills, and cocoa production units. The goal is to gradually transfer full responsibility of the area to the families by 2022.

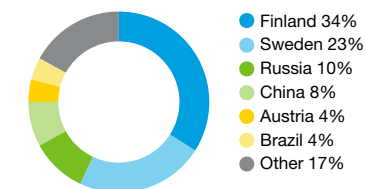
Voluntary community investment by country¹

EUR 2.7 million



Voluntary community investment projects by country²

By number of projects (441 projects in total)



¹ Total community investment includes cash, working hours, and in-kind as defined in the LBG framework. Including 50% of joint operations Veracel in Brazil and Montes del Plata in Uruguay. ² Including joint operations.

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The Bioparque M' Bopicuá, operated by Montes del Plata, promotes environmental education. It has, for example, successfully reintroduced Collared Peccaries, a mammal species extinct in the wild in Uruguay, into their natural habitat.

management. By the end of 2019, 150 fishing community members benefitted from Veracel's support, including 48 women participating in the shellfish collection programme.

To further support the local economy, Veracel gives preference to local businesses when sourcing goods and services.

Montes del Plata, Uruguay

Montes del Plata, our 50/50 joint operation owned together with the Chilean company Arauco, runs a pulp mill in Punta Pereira in southwestern Uruguay, together with associated eucalyptus plantations mainly located in central and north-western parts of the country. Montes del Plata owns 190 000 hectares and leases 72 000 hectares (Alianzas programme) of land. The Alianzas programme provides additional income for local farmers by enabling them to integrate eucalyptus plantations into their farms on suitable lands. At the end of 2019, 475 (426 in 2018) farmers participated in the programme with 53 000 (48 500) hectares planted with eucalyptus.

Alianzas also promotes the diverse use of Montes del Plata's lands for purposes such as cattle grazing and honey production. The diverse use of land enhances local livelihoods, reduces the risk of forest fires, and helps to build stronger relationships with the community. During 2019, 184 farmers kept cattle on Montes del Plata's land and 39 farmers produced honey from approximately 6 100 beehives situated on the company's land to supplement their incomes. During the year, Montes del Plata began cooperation with a national NGO to promote the sustainable management of natural grasslands, which are considered a conservation priority in South America. The results, including suggestions on soil improvements and developing cattle grazing, will be shared with Alianzas producers. Over 65 000 hectares of grassland coexist with Montes del Plata's plantations.

Montes del Plata also seeks to benefit local communities by fostering local employment opportunities, maximising local hiring, participating in mentoring programmes, and promoting entrepreneurship among young people. During 2019, the company supported projects that introduce

students to working life and encourage them to continue their studies, and sponsored an annual teenager entrepreneurial skills competition. Montes del Plata also supports development initiatives carried out by local community groups. The aim is to boost local social cohesion and strengthen community organisations.

Montes del Plata continued to invite visitors into its tree nursery and the company-owned Bioparque M' Bopicuá environmental centre in 2019. The centre, which hosts about 2 000 visitors annually, promotes education and enables visitors to experience native wildlife at first hand.

Mitigating negative impacts from logistics

Montes del Plata has a long-term strategy for the safe transportation of wood, including annual action plans involving truck drivers, transport companies, and local communities. The company's wood supply is operated by approximately 680 truck drivers from different transport companies. Montes del Plata trains all drivers before they start working for the company, organises quarterly workshops for drivers on safety and social responsibility, and follows up on safety indicators. In 2019, Montes del Plata launched an awareness raising campaign on road safety, targeted at its transport providers.

Montes del Plata, together with transport companies and their truck drivers, also strives to raise awareness of traffic safety in the communities most severely affected by the company's traffic. In 2019, this work included cooperation with 12 schools and numerous community members.

Laos

Stora Enso's eucalyptus plantations in Laos have been established in a way that enables local farmers to grow rice and cash crops between the trees. Before establishing plantations, Stora Enso makes the land safe by removing unexploded bombs dropped over Laos during the Vietnam War.

In 2019, our village development fund continued to support local development and livelihoods in the provinces where we operate. The projects are designed together with the villagers and based on their needs, and they are all endorsed by the local authorities. Most of the 2019 funding was directed to projects related to electricity provision, enhancing food security, and improving water supply.

Community consultations, including Free, Prior, and Informed Consent (FPIC), continue to be a key element of our operations in Laos. For more information, see page 13.

The diverse use of land supports local livelihoods and helps build stronger relationships with communities.

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Business ethics

We believe that fostering an ethical company culture strengthens employee engagement and helps them make the right decisions.



Code of conduct index
84/100

Opportunities and challenges

Broad ethical approach beyond compliance

Stora Enso operates in locations including high-risk markets that offer good business opportunities but may also entail exposure to serious risks relating to topics such as corruption and fraud. The US Foreign Corrupt Practices Act, the UK Bribery Act, and the French Loi Sapin II are all examples of effective legislation that governments and authorities have introduced to combat corruption. These laws place high demands on companies' controlling mechanisms, but they also help to build accountability and trust among stakeholders. Competition law is also an area where lawmakers and competition authorities are increasingly active in their efforts to preserve a competitive economy. Complying with international trade sanctions may also require companies to take new measures.

Digitalisation brings great opportunities for organisations but it also presents challenges regarding cybersecurity and the treatment of stakeholders' personal data. Legislation such as the EU General Data Protection Regulation (GDPR) sets requirements concerning the processing of personal data, with heavy fines imposed for infringements. While compliance with laws and regulations is always the highest priority for us, we believe that adopting a wider ethical approach is also crucial.

Our policies

Comprehensive approach to ethics and compliance

Our code of conduct, **the Stora Enso Code**, is a single set of values for all our employees that explains our approach to ethical business practices, human and labour rights, as well as environmental values. These values are applied wherever we operate.

Other policies relevant to ethics and compliance include our:

- **Business Practice Policy**
- **Data Privacy Policy**
- **Supplier Code of Conduct**

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Trainings help employees and partners respond to ethical dilemmas.

How we work

Combatting misconduct on all fronts

Stora Enso's Ethics and Compliance function is a sub-function operating within our Legal team, headed by our General Counsel who reports directly to the CEO. Our Ethics and Compliance Management Committee, a governance body appointed by the CEO, monitors Stora Enso's legal compliance and ethical business conduct by following up on our Ethics and Compliance Action List. The Committee met four times during 2019.

Stora Enso's Ethics and Compliance Strategy forms the basis for annual action plans. The strategy has five focus areas:

- Top-level commitment
- Improved communication and training
- Intensified efforts in countries with heightened concerns
- Developing our grievance channels
- Ethics and compliance as a competitive edge.

Stora Enso is represented in Transparency International's (TI) Steering Committee for Business Principles for Countering Bribery, where

A culture of ethical behaviour is key to our long-term success.

we actively participate in the network's efforts to combat corruption globally and nationally. We are also a member of TI Sweden's Corporate Supporters' Forum.

Top-level commitment

In our efforts to make Stora Enso a more value-driven organisation, we highlight the importance of top-level commitment. All managers in key positions are required to participate in training and make a personal commitment to the Stora Enso Code and our Business Practice Policy, and to share related information with employees in their respective organisations.

In line with workshops organised for employees in managerial positions in recent years, a dedicated ethics and compliance workshop was arranged with the Group Leadership Team during 2019. The workshop provided training in and promoted discussions on ethical issues.

Training our employees

We strive to ensure that Stora Enso's employees and business partners all understand what ethical behaviour is, and how they should respond to any ethical dilemmas that arise. Communications and training are a crucial part of this work.

Our employees receive Stora Enso Code training, either through an e-learning tool or through face-to-face training for those who do not have direct computer access. We aim to ensure that our new employees receive such training within their first month of employment.

In addition, an in-depth e-learning course on anti-trust, anti-corruption, and other compliance related topics is mandatory for all members of our Group Leadership Team, for divisional and mill management teams, and for employees dealing with competitor contacts, purchasing, marketing, and sales. The training has been run since 2013 and was updated in 2018 to be more interactive and to better reflect the challenges of today's work environment. All relevant employees will be invited to complete the updated training during 2020.

The Stora Enso Data Privacy Policy aims to protect the company against risks related to breaches of data privacy, to let our employees know how Stora Enso collects and uses their personal data, and to ensure that the privacy rights of our employees, business partners, and other stakeholders are protected. All white-collar Stora Enso employees are required to complete our e-learning training on data privacy. By the end of 2019, 88% of white-collar employees had been trained.

During 2019, we also developed new e-learning on the areas of dawn raids, trade associations, gifts and hospitality, and the onboarding of critical business partners.

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In 2019, we took several actions to enhance the culture of speaking up and listening at Stora Enso.

Comprehensive risk assessments on compliance

Operating in high-risk markets and entering into joint ventures can entail exposure to serious risks. Our risk assessment procedures on compliance cover all our units. The most significant compliance risks in our global operations relate to anti-trust and corruption.

Overall risk assessment at Stora Enso follows the Risk Management Process and is outlined in our Enterprise Risk Management instructions. In recent years, ethics and compliance has been considered one of Stora Enso's key risks. In 2019, our Ethics and Compliance function implemented an additional risk assessment tool as part of the Ethics and Compliance Self-Assessment Tool (T.E.S.T.). The purpose of the additional tool is to provide a more detailed understanding of compliance risks as well as support our Enterprise Risk Management process.

The management and employees of our fully and jointly owned operations in China, Brazil, and Uruguay receive training on our Business Practice Policy. Employees in our joint operations in Brazil and Uruguay additionally receive training on their respective Codes of Conduct and Business Practice Principles, covering topics such as human rights, environmental impacts, safety, and ethical practices. Anti-trust guidelines designed for our joint operations are implemented with the help of related training globally.

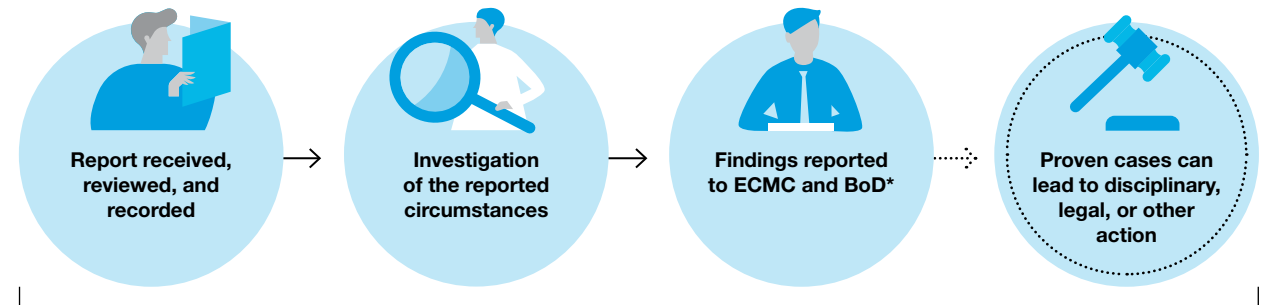
During 2019, our Ethics and Compliance team continued to provide training on topics related to ethics and compliance in our operations globally. This training involved meetings with local employees and managers face-to-face to gain a better understanding of local ethical dilemmas, and to train local personnel on key topics.

Grievance channels

Our employees are encouraged to report suspected cases of misconduct or unethical behaviour. Other stakeholders may also want to seek ways to raise concerns over our activities. To ensure that rights to privacy and effective remedy are respected, we must ensure that our grievance channels operate without fault and are accessible to all relevant stakeholders.

Stora Enso uses an external service through which our employees and external stakeholders can anonymously report potential non-compliance cases by phone, mail, or online. This service is available 24/7. In 2019, the grievance channel was opened to all stakeholders globally. Our operations in China and Laos have established internal grievance channels in local languages for stakeholders with inadequate knowledge of the main language.

How we investigate suspected non-compliance cases



Internal Audit and Ethics and Compliance functions are responsible for the overall process.

* ECMC = Ethics and Compliance Management Committee
BoD = Board of Directors' Sustainability and Ethics Committee and Board of Directors' Financial and Audit Committee

All potential non-compliance cases are duly investigated. Any findings are recorded and reviewed by the heads of our Internal Audit and Ethics and Compliance functions, and reported both to our Ethics and Compliance Management Committee, and to our Board of Directors' Financial and Audit Committee and Sustainability and Ethics Committee. Proven cases of non-compliance can lead to disciplinary or legal action.

Our joint operations Veracel in Brazil and Montes del Plata in Uruguay each have their own local grievance mechanisms.

In 2019, a total of 57 reports received through Stora Enso's various grievance channels were identified as potential non-compliance cases (68 in 2018). Based on the investigations finalised by the end of 2019, proven cases leading to disciplinary action, legal action, and/or process improvements were identified in 26 (20) of the completed investigations. In addition, 12 of the potential non-compliance cases were still under investigation.

Based on our assessments, nine of the proven cases can be considered related to corruption and/or fraud (two in 2018). Seven of these cases resulted in employee dismissal or disciplinary process (two in 2018).

Competitive advantage from business ethics

Being value-driven gives Stora Enso a competitive advantage at a time when stakeholder interest for business ethics is growing, as it builds trust both within Stora Enso and with external stakeholders such as customers and potential employees. We are committed to conducting our business ethically and strive to ensure that our business partners are aware of and share our commitment.

Progress

Comprehensive monitoring

We use an index to monitor and evaluate employee perceptions of our work on topics covered by our Stora Enso Code. The index is based on our annual employee survey responses to questions related to the Stora Enso Code, Stora Enso's values, fair and equal treatment of employees, safety, and responsibility. The index is used as a management tool to understand the ethics and compliance culture of our different teams. After five years of continuous improvement, the index decreased by one unit to 84 in 2019 (85 in 2018). Our objective is to continue the previous positive trend by increasing our efforts in communications and training during 2020.

Breakdown of potential non-compliance cases

| | 2019 | 2018 |
|-------------------------|-----------|-----------|
| Anti-trust | 0 | 1 |
| Conflict of interest | 4 | 7 |
| Corruption | 4 | 9 |
| Fraud | 12 | 2 |
| General human resources | 26 | 33 |
| Health and safety | 3 | 3 |
| Miscellaneous | 8 | 13 |
| Total | 57 | 68 |

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During 2019, we continued the work of the Divisional Compliance Forums and the Group Function Compliance Forum to bring together the heads of key functions and divisions to assess risks, monitor compliance, and contribute to a value driven organisation. By the end of 2019, there were eight established forums in total.

Our Ethics and Compliance Self-Assessment Tool (T.E.S.T.), introduced in 2015, was run once in 2019. This tool has been designed to give our divisions and functions a better overview of the progress their units are making in implementing our policies and compliance measures, while also identifying possible gaps and risks related to compliance. In 2019, the tool was further developed to include a separate risk assessment that better identifies, measures, monitors and controls the relevant risks. The results are addressed through the Compliance Forums with action plans subsequently developed, implemented, and monitored as necessary. Since 2018, the results have been cross-checked between more people within each unit to gain a deeper understanding of their reliability.

Encouraging employee discussions on ethics

We support our managers in discussing ethics topics in their teams by providing them with ethical dilemmas and related instructions on a monthly basis. We also support managers with topic-related communication materials to facilitate the discussions. In 2019, topics included the Stora Enso Code, money laundering and tax havens, inclusion in the workplace, and unconscious bias in decision-making.

Compliance rules can be complicated and ensuring that all our employees know Stora Enso's purpose, values, goals, and policies can be challenging. In 2019, our Ethics Ambassadors, consisting of Stora Enso employees, continued their work in voluntarily supporting our Ethics and Compliance function by running training sessions, clarifying our rules, and answering questions in their respective units. During the year, the Ethics Ambassadors programme was further developed to better respond to individual and organisational needs in the field of ethics and compliance.

In 2019, we created an Ethics and Compliance Case book featuring several compliance cases to serve as reference and training material for our employees. The example cases presented in the book will help to illustrate ethics and compliance issues in practice and facilitate discussions and training on important topics.

During 2019, we also began developing an artificial intelligence based virtual agent to help guide our employees in certain ethics and compliance related issues.

Enhanced compliance control processes

Making sure that laws, regulations, and company rules are complied with, not only by us but also by our business partners, is an essential part of our business. In 2019, we began developing a new critical third-party management tool for conducting due diligence and onboard critical business partners to ensure better compliance control.

In 2019, we established a screening process when recruiting for certain top management positions at Stora Enso. The aim is to identify potential hiring risks and make sure we hire people who live by Stora Enso's values.



We provide several different communication materials to our employees to facilitate discussions and training on important business ethics topics.



The power of inclusive workplaces

One of the biggest fears for human beings has always been to be excluded. Today, exclusion can present itself as discrimination and bullying, which are serious threats to a healthy and productive workplace.

“We are each other's work environment: if it's not safe, it's just as dangerous as if a machine doesn't work properly,” says **Per Lyrvall**, Executive Vice President, HR and Legal at Stora Enso. “We must be ready – and feel safe – to speak up when we see excluding or inappropriate behaviour. But at the end of the day, it doesn't need to be complicated: inclusion can start with a smile.”

Read the full article at storaenso.com/sustainability



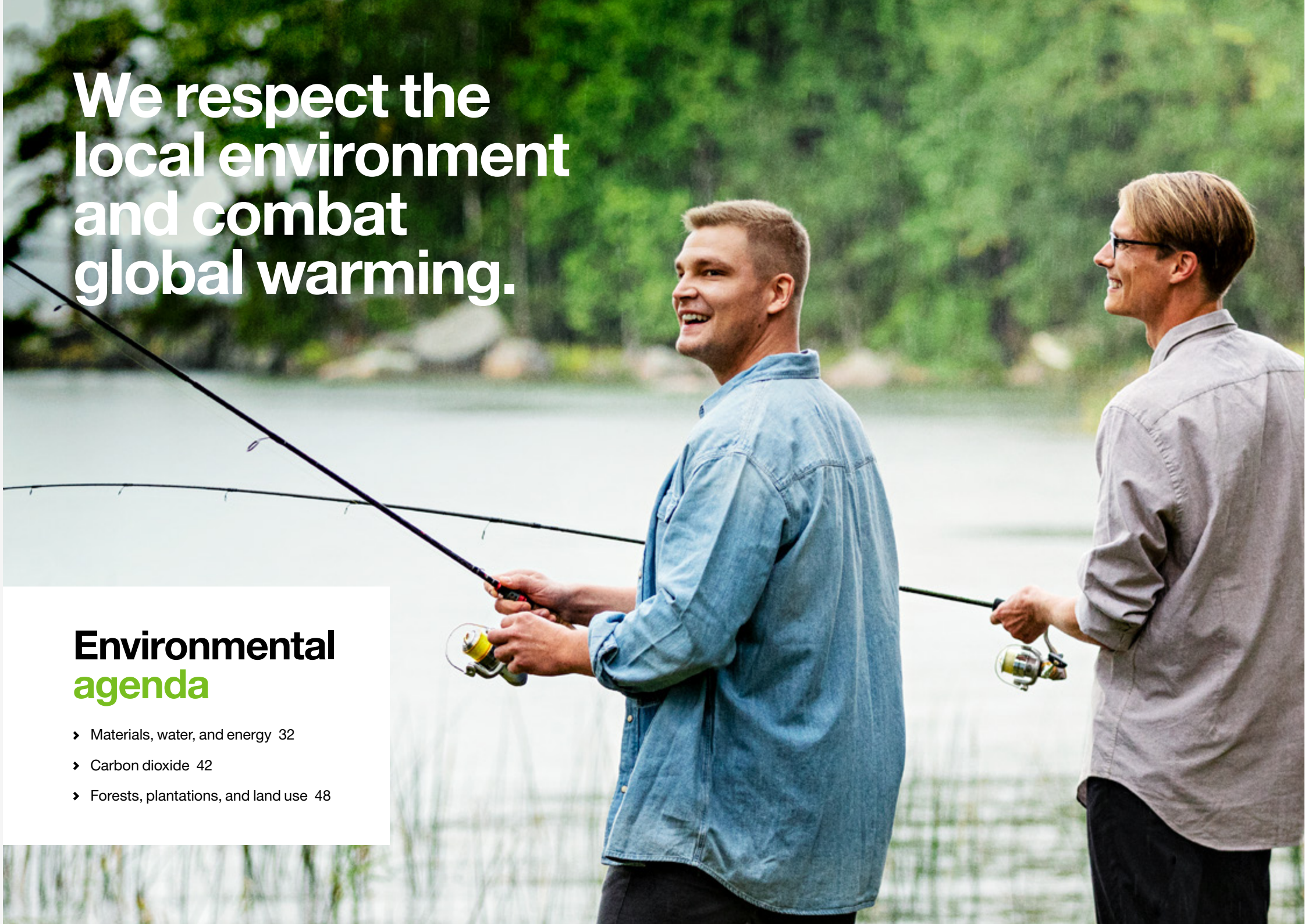
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We respect the local environment and combat global warming.

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Materials, water, and energy

Stora Enso is in a unique position to drive society's transition to a circular bioeconomy. In our operations, we always look for ways to make more from less.

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Share of biomass in our internal energy production

82%

Process residuals utilisation rate

98%

Opportunities and challenges

Reduced waste, maximum value

Global megatrends such as global warming, population growth, eco-awareness, and urbanisation are affecting consumer and corporate decision-making around the world. We respond to these trends by developing circular products and solutions based on materials that are both renewable and recyclable.

Materials

As a renewable materials company, Stora Enso operates at the heart of the bioeconomy and contributes to a circular economy. In a circular economy, waste is minimised as materials are reused and recycled to maximise environmental and financial value. The European Commission (EC) has adopted several legislative proposals within its Circular Economy Package, including the EU directive on single use plastics. The objectives of these ambitions create a need for new innovations and provide business opportunities for Stora Enso.

Water

Water plays a central role in Stora Enso's production, heating, cooling, and cleaning processes, and in generating renewable electricity from the hydropower we purchase. We clean process water in our high-performance water treatment plants before discharging it back to the local environment. Sustainably managed forests and plantations have a key role in maintaining natural water cycles, absorbing CO₂ and therefore increasing resilience to the impacts of global warming. We consider water in the planning and management of our forest and plantation operations. Our forests and plantations need rainwater for growth, and active water management in plantations contributes to positive effects on total water balance as well as water storage, purity, and quality.

The EU Water Framework Directive sets the objective to protect and enhance water resources, thereby achieving a good quality status for lakes, rivers, groundwater, and transitional and coastal waters. Other key directives linked to the Water Framework Directive are the Groundwater Directive and the Environmental Quality Standards Directive. These requirements are implemented in the environmental legislative framework of each member state to which we must comply via our environmental permits.

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Our operations affect the environment but may also impact people. Keeping our employees and surrounding communities safe and healthy is a top priority for us.

While water is relatively abundant in most of our production locations, water scarcity may still impact operations locally and through our wider supply chains, as controls on pollution, recycling, and water pricing are tightened. Occasionally, some mills have been impacted by water stress in terms of availability or increased water temperatures. We therefore consider water stewardship to be an area of increasing importance. At the same time, such challenges give us opportunities to reduce costs by using water more efficiently.

Energy

The EU has stepped up its ambitions with the European Commission proposing a 'European Green Deal' in 2019, which includes the

announcement of a European Climate Law to be presented in 2020. As an overall ambition level, the EU should achieve net zero greenhouse gas emissions and climate neutrality by 2050. To fulfil the ambition, contributions are also requested from energy intensive industries in terms of further emission reductions and providing carbon sinks.

The Energy Efficiency Directive II sets new targets for 2030 that require annual energy savings of 0.8% of energy consumed. Additionally, the Renewable Energy Directive II sets member states a binding collective target on an EU level to derive 32% of their final energy consumption from renewable sources by 2030. With its high proportion of biomass-based energy, the forest industry can help the EU achieve its targets.

We aim to maintain product value for as long as possible through innovation and recycling.

Our policies

Guidance throughout the supply chain

Stora Enso's policies relevant to our use of materials, water, and energy include our:

- **The Stora Enso Code** – our code of conduct guides us on issues related to resource use.
- **Supplier Code of Conduct** – includes practical instructions for Stora Enso's suppliers, Purchasers' Instructions, Sourcing Policy, and Sourcing Guidelines: a guiding framework for the responsible sourcing of materials and energy.
- **Policy on Wood and Fiber Sourcing, and Land Management** – our commitment to the responsible integration of forestry, land use, sourcing, and water stewardship into our sustainable forest management and land use practices.
- **Policy on Energy and Carbon** – a policy stating our ambitions in combatting global warming.
- **Environmental Guidelines** – a comprehensive overview of our policy objectives and how we work to achieve them.

How we work

External initiatives guide our work

We apply precautionary management actions to mitigate and remedy potential adverse impacts on the environment and people. The environmental work at our mills, including water and energy management and resource efficiency, is supported by third-party certified environmental management systems. All our sawmills and board, pulp, and paper mills are certified to the ISO 14001 environmental management system standard, along with all but one corrugated packaging unit, which is expected to be certified in 2020.

Using materials, water, and energy in our production affects the environment but may also have an impact on people. At Stora Enso, keeping employees and surrounding communities safe and healthy is a top priority. The interests of local communities and forestry operations are respected in our approach to systematic Environmental and Social Impact Assessments (ESIAs) in due diligence executed in conjunction with mergers, acquisitions, and divestments (see page 13).

By the end of 2019, 95% of our total energy consumption was certified to the ISO 50001 energy management system standard (95% in 2018). For unit-specific information on certificates, see pages 69–71.

The emissions generated by each of our mills are regulated by the relevant authorities, with limits set through environmental permit processes that consider local environmental conditions, stakeholders, and legislation. Compliance with legislation and permits is monitored by the environmental authorities and by the mill

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in question. Non-compliances and incidents are reported by mills to Group management on a quarterly basis, and significant incidents are reported immediately. For details of significant incidents and violations of environmental permits in 2019, see page 41.

Environmental improvements and investments at our production units are driven by regional and local conditions. The EU's Best Available Techniques (BAT) Reference Documents have limits for effluents and emissions to air, and the BAT conclusions for pulp and paper, as well as for medium and large combustion plants, apply to our board, pulp, paper, and sawmills in Europe. The related investments are proactively planned as part of Group investment processes. These investments fit into Stora Enso's normal capital expenditure framework and policy.

Contributing to the circular bioeconomy

We help our customers become circular: our products are renewable, recyclable, and in many cases compostable. We minimise waste and resource use and aim to maintain the value of products and materials for as long as possible through product design, innovation, and recycling. When a material or product has reached its end-of-life, we promote recycling and energy recovery to create further value. Read more in **Strategy 2019**.

We are a signatory to the New Plastics Economy Global Commitment led by the Ellen MacArthur Foundation, in collaboration with UN Environment. In 2019, our progress was disclosed in the Ellen MacArthur Foundation's Global Commitment Progress Report. As a founding board member of WBCSD's circular economy initiative, Factor10, we worked to develop the 'CEO Guide to Circular Bioeconomy' publication.

In 2019, Stora Enso and other member companies of the Confederation of European Paper Industries (CEPI) launched the 4evergreen alliance to promote fiber-based packaging across the value chain. This alliance brings together companies involved in the life cycle of fiber-based packaging to raise awareness about innovation in fiber-based packaging, set guidelines for circular product design, and support the development of optimised collection systems and critical recycling infrastructure.

For information about how our divisions worked to advance the circular bioeconomy in 2019, see page 59.

Value from waste and residuals

In addition to our traditional products as well as lignin, tall oil, turpentine, and energy pellets, Stora Enso's production processes generate other residuals and wastes, including ash, sawdust, bark, and wastewater treatment sludge. Many of these materials are used in our internal bioenergy generation and pulp production or supplied to third parties to be used in applications such as agriculture, cement and concrete products or land and road construction. We constantly innovate to improve resource efficiency and make profitable use of material streams that would otherwise end up as waste.

We ensure that hazardous waste is safely processed at suitable facilities, and we report on hazardous waste disposal in accordance with relevant regulations. Our third-party certified ISO 14001 systems comprise of on-site management procedures for handling chemicals and waste at our mills. Expertise and best practices related to



optimising material streams are shared throughout Stora Enso by networks focusing on environmental management, materials, Paper for Recycling, chemical safety, and product safety.

We aim to maximise the value of our material streams and work towards zero process waste. We work to achieve this through circular material flows in our value chain, while reducing our own process waste to landfill to as close to zero whenever legally, technically and commercially possible. The Group target is to maintain the high level of a 98% process residuals utilisation rate. The target covers all Stora Enso production units.

Since 2016, Stora Enso has partnered with the Swedish government agency for innovation, Vinnova, with the aim to recycle our materials containing carbon and calcium in the steel industry. Successful trials have explored the beneficial use of fly ash, lime mud, bio sludge and fiber sludge.

Paper for Recycling

Wood and fiber are the main raw materials in Stora Enso's production processes. Materials made with virgin fiber are used for products with special safety requirements such as food packaging and

In 2019, Stora Enso and other CEPI member companies launched the 4evergreen alliance.

Replacing plastics with renewable materials

Stora Enso has joined the New Plastics Economy Global Commitment to eliminate plastic waste and pollution at the source, led by the Ellen MacArthur Foundation. Plastic waste is a global problem as it pollutes our seas and the environment, enters our food chains, and affects our health negatively.

"The world is running out of raw materials and fossil plastics come from a finite source. Using materials that are renewable means you use an alternative that grows back. But replacing fossil-based plastics with renewable materials is a journey that will not happen overnight," says **Eija Hietavuo**, SVP Sustainability, Stora Enso Packaging Materials.

Read the full article at [› storaenso.com/sustainability](https://storaenso.com/sustainability)

pharmaceuticals. For more information about our wood procurement, see pages 48–52.

While wood-based fibers can be recycled for 5–7 times, in some cases over 20 times, virgin fiber is also needed in the paper recycling process. After several recycling rounds, paper fibers eventually become too short to be reused but can be burned for bioenergy, which drives the need for new virgin fiber. Stora Enso also uses paper for recycling (PFR) wherever it makes environmental and economic sense. Recycled newspapers and magazines are used to produce certain paper grades at Langerbrugge Mill in Belgium (where they account for 100% of sourced fiber), Sachsen Mill (100%) and Maxau Mill (approximately 75%) in Germany, and Hylte Mill in Sweden (55%). Recovered board is used to make specific containerboard grades at Ostroleka Mill in Poland (90% of fiber sourced for containerboard production) and at Varkaus Mill in Finland.

Through cooperation with local authorities and waste management companies, and our own collection facilities, we secure sufficient PFR from industrial, commercial and domestic sources. In Poland, we own and manage a network of 18 depots where PFR is collected and baled for transportation to our Ostroleka Mill.

According to CEPI, Europe's overall PFR recycling rate has been high for many years. In 2018, the rate was 71.6%, and the collection was 56.7 million tonnes of PFR (-0.3% compared to 2017). This is a noteworthy achievement as not all paper can currently be recycled, such as tissue paper. While overall collection rates within the EU are relatively high, certain central and southern European countries still have potential to improve. Focusing on EU countries with collection rates below 60%, Stora Enso and the paper industry are actively supporting best practices while these countries establish sustainable collection systems to support the EU goal of a 74% paper recycling rate by 2020.

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We recycle water within our mills whenever possible, to reduce the need for water intake.

Responsible water use

Production at Stora Enso's mills requires large amounts of water. However, only around 4% is consumed in our production processes while almost 96% is recycled back to the local environment. Process water is purified by our treatment plants and then discharged, whereas cooling and other non-process water can be safely released without treatment.

Our strategic approach to water stewardship builds upon six pillars:

- Assessment of conditions at mills and in the water basins where we operate,
- Setting ambition levels and goals,
- Investments,
- Mapping water use at mills to identify saving potential,
- Performance measurement, and
- Communication and engagement with stakeholders.

Stora Enso withdraws 98.5% of its total water from surface water, 1.4% from municipal sources and 0.1% from groundwater. We

have previously applied the [WBCSD Global Water Tool](#) to assess the related risks at our production units, which identified five mills operating in water basins where water stress occurs. It also calculated the total proportion of our water withdrawn from water-stressed basins to be 2%. In 2019, we took the next step to improve our Enterprise Risk Management (ERM) procedures geared towards local water stress. The improved ERM, based on local conditions, method will enhance proactive measures in the water stewardship work at our mills. Water is by definition always a local environmental challenge or opportunity. As a public commitment to water resource management and the development of sustainable water strategies, Stora Enso signed the United Nations Global Compact's [CEO Water Mandate](#) in 2009 and the [Finnish Water Stewardship Commitment](#) in 2018.

Our strategic water goals are to reduce impacts on water use, to minimise impacts on quality, and to recycle water within mills when possible to reduce the need for water intake. Our Group targets are to

Stora Enso's water withdrawal and consumption



- Almost **96%** of the water we withdraw is recycled back to the local environment after being carefully purified.
- Some **4%** of the water we withdraw is consumed in our production.

decrease both total water withdrawal and process water discharges per saleable tonne of board, pulp and paper. In line with Group targets and to drive continuous improvement, our units set their own quantified water targets based on their local context as part of our mill environmental management systems.

The new Group water target setting towards 2030 will be evaluated in 2020 based on the outcome of the Sunila Mill pilot, which will be run in 2020.

Approximately 2% of our water use is recycled internally by reusing cooling and non-contact water as process water. Optimising our water use also reduces the need for water pumping and heating, which creates energy savings and makes the purification of the remaining wastewater more efficient.

We continue to explore the potential to use refined wastewater residue in new products. For example, our Skoghall Mill in Sweden is working with the University of Karlstad to create bio-based products such as bioplastics and hydrogen gas from biosludge.

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Long-term energy supply contracts

Board, pulp, and paper production processes are the most energy intensive phases in Stora Enso's value chain, which makes it essential for our mills to have access to a reliable energy supply at a reasonable cost. Stora Enso's energy supply is managed under long-term contracts, direct market access through energy exchanges, efficient combined heat and power production, and shareholdings in power generation companies such as Pohjolan Voima Oyj and Teollisuuden Voima Oyj in Finland. For more information on these partnerships, see **Financials 2019** (Note 14).

Stora Enso is committed to continuous improvement in energy efficiency and energy self-sufficiency. We assess the opportunities to use fuels from biomass residual streams or other low-carbon options in connection with energy investments.

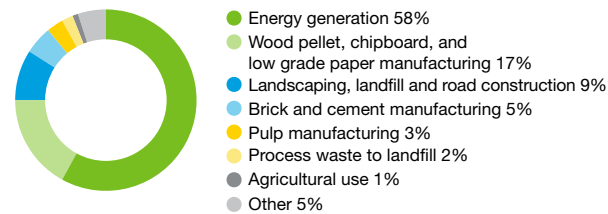
Structured approach to energy management

Stora Enso's Energy Services team is responsible for procuring energy and managing the implementation of our energy strategy. This work involves the hedging of energy prices, managing the trading of emission rights, green certificates, and guarantees of origin, consulting our mills on a wide range of energy topics, and monitoring our carbon dioxide allowance balance. The team also monitors and contributes to developments in energy legislation.

A high proportion of biomass is used in the internal energy production at most of our mills. This renewable energy is generated from by-products and residuals from our own production processes, harvested residues, recovered wood, and waste streams.

The harvesting residuals used for energy within Stora Enso's operations are mainly purchased by our wood supply organisation in connection with wood purchases. Each mill is individually responsible for the procurement of most other fuels. Mills are also responsible for optimising their energy efficiency using internal tools and certified environmental and energy management systems, with support from our energy efficiency teams.

Utilisation of process waste and residual materials¹



¹ Covers all Stora Enso production units, as dry tonnes. Excluding joint operations.

Progress

Materials

Value from waste

During 2019, we continued to monitor our financial value creation from process waste and residuals and the commercialisation of new product applications.

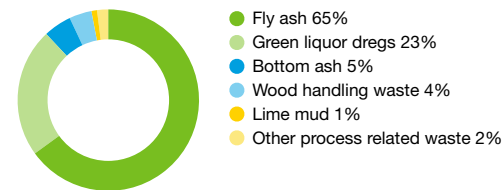
Stora Enso's utilisation rate for process residuals and waste across the Group, including internal and external uses, amounted to 98% in 2019 (98% in 2018). During the year, Stora Enso's revenue from residuals amounted to EUR 30 million (EUR 34 million in 2018). We continued the commercialisation and product development applications for fly ash from several paper mills such as Hylte and Sachsen. A prerequisite for launching fly ash as a product is the registration of the product according to the EU regulation for chemicals (REACH), which was completed during the year. This registration also ensures that the material will be used in a safe and controlled manner according to performed risk assessments.

Stora Enso's fly ash with a product certification will be marketed under the brand VersaLime™ for a broad range of applications. VersaLime™ is a recycled mineral from paper and board production and can replace non-renewable materials to help our customers' become more circular and reduce their carbon footprint. At Sunila Mill in Finland, there has been ongoing work for several years to construct a new wood yard with a load bearing stabilisation layer consisting of a mixture of fly ash from the mill's bark boiler and clay from the ground. When finalised, a total of 37 000 tonnes of fly ash and 6 200 tonnes of green liquor dregs will have been used and covered by asphalt as the top layer.

Other examples of material efficiency and circularity include the beneficial use of fly ash at our Langerbrugge Mill in Belgium and Oulu Mill in Finland. Together with contractors, Langerbrugge Mill recycled approximately 60 000 tonnes of calcium-rich fly

Process waste to landfill¹

68 222 tonnes



¹ Covers all Stora Enso production units. Excluding joint operations. In addition to process waste to landfill, Stora Enso's production units created a total of 2 343 tonnes of non-process waste, and 78 674 tonnes of process waste was sent to on-site storage facilities.



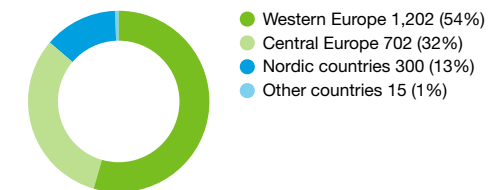
Bark is used in our internal bioenergy generation.

ash for road construction and for the cement manufacturing industry in 2019.

At our Oulu Mill, 3 000 tonnes of fly ash from the solid fuel boiler was granulated onsite by Rakeistus Oy for forest fertilization purposes in 2019, and 8 000 tonnes was used for land construction.

Paper for Recycling: procurement by origin

Thousand tonnes¹



¹ Total amounts of Paper for Recycling (recovered paper and board) procured within these regions for delivery to our mills.

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Hazardous waste

During 2019, Stora Enso's production units generated a total of 4 816 tonnes of hazardous waste, up from 4 123¹ tonnes in 2018. This waste includes oils, solvents, paints, laboratory chemicals, and batteries and is transported and processed by authorised contractors. In addition, 8 575 tonnes of sludge classified as hazardous waste was generated at the disused Falun copper mine in Sweden (8 309 tonnes) and handled by an authorised contractor.

Paper for Recycling

Stora Enso used 2.2 million tonnes of paper for recycling (PfR) in 2019 (2.5 million tonnes), making us one of the largest PfR consumers in Europe. The PfR utilisation rate in our paper and board production was 25% (26%). The figures exclude Dawang Paper Mill in China as the divestment of the mill was completed in October 2019.

In 2019, Stora Enso explored the recycling of paper cups for magazine paper production on a large scale at its Langerbrugge Mill in Belgium. Based on production trials, Stora Enso possesses the technical feasibility to recycle paper cups for use in other paper applications. The trial confirmed that paper cups can be recycled at the mill without any additional process equipment, and that the fibers are well suited for magazine paper production. Stora Enso is now looking into partnerships for the collection and sorting of used paper cups to ensure that this high-quality fiber material is captured and given a second life.

During the year, Stora Enso also conducted a trial with its external partner Fiskeby Board in Sweden to explore possibilities to recycle used paper cups into white-lined chipboard (WLC). The trial confirmed that paper cups can be utilised as a valuable raw material to produce WLC board without any investments or changes to the process conditions at the Fiskeby Board mill.

Chemical safety management

During 2019, Stora Enso continued to roll out a Group-wide Chemicals Management Guideline, which outlines the minimum requirements for all our units globally, including occupational health and safety and environmental safety. The guideline is a part of the internal management systems at our operational units and auditing will be conducted within their existing structures.

Water

Promoting water efficiency

The objective of our KPIs on total water withdrawal and process water discharges is to drive a downward trend from our 2016 baselines of 57 m³ and 27 m³ per saleable tonne of product, respectively. In 2019, our total water withdrawal was 61 m³ per saleable tonne (56 in 2018) and our process water discharges amounted to 29 m³ per saleable tonne (26 in 2018). Despite increasing focus on water efficiency, lower production of board, pulp, and paper partly affected our specific water performance normalised as per tonnes.

We continued to identify mill-specific water-related challenges and opportunities in 2019. Our EUR 25 million investment at Maxau



Recovered fiber is a valuable raw material for many of our mills.

With 2.2 million tonnes of paper for recycling (PfR) used in 2019, Stora Enso is one of the largest PfR consumers in Europe.

Mill in Germany to install a new steam turbine with a closed-loop cooling system and additional biomass storage is expected to be completed in 2020. The cooling system will relieve pressure on the Rhine River through a lower thermal output and by withdrawing considerably less water.

Effluents to water

The wastewater treatment facilities that treat process water from our production processes release effluents to water. These effluents include phosphorus (P), nitrogen (N), chemical oxygen demand substances (COD), and adsorbable organic halogen compounds (AOX). The facilities ensure that discharged water is ecologically safe. Discharging process water that has not been properly treated can contribute to local environmental impacts. Excessive concentrations of phosphorus compounds in water, together with nitrogen compounds and organic substances, can lead to increased biological



Recovered board is used to make specific containerboard grades.

activity in natural watercourses through eutrophication. AOX is a collective term for the amount of chlorine or other halogens bound to organic matter such as wastewater. In 2019, Stora Enso's Group-wide nitrogen effluents to water amounted to 1 150 tonnes (1 180 tonnes), phosphorus effluents to 113 tonnes (110 tonnes), and AOX to 307 tonnes (300 tonnes).

In 2019, Stora Enso began implementing a EUR 3.6 million investment in wastewater treatment improvements at Anjala Mill in Finland. The investment will improve the operation of the biological treatment plant during the winter months and reduce effluent emissions from potential disturbances. The investment will be completed in 2020.

New instructions for legionella

In 2019, Stora Enso rolled out new Group instructions for the management of legionella risks at all production facilities. Legionella is a bacteria that commonly appears in ground and surface waters, and is considered potentially dangerous to humans when inhaled as aerosols (water mist). Legionella can cause respiratory infections such as legionnaires' disease that can lead to pneumonia. Legionella can exist in the pulp and paper industry's biological wastewater treatment facilities, cooling towers, and water ponds.

¹ Restated -1 106 tonnes due to a reporting error.

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In 2019, an outbreak of legionnaire's disease affected a municipality close to Ghent, Belgium. The Flemish Care and Health Agency identified the cooling tower of the power plant at Langerbrugge Mill as one possible source of the infection. The cooling tower was stopped for cleaning and disinfection, and measures were carried out in cooperation with the authorities and international legionella experts. After approval by the Flemish Care and Health Agency, the cooling tower was started again. Investigations are still ongoing. Stora Enso's instructions for legionella were reviewed to capture best practices to manage legionella.

Energy

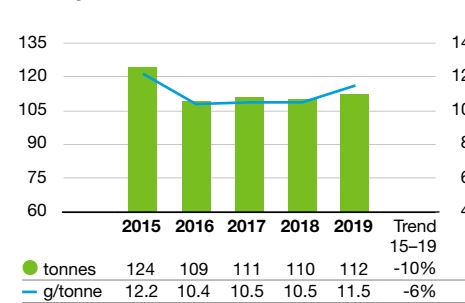
Our Group-wide target is to reduce specific electricity and heat consumption per tonne of pulp, paper, and board production by 15% by 2020, compared with the baseline year of 2010. In 2019, this indicator was 2.9% lower than the 2010 baseline (3.6%¹ in 2018). Specific energy consumption has been affected by structural factors such as production line closures or conversions to new products at our mills, as well as our changing product portfolio.

Water withdrawal and consumption¹

| Million m ³ | 2015 | 2016 | 2017 | 2018 | 2019 | Trend 2015–2019 |
|---------------------------------|------------|------------|------------|------------|------------|-----------------|
| Process water | 306 | 297 | 291 | 291 | 298 | -3% |
| Cooling water (net) | 283 | 301 | 304 | 297 | 297 | 5% |
| Total water withdrawal | 589 | 598 | 595 | 587 | 595 | 1% |
| m ³ /tonne | 58 | 57 | 56 | 56 | 61 | 5% |
| Water consumption | 23 | 23 | 25 | 23 | 22 | -4% |
| m ³ /tonne | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 0% |
| Process water discharges | 272 | 280 | 272 | 273 | 283 | 4% |
| m ³ /tonne | 27 | 27 | 26 | 26 | 29 | 9% |

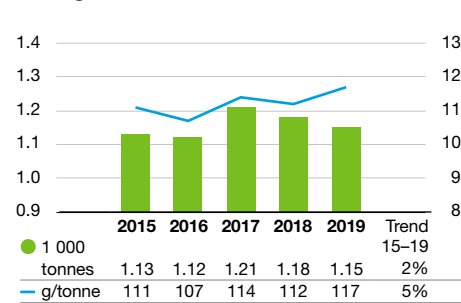
¹ Figures from board, pulp, and paper production units. Normalised figures are reported per unit of sales production.

Phosphorus¹



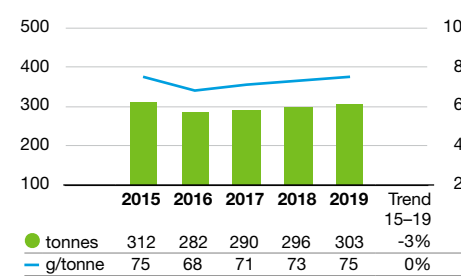
¹ Figures cover board, pulp, and paper production units. Excluding joint operations. Normalised figures are reported per unit of sales production.

Nitrogen¹



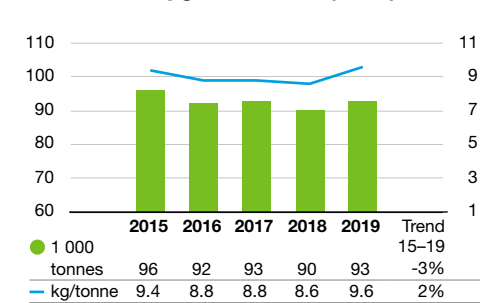
¹ Figures cover board, pulp, and paper production units. Excluding joint operations. Normalised figures are reported per unit of sales production.

Adsorbable organic halogen compounds (AOX)¹



¹ Figures from bleached chemical pulp production units only. Excluding joint operations. Normalised figures are reported per unit of bleached chemical pulp production.

Chemical oxygen demand (COD)¹



¹ Figures cover board, pulp, and paper production units. Excluding joint operations. Normalised figures are reported per unit of sales production.

In 2019, the share of biomass in energy generation at our own mill sites was 82% (81%). Our total energy self-sufficiency rate was 67% (66%²) and our electricity self-sufficiency rate was 61% (58%²).

Energy accounted for 9% of Stora Enso's variable costs in 2019 (10% in 2018).

Energy efficiency high on the agenda

Stora Enso continued to enhance energy efficiency throughout the Group's operations in 2019.

We are committed to the voluntary Energy Intensive Industries Agreement managed by the Finnish Forest Industries Federation (FFI), which aims for a national 4% energy use reduction among its signatories between 2017 and 2020, and a 3.5% reduction (cumulative, in MWh) during 2021–2025.

We also participate in groups that share industry best practice on energy efficiency in Finland and promote energy efficiency at our mills.

¹ Calculation principles for electricity and heat consumption were revised during 2019. The figures for 2018 and 2017 have been restated for comparability.

² Electricity from Pohjolan Voima Oy (PVO), where Stora Enso is a minority shareholder, is considered as own electricity production in the figures.



From hard-to-handle waste to pure bioenergy

Sludge is a by-product of processes carried out in industry and agriculture. It is very wet, so disposing of it is difficult. A pilot project at Stora Enso's Heinola Mill in Finland addresses this challenge in the spirit of bio-based circular economy.

"Using a new technology, bio sludge can now be dried in an energy efficient way and becomes clean and odourless biofuel - without the need for additional fossil-based fuel," says Mikael Sillfors, Development Manager at Heinola Mill.

Read the full article at storaenso.com/sustainability

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Stora Enso's Energy efficiency fund

Stora Enso's central energy efficiency investment fund is another important part of our work. In 2019, this fund amounted to EUR 10 million (EUR 10 million in 2018) and was earmarked for energy efficiency investment projects at our mills. The fund financed 47 (55) projects in 2019, including an air compressor development project at Hylite Mill in Sweden, the installation of a new paper machine drying hood at Sachsen Mill in Germany, and a power boiler operational range improvement project at Varkaus Mill in Finland. When fully implemented, the projects financed in 2019 are estimated to generate annual energy savings of at least 201 GWh (41 GWh electricity and 160 GWh heat). These figures are equivalent to 0.4% of our annual electricity consumption and 0.5% of our annual heat consumption. The projects are estimated to eliminate over 22 000 tonnes of annual direct fossil CO₂ emissions. To support the Group's enhanced focus on water management and water savings, the Energy efficiency fund will more explicitly also support water saving projects starting in 2020, and has been renamed the Energy and water efficiency fund.

Emissions to air

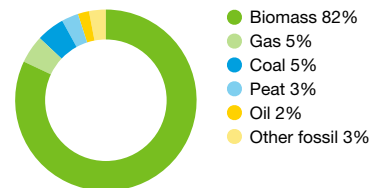
Our atmospheric emissions primarily result from the combustion of fuels used to generate energy. These emissions include carbon dioxide (CO₂), sulphur dioxide (SO₂), nitrogen oxides (NO_x), and fine particles. When not properly managed, CO₂ contributes to global warming while SO₂ and NO_x emissions affect air quality and can cause acid rain and soil acidification. We work to reduce our air emissions by using more renewable energy, improving energy efficiency, and using advanced technologies such as scrubbers and boiler process control systems.

In 2019, Stora Enso's Group-wide SO₂ emissions amounted to 2 870 tonnes (2 900 tonnes in 2018), NO_x emissions totalled 10 180 tonnes (10 840 tonnes), and emissions of fine particles amounted to 1 660 tonnes (1 740 tonnes).



All Stora Enso's board, pulp, and paper mills are part of an energy efficiency best practice network.

Fuels^{1 2}

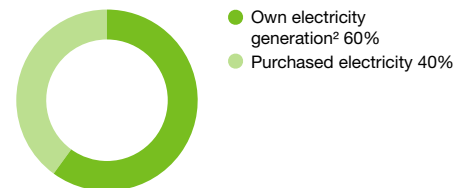


Our total annual fuel consumption was 41.8 terawatt hours (TWh) in 2019 (42.7 TWh in 2018).

¹ Figures cover board, pulp, and paper mills. Excluding joint operations.

² As of Sustainability report 2019 use of fuels is expressed as watt hours.

Electricity generation and sourcing¹

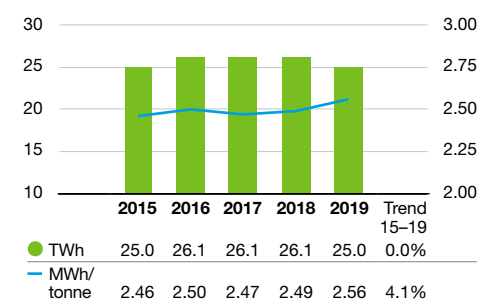


During 2019 we generated and purchased 12.0 terawatt hours (TWh) of electricity and consumed 11.6 TWh (12.6 and 12.3 during 2018). 0.4 TWh was sold (0.3).

¹ Figures cover board, pulp, and paper mills. Excluding joint operations.

² Including electricity from Pohjolan Voima Oyj (PVO), where Stora Enso is a minority shareholder.

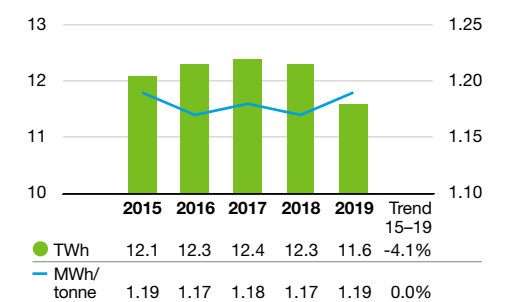
Heat consumption^{1 2}



¹ Heat consumed by board, pulp, and paper mills, excluding sold heat and heat used for electricity generation. Excluding joint operations. Normalised figures are reported per unit of sales production.

² As of Sustainability report 2019 heat consumption is expressed as watt hours.

Electricity consumption¹



¹ Electricity consumed by board, pulp, and paper mills, excluding sold electricity. Excluding joint operations. Normalised figures are reported per unit of sales production.

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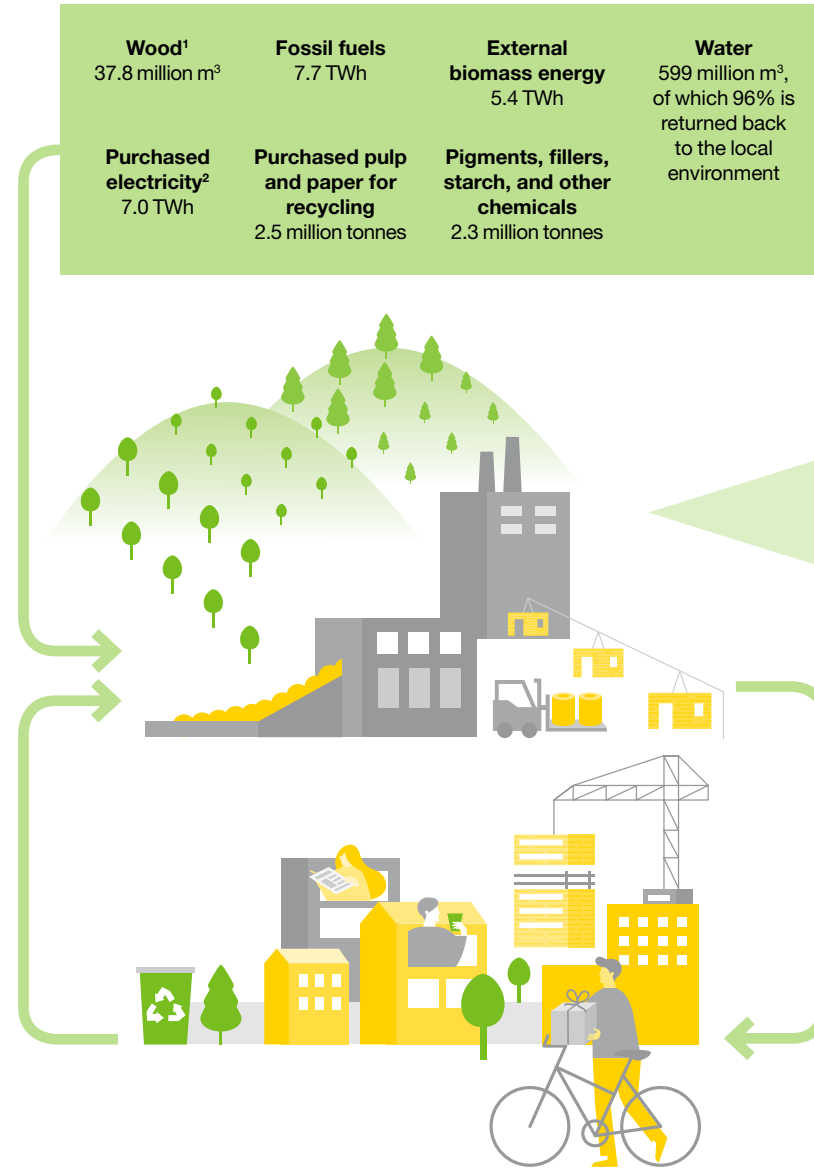
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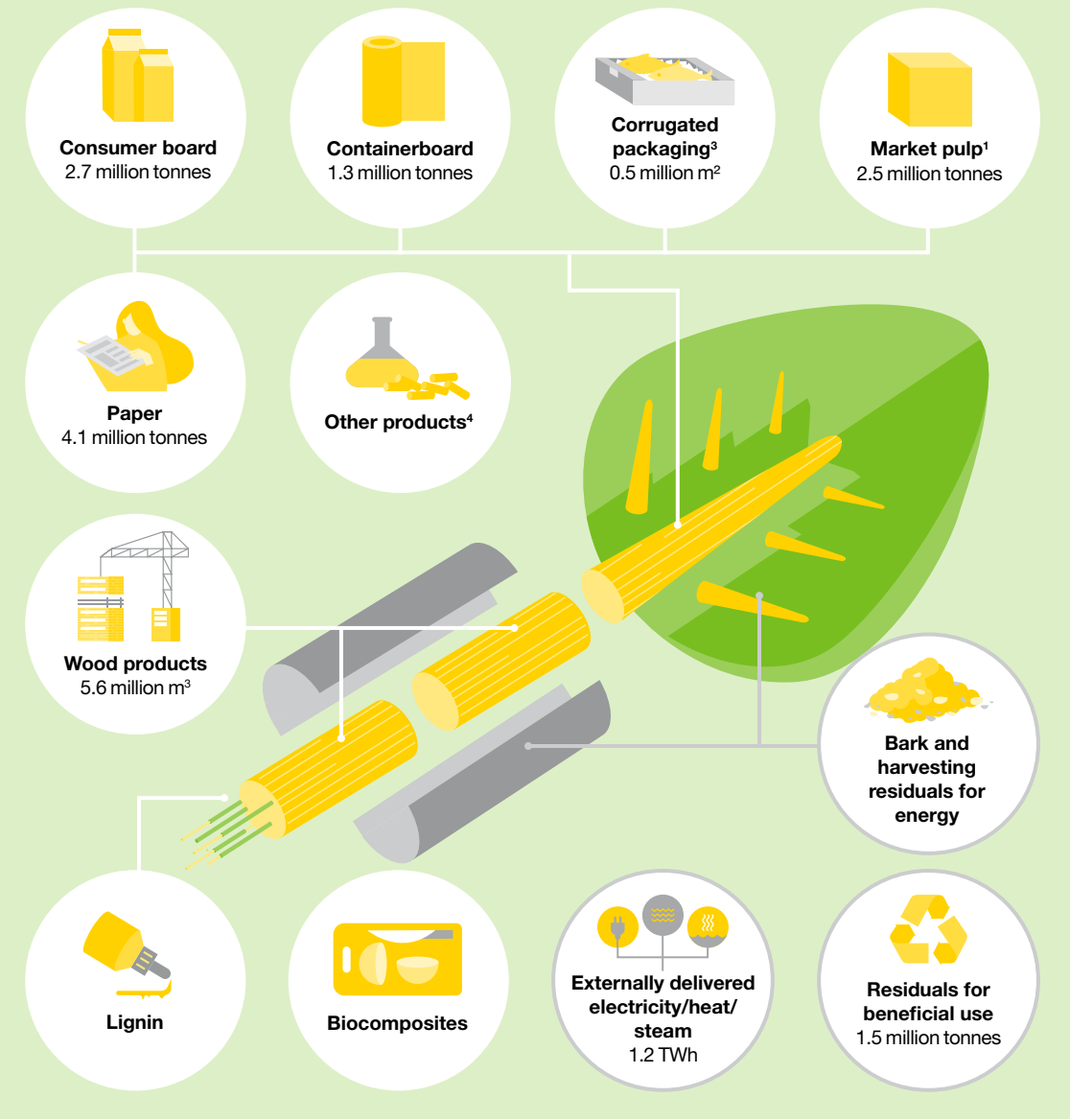
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Efficient use of materials in circular bioeconomy¹



Production in 2019



¹ Covers all Stora Enso production units. Excluding 50%-owned joint operations Veracel and Montes del Plata, except Wood use and Market pulp production figures in which 50% of the joint operations included. The illustration shows the key materials used in our processes, together with our production figures as reported in our environmental reporting system. For a comprehensive illustration on how we create value see our [Strategy 2019](#). ² Electricity from PVO included in purchased electricity. ³ Corrugated packaging production partly based on own containerboard production. ⁴ Other products include mainly pellets, wood chips, tall oil, and turpentine.

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Environmental incidents in 2019

The table below provides details of environmental incidents involving a non-compliance with environmental legislation or permits, or a significant stakeholder concern related to environmental performance.

| Unit | Incident | Corrective actions |
|--|---|--|
| Ostrołęka Mill | SOx air emissions exceeded the mill's environmental permit between October 2018 and Q4 2019. These emissions were caused by insufficient sulphur capture in the recovery boiler bed. The dimethyl disulphide permit limit and the NOx limit from the mill's lime kiln were also exceeded in periodical air measurements made in June and July. These breaches were caused by an insufficient burner on the lime kiln and a lack of continuous measurement. In addition, the night-time noise level was increased between April and July due to a damaged silencer on the exhaust gas channel. | A recovery boiler modernisation project and the implementation of a computerised process control system for the operation of the evaporator and the recovery boiler. New burners were installed in September to ensure the NOx emissions from the lime kiln remain within agreed limits. Investigations are ongoing into the dimethyl disulphide breach, which will be followed up with corrective actions. In addition, frequency of off-line measurements will be increased. Temporarily, a plan to use back-up boilers during night hours and weekends was prepared. A new silencer was later installed on the exhaust gas channel. |
| Anjala/Ingerois integrated mill | Suspended solids in water discharges exceeded the permit limit in February due to previously identified problems in the wastewater treatment plant. | An investment has been approved to overcome the issue with the wastewater treatment plant. |
| Lahti Mill | A leakage of approximately 15 tonnes of starch glue powder mixture used for corrugated board production onto the factory roof occurred in March due to a pipe breakage. A small quantity of the powder was blown by the wind outside the factory area, but there were no environmental impacts or risks to human health. | The pipe was repaired, stakeholders were informed, and preventive actions were taken to avoid similar incidents from occurring in the future. |
| Enocell Mill | Suspended solids in effluents to water exceeded the mill's permit twice in 2019, in July and November. The occurrence in July was due to a recovery boiler logic failure and sudden steam loss causing unstable conditions in the mill. The exceeding in November was caused by runnability problems in pulp washing in connection to the start-up of the mill after a major rebuild, resulting in a high COD load to wastewater treatment. | July: The flow from the wastewater plant buffer pond was stopped and procedures how to manage sudden mill shutdowns were improved focusing on the evaporation tank farm. November: The runnability of pulp washing in fiber line no.2 was stabilised and improved. |
| Heinola Fluting Mill | NOx emissions from the recovery boiler exceeded the annual permit limit due to issues in the chemical system occurring after changes in the boiler. | Corrective measures in air distribution and the position of the black liquor sprays were implemented during the annual shutdown in September 2019. |

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Carbon dioxide

We combat global warming with renewable materials, resource and energy efficient production processes, and sustainable forest management.

Our CO₂e emissions were
25% lower
than the 2010 base-year level

Opportunities and challenges

Contributing to a low-carbon economy

Global warming is one of the greatest challenges of our time, impacting the environment and people through natural disasters, and the loss of ecosystems and livelihoods. As a leading renewable materials company with access to carbon-neutral biomass, Stora Enso is in a unique position to combat global warming. We have an opportunity to pioneer the transition to a fossil-free world. Trees in sustainably managed forests absorb carbon dioxide (CO₂) from the atmosphere and together with wood-based products act as carbon storage. Our products help our customers and society at large to reduce CO₂ emissions by providing low-carbon alternatives to solutions based on fossil fuels and other non-renewable materials.

The first truly global climate agreement was approved at the Paris Climate Conference (COP21) in 2015 and entered into force in November 2016. Ahead of COP21, Stora Enso signed a pledge to combat global warming with science-based reduction targets for greenhouse gas (GHG) emissions. In December 2017, we became the first forest products company to have its climate targets approved by the Science Based Targets initiative. Our targets, which address significant emissions throughout our value chain, were announced in January 2018 and are well below the 2°C limit set by the Paris Agreement.

The Science Based Targets initiative is a collaboration between CDP, World Resources Institute (WRI), the World Wide Fund for Nature (WWF), and the United Nations Global Compact (UNGC). It is also one of the commitments of the We Mean Business Coalition to drive ambitious corporate climate action.

The EU's Emissions Trading System (ETS) is the largest mandatory international system for trading greenhouse gas emission allowances, and a major element of the EU's efforts to combat global warming. The ETS grants 'carbon leakage' status to industries where it is considered that costs related to climate policies might cause businesses to transfer production to countries outside the EU with less demanding requirements. The forest industry in the EU currently has carbon leakage status for its main end products during the current period 2013-2020. It will also continue to enjoy this status for the next 2021-2030 period. The number of free emission allowances will be reduced gradually in the next trading period. This led to further increases to emission allowance prices during 2019.

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The European Commission has presented its strategy for a carbon neutral EU by 2050. The strategy relies on the circular economy, natural carbon sinks, and lifestyle changes and suggests emission cuts from all main sectors including power generation, industry, transport, buildings, construction, and agriculture. As an overall ambition level, it states that by 2050, the EU should achieve net zero greenhouse gas emissions. The role of a competitive EU industry is considered a key enabler in the strategy, and it specifically refers to reaping the full benefits of the bioeconomy. As a result, the European Commission proposed a 'European Green Deal,' which includes the announcement of a European Climate Law to be presented in 2020.

Our policies

A resilient carbon strategy

Agreed in 2016, our carbon strategy states that it is our firm intention to drive down our fossil fuel use, so that we get as close to zero as possible within a decade using technically and commercially feasible means. Relevant policies guiding and steering our efforts to combat global warming include our:

- **Policy for Energy and Carbon**
- **Environmental Guidelines** – a more comprehensive overview of our policy objectives and how we work to achieve them.
- **Supplier Code of Conduct and Practical Guide for Suppliers** – guides us on how CO₂ emissions can be reduced in our supply chain.

How we work

Scenario-driven work

We actively reduce the energy intensity of our operations – and in many places also our dependency on fossil fuels. We measure our progress to reduce greenhouse gas (GHG) emissions as a key performance indicator (KPI). Stora Enso's science-based target is to reduce greenhouse gas (GHG) emissions from our operations by 31 % per tonne of pulp, paper and board produced by 2030 compared with the 2010 base-year. We report on our progress in our [Sustainability report](#) and quarterly [Interim Reports](#).

A key tool in the GHG scenario assessment and the establishment of reduction targets was the Stora Enso Carbon Neutrality Roadmap, which guides our long and short-term fossil CO₂ reduction actions. Read more about our actions in the Progress section of this chapter.

Our Carbon Neutrality Roadmap guides our long and short-term fossil CO₂ reduction actions.



Our mills work systematically to improve energy efficiency, which is one of the most effective ways to reduce our fossil CO₂ emissions.

Improving our energy efficiency

Greenhouse gases emitted by our operations include carbon dioxide, methane and nitrous oxide – with carbon dioxide being by far the most significant. The most effective ways to reduce our direct fossil CO₂ emissions are to further improve our energy efficiency, and to continue to increase our use of biomass fuels from residuals. Significant investments in recent years, particularly in multi-fuel boilers, have achieved large reductions in our fossil CO₂ intensity.

Calculating the climate benefits of our products

Growing trees absorb carbon dioxide from the atmosphere, and the carbon is stored in renewable, fiber-based products even through recycling. Our products help our customers and society at large to reduce CO₂ emissions by providing low-carbon solutions to fossil-based alternatives. During 2019, we worked to calculate our total

climate impact including avoided emissions by product substitution and forest sequestration. Read more about our product substitution potential and total climate impact in **Strategy 2019**. We cooperate with the Swedish University of Agricultural Sciences (SLU) to further develop the scientific methods for calculating climate impact.

Stora Enso regularly carries out Life Cycle Assessments (LCAs) to understand and develop product environmental footprints, including carbon footprints. The LCAs show great potential for renewable products in substituting fossil-based alternatives to cut carbon emissions.

For example, based on our product-specific LCAs, the Trayforma paperboard tray by Stora Enso has a carbon footprint that is up to 64% lower than plastic trays and Stora Enso's EcoFishBox™ climate change impacts and fossil resource depletion is at least 40% lower than traditional polystyrene fish boxes.

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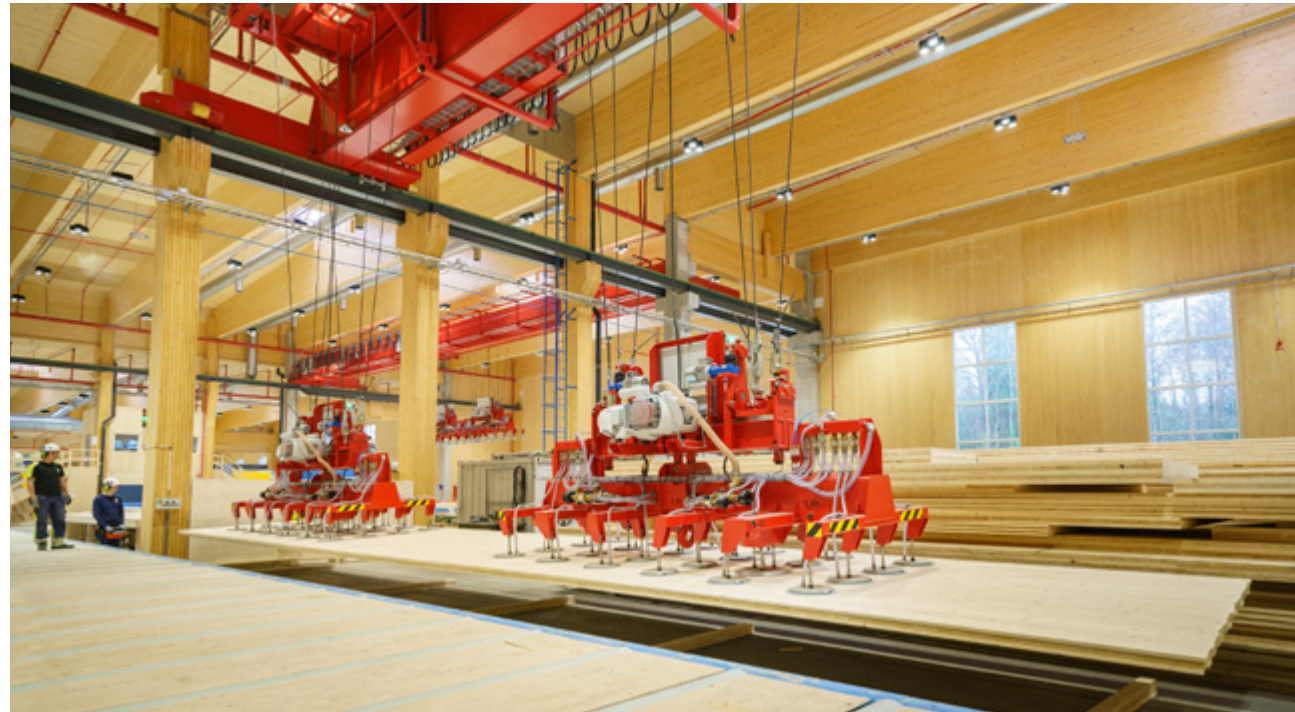
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Massive wood elements such as Cross-Laminated Timber (CLT), pictured here at our Gruvön Mill in Sweden, can store carbon for decades. They also have a smaller carbon footprint than non-renewable alternatives.



Bringing climate reporting to the forefront

Climate reporting is an essential way for companies to show how they are doing their share to combat global warming. Having one set of reporting standards for all, such as the TCFD recommendations, should make it easier for investors and lenders to compare industries and companies. The challenge is that some companies have better resources and expertise available than others, and the work may seem intimidating.

“But the climate challenge on which our survival depends is also intimidating so this is necessary work that must get done. Reporting in line with the TCFD recommendations will help society at large to judge whether companies are truly making decisions for the long-term survival of our planet,” says **Lois Guthrie**, Director of Redefining Value at the World Business Council for Sustainable Development (WBCSD).

Read the full article at [› storaenso.com/sustainability](https://storaenso.com/sustainability)

Substituting fossil-based materials with renewable materials helps combat global warming.

Evaluating risks and opportunities

Stora Enso evaluates the risks and opportunities related to global warming through its annual Enterprise Risk Management (ERM) process, which forms an integral part of the Group's management approach (for more information, see **Financials 2019**). We routinely calculate the financial impacts of potential cost increases in relation to emission allowances, including the impacts of possible increases in energy prices. Our production units systematically work to meet their environmental regulatory requirements and to improve their energy efficiency. Their work is supported by international third-party certified systems such as the environmental management standard ISO 14001 and the energy management standard ISO 50001. For unit-specific information on certifications, see pages 69–71.

Detailed carbon reporting

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

- Carbon dioxide equivalent (CO₂e) emissions from operations we directly own or control, including on-site energy generation facilities and our own processes, power boilers, lime kilns, and on-site vehicles (Scope 1).
- CO₂e emissions related to the electricity and heat we purchase externally for use in our operations (Scope 2).
- Estimated CO₂e emissions from other indirect sources along our value chain (Scope 3).

Reporting according to TCFD

The Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) recommends a framework for disclosing climate-related risks and opportunities that goes beyond current practices. The TCFD recommendations respond to a growing demand for improved financial disclosures from companies in relation to climate risks. In addition to investors and regulators, Stora Enso together with other leading companies have communicated their support for the recommendations through Statements of Support by Accounting for Sustainability (A4S). For more information on Stora Enso's reporting according to TCFD recommendations within the categories of governance, strategy, risk management and metrics, see **Financials 2019**.

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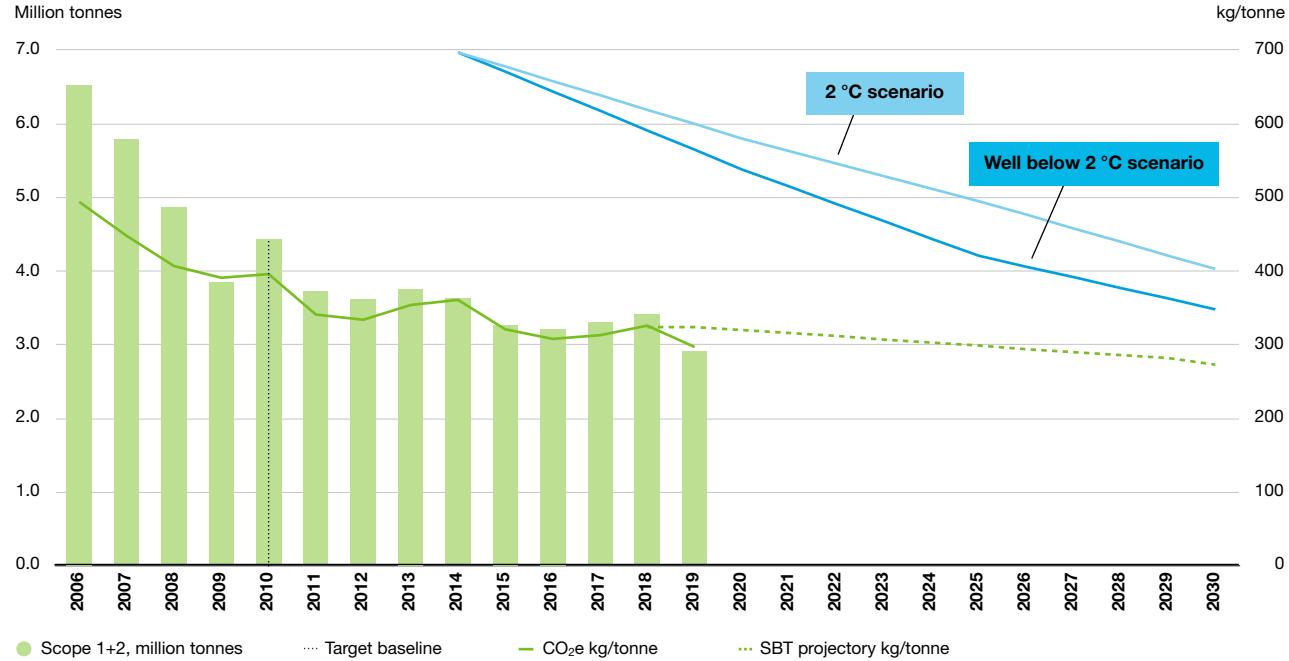
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Stora Enso's GHG performance^{1 3} and scenarios for the forest industry²

Greenhouse gas emissions (GHG) in relation to production



| Scope 1+2 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 ⁴ | 2017 | 2018 ⁵ | 2019 | Target 2030 |
|----------------|------|------|------|------|------|------|------|------|------|------|-------------------|------|-------------------|------|-------------|
| Million tonnes | 6.52 | 5.78 | 4.86 | 3.85 | 4.42 | 3.72 | 3.62 | 3.75 | 3.63 | 3.27 | 3.21 | 3.31 | 3.42 | 2.90 | |
| kg/tonne | 494 | 448 | 407 | 391 | 396 | 341 | 334 | 354 | 361 | 321 | 308 | 313 | 326 | 297 | 273 |

¹ Covering direct and indirect emissions as fossil CO₂ equivalents (scope 1 and 2) from board, pulp, paper, and corrugated production units. Excluding joint operations. Normalised figures are reported per unit of sales production. Includes trading of Guarantees of Origin of electricity.

² GHG reduction pathways for 2 °C scenario and well below 2 °C scenario as CO₂e kg/tonne, based on information from the Transition Pathway Initiative (TPI)* including scenarios data from the Energy Technology Perspectives report by the International Energy Agency.

³ Fossil CO₂e emissions data from our operations (scope 1+2) have been verified at reasonable assurance level since 2015 and calculated according to the GHG protocol.
⁴ Since 2016 our CO₂e performance has been adversely affected by the coal-based energy generation at our Beihai Mill in China.

⁵ Historical figures recalculated due to accuracy improvements.
* Asset owner-led initiative supported by Grantham Research Institute and London School of Economics.

SBT = Science-based target

All our units report quarterly on carbon emissions 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 Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). In 2019, we continued to have the reporting of our direct and indirect fossil CO₂e emissions (Scopes 1 and 2) externally assured to a Reasonable Level. For more information, see page 72.

External recognition and partnerships to combat global warming

In February 2020, Stora Enso was top-ranked in greenhouse gas management for the third time in a row. The Transition Pathway Initiative (TPI) is an asset owner-led initiative supported by the Grantham Research Institute and London School of Economics. It evaluates and tracks the quality of a company's management of greenhouse gas emissions and of risks and opportunities related to

the low-carbon transition. It also evaluates how a company's future carbon performance would compare to the international targets and national pledges made under the Paris Agreement. In its assessment of how 18 of the largest paper producers globally are preparing for the transition to a low-carbon economy, TPI top-ranked Stora Enso in both management quality and carbon performance. Stora Enso ranked on the highest possible level in management quality and had an emissions reduction target set until 2030, aligned with keeping the global temperature rise below 2°C.

Stora Enso endorses the Corporate Leaders Group (CLG) policy statement on net-zero strategies. The CLG brings together European business leaders to accelerate progress towards a low-carbon, sustainable economy. In 2019, we contributed to the CLG report 'Forging a carbon-neutral heavy industry by 2050: How Europe can seize the opportunity.'

Stora Enso is a member of the We Mean Business coalition. The coalition brings together non-profit organisations, businesses, and investors who recognise that transitioning to a low-carbon economy is the only way to secure sustainable economic growth.

As a partner of the World Green Building Council in Europe, we supported the launch of the 'Bringing Embodied Carbon Upfront' report, with the vision of net zero embodied carbon for the construction industry.

Progress

Our science-based targets

In 2019, our CO₂e emissions per saleable tonne of board, pulp, and paper were 25% lower than the 2010 benchmark level (18% lower in 2018). The performance improved mainly due to a significant new contract to purchase certified renewable electricity from the national pool in Poland and to the use of less fossil-intensive purchased electricity at our Finnish mills and Beihai Mill in China. In absolute terms, our direct and indirect CO₂e emissions were 34% lower than in 2010. Direct CO₂e emissions per unit of sales production were 16% lower than in 2010. The CO₂e emissions resulting from the generation of purchased electricity and heat during 2019 were 66% lower than in 2010 per unit of sales production.

The total direct and indirect CO₂e emissions from Stora Enso's board, pulp, and paper mills amounted to 2.90 million tonnes in 2019 (3.42 million tonnes in 2018).

Sixteen of Stora Enso's mills use production process residuals to generate renewable energy and distribute it to local district heating systems (approximately 90%) and industrial partners (approximately 10%). In most cases, the heat supplied from our production units directly reduces the local use of oil and other fossil fuels. In 2019, a total of 0.9 TWh of heat was sold to these district heating systems serving thirteen communities (1.1 TWh in 2018). Using this amount of renewable energy instead of, for example, light fuel oil for heating resulted in estimated emission reductions amounting to 0.23 million tonnes of fossil CO₂ (0.29 million tonnes).

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Investing in a low-carbon future

We strive to increase the proportion of biomass in our internal energy generation. In line with our policy to give preference to energy from low-fossil carbon sources, Stora Enso has invested EUR 25 million to boost green energy generation at Maxau Mill in Germany. The project will be completed during 2020. The investment is expected to annually save 50 000 tonnes of CO₂ emissions from 2020. For more information, see page 37.

In 2019, an industrial scale pilot plant was built at Heinola Mill in Finland, to convert biosludge into renewable biofuel. The facility will recycle 16 000 metric tonnes of biosludge a year and reduce annual carbon dioxide emissions. For more information, see page 38.

Another important part of our work is our central energy efficiency investment fund. When fully implemented, the projects financed in 2019 are estimated to eliminate over 22 000 tonnes of direct fossil CO₂ emissions annually. For more information, see page 39.

Investigating non-fossil fuel alternatives for Beihai Mill

At our Beihai Mill in Guangxi province, China, coal is currently the only feasible energy source for an industrial project of this scale in the region, as there are inadequate sustainable supply chains for non-fossil fuels at present. We continue to investigate long-term options to gradually move away from coal to biomass and other non-fossil fuels. The power boiler at Beihai Mill is technically able to

use a variety of fuel mixes. In 2019, modest amounts of wastewater sludge, forest residuals and other side streams from our production processes were used in the boiler. The medium-term objective is to replace 10 000 tonnes of coal in annual fuel use with these steps. A power supply contract with low-carbon nuclear electricity has reduced the CO₂ emissions from purchased electricity by over 50 000 tonnes compared with 2018. For more information about our coal sourcing, see page 63.

Carbon neutral emissions

Carbon neutral CO₂ emissions are fossil-free emissions generated during the combustion of biomass-based fuels sourced from sustainably managed forests¹. These emissions are carbon neutral as the forests are regenerated and the new generation of trees absorb CO₂ while growing. When forests are sustainably managed, this cycle can continue indefinitely. Stora Enso's operations utilise renewable biomass fuels from forest and process residuals to a large extent, which means that the proportion of carbon neutral CO₂ emissions in our total emissions is high. In 2019, 81% (80%) of the total direct and indirect CO₂ emissions from our own operations were carbon neutral.

Our carbon footprint

Direct emissions from our operations account for 23% (22% in 2018) of our carbon footprint, while emissions related to the electricity and

heat that we purchase for use in our operations account for 6% (9%) of our total carbon emissions.

We estimate that 71% (69%) of the emissions in our carbon footprint are generated elsewhere along our value chain. The majority of our emissions are generated in the sourcing and manufacturing of our raw materials and services (37% of the total Scope 3 emissions); in the further processing of our products by customers (43%); and in the transportation of raw materials to our mills and our final products to our customers (20%). To identify potential for further reducing our emissions in Scopes 1, 2, and 3, we have strengthened our internal steering processes in accordance with the actions agreed in our science-based targets.

We continued to implement methodologies for calculating the quantities of carbon sequestered in forests and plantations owned and managed by Stora Enso and our associate companies. We also continued our work with external experts to identify a credible methodology to calculate the positive substitution effect our renewable products have when compared with fossil CO₂ intensive alternatives.

Value chain emissions

The CO₂ emissions generated during the transportation of our raw materials and products, which is the most significant environmental impact associated with our logistical operations, are mainly produced by external service providers. Transportation accounts for 20% of all our Scope 3 CO₂ emissions. In 2019, we introduced High Capacity Transport (HCT) in our logistics in Finland and Sweden. These longer and more efficient trucks reduce fuel consumption and emissions per unit of cargo transported and the number of trips required to move the same amount of freight. With High Capacity Transport, there is potential to halve CO₂ emissions from road transportation. In 2019, we introduced HCT in Finland for a limited number of routes and achieved a 10% reduction in CO₂ emissions for transportation when using HCT transport compared with normal truck deliveries.

Sea transport accounts for approximately 89% of all our product transportation by weight and distance, while road and rail transportation account for 9% and 2% respectively.

Our commitment to science-based targets includes engagement targets for Scope 3. To reduce emissions in the value chain, Stora Enso commits to having 70% of its non-fiber raw material suppliers and downstream transportation suppliers in terms of spend set their own greenhouse gas (GHG) reduction targets by 2025, towards the aim of adopting science-based GHG reduction targets by 2030.

We use sustainability criteria in the tendering phase of our sourcing process and collecting data on supplier performance. Suppliers now need to respond to a set of questions about their financial stability, CO₂ emissions, and accident rates. These criteria are part of every tender, regardless of previous contracts with the same supplier. For more information, see page 61.

In addition, we will educate 100% of our customer-facing staff on the advantages of setting science-based targets by 2020.

In 2019, 81% of the total CO₂ emissions from our own operations were carbon neutral.



With High Capacity Transport, there is potential to halve CO₂ emissions from the road transportation of our materials and products.

Stora Enso's carbon footprint 2015–2019¹

| | Fossil CO ₂ equivalent (million tonnes) ³ | | | | | Trend 15–19 |
|---|---|--------------|--------------|-------------------|--------------|-------------|
| | 2015 | 2016 | 2017 | 2018 ² | 2019 | |
| Scope 1: Direct emissions from our operations. | 2.24 | 2.40 | 2.34 | 2.48 | 2.38 | 6% |
| Scope 2: Emissions from purchased energy consumed in our operations. ³ | 1.19 | 0.97 | 1.10 | 1.08 | 0.66 | -45% |
| Scope 3: Emissions from other sources along our value chain. ⁴ | 7.26 | 7.65 | 7.97 | 7.89 | 7.42 | 2% |
| Total | 10.69 | 11.02 | 11.41 | 11.45 | 10.46 | -2% |

¹ Covers all Stora Enso production units. Excluding joint operations. Includes the trading of Guarantees of Origin for electricity.

² Historical figures for 2018 recalculated due to accuracy improvements.

³ The CO₂ factors we use for purchased energy (scope 2) largely follow the market-based methodology, which means that almost all our units apply CO₂ factors provided by their energy suppliers. When applying currently available location-based factors our scope 2 emissions for 2019 are 1.08 million tonnes of CO₂ equivalents (1.30 million tonnes in 2018).

⁴ Historical scope 3 emissions recalculated bi-annually against the most recent methodology in order to ensure comparability.

¹ Recommendations on Biomass Carbon Neutrality, WBCSD 2015.

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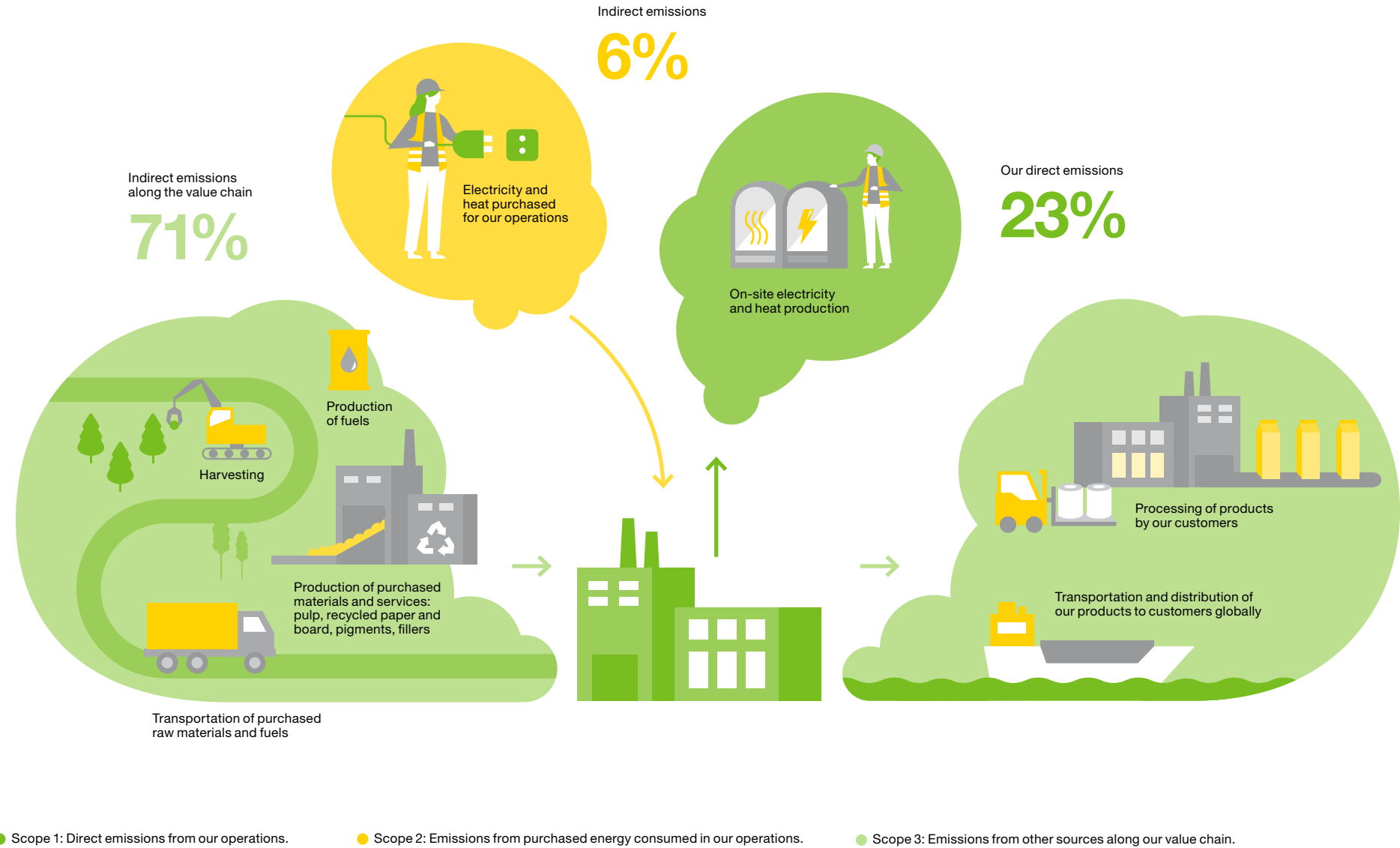
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Stora Enso's carbon footprint¹



¹ Covers all Stora Enso production units, a total of 10.46 million tonnes of fossil CO₂ equivalent (11.45 million tonnes in 2018). Excluding joint operations.

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Forests, plantations, and land use

Sustainable forest management safeguards forest health and productivity, helps combat global warming, and protects biodiversity. Forests have an important role to play in the transition to a fossil-free world.



Forest certification coverage for lands owned or managed by us

98%

Opportunities and challenges

Combating global warming with forestry

Forests and plantations are an increasingly important part of the wider global sustainable development agenda, particularly in relation to combatting global warming. As a renewable natural resource, wood represents a favourable alternative to fossil-based and other non-renewable materials. Growing trees absorb carbon dioxide (CO₂) from the atmosphere, and together with wood-based products act as carbon storage. Sustainable forest management ensures that new generations of trees replace those that are logged.

The role of forests in combatting global warming has been broadly recognised. The Intergovernmental Panel on Climate Change issued the 'Climate Change and Land' report in 2019 that emphasised sustainable land management. For Stora Enso, it is essential that any regional or national policy fully utilises the potential of sustainable renewable materials and supports the transition towards a circular economy.

Global warming entails physical challenges and opportunities in relation to forests and plantations but also people, which highlights the importance of sustainable forestry as a solution to climate change. Changing patterns of temperature, wind, and rainfall can all be expected to impact our operational environment. Well-managed forests and plantations can make entire ecosystems more resilient to negative impacts, and even benefit from the positive effects. In addition to global warming, biodiversity loss due to unsustainable land use is a global challenge that emphasises the need to conserve natural ecosystems.

Using forests or land for tree plantations may also impact the human rights of forestry workers and local communities. Maintaining good dialogue with community members helps to ensure that their rights to, for example, property, self-determination, and cultural activities, are respected.

Global challenges such as population growth, the increasing demand for agricultural land, and the widening gap between the supply and demand for wood, all require us to use natural resources even more efficiently, and to produce more raw materials from less land.

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We established the new Forest division to add transparency and manage our forest assets.

Our policies

Committed to sustainable wood and fiber sourcing

Stora Enso's policy on **Wood and Fiber Sourcing, and Land Management** covers the entire cycle of forest and tree plantation management. The policy requires sustainable forest management through responsible sourcing and land use – to safeguard the health and ecological functions of ecosystems and to help conserve biodiversity, soil, and water resources. To achieve this, we maintain open dialogue with our stakeholders.

Other relevant policies that promote sustainable forestry include our:

- **Environmental Guidelines** – a more comprehensive overview of our policy objectives and how we work to achieve them.
- **The Stora Enso Code** – our code of conduct.
- **Supplier Code of Conduct** – our demands on suppliers.

How we work

Ensuring the sustainability of fiber

Stora Enso's approach to responsible forest and tree plantation management is based on the economic, social, and environmental aspects of sustainability. Compliance with national legislation and regulatory obligations is only the starting point for our work. We actively support and implement voluntary forest conservation and restoration measures on lands owned, leased, and managed by Stora Enso, and in other areas where we purchase wood.

Stora Enso continued its cooperation with the World Wildlife Fund for Nature (WWF) in several countries in 2019. Initiatives included the New Generation Plantations (NGP) platform, which focuses on the institutional and technological aspects of responsible plantation management.

We are active members in numerous local and global forestry associations, networks, and programmes. Stora Enso has been a member of the Forest Solutions Group (FSG) of the World Business Council for Sustainable Development (WBCSD) since the late 1990s and has co-chaired it since 2018. During 2019, we actively participated in the implementation of the Forest Sector SDG Roadmap. For more information, see page 10. We also continued to support and participate in The Forests Dialogue (TFD), which is a platform for multi-stakeholder discussion and collaboration on the most pressing local and global issues facing forests and people.



We always ensure that forests and tree plantations are duly regenerated. Regeneration is usually done through active planting or sowing.

Stora Enso and the Forest Stewardship Council (FSC) have an international partnership agreement to establish a long-term strategic collaboration to develop and promote sustainable forestry. During 2019, the focus was on expanding FSC group certification among private forest owners in Finland. Stora Enso promotes all main forest certification systems and is committed to the responsible sourcing of wood and fiber from only sustainably managed forests and tree plantations.

Strategic approach to forestry operations

Our wood supply strategy is based on competitive wood supply, innovation, and sustainable forest management (read more in **Strategy 2019**). To cover all aspects of sustainability in our forest and plantation operations, we apply the same comprehensive wood procurement

process in all our operating regions. Our wood supply organisation consists of regional units that source wood for Stora Enso mills. Key elements in this work include knowledge sharing, personnel rotation, contractor support, centralised coordination of innovation projects and the use of digitalisation. Our wood procurement process covers the entire management cycle in forests and plantations – from planning to harvesting and regeneration.

We use long-term planning to ensure our forestry operations are preparing and adapting to the changing climatic conditions. Stora Enso evaluates risks and opportunities related to global warming, and forest and land use through the annual Enterprise Risk Management (ERM) process, which forms an integral part of the Group's management approach (for more information, see **Financials 2019**).

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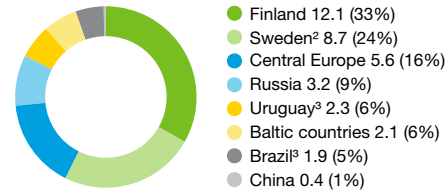
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Responsible forestry

Stora Enso's wood comes from three sources: company-owned forest; company-owned plantations; and third-party suppliers. In 2019, 87% (89%) of Stora Enso's wood came from managed semi-natural forests in Europe, most of which are privately owned. We work together with forest owners to identify sensitive forest areas in need of protection. Our experts are trained to identify such areas and we regularly consult the authorities on these matters. Forest planning involves finding ways to optimise wood production and conservation.

Wood procurement by region¹

36.3 million m³



¹ Total amounts of wood (roundwood and chips) procured within these regions for delivery to our mills (million m³, solid under bark). Excluding internal wood chip deliveries.

² Including wood procured from Norway.

³ Figures for Brazil and Uruguay include 50% of the wood procurement of our joint operations Veracel and Montes del Plata.

In 2019, 13% of Stora Enso's wood came from tree plantations (11%). When establishing new plantations, we use internationally approved principles such as the Food and Agriculture Organisation's (FAO) Voluntary Guidelines on Planted Forests. Our commercial plantations are also certified to ensure all aspects of sustainability are taken into consideration. Stora Enso never establishes plantations in natural forests, protected areas, or water-sensitive locations. We only use land with low biodiversity value, such as former pasture land. Stora Enso's employees and forestry contractors are given on-the-job training in ecological management, and we regularly monitor the impacts of our operations on biodiversity, soil, and water resources.

As we recognise that our plantations are an integral part of local land use, we evaluate and define sustainable land use practices specifically for each location. After determining the scope of expected impacts and possible remedies, we decide whether or not to proceed with a proposed project. Stora Enso subsequently remains in constant dialogue with stakeholders and strives to ensure that land contracts are legitimate and fair. For more information about human rights in land acquisition and management, see pages 14–15.

Forest regeneration

We always ensure that the forests and plantations where we harvest wood are duly regenerated. This is often done through active planting or sowing, although in many areas active regeneration

is complemented by natural seed dispersal from nearby forests, by leaving seed trees standing in the harvesting area, or by coppicing. Whatever the methods used, we always ensure the forest will regenerate.

Protecting biodiversity

Sustainable forest management safeguards forest health and productivity and protects biodiversity – while securing the long-term availability of our renewable resources. Therefore, we closely monitor the management of the forests and plantations from which we source wood. Wood harvesting is planned to suit the particular characteristics of each harvesting site, making use of appropriate harvesting methods and technologies. Harvesting volumes are aligned with the long-term carrying capacity of particular forests and plantations.

In Northern managed semi-natural forests, biodiversity is maintained and enhanced in both areas for wood production and set-aside areas. As trees take many years or decades to mature, long-term forestry planning is essential. This involves ecological landscape plans and biodiversity assessments to identify, conserve, and restore vital ecosystems and ecological features. For examples on how we

implement biodiversity management practices in Northern forests, see page 53.

Stora Enso is also cooperating with WWF Finland to promote the conservation and sustainable use of forests. This work includes promoting alternative harvesting practices among private forest owners.

In 2019, Stora Enso established a long-term co-operation with the Swedish University of Agricultural Sciences (SLU) to further develop biodiversity management in Nordic forests.

In fast growing tree plantations, the landscape typically consists of a mosaic of areas for both intensive wood production and biodiversity conservation.

In Brazil, our joint operation Veracel goes beyond regeneration by conserving and restoring areas of natural Atlantic Rainforest. All Veracel's tree plantations were established on degraded pasture lands, and no rainforest has been converted into plantations. When Veracel's plantations were established in 1991, less than 7% of the original Atlantic rainforest was left in the region following extensive logging and clearing for cattle ranching between the 1950s and 1980s. Since the plantations were established, Veracel has worked systematically to protect and restore local biodiversity.



In forestry operations, the amount of deadwood is increased to maintain biodiversity by leaving decaying trees untouched and avoiding the removal of forest floor deadwood.

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Approximately half of Veracel's 213 000 hectares of land are dedicated to rainforest preservation and restoration. Veracel aims to restore approximately 400 hectares of rainforest habitat every year by planting native species. In total, 6 600 hectares of forest have been restored between 1994 and the end of 2019. This work is part of a regional restoration programme that helps connect the remaining areas of valuable natural habitat to each other with forest corridors that enable wildlife to move more freely from one area to another. Veracel's significant contribution to the conservation of natural Atlantic rainforest and its rich biodiversity has been recognised by both the Brazilian authorities and international stakeholders.

The Veracel Station visitor centre, established in an area of preserved rainforest habitat, conducts research, conserves native and endangered ecosystems, and raises environmental awareness among visitors. Since 2015, the visitor centre has also developed ecotourism, with a special focus on birdwatching.

In 2019, Montes del Plata signed a cooperation agreement with Uruguayan NGO Aves Uruguay. Through this agreement, both organisations will promote the sustainable management of natural grasslands. For more information, see page 26.

In 2019, Stora Enso supported a migratory bird protection project in Beihai, China, which is an important flyway for birds.

Promoting sustainable forestry management through forest certification

All roundwood, chips, sawdust, and externally purchased pulp supplied to our mills come from sustainable sources. We use a range of tools to ensure this, and to guarantee the sustainability of each part of the forest management cycle. These tools include forest certification and third-party traceability systems such as the Forest Stewardship Council's (FSC) Chain of Custody/Controlled Wood scheme, the Chain of Custody/Due Diligence System of the Programme for the Endorsement of Forest Certification (PEFC), and the ISO 14001 environmental management standard. In addition, our Supplier Code of Conduct complements these tools by imposing strict contractual requirements on our suppliers.

We work actively with our stakeholders to promote sustainable forest management and the wider use of certification systems. As certification programmes cover all three aspects of sustainability (environmental, social, and economic), they are an important indicator of responsible forestry.

We regularly audit our suppliers and work together with respected local institutions to ensure everything is done according to the standards set by certification schemes and our own policies.

We work with our stakeholders to promote sustainable forest management and the wider use of certification systems.



Approximately half of Veracel's 213 000 hectares of land is dedicated to the conservation and restoration of rainforest.

Tree breeding

Stora Enso continuously works towards the long-term goal of improving the productivity and quality of the eucalyptus trees grown in our plantations, so as to sustainably enhance wood production per unit of land. Tree breeding primarily targets increased biomass production (i.e. volume and density) and cellulose yield. Other objectives might include improved rooting or resistance to frost, drought, pests, or diseases, depending on local conditions and the species in question. We test and apply modern scientific tools for tree improvement and the management of genetic diversity. This may involve selecting 'elite trees' or conducting marker-assisted breeding and genetic engineering.

Our genetic engineering activities are in the research phase. As with traditional clone improvements, it will take many years to develop genetically engineered clones for commercial use. During 2019, we continued the process to establish field trials in areas totalling less than five hectares in Brazil. These trials fully comply with relevant national regulations. Stora Enso will not carry out any trials considered by the authorities to be unsafe or otherwise not permitted. We currently have no plans to plant genetically engineered trees in any of our commercial plantations.

Progress

Wood from sustainable sources

In 2019, the shareholders of Bergvik Skog AB, a Swedish forest holding company, finalised the previously announced restructuring of its ownership. Stora Enso's forest holdings in Sweden are 1.41 million hectares, of which 1.14 million hectares is productive forest land. Stora Enso's Swedish forest assets are 100% covered by forest certificates. In 2019, Stora Enso also announced that it will establish a Forest division as of 1 January 2020. The new division includes Stora Enso's Swedish forest assets and its 41% share of Tornator with the majority of its forest assets located in Finland. The Forest division also includes wood supply operations in Finland, Sweden, Russia and the Baltic countries.

Globally, Stora Enso owns or manages lands covering a total area of 2.35 million hectares. We follow our progress on responsible forestry with a key performance indicator (KPI) that measures the proportion of land in wood production and harvesting owned or managed by Stora Enso that is covered by forest certification schemes. Our target is to maintain the high level of 96%. In 2019, coverage amounted to 98% (96% in 2018).

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We work together with forest owners to identify sensitive forest areas in need of protection.

The proportion of third-party certified wood in our total wood supply was 75% in 2019 (76% in 2018). We know the origin of all the wood we use and 100% comes from sustainable sources.

In 2019, the total amount of wood (including roundwood, wood chips, and sawdust) delivered to our mills was 36.3 million m³ (solid under bark) (38.7 million m³ in 2018).

In Russia, we continued to work with WWF. In 2019, Stora Enso and WWF Russia celebrated 20 years of cooperation for the development and wide implementation of sustainable forestry practices in the country. During the year, with Stora Enso's support, WWF Russia organised training related to the social aspects of forestry. The total area covered by group forestry certifications in Russia was 1.31 million hectares (1.31 million hectares in 2018). Our Russian subsidiaries have been FSC certified since 2006, and the lands managed by Stora Enso in Russia through long-term harvesting rights are included

in the total certified area. For further details, see the table on page 54. We also continued our support for the Boreal Forest Platform (BFP), a stakeholder forum organised by WWF Russia.

In Finland, Stora Enso offers FSC forest certification services to private forest owners. In 2019, the number of members in Stora Enso Wood Supply Finland's FSC group grew to 285 private forest owners (135 in 2018) corresponding to 54 000 hectares (over 30 000 hectares at the end of 2018).

Since 2011, Veracel has promoted group certification among its tree farmers in Brazil. In 2014, Aspex, an association representing certified tree farms, took over the management of the certification process, using certificates granted by both FSC and Cerflor (PEFC). By the end of 2019, dual forest certificates had been obtained by 75 farmers (73 at the end of 2018) for areas totalling 38 000 hectares (38 000), including 16 000 hectares (16 000) planted with eucalyptus.

Stakeholder concerns and dialogues

Stora Enso recognises that the areas where we operate are of value to different stakeholders. We have therefore adopted an integrated approach to land use around our plantations. This includes applied innovative land use models in Laos, Uruguay, and Brazil to benefit local farmers and communities as well the company. For more information on these integrated land use practices, see pages 25–26.

In 2019, sustainable forestry was of stakeholder interest, with environmental NGOs widely calling for increased forest protection. In our stakeholder communications during the year, we stressed our commitment to forest certification, wood traceability, biodiversity conservation, and open stakeholder dialogues, and that we always ensure that all the wood we use comes from sustainably managed sources. We believe that the most sustainable way to protect high conservation values is through national and regional multi-stakeholder processes. During the year, Stora Enso engaged in regular dialogues with NGOs and other stakeholders. We also encouraged our business partners and NGOs to participate in such engagements.



Building models for sustainable forestry

In 2019, WWF-Russia and Stora Enso celebrated 20 years of cooperation in Russia. The Pskov Model Forest project is one of the landmarks of the joint efforts to improve sustainable forestry. Why was that project established and what have we learnt?

"From the beginning, our goal in cooperating with WWF was to improve sustainable forestry practices in Russia, to ensure that wood procurement is responsible and that environmental and social aspects are taken into account in forestry," says **Olga Rogozina**, Sustainability Manager at Stora Enso Wood Supply Russia. "For example, conserving biodiversity in forests is an important part of sustainable forest management."

Read the full article at [› storaenso.com/sustainability](https://storaenso.com/sustainability)

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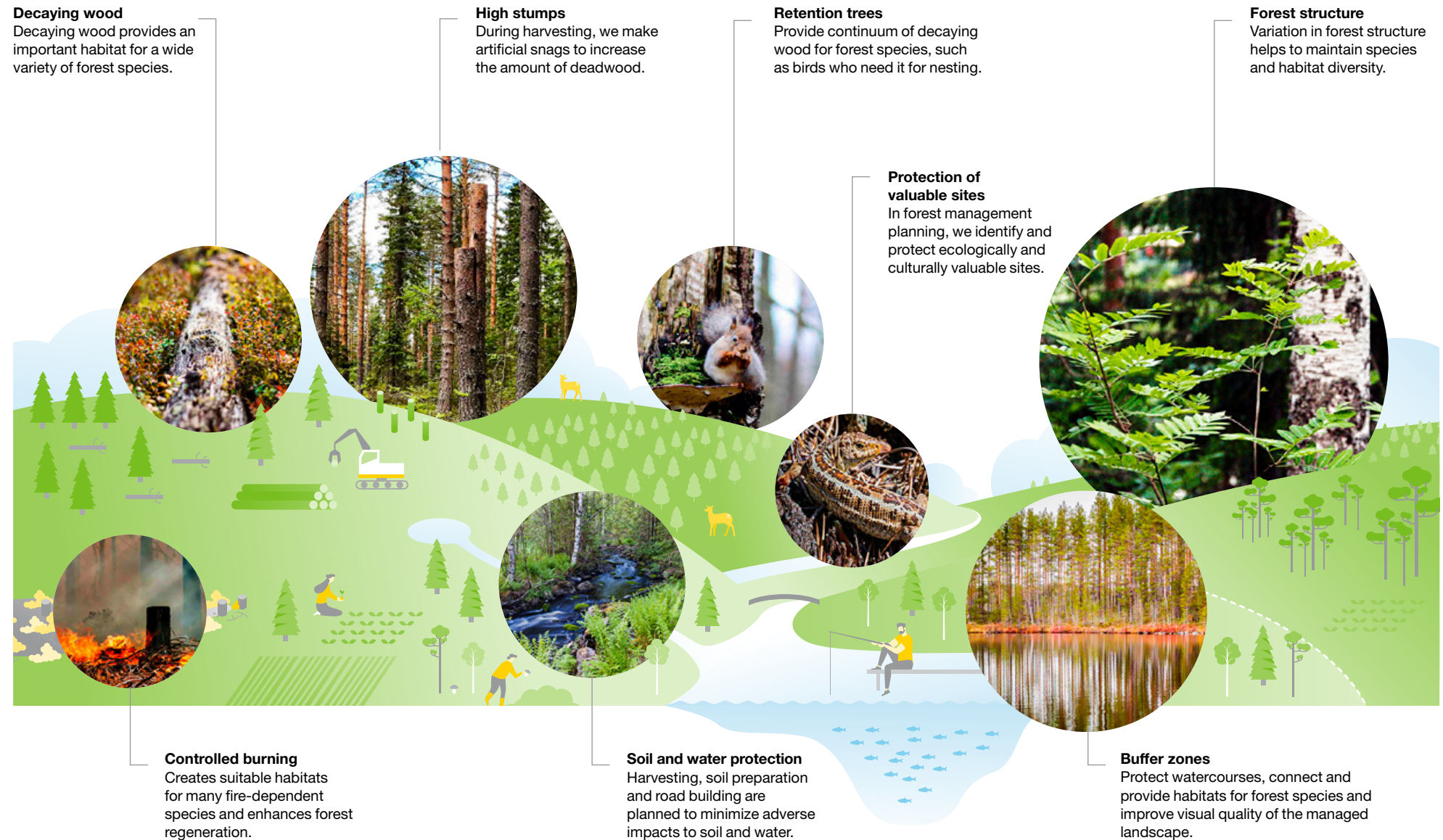
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Biodiversity management practices in Northern forests



Read more at storaenso.com/biodiversity.

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Forests, plantations, and land owned by Stora Enso¹ as of 31 December 2019

| Unit | Area | Certification coverage | Details of local landscapes and protected areas |
|---|--|---|---|
| Swedish forest holdings | 1 408 000 ha, of which 1 140 000 ha productive forest land | PEFC and FSC for 1 408 000 ha | Protected areas consist of low productive areas, voluntary set-aside areas and forests in high altitudes. |
| Wood Supply, Estonia | 140 ha, of which 120 ha productive forest land | | No protected areas within this area. |
| Montes del Plata plantations and lands, Uruguay (joint operation with Arauco) | 190 000 ha, of which 103 000 ha planted | PEFC and FSC for 190 000 ha | Mainly pasturelands and agricultural fields. Remnants of native ecosystems, such as grasslands and riparian forests, are protected within the company's lands. |
| Veracel plantations and lands, Bahia, Brazil (joint operation with Suzano) | 213 000 ha, of which 79 000 ha planted for pulp production | CERFLOR (PEFC) for 188 000 ha; FSC for 188 000 ha | Dominated by pasturelands cleared from the Atlantic rainforest between the 1950s and 1980s. 108 000 ha of Veracel's lands are protected, including a 6 000 ha Private Natural Heritage Reserve. These protected areas mostly consist of native forest remnants at different stages of regeneration. |

¹ Including operations where Stora Enso's shareholding is at least 50% and size of the area exceeds 100 hectares. In addition to the forest and plantation areas listed above, Stora Enso owns 41% of Tornator, which owns 0.6 million hectares of forestland in Finland, 66 000 hectares in Estonia, and 12 000 hectares in Romania.

Forests and plantations managed by Stora Enso¹ as of 31 December 2019

| Unit | Area | Certification coverage | Details of local landscapes and protected areas |
|---------------------------------------|--|--|--|
| Wood Supply, Russia ² | 369 000 ha, of which 323 000 ha productive forest land | FSC group certificate | In Russia, protected areas are generally excluded from lease agreements. Areas amounting to 8000 ha are protected as natural monuments, including genetic pine reserves and watercourses. |
| Plantations and lands, Guangxi, China | 81 000 ha, of which 76 000 ha planted | Chinese Forest Certification Council certificate (PEFC) for 81 000 ha; FSC for 81 000 ha | Mosaic landscape including agricultural crop fields, forest plantations, and settlements. No native ecosystems are found in the leased lands. Areas total at around 2 000 ha, consisting of steep slopes, buffer zones, and other important areas for watershed protection. |
| Montes del Plata | 72 000 ha, of which 53 000 ha planted | PEFC and FSC for 63 000 ha | Mainly pasturelands and agricultural fields. Protected and sensitive areas are not included in lease agreements. |
| Veracel | 10 000 ha, of which 4 000 ha planted | CERFLOR (PEFC) for 9 000 ha; FSC for 9 000 ha | 4 000 ha of leased lands are protected. They mostly consist of native forest remnants at different stages of regeneration. |
| Trial plantations, Laos | 4 000 ha, of which 3 000 ha planted | FSC for 4 000 ha | The plantations are located within a mosaic of intensive shifting cultivation lands and traditionally protected remnants of native forests. One plantation area is located close to a National Biodiversity Conservation Area. The majority of the total area is covered by agroforestry production schemes. |

¹ Areas managed through leasing or long-term harvesting rights. Including operations where Stora Enso's shareholding is at least 50% and size of the area exceeds 100 hectares. ² Long-term harvesting right.



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We help our customers meet consumer demands for sustainable products.

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Customers

Our renewable products and innovations help society to replace fossil-based materials.



25

of our production units were registered in Sedex

Opportunities and challenges

Demand for sustainable solutions

The global middle class is growing at an unprecedented pace, leading to an increase in lifestyles that can seriously burden the planet. At the same time, consumer awareness of limited natural resources, the environmental and health impacts of products, and social responsibility, including human rights, is growing. These megatrends place pressure on brand owners to pay more attention to product and supply chain responsibility. Combined with regulations and economic incentives, they are also driving our customers to favour renewable and recyclable raw materials.

The European Commission's Circular Economy Package, including the EU directive on single use plastics, creates needs for new innovations and provides business opportunities for Stora Enso. According to a study conducted by Material Economics, it has been estimated that 25% of European plastic packaging could be replaced with existing wood fiber solutions¹ such as Trayforma and EcoFishBox™ by Stora Enso, without significant compromise on functionality.

Substituting plastics with wood fiber can also make a significant contribution to the EU's targets for greenhouse gas emissions¹. Our massive wood elements are examples of solutions that store carbon and have a smaller carbon footprint than non-renewable alternatives.

In the long term, we believe societies will increasingly choose to replace fossil-based and other non-renewable materials with renewable alternatives such as those offered by Stora Enso.

Our policies

Guided by our values

The Stora Enso Code – constitutes a single set of values for all our employees and explains our approach to ethical business practices, human and labour rights, and environmental values. These values are applied wherever we operate and in all customer relations.

As of 1 January 2020, Stora Enso merged its containerboard business in the Packaging Solutions division with the Consumer Board division, creating a new Packaging Materials division.

¹ Material economics

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How we work

Value from customer engagement

Our expertise in renewable materials and products with high sustainability performance helps us meet the needs of our current and future customers. Our divisions have specific focus areas and products that cater to a broad range of customers. Their product portfolios include various boards for packaging and printing, several pulp grades, wood and fiber-based products for construction, biocomposites, energy pellets, paper products made from virgin and recycled fiber, lignin, formed fiber, and intelligent packaging. We foresee many possibilities for bio-based chemicals, bio-barriers, lignin, and biocomposites to meet industry and consumer demands for solutions that can replace fossil-based materials.

Stora Enso promotes and participates in successful recycling schemes, particularly for paper and board. We also sell and reuse a variety of valuable by-products and residuals from our production processes. For more information, see page 34.

We actively work with our customers to improve material efficiency and decrease the environmental impact of our products and related processes through circular programmes and life cycle analyses, for example. In 2019, our Consumer Board division also established an 'animal origin free' programme, which helps our customers with potential vegan certification.

We collaborate with stakeholders to find sustainable solutions for the entire value chain. As a member of the Tree-to-Textile initiative, we have joined IKEA and H&M in developing a new sustainable textile fiber for the consumer market.

We also share our sustainability expertise with customers. In 2019, Stora Enso conducted four Paper & Print Academy training sessions with over 160 participants from customer companies. The sessions enable participants to follow the entire supply chain from forest management to the final paper product.

We systematically measure customer satisfaction. In 2019, our Net Promoter Score, which measures the willingness of our customers to recommend our products and services to others, was 56% (51% in 2018).

Safety and sustainability certifications

Ensuring the safety of all our products is essential in everything we do, in order to safeguard the environment as well as the health and safety of our employees, customers, and product end-users. Our in-house

We collaborate with customers and other stakeholders to find sustainable solutions for the entire value chain.



According to studies, children in wooden schools experience less stress, have fewer conflicts, and concentrate better. Wooden interiors can also have a calming effect on blood pressure.

product safety and quality control systems cover product development, raw material sourcing, and the manufacturing and delivery of products. We demand that our suppliers comply with our product safety requirements.

Our products covered by specific safety regulations include food contact materials, materials for toys, packaging for pharmaceuticals, and construction materials. Our units producing these sensitive materials follow Good Manufacturing Practices, which are a set of widely recognised guidelines incorporated into EU regulations. During 2019, these practices were implemented at two Paper division mills, enabling the division to offer specialty papers for food packaging. In addition to following Good Manufacturing Practices, all Consumer Board mills and most Packaging Solutions mills are certified according to recognised hygiene management standards. Food safety compliance for essential raw materials is also verified with our suppliers prior to any purchasing decision. We provide our customers with information on product hygiene and safety aspects through compliance declarations.

We also follow legislation designed to protect human health and the environment. These include the EU's REACH, Biocidal Products, the Classification, Labelling, and Packaging Regulation, as well as

relevant food contact legislation and demands concerning food safety. When producing food contact materials, we only use chemicals that have been specifically approved for this purpose, after evaluating their safety and legal compliance. Our divisions have Product Safety Networks in place, and all our mills work to ensure that their products meet the relevant safety requirements. The ISO 22000, FSSC 22000, and FDA product safety certificates issued to many of our units further ensure that we apply a systematic approach to food safety issues.

ISO 9001 and ISO 14001 certified systems help our units to identify and meet customer requirements and to systematically improve product quality and environmental management. Many of our wood products are also CE marked to guarantee that they comply with the relevant EU legislation.

Many Stora Enso products are sold as FSC or PEFC certified or with other verification for responsible chain of custody and due diligence. These tools validate that the wood used in the products comes from responsibly managed sources, and that the entire journey of the raw material – from forest to end-user – has been verified by a third party. For more information about our responsible forestry and forest certification work, see pages 48–54.

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When a material or product has reached the end of its life, we promote recycling and energy recovery to create further value.



Invaluable information for customers

Life Cycle Assessments (LCAs) analyse the selected life cycle stages of a material, product, or service, revealing its potential environmental or human health impacts. A Stora Enso customer, for example, can use the information to study the environmental performance of different packaging or construction materials, and to make decisions that help them reach their own sustainability goals.

“An LCA study is a vigorous process of gathering and processing data, interpreting results, and evaluating our work as we go,” says **Tiina Keskiisaari**, Senior Manager of LCA at Stora Enso. “But it gives us and our customers invaluable information about product features and process parts.”

Read the full article at [› storaenso.com/sustainability](https://storaenso.com/sustainability)

Life cycle assessments and ecolabels

We collect product-specific life cycle inventory (LCI) data, which is typically used in life cycle assessments (LCAs) conducted by our own experts, our customers, or brand owners. Third-party verified Environmental Product Declarations (EPDs) offer transparent information about the footprint of a product throughout its life cycle. Most of Stora Enso's wood products, such as Classic Sawn Timber and Cross Laminated Timber (CLT), have EPDs. EPDs are used by our customers to help optimise the environmental performance of buildings and to achieve green building certification.

In 2019, new LCAs were conducted by two Stora Enso divisions. Our Wood Products division published an LCA on a wooden residential building in Finland, which was built using CLT and Laminated Veneer Lumber (LVL) by Stora Enso. The LCA shows that wood significantly contributes to achieving net zero carbon buildings. Our Consumer Board division co-commissioned a comparative LCA on single-use coffee cups. The LCA, conducted by the Technical Research Centre of Finland (VTT), shows that when paper cups are collected and recycled into new products after use, they have the lowest carbon footprint compared to reusable plastic, steel, and ceramic cups.

More than 90% of our Paper division's own brands are covered by one or more recognised ecolabel, including the EU Ecolabel, the Nordic Ecolabel, and the German Blue Angel (Blauer Engel). Many of our graphical board brands are also available as EU Ecolabel certified. Ecolabel criteria cover the entire life cycle of a product, from the extraction of raw materials to production, product use, and disposal. The EU Ecolabel criteria for graphic paper were revised in 2019, setting stricter demands for elements such as fiber certification. Our related products received renewed certificates during 2019.

The environmental performance of our paper and board products is reported in line with the voluntary Paper Profile initiative. Paper Profiles have been calculated for all our paper and containerboard products and all main paperboard products.

Progress

Sustainability through co-creation

Customer needs play an important role when we develop products, services, and processes. We identify these needs by exchanging expertise with our customers on various sustainability topics. In 2019, our Packaging Solutions division conducted a customer study to identify business opportunities emerging from sustainability.

During the year, our Wood Products division also surveyed their customers to find new ways to improve the sustainability and recyclability of its product packaging. Based on the results, the division will compile case studies on replacing fossil-based plastic packaging with fiber-based, recyclable alternatives and on avoiding packaging completely. In addition, a packaging line was established at our Näpi sawmill in Estonia where energy pellets are now packed in corrugated board instead of plastic.

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Advancing the circular bioeconomy

As the renewable materials company, Stora Enso operates at the heart of the circular bioeconomy. With our expertise, we can help our customers achieve their targets concerning circularity and renewability.

In 2019, our Consumer Board division established a circular economy programme to drive circularity in the value chain together with customers, brand owners, and recyclers. The programme focuses on circular innovations, industry collaboration to increase the collection and recycling of cardboard products, circular design and co-creation with customers, and work with start-ups (see our **Strategy 2019**). Our Wood Products division established an action plan to enhance the circularity of the building value chain and to understand circular design parameters for wood products. The action plan also seeks to find potential uses for recycled wood from construction and demolition waste.

Our products continued to replace plastics during 2019. Products from our Consumer Board division replaced plastic in ice cream and liquid packaging for major brand owners. **EcoFishBox™** by Stora Enso replaced a Finnish fish wholesaler's expanded polystyrene (EPS) packaging to provide renewable, recyclable packaging for around a thousand tonnes of fish annually. Our Intelligent Packaging unit introduced the plastic-free ECO RFID Retail Collection to provide retailers with a renewable and more sustainable alternative to traditional hangtags and stickers.

Our Consumer Board division also works with the Paper Cup Alliance to actively facilitate the recycling of paper cups in the UK, together with many of our customers. In addition, the division is an active member of the Alliance for Beverage Cartons and the Environment (ACE), EXTR:ACT, a platform for increasing beverage carton recycling in Europe, and GRACE, an alliance launched in 2019 for advocating, communicating, and improving the recycling of beverage cartons globally.

Sustainability embedded in innovation

In 2019, over 7% of Stora Enso's sales came from new products (see more in **Strategy 2019**). We continued to innovate new renewable and recyclable solutions, and introduced an internal checklist that ensures that sustainability is considered at all stages of every research and development initiative. Stora Enso's expenditure on innovation, research, and development in 2019 was EUR 141 million (EUR 149 million), which was equivalent to 1.4% (1.4%) of sales. Read more about our approach to innovation in **Financials 2019**.

Our new production line at Hylte Mill in Sweden began the manufacturing of formed fiber products in 2019. The products are manufactured using various chemical pulps and chemi-

With our expertise, we can help customers to replace plastics and achieve their circularity objectives.

thermomechanical pulp (CTMP) by pressing them into a desired shape in a moulding machine. Potential end-uses include single-use food packaging items such as plastic-free cups, bowls, and coffee cup lids.

In 2019, Stora Enso began the construction of a pilot facility at Sunila Mill in Finland for converting lignin into carbon anode materials for lithium-ion batteries. The innovation is designed to replace fossil-based anodes, mainly synthetic graphite, that are currently used in batteries.

Stora Enso introduced a paperboard tube for cosmetics packaging in 2019. The body of the tube is made from 70% renewable raw materials, and Stora Enso is developing biocomposite materials to replace the tube's plastic cap and shoulder.

In 2019, Stora Enso also announced its investment in the production of a plant-based chemical to be used to make bio-based PEF plastic. The pilot plant, to be located at our Langerbrugge Mill in Belgium, will convert plant-based sugars into the chemical needed to make PEF.

A responsible supplier to our customers

By the end of 2019, 25 (25 in 2018) of Stora Enso's production units were registered in the Supplier Ethical Data Exchange (Sedex). Sedex is a platform where we can share sustainability information with multiple customers in an agreed format and level of detail. By the end of the year, twelve of the 25 units had been audited through Sedex Member Ethical Data Audits (SMETA) at least once. During 2019, SMETA audits were conducted at nine Stora Enso units. A second SMETA audit was also completed at our joint operation Veracel in Brazil. All summary audit reports are made visible to customers in Sedex.

Stora Enso is also a member of the ethical supplier rating system Ecovadis. Ecovadis' sustainability scorecards provide detailed insight into environmental, social, and ethical risks in the supply chain. Since 2017, we have been included in the top 1% of industry supplier performers in sustainability.



In 2019, Stora Enso introduced formed fiber products that can replace single-use food packaging such as plastic plates and bowls.

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Suppliers

We have strict sustainability requirements for all our suppliers. We see our extensive supplier base as an opportunity to drive change in the world.



96%

of supplier spend was covered by our Supplier Code of Conduct

Opportunities and challenges

Promoting supply chain sustainability

As a global business with over 20 000 suppliers globally, Stora Enso can use its purchasing power to drive them to make their operations more sustainable. This helps to increase the number of suppliers with improved sustainability globally. However, developing a comprehensive understanding of a supplier's sustainability performance, including their potential impacts on human rights, remains a challenge, even with very strict sourcing processes and criteria in place.

Stora Enso runs sourcing and logistics operations in various regulatory environments. For example, new global regulation by the International Maritime Organisation will require reduced sulphur content in fuel oil used in marine vessels. We also consistently respond to stakeholder demands concerning transparency and the sustainability performance of our suppliers. Similarly, when sourcing materials, we look for ways to address the growing stakeholder demand for less plastic. By passing on sustainability requirements to our direct suppliers, we are able to drive positive change further down our supply chains.

Our policies

Extensive framework for responsible sourcing

The Stora Enso **Supplier Code of Conduct (SCoC)** is the cornerstone of our approach to responsible sourcing. It is a legally binding document that imposes sustainability requirements on our suppliers concerning human and labour rights, occupational health and safety, environmental commitments, and responsible business practices. The SCoC applies to all our sourcing categories globally.

Several other Stora Enso policies and documents also support responsible sourcing, including our:

- **Stora Enso Code** – our code of conduct.
- **Sourcing Policy, Logistics Policy** – our statements on our sourcing and logistics framework and objectives.
- **Sourcing Guideline, Logistics Guideline** – define how sourcing and logistics should be executed, managed, and controlled.

Through our Supplier Code of Conduct, we also implement policies and guidelines such as our **Policy on Wood and Fiber Sourcing, and Land Management, Chemical Management Guideline, and Human Rights Policy**.

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How we work

Strict sustainability requirements

Materials and products sourced by Stora Enso include wood and fiber-based materials such as pulp and Paper for Recycling (PfR), chemicals, fillers, energy, fuels, and spare parts, as well as maintenance, logistics, and IT services. In 2019, purchases of materials, goods, and services represented 49% of our total variable cost (50% in 2018) while fiber procurement accounted for 51% (50%).

Sourcing is a centrally-led function at Stora Enso that serves the entire Group and enables clear and transparent decision-making. Sourcing initiatives are reviewed and resolved by dedicated committees that meet when the sourcing need is specified, during the tendering process, and when a contract is drafted. In 2019, we created new guidelines, with sustainability considerations embedded, for strengthening the role of sourcing categories in managing our activities.



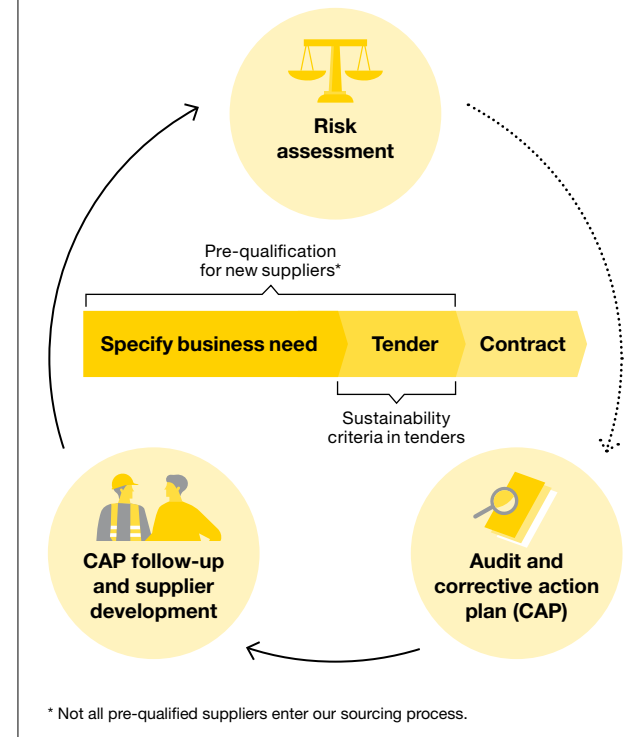
Dedicated committees review and approve Stora Enso's sourcing needs.

All suppliers wishing to do business with Stora Enso must first pre-qualify during tendering or, at the latest, before a contract is drafted. Instead of using our own supplier numbering, we use D-U-N-S® numbering, which is a globally recognised system for identifying companies. To pre-qualify, suppliers must complete a questionnaire, submit confirmation of their compliance with our SCoC, and complete our safety management online training. Our suppliers are also asked to provide information about their own suppliers, including sub-suppliers operating in high-risk countries.

We use sustainability criteria in the tendering phase of all sourcing, regardless of previous contracts with the same supplier, and collect data on supplier performance. The criteria help us make more balanced sourcing decisions and create incentives for our suppliers to invest in sustainability reporting. To adhere with the criteria, suppliers need to respond to a set of questions about their financial stability, occupational accident rates, and carbon

Our process for responsible sourcing

Risk assessments and audits can be conducted prior to pre-qualification and at any stage of the supplier contract.



* Not all pre-qualified suppliers enter our sourcing process.

dioxide (CO₂) emissions. Collecting data on our suppliers' CO₂ emissions also contributes to our science-based targets for reducing greenhouse gas emissions in our value chain.

Driving supplier sustainability

In addition to enforcing our SCoC, we help our suppliers improve their sustainability performance. Our 'deep dives' combine desktop reviews and on-site visits to help us better understand specific supply chains and support suppliers in improving their operations. For examples, see the Progress section in this chapter. Deep dives also enable us to offer added transparency to our customers – and even their customers. In addition, we conduct on-site visits and commission audits by third-party auditors to monitor and improve supplier sustainability performance. Focused audits are done based on risk assessments or concerns raised by our stakeholders.

Stora Enso's supplier sustainability risk mapping tool, created in collaboration with an international non-profit organisation, helps our purchasers to make more detailed risk assessments. Based on a pre-evaluation of a supplier's social and environmental risk profile, they may be selected for a third-party sustainability audit, conducted together with our purchaser.

Any suspected SCoC non-conformances identified during supplier visits or audits or brought to our attention through our many grievance channels are duly investigated. The findings are discussed, and corrective action plans are devised together with suppliers that must sign up to the plans. Our purchasers follow up on their implementation. If a supplier does not take the necessary corrective actions, new discussions are held to examine the reasons, and at a higher management level if necessary. In cases when a supplier is not willing to improve their performance, the relationship is terminated.

Contractors

Some of our suppliers are contractors hired for long-term work, such as in forest and plantation management, and others on a shorter-term basis, for example in large-scale investment or mill maintenance projects. Our SCoC and sourcing process applies to all contractors. While contractors are primarily responsible for their own employees, we strive to ensure that everyone working on our premises is treated fairly and receives adequate safety training.

Pulp procurement

Most of the pulp used in Stora Enso's operations is produced internally at our mills. For specific quality and logistical reasons, a small proportion of the pulp for our paper and board production is purchased from external suppliers. As with wood, we ensure that all the pulp we purchase is sustainably sourced. For more information about our wood procurement, see pages 48–54.

Paper for Recycling

Stora Enso sources paper for recycling (PfR) from local authorities and waste management companies. For more details on our PfR use, see pages 34 and 37.

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In Brazil, our joint operation Veracel funds a programme to protect humpback whales near the Belmonte Maritime Terminal where the company ships out pulp. The programme includes the training of Veracel's sea logistics suppliers to prevent collisions with whales.

Progress

Deeper understanding of supply chain sustainability

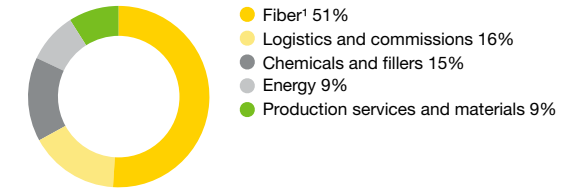
Stora Enso's key performance indicator (KPI) for responsible sourcing measures the proportion of our total supplier spend covered by our SCoC, including all categories and regions. By the end of 2019, 96% of Stora Enso's total spend on materials, goods, and services was covered (95% at the end of 2018), which exceeds our target to maintain the level of 95%. Joint operations, intellectual property rights (IPR), leasing fees, financial trading, government fees such as customs, and wood purchases from private individual forest owners are not included in our total supplier spend.

During 2019, we conducted three deep dives of specific supply chains. In Thailand, we reviewed our tapioca starch supply chain from the farmers to the plant that manufactures the starch we purchase. In the United States, we completed a review of our supply chain for polylactic acid which is made from corn. We also conducted a deep dive of our corn-based starch supply chain in the Ukraine. Besides the lack of progressive sustainable farming practices in the Ukraine and slight concerns over chemical use in Thailand, no serious non-conformances were found in the deep dives.

Our efforts to automate the collection of supplier sustainability performance data continued in 2019. With search robotics and artificial intelligence, we are able to access publicly available supplier

Breakdown of raw material and service costs

% of our total variable costs



¹ Wood, Paper for Recycling, and purchased pulp

CO₂ data and to evaluate our suppliers' carbon footprints. According to the results, approximately 200 (approximately 200 also in 2018) out of our approximately 1 300 (1 300) top suppliers by spend had publicly reported their CO₂ data in 2019.

Developments in sea logistics

In 2019, Stora Enso joined the Clean Cargo Working Group, which is a global initiative that promotes responsible shipping and aims to reduce the environmental impacts of transportation.

During the year, we also signed a contract with an existing partner that will decrease the environmental impact of our sea logistics in the Gulf of Bothnia, the Baltic Sea, and the North Sea. Vessels currently leased by Stora Enso will become part of the supplier's fleet, and two new vessels running on liquefied natural gas (LNG) will be added to the fleet by 2022. LNG does not contain sulphur and has lower CO₂ emissions than fuel oil or diesel.

Occasionally, people board our chartered sea logistics line from Central Europe to the Nordic countries unpermitted and undetected. In 2019, our sea logistics suppliers recorded three cases where a total of 11 people were found hiding. Detailed records show that all detected people were treated with dignity and respect onboard and ensured a safe and humane return into the custody of local authorities at their point of origin in Central Europe. For more information about how we manage potential human trafficking, see our annual [Slavery and Human Trafficking Statement](#).

Improving supplier safety

Stora Enso's commitment to safety also extends to our suppliers and contractors. In 2019, we piloted 'Safety share' to share details of a serious contractor accident - and best practices to avoid similar incidents - with other suppliers in the same category. During Stora Enso's Safety Week, we held our first safety webinar for suppliers to introduce key elements for safe operations and Stora Enso's eight life-saving rules. In addition, we updated our Safety Trail e-learning tool to cover two new languages: Czech and Estonian.

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We held a safety webinar for suppliers in 2019 to share expertise on safe behaviour.

Using a Group-wide safety reporting platform, we continuously monitor contractor accidents to recognise patterns and to identify those with an unacceptably high accident performance compared to their peers. When such behaviour is indicated by statistics, we take action to mitigate it.

Auditing high-risk suppliers

In 2019, Stora Enso's third-party supplier audits continued to focus on suppliers with heightened sustainability risks, as identified by our risk assessment tool. Other focus areas were the chemical value chain, waste handling, Paper for Recycling, and land logistics.

During 2019, a total of 62 Stora Enso suppliers were audited through third-party supplier audits (70 in 2018), including 17 audits (18) through external audit schemes such as the HSEQ (Health, Safety, Environment, and Quality management) audit cluster in Finland. The total number of audits in 2018 has been restated to include audits from external audit schemes. In the HSEQ cluster, buyer companies such as Stora Enso use the platform to improve auditing efficiency by sharing results from their third-party supplier audits. The participating Stora Enso suppliers' performance in safety, in particular, has improved significantly over the last three years.

The supplier audits revealed non-conformances particularly related to working hours, basic worker rights, and emergency preparedness. Several non-conformances were also related to missing documentation and policies. We create corrective action plans for all non-conformances and follow up on them. In China, for example, a packaging supplier installed an additional exit in 2019 to improve fire safety in the dormitory building, as agreed in our corrective action plan.

By the end of 2019, 28% of our identified high-risk supplier spend was covered by third-party supplier audits (24% in 2018). In our 2018 report, the audit coverage was reported based on the number of suppliers, and the figure for 2018 has been restated for comparability.

In 2019, we also conducted 50 supplier visits (23 in 2018). No supplier relationships were terminated in 2019 (none in 2018) based on findings or follow-ups resulting from third-party audits or our own supplier visits. However, one contract was not renewed due to business ethics challenges that were identified while investigating a potential SCoC violation reported by our own organisation.

Sourcing developments in China and the USA

Coal sourcing for Beihai Mill in China

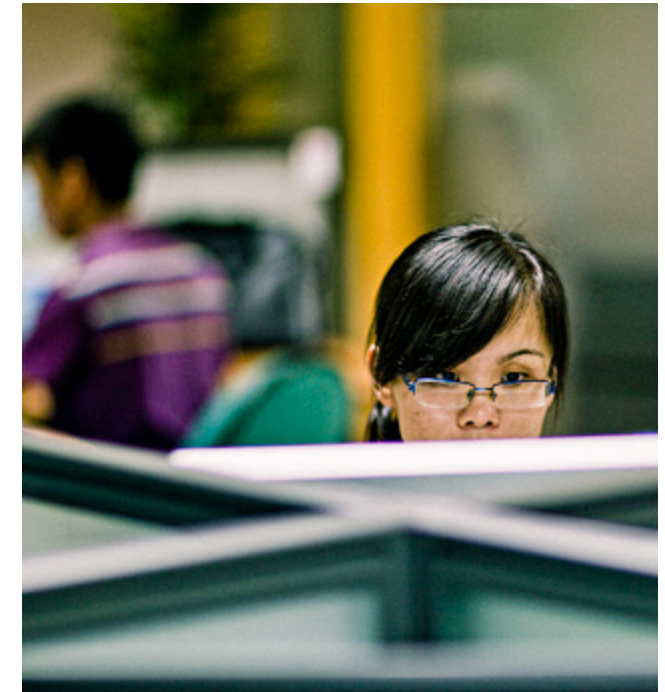
In southern China, coal is currently the only feasible energy source for an industrial facility as large as Stora Enso's Beihai Mill. However, as part of our long-term planning, we are investigating opportunities to use more renewable energy at the mill. For more information, see page 46. In 2019, we continued to look for more sustainable alternatives to coal.

Following a thorough supply chain audit and consequent corrective action plans in China, we found insufficient improvements made by our coal supplier during 2018. In December 2018, we replaced them with a new supplier that has a significantly better sustainability performance and a railway connection to the port, which reduces the need for truck transport and improves road safety.

Sourcing sugar industry by-products in the USA

Stora Enso's demonstration plant in Raceland, Louisiana, USA, validates extraction and separation technologies by converting cellulosic biomass into highly refined xylose sugars. For feedstock, the plant purchases bagasse, a residual from the sugar-making process, from a nearby sugar mill.

Stora Enso has been monitoring labour rights in its bagasse supply chain for several years to ensure that working hour schedules do not have adverse impacts on contractor health and safety. In 2019, our long-term dialogue with the supplier led to significant progress in adopting our SCoC requirements. We will continue to monitor and support our bagasse supplier in adopting our SCoC requirements, while continuously pushing for improvements.



Desktop reviews are an important part of our supply chain deep dives.



What's in a supply chain?

While all Stora Enso suppliers must commit to our Supplier Code of Conduct, driving change with the suppliers' suppliers remains a challenge. To tackle this, our sourcing personnel uses "deep dives" to have a closer look at supply chains where we have identified risk or that we simply want to learn more about.

"Deep dives focus on open dialogue and observe the full chain of a product or service. They are not needed everywhere but for those supply chains that are spread across the globe and that may pose risks we're not familiar with, it's a great tool," says **Johanna Pirinen**, Head of Sustainable Sourcing and Logistics at Stora Enso.

Read the full article at storaenso.com/sustainability

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Investors

We strive to continuously improve our sustainability performance and reporting, and to keep investors informed of our progress, ambitions, and future direction.



Stora Enso issued its first Green Bonds in 2019, collecting **SEK 6 billion**

Opportunities and challenges

Growing interest in sustainable investing

Investors are increasingly recognising the importance of corporate sustainability in their investment decision-making by exploring ways to integrate environmental, social, and governance (ESG) performance into their investment strategies. In addition to the growing interest in sustainability aspects, including human rights, investors perceive sustainability as a valuable growth driver and/or competitive advantage for companies and sustainability reporting as an important tool in identifying investment opportunities that can generate long-term shareholder value. Hence, companies are encouraged to conduct their business more sustainably. Simultaneously, investors expect financial rewards from their investments.

At Stora Enso, we believe that long-term financial success results from truly sustainable business. Stora Enso's Investor Relations work is guided by several laws and regulations, including the EU's Market Abuse Regulation (MAR), the Finnish Securities Markets Act, Nasdaq rules in Helsinki and Stockholm, and the standards of the Finnish Financial Supervisory Authority.

Our policies

Guiding our Investor Relations

Company policies and guidelines related to Stora Enso's Investor Relations include our:

- **Disclosure Policy** – a set of rules covering all our communications with investors and other stakeholders. It encompasses insider guidelines, closed periods, communications governance, and communications procedures.
- **The Stora Enso Code** – our code of conduct, applied to all our operations around the world, including Investor Relations.

We believe that truly sustainable business results in long-term financial success.

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How we work

Sustainability as a key metric

Many investors are committed to integrating ESG factors into their investments. Aspects of sustainability, such as global warming and sustainable forest management, are important to Stora Enso's investors. Our main shareholders are long-term investors that place high value on sustainable business practices, and continuously monitor and evaluate our performance. For more information on how we create value through a sustainable business model, see **Strategy 2019**. For details of Stora Enso's ownership distribution, see **Financials 2019**.

Timely and transparent communication with investors is a top priority for Stora Enso. We actively maintain open dialogue with our investors on ESG matters through face-to-face meetings, conference calls, seminars, roadshow meetings, and webcasts. We also regularly share updated information on our sustainability performance with investors in our Interim and Annual Reports, stakeholder letters, web updates, and investor newsletters. We participate in sustainability events of interest to investors. For more information about our investor relations, see storaenso.com/investors.

Stora Enso's Sustainable Finance strategy is an integrated part of our overall strategy. Stora Enso aims to have access to sufficient and competitively priced funding at any time to be able to pursue its strategy and achieve its targets. In order to accomplish this, our emphasis is on debt capital markets funding. In the long-term, Stora Enso's aim is to secure funding partners that have sustainability as a fundamental part of their agenda. We aim to influence and develop the financial markets to ensure that sustainability becomes an integral part of decisions and credit evaluation.

Stora Enso has a Green Bond Framework as part of its Sustainable Finance strategy. The ambition is to offer a type of loan that supports sustainability-focused fixed-income investors, and to report the direct environmental impacts of specific investments and business activities. The Green Bond framework is based on and aligned with the international Green Bond Principles (GBP) formulated by the International Capital Market Association. The framework lists the possibilities and limitations of the project categories that Stora Enso has defined as eligible for green funding.

Progress

ESG topics embedded into investor relations activities

During the year, we continued our strategy to enhance the availability of ESG information to investors, and to prioritise Stora Enso's participation in questionnaires and assessments for the ESG index and ratings schemes that are most material for our investors.

In 2019, Stora Enso organised an Investor Day and provided an update on our strategy, including a detailed review of Wood Products and Nordic forests, and published its carbon substitution potential. Read more at storaenso.com/investors.

For more information about our investor activities during the year, see Capital Markets in **Financials 2019**.

Sustainable finance and use of proceeds

Stora Enso issued its first green bonds in February 2019, collecting SEK 6 billion. In addition, a SEK 1 billion Green Loan was issued in May 2019. The proceeds of both were solely used for financing Stora Enso's acquisition of forest assets in Sweden and were 100% allocated by the end of 2019. The forest assets will be managed intensively, yet sustainably to utilise their full growth potential and produce more fiber-based products, including Cross Laminated Timber (CLT), which can substitute non-renewable construction materials and store carbon throughout its lifetime. This helps combat global warming and creates value for society at large.

The acquired forest assets are 100% certified by FSC and PEFC and amount to 1.41 million hectares, including 1.14 million hectares of productive forest land. As a consequence of the acquisition,



Cross-laminated timber replaces non-renewable materials in the construction industry.

Stora Enso's proportion of owned or managed lands in wood production and harvesting covered by forest certification schemes (our Forests, plantations, and land use KPI) increased to 98% in 2019 (96% in 2018). We continue to develop our green bond reporting approach to enable the disclosure of impacts within relevant aspects of sustainability.

In 2017, Stora Enso signed a Revolving Credit Facility (RCF) loan where part of the pricing is based on Stora Enso's ability to reduce greenhouse gas emissions per tonne of pulp, paper, and board produced, in accordance with the Science Based Targets initiative.

In 2019, Stora Enso was highly commended in the 'Embedding an integrated approach' category at the Finance for the Future Awards by Accounting for Sustainability (A4S), where the Group's climate leadership was also recognised. Stora Enso also signed the A4S Net zero statement of support by Accounting for Sustainability.



Sustainable funding with green bonds

Interest in ESG (environmental, social, and governmental) issues and general awareness of sustainability topics is growing among all investors. For Stora Enso, sustainable funding is more than responding to trends, as sustainability is already integrated into everything we do within the company.

"Green bonds are basically loans that are earmarked for investments in sustainable projects. The green bonds we issue give investors an opportunity to invest in projects that are controlled and managed by Stora Enso in order to provide sustainable solutions for the climate and environment," explains **Pasi Kyckling**, SVP, Group Treasury at Stora Enso.

Read the full article at storaenso.com/sustainability

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ESG indices and other external recognition in 2019



Euronext Vigeo
Stora Enso is listed in the Euronext Vigeo Europe, and Eurozone 120 indices as one of the 120 most advanced companies in terms of environmental, social, and governance performance.



Ethibel
Stora Enso is a constituent of the Ethibel Sustainability Index (ESI) Excellence Europe. The ESI indices are composed of companies that display the best performance in the field of corporate social responsibility.



FTSE4Good Index
Stora Enso is included in the FTSE4Good Index Series. These indices measure the performance of companies demonstrating strong environmental, social, and governance practices.



MSCI
In 2019, Stora Enso received a rating of AA in the MSCI ESG Ratings assessment. Stora Enso is included in several of MSCI's ESG indices.



ECPI Ethical Indices
Stora Enso is included in the ECPI EMU Ethical Equity index, which covers environmental, social, and governance criteria.



Transition Pathway Initiative (TPI)
Stora Enso is top-ranked in greenhouse gas management and performance by the TPI. An asset owner-led and asset manager-supported global initiative, the TPI assesses companies' preparedness for transition to a low carbon economy, supporting efforts to address climate change.



CDP
Stora Enso is included in CDP's Climate List, which identifies the global companies that are taking leadership in climate action.



STOXX ESG indices
Stora Enso is included in several STOXX ESG indices. These indices rate leading global companies according to environmental, social, and governance criteria.



Equileap
Ranked globally at number 29, Stora Enso was also rated the best performing Finnish company and best in our industry in gender balance and gender equality by Equileap.



Ecovadis
Stora Enso was included in the top 1% (industry suppliers) of the Ecovadis ethical supplier rating system, and achieved the highest recognition level (Gold).

OMX Sustainability Finland index
Stora Enso is included in the NASDAQ OMX Sustainability Finland index.



WBCSD
Stora Enso's Sustainability Report 2018 was included in the top ten sustainability reports globally according to the 2019 Reporting matters publication by the World Business Council for Sustainable Development (WBCSD).



Sustainability Reporting Awards Finland
Stora Enso's Sustainability Report 2018 was chosen as the best in Finland in a competition organised by an independent group of expert organisations.



ReportWatch
Stora Enso's Annual report 2018, including the Sustainability report, received the highest A+ ranking among more than 300 reports globally.



Stockholm School of Economics
Stora Enso received the highest score in the 2019 'Walking the talk' study on sustainability communications by the Mistra Center for Sustainable Markets (Misum) at the Stockholm School of Economics. The study included 95 Large Cap companies at the Stockholm stock exchange.

Most sustainable company 2019
Stora Enso was ranked the most sustainable listed company in our sector in Sweden by Dagens Industri, Aktuell Hållbarhet, and Lund University School of Economics and Management. We were also ranked overall best in the category for 'Climate and environment.'



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The world needs a new approach to materials.

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Reporting scope

At Stora Enso, we regularly review the priorities in our Sustainability Agenda and ensure that our reporting duly addresses them. When defining the materiality of issues impacting our sustainable business model, we consider the expectations of our major internal and external stakeholders. For more information on our approach to materiality, see page 7.

Data boundaries

Unless otherwise stated, the Group's consolidated performance data expressed in this report covers the parent company, Stora Enso Oyj, and all companies in which we hold over 50% of voting rights directly or indirectly. The consolidated figures and our reporting on human rights, safety, community, and forests, plantations, and land use also include the 50% owned joint operations Veracel in Brazil and Montes del Plata in Uruguay, due to their materiality to the Group's sustainability impacts and stakeholder interest. Otherwise the consolidated figures do not include equity-accounted investments where Stora Enso's ownership is between 20% and 50%, or equity investments in which our ownership share is less than 20%.

Consolidated environmental and energy data covers our production units. Stora Enso's sawmills and converting facilities are excluded from water, energy, and certain CO₂ indicators that are normalised per tonne of sales production unless otherwise specified in the respective footnotes. This is due to the lower materiality of sawmills and converting facilities in the Group's related performance and different metrics for sales production (cubic metre and square metre, respectively), compared with board, pulp, and paper mills (tonnes).

Human Resources (HR) data is derived from separately collected statistics. Unlike in our financial reporting, consolidated HR data in this Sustainability report excludes employees of our 50% owned joint operations Montes del Plata and Veracel. The HR data presented covers our permanent and temporary employees as of 31 December 2019 and are expressed as a headcount (rounded to the nearest 10). Certain administrative functions and sales offices are not included in the Group's consolidated occupational health and safety (OHS) data due to availability and lower occupational safety risk compared to production units.

Significant changes in scope during 2019

In 2019, the shareholders of Bergvik Skog AB, a Swedish forest holding company, finalised the previously announced restructuring of its ownership. Stora Enso's Swedish forest holdings are consolidated in the Group's annual sustainability reporting for 2019 as material.

The divestment of Dawang paper mill in China was completed in October. The closure of Kitee sawmill was concluded in September. Both units are still included in our annual sustainability reporting for 2019 as applicable. The divestment of Dawang or closure of Kitee do not have material impact on the Group's consolidated sustainability performance figures. For more information on the Group's acquisitions and disposals, see note 4 in **Financials 2019**.

In 2019, our Wood Products division inaugurated a new production unit for Cross Laminated Timber (CLT) at Gruvön sawmill in Sweden, which is included in the reporting.

In our environmental and energy reporting, divestments and closures are managed according to the international Greenhouse Gas Protocol. This means that figures for historical performance are recalculated following the removal of divested units from the baseline when necessary. However, closed units are included in the environmental and energy targets and trend calculation baselines, as per internationally accepted rules.

In accordance with the GRI Standards

We also prepare our reporting in accordance with the GRI Sustainability Reporting Standards: Core option. Our reporting covers all the General Disclosures as well as the topic-specific GRI Standards we deem material. Our [GRI Content Index](#) lists our disclosures with reference to the GRI Standards and refers to the locations where these issues are addressed in our reporting. The location references are complemented in the index with additional information, such as reasons for omission as necessary.

Impacts that make sustainability topics relevant to us may occur outside operations owned by Stora Enso, or they may only be material for some of our operations or locations. When our reporting on a sustainability disclosure only concerns specific units, geographical regions or other data collection boundaries, based on the identified materiality, this is specified in connection with the respective disclosure.

External assurance

This report has been verified by an independent third-party assurance provider in accordance with the voluntary external assurance practices followed in sustainability reporting. The assurance report appears on page 72. PwC has provided a limited level of assurance covering the entire contents of this report, based on an assessment of materiality and risk. For the fifth year running, a level of reasonable assurance has been provided for Stora Enso's reporting on direct and indirect fossil CO₂e emissions (Scopes 1 and 2).

The UN Global Compact

Stora Enso supports the ten principles of the United Nations Global Compact, an initiative set up in 2000 to encourage businesses worldwide to embed responsibility into their operations. We respect and promote these principles throughout our operations and report on our progress in this report. We annually upload our Communication on Progress to the [UN Global Compact website](#) as a public record of our commitment.



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| Unit | Number of employees ^{a)} | Production capacity ^{b)} 1 000 t | Products | Recovered fiber ^{c)} | Certificates | | | | | | | | Fossil CO ₂ emissions | | | | | | | | | | | | | | | | |
|--|-----------------------------------|--|----------|-------------------------------|--------------|-----------|-----------|------------|-----|-----------|-------------|------------------------|----------------------------------|------------------------------|---------------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------------------|--|---|--|------------|--------|------------|----------|--------------------------|---------------------|----|
| | | | | | ISO 9001 | ISO 14001 | ISO 22000 | FSSC 22000 | FDA | ISO 50001 | OHSAS 18001 | ISO45001 ^{d)} | FSC ^{e)} CoC | PEFC ^{f)} /CFCC CoC | Process waste to landfill | Hazardous waste ^{g)} | SO ₂ ^{h)} | NO _x as NO ₂ | Direct CO ₂ ⁱ⁾ | Indirect CO ₂ ^{j)} | CO ₂ , on-site transport ^{k)} | Carbon neutral CO ₂ , biomass fuels ^{l)} | COD | AOX | Phosphorus | Nitrogen | Process water discharges | | |
| Poland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Łódź | 276 | 135* | 3 | | x | x | x | | | x | x | x | | | | 1 | | 3 | 3 289 | 1 080 | | | | | | | | | |
| Mosina | 98 | 20* | 3 | | x | x | x | | | x | x | x | | | | 109 | | | 421 | | 38 | | | | | | | | 1 |
| Ostrołęka Corrugated ^{d)} | 255 | 145* | 3 | x | x | x | x | | | x | x | x | | | | 2 | | | | 4 657 | 108 | | | | | | | | |
| Ostrołęka Containerboard ^{d)} | 1 019 | 723 | 1 4 | | x | x | | | | x | x | x | | | | 37 | 387 | 359 | 283 376 | | 1 633 | 406 663 | 887 | 5.4 | 24.7 | | | 9 916 ^{k)} | |
| Tychy | 173 | 135* | 3 | | x | x | x | | | x | x | x | | | | 4 | | | 3 031 | | 173 | | | | | | | | 12 |
| Russia | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arzamas | 166 | 100* | 3 | | x | x | x | | | | | x | | | 18 | 8 | 1 | 6 | 3 223 | 14 054 | 80 | | | | | | | | 31 |
| Balabanovo | 334 | 165* | 3 | | x | x | x | | | | | x | | | | 5 | 1 | 3 | 4 880 | 21 880 | 102 | | | | | | | | 25 |
| Lukhovitsy | 137 | 100* | 3 | | x | x | x | | | | | x | | | | 5 | | 2 | 2 672 | 14 717 | 127 | | | | | | | | 18 |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Falu Rödfärg | 0 | | 6 | | x | x | | | | | | | | | | 8 575 | | | 387 | | | | | | | | | | |
| Fors | 541 | 455 | 1 | | x | x | x | x | | x | x | x | x | | | 121 | 7 | 88 | | 82 | 602 | 223 807 | 1 848 | 0.5 | 1.2 | 27.5 | | 4 516 | |
| Hylte | 423 ^{m)} | 480 | 4 | x | x | x | | | | x | x | x | x | | 23 725 | 71 | | 178 | 3 397 | 106 | 856 | 281 604 | 770 | 1.4 | 2.1 | 31.9 | | 5 271 | |
| Jönköping | 179 | 100* | 3 | | x | x | x | | | | | x | | | | 39 | | | 200 | 527 | 21 | | | | | | | | 11 |
| Kvarnsveden | 472 | 385 | 4 | | x | x | | | | x | x | x | x | | | 133 | 19 | 104 | 14 337 | 237 | 1 | 207 493 | 1 841 | 0.7 | 2.0 | 40.5 | | 7 358 | |
| Nymölla | 569 | 485 | 4 2 | | x | x | | | | x | x | x | x | | | 85 | 543 | 474 | 2 553 | 57 | 1 790 | 701 204 | 11 656 | 0.5 | 4.7 | 71.6 | | 27 828 | |
| Skene | 153 | 100* | 3 | | x | x | | | | | | x | | | | 3 | | | | 19 | 7 | | | | | | | | 15 |
| Skoghall | 732 | 875 | 1 | | x | x | x | x | | x | x | x | x | | 3 093 | 494 | 164 | 449 | 55 819 | 134 | 1 632 | 961 646 | 10 070 | 19.3 | 10.5 | 102.2 | | 26 281 | |
| Skoghall (Forshaga) | 104 | 120 | 1 | | x | x | x | x | x | x | x | x | x | | | 11 | | | 966 | 3 | 150 | | | | | | | | |
| Skutskär | 400 | 540 | 2 | | x | x | | | | x | x | x | x | | | 42 | 125 | 817 | 100 | 25 | 1 469 | 1 156 078 | 5 781 | 36.9 | 20.2 | 106.0 | | 19 126 | |
| Vikingstad | 69 | 75* | 3 | | x | x | | | | | | x | | | | 1 | | | 1 075 | 60 | 1 | | | | | | | | 1 |
| Total board, pulp, paper, converted products | | 11 498 ⁿ⁾ | | | | | | | | | | | | | | 62 013 | 12 218 | 2 840 | 9 691 | 2 207 720 | 555 309 | 19 358 | 12 373 275 | 93 362 | 307 | 112 | 1 148 | 282 995 | |
| Total, wood products | | 0 ^{o)} | | | | | | | | | | | | | | 6 209 | 1 174 | 27 | 485 | 5 029 | 105 249 | 19 056 | 486 715 | | | | | | |
| Wood products units ^{p)} | | | | | p) | p) | p) | p) | p) | p) | p) | p) | p) | p) | p) | | | | | | | | | | | | | | |
| Grand Total | | | | | | | | | | | | | | | | 68 223 | 13 392 | 2 866 | 10 176 | 2 212 749 | 660 558 | 38 413 | 12 859 990 | 93 362 | 307 | 112 | 1 148 | 282 995 | |
| All units | | | | | | | | | | | | | | | | 68 223 | 13 392 | 2 866 | 10 176 | 2 212 749 | 660 558 | 38 413 | 12 859 990 | 93 362 | 307 | 112 | 1 148 | 282 995 | |

a) Yearly average as full-time equivalents.
b) Production capacities of integrated pulp, paper, and board mills only include paper and board production capacities.
c) Mills using recovered fiber as raw material (fully or partly).
d) The new certificate ISO 45001 will gradually replace the OHSAS 18001.
e) Reported on the basis of country-specific definitions applied in national regulations.
f) Total sulphur is reported as sulphur dioxide (SO₂) equivalent, but includes all sulphurous compounds.
g) All CO₂ figures are calculated using the WRI/WBCSD Greenhouse Gas Protocol and Scope 2 Guidance.
h) The divestment of Dawang paper mill was completed in October 2019.
i) Covers only board production at Ingeröis.
j) Covers only PM5.
k) Water discharges reported together from both Ostrołęka units.
l) Does not have its own personnel but hires personnel from Stora Enso AB.
m) Number of biocomposite production line employees is included. See separate table for Wood Products units for biocomposite production data.
n) Excluding total corrugated board capacity 1 368 million m².
o) Production capacities for sawn timber 5 830 000 m³ and for wood pellets 495 000 t.
p) See separate table for Wood Products units.

Products:
① board and packaging paper
② market pulp
③ converted products (e.g. cores, corrugated board)
④ paper
⑤ lignin
⑥ red paint pigment

The figure 0 (zero) in the table signifies that such discharges, emissions, or waste did not occur or they were below the Group's reporting threshold. Where cells are left blank, this signifies that the parameter is considered as not relevant for that unit.

Certificate documents can be found at storaenso.com/certificates

* million m²

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| Unit | Capacities | | | | | | Certificates | | | | | | | Fossil CO ₂ emissions | | | | | | | | | |
|----------------------------------|-----------------------------------|----------------------|----------------------|------------|--------------|----------------------|--------------|----------|-----------|-----------|-------------|----------|-----------|----------------------------------|---------------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------------------|--|--|--|--------|
| | Number of employees ^{a)} | Sawn products | Further processed | CLT | Wood pellets | LVL | Biocomposite | ISO 9001 | ISO 14001 | ISO 50001 | OHSAS 18001 | FSC® CoC | PEFC™ CoC | SBP | Process waste to landfill | Hazardous waste ^{b)} | SO ₂ ^{c)} | NO _x as NO ₂ | Direct CO ₂ ^{d)} | Indirect CO ₂ ^{d)} | CO ₂ , on-site transportation ^{e)} | Carbon neutral CO ₂ biomass fuels ^{f)} | |
| | 1 000 m ³ | 1 000 m ³ | 1 000 m ³ | 1 000 t | 1 000 t | 1 000 m ³ | 1 000 t | | | | | | | t | t | t | t | t | t | t | t | t | |
| Wood products units | | | | | | | | | | | | | | | | | | | | | | | |
| Austria | | | | | | | | | | | | | | | | | | | | | | | |
| Bad St. Leonhard | 256 | 360 | 105 | 80 | | | | x | x | x | x | x | x | | 48 | | 4 | | | | 3 | | |
| Brand | 209 | 440 | 295 | | | | | x | x | x | x | x | x | | 50 | | | | | | 3 | | |
| Ybbs | 404 | 700 | 450 | 100 | | | | x | x | x | x | x | x | | 88 | | 8 | | | | 3 | | |
| Czech Republic | | | | | | | | | | | | | | | | | | | | | | | |
| Planá | 238 | 390 | 220 | | | | | x | x | x | x | x | x | | 414 | 53 | 0.3 | 55 | | | 1 827 | 22 651 | |
| Ždírec | 253 | 580 | 220 | | 80 | | | x | x | x | x | x | x | | 3 396 | 26 | 2.4 | 110 | | | 2 400 | 127 527 | |
| Estonia | | | | | | | | | | | | | | | | | | | | | | | |
| Imavere | 312 | 340 | 160 | | 100 | | | x | x | x | x | x | x | x | 4 | 79 | 4.3 | 44 | | 45 773 | 1 697 | 55 284 | |
| Näpi | 94 | 50 | 180 | | 23 | | | x | x | x | x | x | x | | 26 | 42 | 0.6 | 6 | 34 | 10 728 | 299 | 4 917 | |
| Finland | | | | | | | | | | | | | | | | | | | | | | | |
| Honkalahti | 115 | 310 | 70 | | | | | x | x | x | x | x | x | | 35 | 0.6 | 24 | 67 | 2 487 | 988 | | 43 391 | |
| Kitee ^{g)} | 93 | 260 | 110 | | 25 | | | x | x | x | x | x | x | | 6 | 0.2 | 13 | | 1 438 | 350 | | 29 256 | |
| Uimaharju | 67 | 240 | 20 | | | | | x | x | x | x | x | x | | 5 | 0.0 | | | 1 950 | 679 | | | |
| Varkaus | 120 | 150 | 35 | | | 75 | | x | x | x | x | x | x | | 27 | | | | 4 495 | 810 | | | |
| Veitsiluoto ^{h)} | 57 | 200 | | | | | | x | x | x | x | x | x | | | 10.3 | 19 | | 4 979 | 554 | | | |
| Germany | | | | | | | | | | | | | | | | | | | | | | | |
| Pfarrkirchen | 102 | | 145 | | | | | x | x | x | x | x | x | | 9 | 1.8 | 13 | | | | 256 | 5 545 | |
| Latvia | | | | | | | | | | | | | | | | | | | | | | | |
| Launkalne | 151 | 200 | 20 | | | | | x | x | x | x | x | x | | 3 | | 27 | 534 | 1 573 | 1 119 | | 25 102 | |
| Lithuania | | | | | | | | | | | | | | | | | | | | | | | |
| Alytus | 250 | 210 | 115 | | | | | x | x | x | x | x | x | | 22 | 1.7 | 14 | | 2 599 | 1 075 | | 25 414 | |
| The Netherlands | | | | | | | | | | | | | | | | | | | | | | | |
| Amsterdam | 47 | | 80 | | | | | x | x | x | x | x | x | | 1 | | | 13 | 1 044 | 1 | | | |
| Poland | | | | | | | | | | | | | | | | | | | | | | | |
| Murow | 275 | 300 | 210 | | | | | x | x | x | x | x | x | | 624 | 2.7 | 16 | | 10 619 | 1 332 | | 11 532 | |
| Russia | | | | | | | | | | | | | | | | | | | | | | | |
| Impilahti | 124 | 150 | 10 | | 25 | | | x | x | x | x | x | x | | | | 9 | | 5 197 | 1 286 | | 22 781 | |
| Nebolchi | 178 | 180 | 45 | | 42 | | | x | x | x | x | x | x | x | 2 370 | | 0.5 | 44 | | 8 314 | 1 164 | | 23 855 |
| Sweden | | | | | | | | | | | | | | | | | | | | | | | |
| Ala | 147 | 400 | 50 | | 100 | | | x | x | x | x | x | x | | 42 | 1.2 | 75 | | 10 | 1 839 | | 89 461 | |
| Gruvön ^{h)} | 178 | 370 | 150 | 25 | 100 | | | x | x | x | x | x | x | x | 15 | 0.1 | 3 | 4 381 | 4 014 | 1 370 | | | |
| Hylte | 19 | | | | | | 15 | x | x | x | x | x | x | | | | | | | 29 | | | |
| Wood products units total | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 830 | 2 690 | 205 | 495 | 75 | 15 | | | | | | | | 6 209 | 1 174 | 27 | 485 | 5 029 | 105 249 | 19 056 | 486 715 | |

a) Yearly average as full-time equivalents.
b) Reporting is based on country-specific definitions applied in national regulations.
c) Total sulphur is reported as sulphur dioxide (SO₂) equivalent, but includes all sulphurous compounds.
d) All CO₂ figures are calculated using the WRI/WBCSD Greenhouse Gas Protocol and Scope 2 Guidance.
e) The permanent closure of Kitee sawmill was concluded in September 2019.
f) Sawing capacity reported with Paper Division.
g) CLT production was started at Gruvön sawmill in May 2019.

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Auditor's assurance report

To the Board of Directors and Management of Stora Enso Oyj

We have been engaged by the Board of Directors and the Group Leadership Team of Stora Enso Oyj (hereafter Stora Enso) to provide limited assurance on Stora Enso's Sustainability report 2019 as a whole, and reasonable assurance on Stora Enso's direct and indirect (scopes 1+2) fossil CO₂ emissions as disclosed in the Sustainability report.

Responsibilities of the Board and Management

The Board of Directors and Group Leadership Team of Stora Enso are responsible for preparing the Sustainability report in accordance with the Reporting Criteria as set out in the Company's reporting instructions, including the Sustainability Reporting Standards of the Global Reporting Initiative (GRI) and the Greenhouse Gas Protocol for CO₂ emissions. This responsibility includes the internal control relevant to the preparation of a Sustainability report that is free from material misstatements, whether due to fraud or error.

Responsibilities of the Auditor

Our responsibility is to express a conclusion on the Sustainability report based on the procedures we have performed and the evidence we have obtained. Our assignment is limited to the historical information that is presented and thus does not include future-oriented information. We do not accept, or assume responsibility to anyone else, except to Stora Enso for our work, for this report, or for the conclusions that we have reached.

We conducted the assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000, "Assurance Engagements Other than Audits or Reviews of Historical Financial Information", to provide limited assurance on the Sustainability report as a whole, and in accordance with ISAE 3410, "Assurance Engagements on Greenhouse Gas Statements", to provide reasonable assurance on direct and indirect (scopes 1+2) fossil CO₂ emissions as disclosed in the Sustainability report. These standards require that we plan and perform the engagement to obtain the appropriate level of assurance that the information examined is free from material misstatement.

A reasonable assurance engagement includes examining, on a test basis, evidence supporting the selected information in the Sustainability report. We have evaluated the effectiveness of internal controls and the processes for collecting and consolidating CO₂ emissions data, and performed testing on a sample basis to evaluate whether the CO₂ emissions are reported according to the Reporting Criteria.

A limited assurance engagement consists of making inquiries, primarily of persons responsible for the preparation of the Sustainability report, reviewing documentation, and applying analytical and other limited assurance procedures based on the auditor's judgement. In addition, we have performed site visits to Langerbrugge (Belgium) and Ostrołęka (Poland) to review compliance with reporting policies, assess the reliability of local reporting process, and test data collected for sustainability reporting purposes on a sample basis.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusions below. The conclusion based on our limited assurance procedures does not comprise the same level of assurance as the conclusion of our reasonable assurance procedures. Since this assurance engagement is combined, our conclusions regarding the reasonable assurance and the limited assurance procedures are presented separately below.

Our independence and quality control

We have complied with the independence and other ethical requirements of the "Code of Ethics for Professional Accountants" issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

PricewaterhouseCoopers applies International Standard on Quality Control (ISQC) 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Conclusions

Based on the limited assurance procedures we have performed, nothing has come to our attention that causes us to believe that the Sustainability report is not prepared, in all material respects, in accordance with the Reporting Criteria.

In our opinion, Stora Enso's direct and indirect (scopes 1+2) fossil CO₂ emissions which have been subject to our reasonable assurance procedures have, in all material respects, been prepared in accordance with the Reporting Criteria.

Helsinki, 11 February 2020
PricewaterhouseCoopers

Samuli Perälä
Authorized Public Accountant

Fredrik Ljungdahl
Sustainability Reporting Specialist

Stora Enso Oyj

P.O. Box 309
FI-00101 Helsinki, Finland
Visiting address: Kanavaranta 1
Tel. +358 2046 131

Stora Enso AB

P.O. Box 70395
SE-107 24 Stockholm, Sweden
Visiting address: World Trade Center
Klarabergsviadukten 70
Tel. +46 1046 46 000

storaenso.com
group.communications@storaenso.com

Concept and design: Milton Oy

Photography: Riku Aronen, Lasse Arvidson, Mikko Auerniitty, Roberto Brusacá, Markus Bullik, Iryna Dobytychina, Justyna Veni Ejsmont, Jonatan Fernstrom, Markus Haapamäki, Tuomas Harjumaaskola, Sanna Heiskanen, Jussi Hellsten, Jarmo Hietaranta, Matti Immonen, Kaapo Kamu, Tuukka Koski, Lily Li, Dandan Lyu, Mikko Nikkinen, Felix Odell, Mikko Ryhänen, Ernst Tobisch, Timo Tuviala / Tavaton Media, Mats Vuorenjuuri, C-Green Technology AB, MODE Artes Visuales, and Stora Enso's image bank.

It should be noted that Stora Enso and its business are exposed to various risks and uncertainties and certain statements herein which are not historical facts, including, without limitation those regarding expectations for market growth and developments; expectations for growth and profitability; and statements preceded by "believes", "expects", "anticipates", "foresees", or similar expressions, are forward-looking statements. Since these statements are based on current plans, estimates and projections, they involve risks and uncertainties, which may cause actual results to materially differ from those expressed in such forward-looking statements. Such factors include, but are not limited to: (1) operating factors such as continued success of manufacturing activities and the achievement of efficiencies therein, continued success of product development, acceptance of new products or services by the Group's targeted customers, success of the existing and future collaboration arrangements, changes in business strategy or development plans or targets, changes in the degree of protection created by the Group's patents and other intellectual property rights, the availability of capital on acceptable terms; (2) industry conditions, such as strength of product demand, intensity of competition, prevailing and future global market prices for the Group's products and the pricing pressures thereto, price fluctuations in raw materials, financial condition of the customers and the competitors of the Group, the potential introduction of competing products and technologies by competitors; and (3) general economic conditions, such as rates of economic growth in the Group's principal geographic markets or fluctuations in exchange and interest rates. All statements are based on management's best assumptions and beliefs in light of the information currently available to it and Stora Enso assumes no obligation to publicly update or revise any forward-looking statement except to the extent legally required.