Arctic Paper Munkedals AB
Environmental Report 2024

# EMAS 2024

ARCTIC PAPER

# Environmental Report 2024

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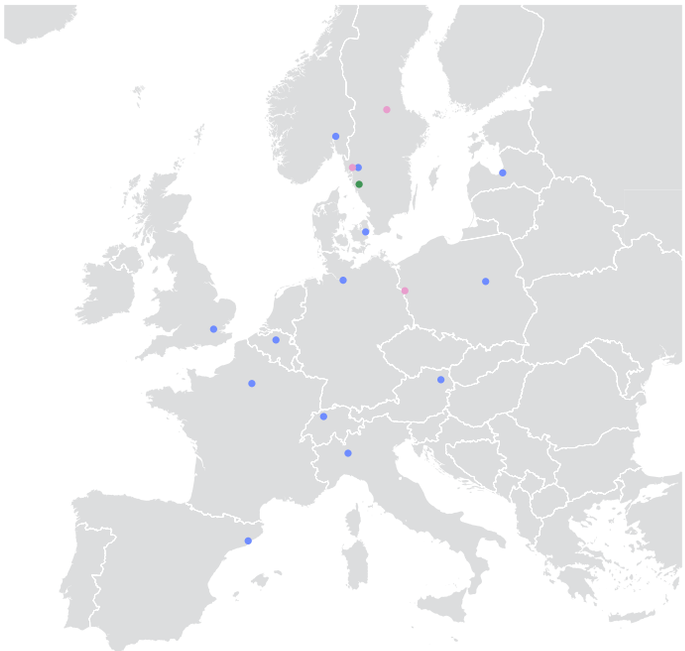
## Arctic Paper Munkedals AB

Arctic Paper Munkedals AB is part of the Arctic Paper Group. In 2024, we had a turnover of approximately SEK 1.7 billion. Our largest markets are Germany, Sweden, England, France, and the Benelux countries. Sales are made through the Group's own sales offices, agents, wholesalers, or directly to publishers and printers. Arctic Paper Munkedals AB has approximately 330 employees and is located on the west coast of Sweden, next to the Örekil River – one of the country's premier salmon rivers. The Örekil River flows into the unique Gullmarn fjord. Both the river and the fjord are areas of high natural value.

Paper production at Munkedals started in 1871. Today, we are one of Europe's leading manufacturers of uncoated graphic paper. Our paper is mainly used for commercial printing, magazines, and books. From early on, our production has been adapted to the natural environment by discontinuing pulp production, which had a high environmental impact, and by ceasing the use of chlorine-bleached pulp altogether. Our vision of being the better choice for every customer has increasingly driven our development towards reducing our environmental footprint.

## Arctic Paper | Europe



Sales Office  Paper Mill  Head Office

## Arctic Paper SA

Arctic Paper SA is one of Europe's leading suppliers of high-quality book paper and graphic fine paper.

The Group produces high-quality coated, uncoated woodfree, and uncoated wood-containing paper. Its product portfolio includes the brands Amber, Arctic, G, and Munken. Production takes place at three European paper mills: Arctic Paper Munkedals and Arctic Paper Grycksbo in Sweden, and Arctic Paper Kostrzyn in Poland. The total production capacity of these three mills is approximately 630,000 tonnes of paper per year. The company employs about 1,584 people and operates 13 sales offices across Europe. Our head office is located in Kostrzyn, Poland, with a branch office in Gothenburg, Sweden.

Arctic Paper SA has been listed on the Warsaw Stock Exchange since October 2009 and on NASDAQ OMX Stockholm since December 2012.

# Preface

At Arctic Paper Munkedals AB, we view sustainability and environmental responsibility as fundamental parts of our operations. Through our efforts, we strive not only to meet regulatory requirements but also to lead the way and actively contribute to a sustainable society. We are proud of our commitment to the environment and our ongoing initiatives to minimize our impact on nature. Our focus on using renewable raw materials – with our uncoated paper, which contains a high proportion of certified renewable material, as a cornerstone – is a clear example of our sense of responsibility. By continuously improving our processes and investing in sustainable solutions, we create long-term environmental benefits for ourselves and for society as a whole.

In 2024, we continued our work to enhance our environmental performance. We are proud of the progress we have made, especially regarding our energy management, where we have intensified efforts to increase energy efficiency and to ensure a sustainable and secure energy supply. Continuous improvements in direct energy savings, as well as indirect improvements through increased efficiency of our machinery, have been implemented during the year. We have also decided to renew our raw water treatment plant at the mill in the coming years, which will have a positive effect on the local waterways.

Our vision of achieving a completely closed water system remains a driving force in our work. By carefully analyzing and optimizing the use of our resources – such as water and chemicals – we strive to develop even more sustainable processes. In 2024, we also continued our work to improve the fish habitat in the Munkedals River – a concrete example of our commitment to biodiversity and our local ecosystem.

Our environmental management system, based on ISO 14001 and EMAS, ensures that we follow a structured and effective path toward continuous improvement. We aim for every employee at Arctic Paper Munkedals AB to feel a sense of responsibility for the environment, so that sustainability work permeates all aspects of our operations.

This EMAS environmental report presents our progress during 2024 and the goals we have set for the future. We continue our efforts to create a more sustainable future  both for our company and for society as a whole.

We would like to thank our employees for their dedication and all our stakeholders for their trust and cooperation.

**Kent Blom**
**MD, Arctic Paper Munkedals AB**



Printed on Munken Pure 150 g/m²

# Facts about Arctic Paper Munkedals AB

| **Products** | | |
|---|---|---|
| | Munken Design Range: | Munken Lynx, Munken Pure, Munken Polar, Munken Kristall<br>Munken Pure Rough, Munken Polar Rough,<br>Munken Lynx Rough, Munken Kristall Rough,<br>Munken Lynx ID, Munken Pure ID, Munken Polar ID, Munken Kristall ID |
| | Munken Book Papers: | Munken Premium Cream, Munken Premium White,<br>Munken Print Cream, Munken Print White |
| | Munken Kraft Papers: | Munken Kraft och Munken Kraft Highwhite |
| | Graphical Fine Paper: | Amber Graphic by Arctic Paper Munkedals |

| **Energy** | |
|---|---|
| Solid fuel boiler | 30 MW |
| Steam boiler (electric) | 35 MW |
| Hydropower plant | 7.0 MW |
| Steam boiler (LNG) | 42 MW |

| **The Operations** | |
|---|---|
| Capacity | 160,000 tonnes/year |
| Sales | Export 90%, Sweden 10% |
| Employees | 330 |

| **Paper Machines** | **Width** | **Grammage** | **Speed** | **Capacity** |
|---|---|---|---|---|
| PM 5 | 3.22 m | 60–240 g/m² | 750 m/min | 75,000 tonnes/year |
| PM 8 | 3.97 m | 60–150 g/m² | 800 m/min | 85,000 tonnes/year |

| **Sheet Cutters** | **Sheet Width** | **Sheet Length** | **Capacity** |
|---|---|---|---|
| S1, S2, S3*, S11, S12 | 35–168 cm | 42–188 cm | 80,000 tonnes/year |

| **Storage Capacity** | |
|---|---|
| Munkedal | 4,500 tonnes |
| Göteborg (central storage) | approx. 6,500 tonnes (part of a company shared warehouse of  21,000 m²) |
| Åsensbruk | 3,000 tonnes |

| **Certificates** | |
|---|---|
| Environmental managemant system ISO 14001:2015 | Qvalify cert no: 1005 |
| Environmental managemant system EMAS 1221/2009 | EMAS registration no: S-000248 |
| Quality management system ISO 9001:2015 | Qvalify cert no: 1005 |
| Energy management system ISO 50001:2018 | Bureau Veritas cert no: SE009197 |
| Chain of Custody according to FSC® | SGS Cert no: SGSCH-COC-001693 |
| Chain of Custody according to PEFC | SGS Cert no: SGSCH-PEFC-COC-0634 |
| Cradle to Cradle Certified® at Bronze level | Cradle to Cradle Cert no: 8421 |
| EU Ecolabel | EU Ecolabel licence SE/011/005 |

* laminating machine

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# Environmental Management

Arctic Paper Munkedals AB has a long-standing tradition of safeguarding nature's interests and systematically reducing the environmental impact of its operations.

To improve and streamline its environmental efforts, the company has chosen to follow the ISO 14001 environmental management system and register under EMAS. These frameworks provide a structured platform for setting and tracking goals, key performance indicators, stakeholder requirements such as legal compliance, etc., through tools like management reviews, legal compliance checks, and SWOT analyses.

Regular assessments are conducted to determine which activities may have a significant environmental impact, both locally and globally. This process helps identify our significant environmental aspects. By continuously measuring, monitoring, and, when necessary, revising operational goals, we can gradually improve our environmental performance. An important tool for ensuring the functionality of the system is regular internal and external audits. The results of these audits, along with other relevant information, provide management with an accurate view of the company's performance, enabling necessary improvements to the management system.

# Environmental Policy

**Environmental, Energy and Quality Policy for Arctic Paper Munkedals AB**

Arctic Paper Munkedals AB's business concept is to produce and market uncoated paper of high quality. At the same time, we shall be known for pursuing a sustainable environmental work and being able to offer our customers environmentally adapted products.

By means of continuous improvements to our operations and management systems as well as great commitment, we shall always deliver paper of high quality within the respective product segments, improve our energy performance as well as minimise and prevent negative environmental impact from the products and services that we buy, manufacture and sell.

We shall satisfy and preferably surpass prevailing applicable legislation and fulfil other environmental, energy and quality demands made on us and work together to prevent environmental accidents.

This means that we must:

- Make environmental, energy and quality work an integrated part of the company's long-term sustainable strategy by drawing up rules and procedures at management group level defining how the organisation is organised and business is operated.
- Consult with, inform, educate and engage our employees in environmental, energy and quality issues.
- Produce, market and sell products with the least possible environmental impact.
- Make demands of and prioritize suppliers and contractors who promote raw materials, products, transport activities and services being manufactured and delivered with the right quality and in an sustainable environment-friendly way.
- Consider the environmental and quality impact as well as impact on energy performance at procurement, new investments, new building or renovation, and other changes in the business.
- Openly communicate our environmental work and our environmental impact to the public, customers, suppliers, authorities, and other interested parties so that a commitment

**Kent Blom**
**MD, Arctic Paper Munkedals AB**



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# Paper Production

## Pulp Reception

The mill does not manufacture its own pulp; instead, it purchases it in the form of bales from external suppliers. After arrival at the mill, the pulp bales are stored in the pulp warehouse until needed. The pulp bales are slushed in process water, which has been purified internally, and then ground in refiners so that the fibres are softened and swell. Grinding is important for the paper's strength properties. Various raw materials and chemicals such as filler chalk, adhesives and starch are added. The pulp is filtered in several steps to remove foreign particles.

## Paper Machine

### Headbox and Wire Section

The function of the headbox is to distribute the diluted stock over the whole width of the wire. Dewatering and forming of the web take place in the wire section.

### Press Section

The web is dewatered still further in the press section. Here, the paper is given the right density and surface structure.

### Drying Section

The paper is dried in the drying section with the help of steam-heated cylinders.

### Surface Sizing

After drying, the surface on both sides of the paper is surface sized in a sizing/coating process. Surface sizing the paper gives it a smoother and stronger surface with improved printing properties. The surface is dried afterthe process with infra driers and a second drying section of steam-heated cylinders.

### Machine Calendering and Tambour

The web passes through a calender, which gives it its final surface structure. The finished web is rolled onto a tambour and moved to the winding machine.

## Winding Machine

In the winding machine, the large reel is divided into smaller reels in line with the customer's order. The different sizes of reels are combined so that the width of the web is optimally utilised.

## Finishing

### Paper Cutting Machines

The reels proceed for further conversion. In paper cutting machines, they are cut into sheets in varying formats as requested by the customer. Some of the sheets are packaged in an automatic bale packaging machine.

### Pallet Pack

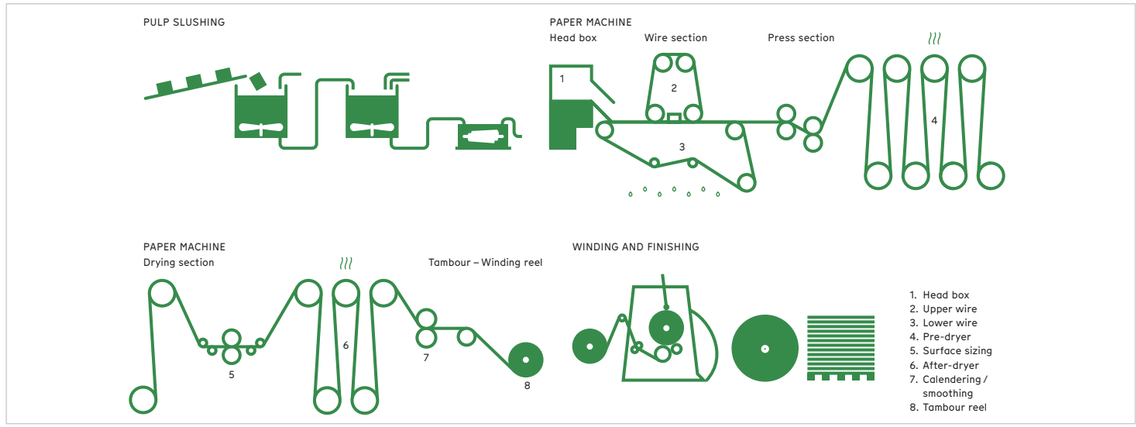
The sheet pallets are provided with a cardboard lid made of recycled paper and shrink-wrapped.

### Reel Pack

Reels to be delivered directly to the customer are fitted with protective packaging and labelled so that they can be identified.

## Storage and Shipping

The finished reels and pallets of sheets are placed in the mill's warehouse for finished goods until they are released from inventory for transportation to corporate warehouse or the customer by road, rail or sea depending on the customer's geographical location.

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# Purification Plant

The process wastewater is channelled to our final purification process. The water is purified through a combination of biological and chemical treatment.

a) The first stage is the buffer tower. This is where the decomposition of pollutants commences. Here we add nitrogen and phosphorus to provide nutrients for the bacteria in the water. Air is blown into the base of the tower, to oxygenate the water.

b) The next stage is a bio-bed, which is filled with solid plastic material and has a very large surface area – roughly equivalent to 10 football pitches (60,000 m²). Here a biofilm of bacteria and larger creatures is formed, which continues to break down pollutants in the water.

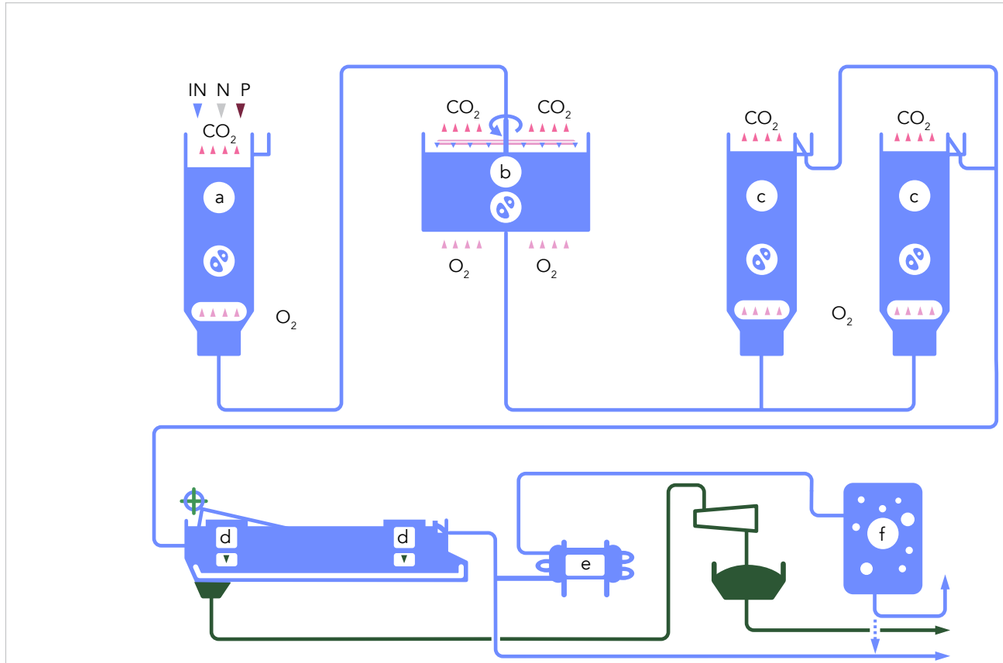
c) The water proceeds to towers with floating material, the surface of which is covered by bio-film. Air is added to make the material circulate in the towers.

The air also serves to ensure that the bacteria and the larger creatures have good access to oxygen, which is necessary for their survival and consequently for the biological decomposition of the surplus water.

d) The next stage comprises two sedimentation tanks, where flocculants are added to separate particles from the aque ous phase. The separated particles go to a centrifuge, where they are thickened, so that they can then be processed for soil improvement.

e) The treated water proceeds to the ultra-filtration plant.

f) The final, treated water from ultra-filtration goes to our external ponds, before being discharged into the Munkedal River or recirculated to the mill.







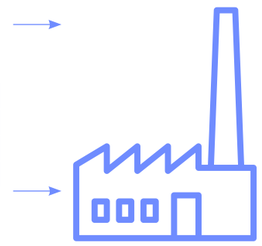

# Environmental Data and Regulations

Below are the raw materials, chemicals, and energy required to produce one tonne of paper in 2024, with the corresponding values for 2023 shown in parentheses. In addition, emissions to air and water, as well as the amounts of waste generated by this production, are reported. At the end of this section, we also present how we complied with the conditions set by the authorities. The applicable environmental requirements are detailed in this year's environmental report to the authorities and can be requested from the EMAS environmental contact persons (see page 18).

| **Raw materials** | | | |
|---|---|---|---|
| Pulp | 775 | (778) | kg |
| Chalk | 320 | (328) | kg |
| Starch | 58.1 | (59.1) | kg |
| Chemicals | 28.8 | (29.3) | kg |

| **Biodiversity** | | |
|---|---|---|
| Covered land area | 125,900 | $m^2$ |
| Nature-oriented area | 58,922 | $m^2$ |
| Total land use | 184,822 | $m^2$ |

| **Energy** | | | |
|---|---|---|---|
| Electricity – purchased | 687 | (626) | kWh |
| Electricity – own hydropower | 186 | (224) | kWh |
| Oil | 0 | (0) | kWh |
| LNG | 263 | (474) | kWh |
| Diesel | 0 | (0) | kWh |
| LPG | 0 | (0) | kWh |
| Steam – purchased | 1,311 | (1,183) | kWh |
| Total energy use | 2,446 | (2,507) | kWh |



Waste

| **Emissons to air** | | | |
|---|---|---|---|
| Sulphur dioxide ($SO_2$) | 0.02 | (0,03) | kg |
| Nitrogeneoxide ($NO_x$) | 0.249 | (0.290) | kg |
| Carbondioxide ($CO_2$) | 251 | (285) | kg |

| **Discharges to water** | | | | BAT* |
|---|---|---|---|---|
| AOX | 1.32 | (1.16) | g | |
| SS | 0.153 | (0.208) | kg | 0.020-0.350 |
| $COD_{Cr}$ | 0.406 | (0.552) | kg | 0.150-1.500 |
| $BOD_7$ | 0.076 | (0.150) | kg | 0.150-0.250 |
| Nitrogen (N) | 0.0241 | (0.0225) | kg | 0.050-0.200 |
| Phosporus (P) | 0.0017 | (0.0024) | kg | 0.003-0.010 |
| Process water to recipient | 3,643 | (3,846) | $m^3$ | 3,500-20,000 |

| **Material recycling** | | | |
|---|---|---|---|
| Biosediment | 21.9 | (19.5) | kg |
| Metal scrap | 2.60 | (2.58) | kg |
| Paper/board | 14.73 | (13.58) | kg |
| Plastic | 0.09 | (0.07) | kg |
| Glass | 0.0 | (7.82) | kg |
| Hazardous waste | 0.54 | (0.12) | kg |

| **Energy extraction** | | | |
|---|---|---|---|
| Combustible | 1.91 | (3.15) | kg |
| Wood | 0.04 | (0.40) | kg |
| Hazardous | 0.09 | (0.68) | kg |

| **Landfill / Destruction** | | | |
|---|---|---|---|
| Building waste | 0,21 | (0.01) | kg |
| Hazardous | 0,04 | (0.03) | kg |
| Fiber waste | 0,00 | (0.00) | kg |

| **Compliance with permit conditions** | **Max permit** | **Result 2024** | |
|---|---|---|---|
| Production (level net) | 200,000 | 112,097 | tonnes/year |
| **Discharges to water** | | | |
| Suspended solids | 150 | 73 | kg/day |
| $COD_{Cr}$ | 450 | 193 | kg/day |
| $BOD_7$ | 120 | 36 | kg/day |
| Total Nitrogene (N) | 20 | 11.5 | kg/day |
| Total Phosphorus (P) | 2 | 0.8 | kg/day |
| **Discharges to air** | | | |
| Sulphur | 90 | 2.48 | tonnes/year |
| $NO_x$ | 70 | ** | mg/MJ of oil |
| Dust | 1 | ** | g/kg oil |
| **Other conditions** | | | |
| Noice (night time) | 45 | 45 | dB(A) |
| Freshwater from river (process and cooling water) | 7,500 | 4,241 | l/minute |

* BAT – Best Available Techniques/EU BREF 2015 (Unintegrated fine paper production) refers to production Net reel machine. Net reel machine shows a figure before deductions for rejects in our post-processing have been made.

** No emissions above the reporting threshold

*** Includes both internal and external emissions to air. Further explanation see page 14.

# Biodiversity

## GULLMARN
## – one of Swedens most studied fjords

The water in Swedens largest genuine sill fjord is divided into several layers from Baltic sea, Kattgatt, Skagerrak, Northern sea and the Atlantic. The depth is home for Twohorn sculpin, Atlantic hookear sculpin and Northern stone crab.

The fjord Gullmarn is Swedens largest fjord. The lenght is almost 30 km, the width 1–4 kilometer with depths down to 125 meter. Passing the islands of Bornö the hill of Smörkullen rises 134 meter over the sea level. A sill fjord means that it is long, deep and narrow and has a sill at the mouth.

Gullmarn was formed by a fault hollowed out by watercourses and inland ice 560 million year ago. It is the natural border between the 920 million year old red granite in the north and the 1700 million year old area of gnejs in the south.

In 1830 scientists and interested parties were gathered on Kristineberg to discuss and to study the biodiversity of Gullmarn. One of these were the artist Wilhelm von Wright who painted – Fishes in Scandinavia, the zoologist Sven Lovén who is claimed to be the first to ever study the biodiversity of Gullmarn and the ornithologist and conservator Gustaf Kolthoff who publised the book – Nordic Birds.

Three large ocean streams affects the marine life of Gullmarn. This means that we find water from Baltic sea, Kattegatt/ Skagerrak och Northern/Atlantic sea. Due to diffrencies in salinity (content of salt) these water finds their own depths.

With a sill at 40 meters in the mouth of the fjord it causes a unique biology and at the same time a greater vulnerability to pollutants. The depth of 125 meters in Gullmarn has a similar biology and habitat like the 300–600 meters depth in the ocean outside the fjord.

In the depths it is almost complete darkness, cold (4-5 degrees celcius) with high salanity (35 per mille). Here we find creatures like the Twohorn sculpin, Atlantic hookear sculpin and Northern stone crab.



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# Significant Environmental Aspects

### Gathering Aspects

We have identified the most significant environmental aspects in our business. The environmental assessment is based on a holistic approach, where the entire chain from the production of materials used in our products to the shipment of our products is taken into consideration. The significant environmental aspects can then be a focus of environmental work and form the basis of improvement plans.

The significant environmental aspects are produced by drawing up a list of the various activities in the company together with a description of their environmental aspects and environmental impact. The aspects are reassessed as the business develops and the findings of new research become available

### Selecting Aspects

Our environmental assessment considers the following issues:

- Does the aspect cause a known, significant environmental impact, such as environmental threats identified by the Swedish Environmental Protection Agency, or does it counteract the national environmental targets adopted by the Swedish parliament?
- Does it involve high consumption of scarce raw materials, natural assets or energy?
- Does the environmental aspect involve a chemical that is harmful to the environment?
- Could the environmental aspect cause a serious environmental accident?
- Is the size/volume/content of the environmental aspect significant in terms of the environmental impact.

**Using this approach, the following significant environmental aspects have been identified**

**Transport**
for delivery of raw materials and finished product

**Emissions to air**
in connection to steam generation

**Energy**
to equipment in the production

**Chemical products**
to create the special properties of the paper and keep it clean in the process

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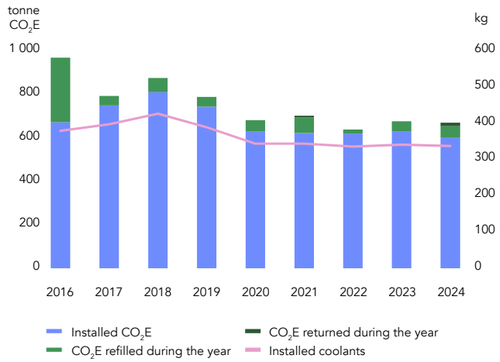
# Environmental Impact

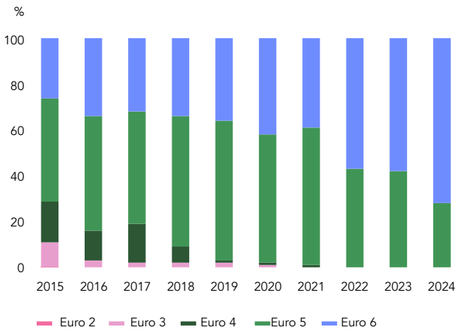
## Coolants

At Munkedals we have one type of coolant "F gases". The HFCs (incompletely halogenated fluorocarbons) do not affect the ozone layer but have an impact on the greenhouse effect. Coolants are shown in the graph as Carbon Dioxide Equivalents ($CO_2E$), which are calculated using the Global Warming Potential (GWP) factor for greenhouse gases. The GWP factor indicates how much one kilogram of a greenhouse gas affects the climate compared to one kilogram of carbon dioxide. For comparison, the GWP factor for carbon dioxide is one (1), while the GWP factors of the F-gases vary. It is calculated by multiply the emission (kg) of a greenhouse gas by the GWP factor of the gas.




## Transport Operations

Transport operations cause noise, emissions to air and the consumption of fossil fuels. The environmental impact of transport operations is therefore one of the considerations when we decide which transport carrier to use. Truck engines are divided into various EURO classes, in which a higher figure represents engines with lower emissions, especially of nitrogen oxides and carbon monoxide. Transport operations is based on transported tonnes.



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# Core Indicators

## Annual Comparisons

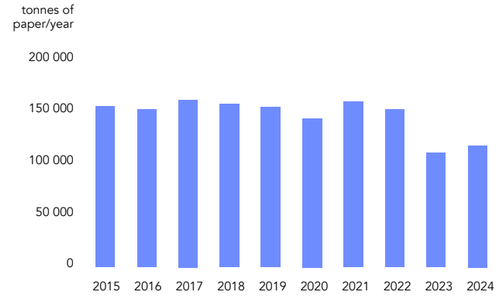
In 2024, paper production increased from 105,423 tonnes to 112,097 tonnes. Internal use of LPG and fuel oil has been completely phased out. In steam production, the energy mix consists of RDF (Refuse-Derived Fuel), LNG (Liquefied Natural Gas), and electricity. RDF is a fuel made from household and industrial waste; it contains a mix of both fossil and non-fossil materials.

In the diagrams for the core indicators Nitrogen Oxide and Carbon Dioxide, the emissions from the purchased steam are also reported as they are directly linked to paper production.

The ongoing collaborative project with the external energy company aims to secure the company's energy needs and, in the long term, reduce its fossil carbon footprint and ease the burden on the national power grid. Throughout most of 2024, our external energy partner's ability to produce steam using a solid-fuel boiler has been utilized to full capacity. Work on operational optimization and further progress regarding fuel for steam production is ongoing.

## Net Production

The relation to net production of paper is an important aspect when describing the progress of the company's environmental performance. The net production shown in the trend diagram is used to calculate the efficiency of the operational activity with respect to the core indicators.

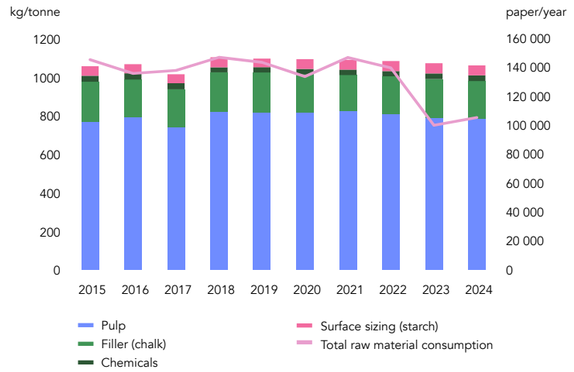



## Material Efficiency

The main raw materials used in paper production are pulp, pigment, starch and auxiliary chemicals. The diagram on the right shows the material balance between raw material and finished product, excluding water.

Raw materials are transported to the mill by sea, road and rail.

For key figures for Raw materials, see page 7.

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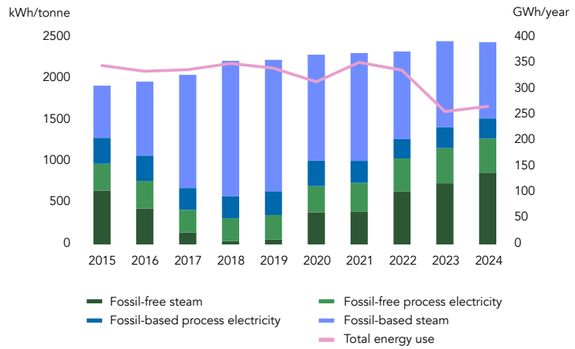
# Core Indicators

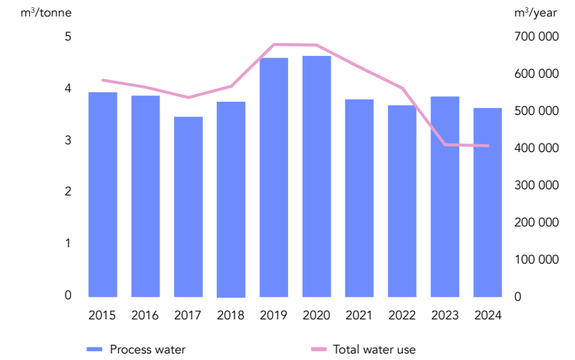
## Energy Efficiency

The most energy-intensive processes in the production of paper are the production of steam and the operation of the paper machine's engines, grinders and pumps. The steam is distributed from internal steam boiler (based on LNG or Electricity) or from external solid fuel boiler (based on RDF) to sealed cylinders where the paper is dried. The diagram shows the total energy consumption and the distribution between different types of energy carriers. For key figures for Energy consumption, see page 7.



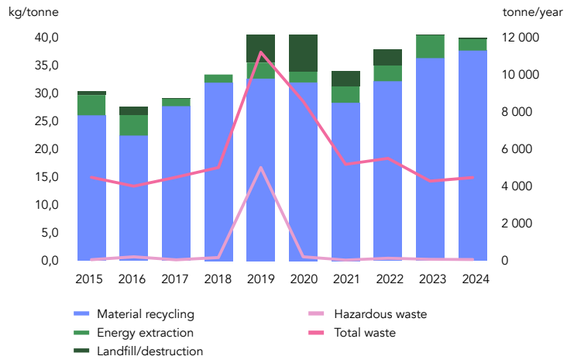

## Water Use

When manufacturing paper, water is used to slush the pulp into fibre stock and to transport the fibres to the paper machine's headbox. In the paper machine, the stock is dewatered when the paper is formed. Most of the water is utilised and recirculated in the mill. Water that is not recirculated goes to the mill's water purification plant.The amount of water used is measured as the water leaving the mill after having passed through the water purification plant.




## Waste

The diagram shows the company's amount of waste in relation to production. Whenever possible, the waste is recycled. Waste that is not suitable for recycling is used for energy recovery or landfill/sent to a treatment plant for destruction. In 2019, land preparation began for the construction of a new hydroelectric power plant, and the work continued into 2020. For key figures for Waste, see page 7.



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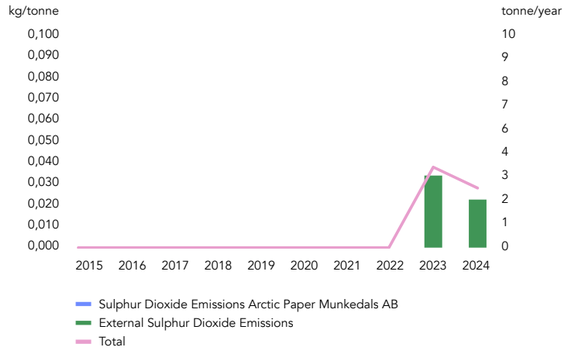
# Core Indicators – Emission to Air

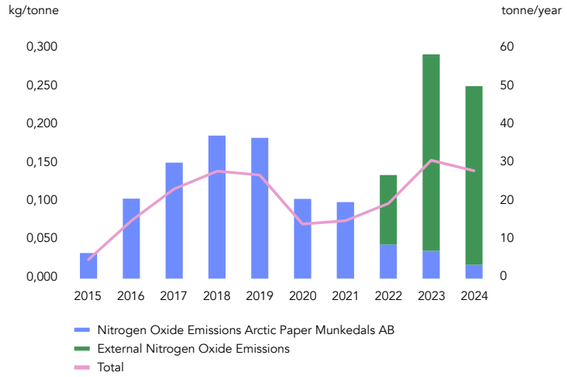
## Sulphur Dioxide ($SO_2$)

Sulphur dioxide is formed during the burning of fuels containing sulphur, such as fossil-based materials like oil or coal. Sulphur dioxide contributes to the acidification of soil and water. The sulphur dioxide figure in the graph is derived from the burning of LNG in an internal boiler (blue) and from the external burning of RDF fuel in an external solid fuel boiler (green). Sulphur dioxide emissions from internal burning of LNG are close to zero.



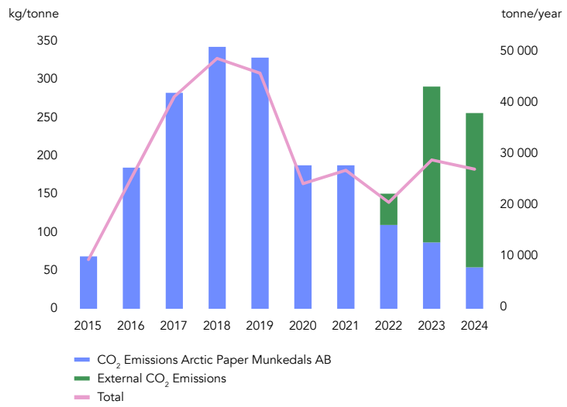

## Kväveoxider ($NO)_x$

Nitrogen Oxides is a collective term for the nitrogen oxides formed during combustion that can contribute to acidification of soil and water. The nitrogen oxides figure in the graph is derived from the combustion of LNG in the internal boiler (blue) and from the external combustion of RDF fuel in the external solid fuel boiler (green). External partner reports external nitrogen oxide emissions and is the owner of it, however, the emissions are linked to paper production and therefore these emissions are also reported in the attached trend graph.




## Fossil Carbon Dioxide ($CO_2$)

Carbon dioxide is formed by the complete combustion of carbon compounds in oxygen. Fossil fuels are formed by exposing organic compounds such as plants and animals to high pressure, high temperature for a very long time. Burning fossil fuels increases the amount of carbon dioxide in the atmosphere. This is because the carbon that is then added to the atmosphere was previously outside the cycle due to its encapsulation in the Earth's crust. The increase in atmospheric carbon dioxide is one of the causes of global warming.
The carbon dioxide figure in the graph is derived from the combustion of LNG in the internal boiler (blue) and from external combustion of RDF fuel in external solid fuel boiler (green). The external partner reports external carbon dioxide emissions and is the owner of it, however, the emissions are linked to paper production and therefore these emissions are also reported in the attached trend graph.

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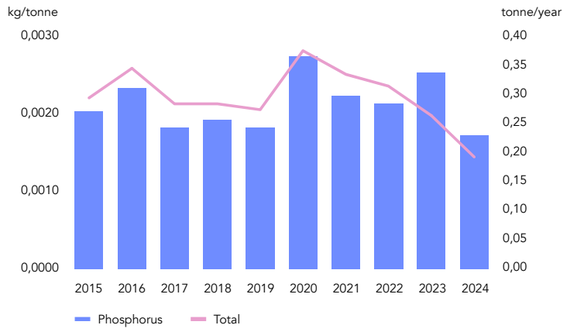
# Core Indicators – Emission to Water

## Phosphorus (P)

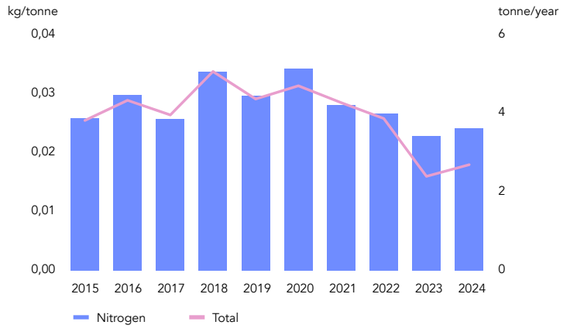
Phosphorus is an element. High levels of phosphorus compounds can, together with nitrogen compounds and organic substances, result in heightened organic activity in water, which, in turn, can result in watercourses becoming overgrown.

There is a decrease compared to last year, which is believed to be due to a higher recycling rate of treated process water and better optimisation of the treatment plant against the current production volume.



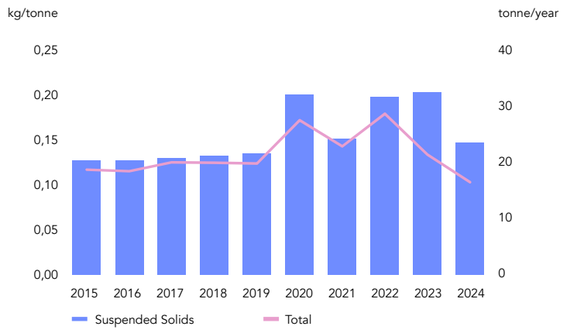

## Nitrogen (N)

An element that exists in large amounts as gas in the atmosphere, High levels of nitrogen compounds can, together with phosphorus compounds and organic substances, result in heightened organic activity in water, which, in turn, can result in watercourses becoming overgrown.




## Suspended Solids (SS)

Fiber fragments and other solid substances (e.g. chalk) in wastewater are called suspended solids and cause oxygen consumption and shallowing where the discharge takes place. In some years, elevated peaks of suspended solids have been observed that are not otherwise seen in a normal year; uneven production conditions are thought to have contributed to this increase. The reduction in 2024 is believed to be due to a higher recycling rate of treated process water and better optimisation of the treatment plant against the current production volume.



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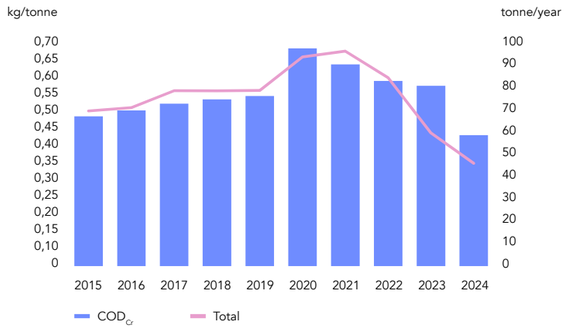
# Core Indicators – Emission to Water

## $COD_{Cr}$

Chemical Oxygen Demand – a measure of the amount of chemically oxygen-consuming substances in water. It is mainly the organic content that consumes oxygen during decomposition. $COD_{Cr}$ emissions decreased for the fifth year in a row.

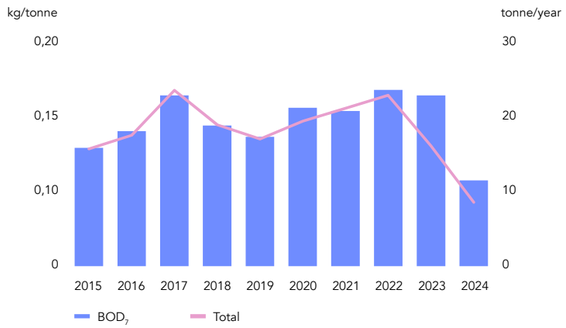
The reduction in 2024 is believed to be due to a higher recycling rate of treated process water and better optimisation of the treatment plant against the current production volume.




## $BOD_7$

Biological Oxygen Demand – a measure of the amount of oxygen consumed by microorganisms during the decomposition of organic matter in water over seven days.

The reduction in 2024 is believed to be due to a higher recycling rate of treated process water and better optimisation of the treatment plant against the current production volume.

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# Environmental Targets 2024

| Reduce Emissions to Water | |
|---|---|
| Detailed target: | Smoother raw water treatent and reject to the river. |
| Action plan: | Installation of new equipment for purification of raw water. |
| Result/Status: | Action must be reconsidered. Pipe to water tank needs to be replaced. Target extended to 2025. |

| Reduced Freshwater Use | |
|---|---|
| Detailed target: | As an annual average, 20% of the discharge water must be returned to the process. |
| Action plan: | Reassign stagnant ultra filtration plant to treat parts of today's outgoing water. |
| Result/Status: | Ultra filtration plant was put in to operation in December 2024. Target achieved. |

| Reduction of Fossil Energy | |
|---|---|
| Detailed target: | Maximum 50% fossil origin in the steam production comparison in 2017. |
| Action plan: | Optimize the operating criteria for the solid fuel boiler. |
| Result/Status: | Rebuilding carried out on ash output and other limitations. 100% operation of the solid fuel boiler. Target achieved. |
| | |

| Reduced Energy Use | |
|---|---|
| Detailed target: | Reduce the energy use 2,5% compared with 2019. |
| Action plan: | Reduce broke share, improved operability. Use enzyme and indirectly produce a more easily dried paper. |
| Result/Status: | Malfunctions are fixed and enzyme works well. Target reformulated to 2025. |

| Biodiversity | |
|---|---|
| Detailed target: | Flower meadow in the immediate area for pollinating insects. |
| Action plan: | Establishment of a flower meadow in a suitable place. |
| Result/Status: | Flower meadow is established. Target achieved. |

| Reduce Material Waste | |
|---|---|
| Detailed target: | Consentrate the biosludge by drying. |
| Action plan: | Investigate the possibility of using waste heat from the boiler to dry biosludge. |
| Result/Status: | Co-combustion test performed, unsatisfactory results. The goal takes once more a new direction. A collaboration with an external company that manufactures construction soil initiates. The bio sludge provides environmental benefits through reuse. Target achieved. |



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# Environmental Targets 2025

| Reduce Emission to Water | |
|---|---|
| Detailed target: | Smoother raw water treatment and reject to the river. |
| Action plan: | Installation of new raw water treatment equipment – automatic filter in water treatment. |
| Result/Status: | Action has been reconsidered. Quotations for new water treatment have been requested. |

| Reduce Energy Use | |
|---|---|
| Detailed target: | Reducing energy use through specific measures. |
| Action plan: | Speed control at least 5 drives, low load stop pulses, optimise hot water use, limitheat dumping, replace fluorescent lamps with LED. |
| Result/Status: | Work in progress. |

| Reduced Amount of Unsorted Waste | |
|---|---|
| Detailed target: | Reducing the share of combustible waste. |
| Action plan: | Systematically prevent interruptions and operational errors, implement the concept of visual management boards and improvement actions, and introduce waste sorting for food, packaging, and textiles. |
| Result/Status: | New target. |

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# Environmental Auditor

VERIFIED ENVIRONMENTAL MANAGEMENT
S-000248

Bureau Veritas Certification Sverige AB is an environmental verifier accredited by SWEDAC, accreditation number 1002. They have audited Arctic Paper Munkedals AB and confirmed that the company has an environmental management system that meets the requirements of the EMAS Regulation 1221/2009.

Bureau Veritas Certification AB has also reviewed the environmental statement and found it to be accurate and sufficiently detailed to meet the requirements of EMAS.

Michael Verne
Munkedal, 2025-06-25

**Environmental Verifier's Summary**
The environmental performance has improved positively over the past year. Examples include a reduction in fresh water consumption by reusing treated process water – achieving at least 20% of the discharged water annually – and reducing the share of fossil energy, with a maximum of 50% fossil origin in steam production compared to 2017.

The company is a relatively large facility (330 employees) with a strong focus on raw materials, energy, and waste/recycling.

- The goal to reduce water discharges through more consistent raw water treatment and reject to the river was not achieved in 2024 – extended to 2025.
- The goal to reduce freshwater use by recirculating treated process water to reach at least 20% of the discharged water annually was achieved in 2024.
- The goal to reduce the share of fossil energy to a maximum of 50% of steam production origin (compared to 2017) was achieved in 2024.
- The goal to reduce energy use by 2.5% compared to 2019 was reformulated for 2025.
- The goal regarding biodiversity – establishment of a wildflower meadow in the vicinity for pollinating insects – was achieved in 2024.
- The goal regarding reduced waste amounts – concentrating biosludge through drying – was achieved in 2024.

New goals for 2025:

- Achieve more consistent raw water treatment and reject to the river.
- Reduce energy consumption through specific measures.
- Reduce the share of combustible waste.

# Contact at the Mill

**For further information and request of environmental statements**
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arcticpaper.com

Arctic Paper Munkedal's Environmental Report is available in Swedish and English as well as in printed and digital form. The next environmental report is expected to be published in spring 2026.

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# Glossary

**ACCREDITED COMPANY**
A company that has been approved by a supervisory authority for example to conduct special analyses and checks on industrial processes.

**AOX**
Adsorbable Organic Halogens is a measure of the total presence of persistent – organically bound halogens.

**BIOLOGICAL TREATMENT**
Decomposition of pollutants in water with the aid of microorganisms.

**BLEACHING**
A method of increasing for example the pulp's brightness. Bleaching is undertaken using chemical compounds without elementally bound chlorine, ECF, or without any chlorine compounds, TCF.

**$BOD_7$**
Biological Oxygen Demand. The amount of oxygen required for natural decomposition of wastewater. BOD is low in relation to COD if remaining substances are hard to decompose and the biological treatments functioning well.

**$COD_{Cr}$**
Chemical Oxygen Demand. The amount of oxygen required for chemical decomposition of remaining pollutants in for example wastewater. Cr means that chromate has been used as oxidation agent for the analysis. High values may involve an increased risk of a lack of oxygen in the recipient.

**dB(A)**
Decibel A, a measure of the amount of sound measured with a filter that takes account of the human ear's sensitivity to various sound frequencies.

**EMAS**
Eco-Management and Audit Scheme. A voluntary EU decree and requirement document for an environmental management system. EMAS requires, in addition to the fact that ISO 14001 or equivalent is fulfilled, that an official environmental report is compiled. The environmental report is examined and approved by an accredited environmental audit company.

**HAZARDOUS WASTE**
Waste containing pollutants that are directly hazardous to the environment, such as certain chemicals, waste oils, batteries, fluorescent tubes, mercury lamps and electronic scrap.

**FINE PAPER**
A generic term for graphic paper, writing paper and printing paper, and certain special types of paper.

**FSC® CERTIFIED RAW MATERIAL**
Raw material with guaranteed origin (Forest Stewardship Council®) which exclude wood produced in conflict with FSC´s 5 paragraphs (illegal lumbering, key biotopes, serious social conflicts, genetically modified wood or nonsustainable forestry).

**PEFC CERTIFIED RAW MATERIAL**
A certification of forest raw material that utilises the great growth potential of forests while protecting biodiversity.

**ISO 14001**
An international standard containing specific requirements for an environmental management system. A certificate remains valid for three years on the condition that there is compliance with the certification requirements and the annual audits are conducted and produce a successful result.

**CHEMICAL PRECIPITATION**
Chemical bonding of pollutants which makes it possible to separate the pollutants from the waste water through sedimentation.

**CHEMICAL PULP**
A joint term for SULPHATE PULP and SULPHITE PULP, which are manufactured by chemically detaching the wood's fibres from one another.

**CARBON DIOXIDE $CO_2$**
A naturally occurring gas formed during the biological decomposition and combustion of organic material. A change in the concentration of carbon dioxide in the atmosphere is likely to lead to temperature variations. The gas is present, along with water, in the exhaled air of mammals and is absorbed by plants, where it is stored as biomass.

**CARBON DIOXIDE EQUIVALENTS**
Carbon dioxide equivalents ($CO_2e$) are a way to express the climate impact of a greenhouse gas emission in comparison to the same amount of carbon dioxide ($CO_2$).
By expressing greenhouse gas emissions in carbon dioxide equivalents, it becomes easier to compare the individual contribution of different gases to the greenhouse effect.

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# Glossary

**NITROGEN OXIDES, $NO_x$**
Gas formed when the nitrogen in combustion air is oxidised at a high combustion temperature. Contributes to acidification and eutrophication.

**MECHANICAL PULP**
A joint term for pulp which is manufactured by mechanically detaching the wood's fibres from one another.

**UNCOATED PAPER**
Paper which has been coated with a thin layer of starch, in contrast to coated paper which is coated with a layer consisting of elements including among others clay, chalk, starch and synthetic binding agents.

**RECIPIENT**
A receiving entity for discharges, such as the sea, a lake, a watercourse or the atmosphere.

**GUIDELINE VALUE**
A guideline value is a value that, if exceeded, places an obligation on the permit holder to take action to ensure that the value can be met.

**SUSPENDED SOLIDS, SS**
The volume of solid matter in water that remains in a filter with a mesh of a defined size.

**SULPHUR DIOXIDE, $SO_2$**
Formed by the combustion of sulphurous fuels such as gas, coal, oil and oil products. Discharges contribute to the acidification of land and lakes.

**EUTROPHICATION**
PHOSPHORUS, P, and NITROGEN, N, are elements included in nutrient salts that increase the growth of plankton in water. If the content of the nutrient salts is too high, such growth can be so strong that the oxygen is used up and a shortage of oxygen arises.

**LIMIT**
A value for discharges from industrial operations that has been set by the environmental authorities and that may not be exceeded.



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