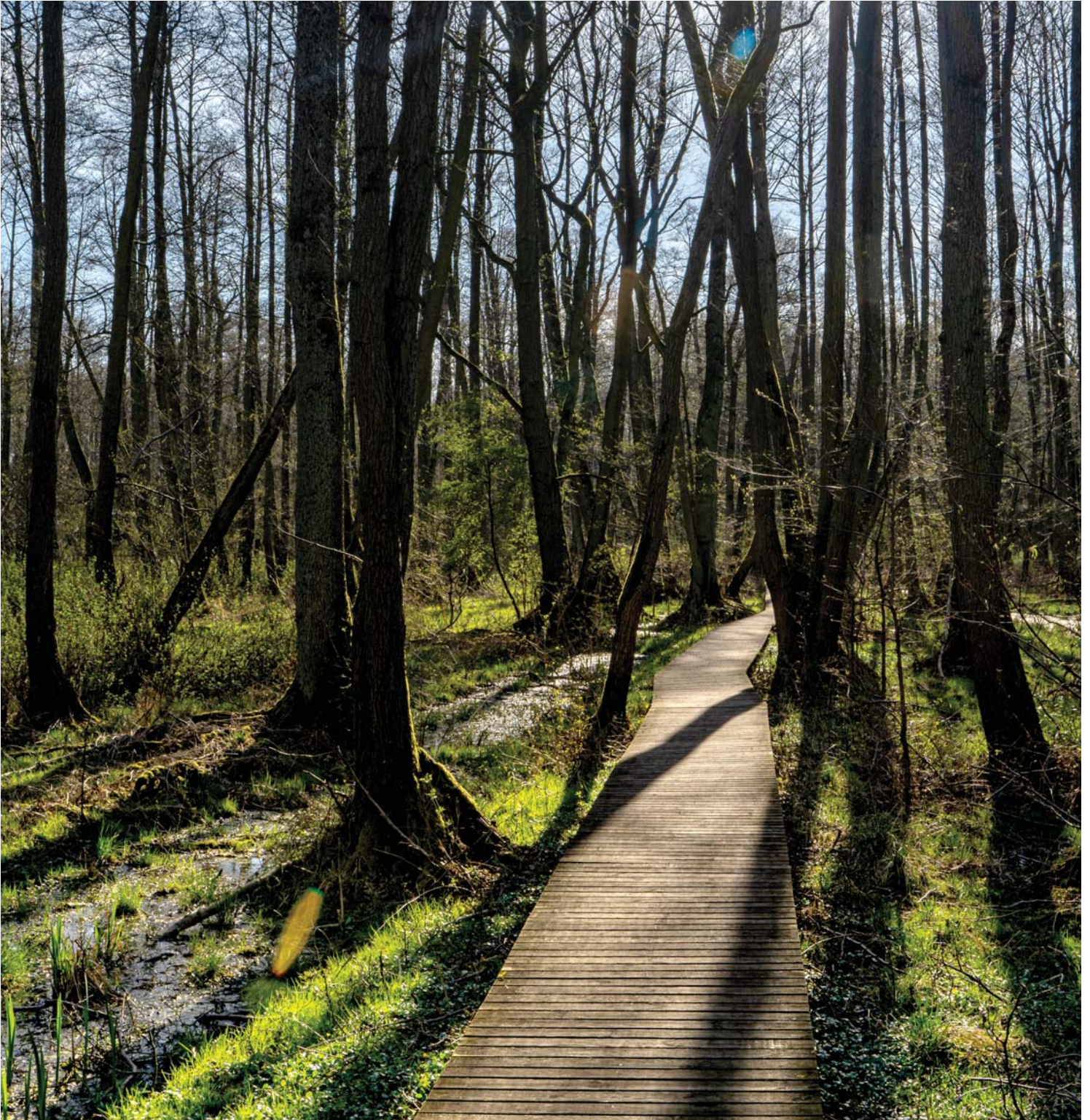


# EMAS 2024



ARCTIC PAPER



# Environmental Report 2024

## Table of Contents

|                                                        |    |
|--------------------------------------------------------|----|
| Preface                                                | 2  |
| Facts about Arctic Paper Kostrzyn SA                   | 3  |
| Environmental Management                               | 4  |
| Environmental Policy                                   | 4  |
| Paper Production                                       | 5  |
| Local Processes                                        | 6  |
| Main and Detailed Environmental Performance Indicators | 7  |
| Biodiversity                                           | 8  |
| Significant Environmental Aspects                      | 9  |
| Key Indicators                                         | 10 |
| Environmental Performance 2024                         | 18 |
| Environmental Objectives 2025 and Action Plan          | 20 |
| Auditor's Statement                                    | 21 |
| Contacts                                               | 22 |
| Glossary                                               | 23 |

## Arctic Paper Kostrzyn SA

Arctic Paper Kostrzyn SA (APK SA) is the largest producer of offset papers in Poland and the second-largest producer of graphic papers in the country. Since 1993, the company has been part of the Swedish paper group **Arctic Paper**.

The Kostrzyn mill primarily manufactures **Amber** brand papers – high-quality, uncoated, woodfree papers produced in a modern and safe working environment, with great care for the natural surroundings. Our product range also includes bleached kraft papers dedicated to the packaging market.

Arctic Paper Kostrzyn SA is certified under the **ISO 9001** quality management system, the **FSSC 22000** food safety system for packaging materials, and the **ISO 45001** occupational health and safety management system. It has implemented an environmental management system in accordance with **ISO 14001** and publishes a publicly available **EMAS** report on its environmental impacts.

## 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 695,000 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 Poznań, Poland, with a branch office in Gothenburg, Sweden.

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

# Preface

Dear Readers,

We are pleased to present the latest EMAS report from Arctic Paper Kostrzyn S.A., highlighting our environmental management efforts and reflecting our continued commitment to responsible business practices in 2024. As we navigate a rapidly evolving business landscape, maintaining transparency in our environmental impact reduction efforts remains crucial.

As part of this commitment, we are taking significant steps to improve energy efficiency, optimise water usage, and increase the share of renewable energy in our production processes. Both our Kostrzyn mill and the wider Arctic Paper Group are working toward a transition to fully fossil-free energy by 2035, a goal that will lead to a substantial reduction in greenhouse gas emissions. To support this, we are actively investing in renewable energy sources. The energy segment being developed by Arctic Paper is becoming an increasingly important source of future revenue, and a key driver of our path toward climate neutrality.

In the second half of 2024, our 17 MW solar power plant in Kostrzyn nad Odrą was brought online. This investment will generate an additional 18 GWh of renewable energy annually to help power our mill. We also acquired a 4 MW photovoltaic farm in Garwolin, Poland in 2024, bringing the Group’s installed capacity to over 30 MW by summer 2025. In 2025, we will continue expanding our green energy initiatives, including launching an additional 9 MW solar farm in Kostrzyn in the first quarter, and pursuing the next stage of renewable energy development later in the year.

Guided by circular economy principles, we are committed to providing sustainable wood fibre-based products. We also recognise our duty to protect biodiversity – particularly in protected areas and forests – by carefully selecting and collaborating with responsible suppliers.

Partnerships play a vital role in enhancing our positive environmental impact. At Arctic Paper Kostrzyn S.A., we follow the Group’s Code of Conduct, which strengthens ethical practices and ensures alignment with our sustainability goals.



Finally, I would like to express my sincere thanks to all our employees for their outstanding dedication and hard work throughout the year in achieving strong environmental performance.

With best regards,  
**Michał Jarczyński**  
**President of the Management Board**  
**Arctic Paper Kostrzyn SA**  
Kostrzyn nad Odrą, June 7, 2025

# Facts about Arctic Paper Kostrzyn SA

|         |                        |
|---------|------------------------|
| Product | Amber Graphic          |
|         | Amber Preprint         |
|         | Amber Volume           |
|         | Amber Highway          |
|         | Amber Terra            |
|         | Munken Kraft           |
|         | Munken Kraft HighWhite |

|                        |         |           |                        |
|------------------------|---------|-----------|------------------------|
| Energy                 |         | Capacity  | 315,000                |
| Gas boilers            | 169 MW  | Sales     | Export 72%, Poland 23% |
| Back-pressure turbines | 18.7 MW | Employees | 446                    |
| Gas turbines           | 21.8 MW |           |                        |

| Paper Machine | Width | Grammage    | Speed     | Capacity |
|---------------|-------|-------------|-----------|----------|
| MP1           | 5.3 m | 40-120 g/m² | 950 m/min | 155,000  |
| MP2           | 5.3 m | 70-170 g/m² | 800 m/min | 160,000  |

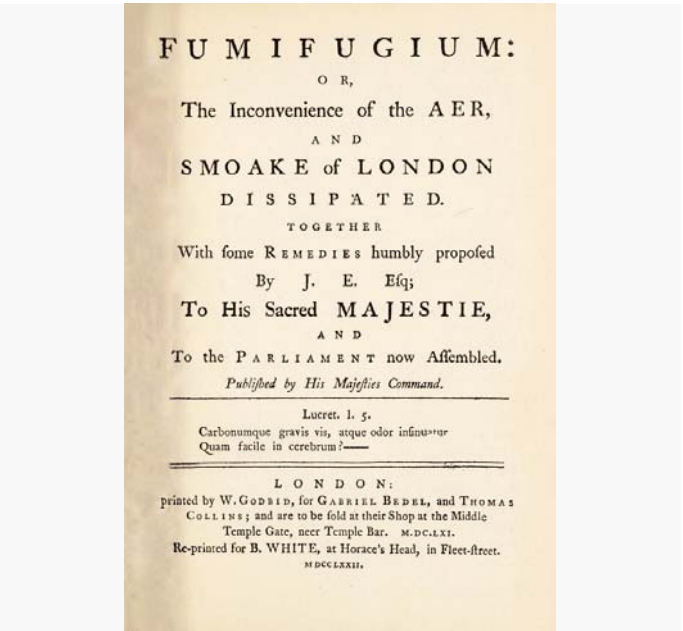
| Sheet Cutters | Sheet Width | Sheet Length | Production Capacity | Storage Capacity |
|---------------|-------------|--------------|---------------------|------------------|
| 6 szt.        | 30 – 160 cm | 32 – 160 cm  | 180,000 tonnes/year | 16,000 tonnes    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|
| Certyfikaty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |            |
| <div><div><p>FSC<br/>www.fsc.org<br/>FSC® C012880<br/>The mark of responsible forestry</p></div><div><p>PEFC<br/>PEFC0131-126<br/>Promoting Sustainable Forest Management<br/>www.pefc.org</p></div><div><p>EU Ecolabel<br/>www.ecolabel.eu<br/>EU Ecolabel: PL/011/002</p></div></div> |                                          |            |
| Environmental managemant system ISO 14001:2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Numer Zatwierdzenia: ISO 14001 – 0052495 | 2027-04-30 |
| Environmental managemant system EMAS 1221/2009 (with changes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PL 2.08-001-13                           |            |
| Chain of Custody according to FSC®                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PBN-COC-012351                           | 2026-12-06 |
| Chain of Custody according to PEFC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PBN-PEFC-COC-000022                      | 2027-06-05 |

# Environmental Management

## Awareness

In modern history, the understanding of the interdependence between humans and the environment was marginalized at a very early stage. Natural resources were considered inexhaustible, and human impact was seen as negligible. Attention was focused primarily on problems that had a direct and material effect on human health. To enable a more systemic approach,



environmental review methods were developed – laying the foundation for structured environmental management.

In 1661, John Evelyn published “Fumifugium, or The Inconveniencie of the Aer and Smoak of London Dissipated”, a work considered a precursor to modern environmental reviews.

## Subject Matter

Environmental management can be defined as the organized acquisition of knowledge about the environment and the gradual reduction of one’s negative impact on it. EMAS and ISO 14001 are key documents that set the conditions and serve as pillars of our environmental management systems. They are not only certifications of legal compliance but also instruments that promote continuous improvement through procedures, audits, goals, and action programs.

## Arctic Paper as a Pioneer

Today, there are many incentives to reduce environmental impact. With its long-term commitments and well-established systems, Arctic Paper is a group with a clear objective: to minimize its environmental footprint, improve operational efficiency, and foster open dialogue.

# Environmental Policy

“With care for the natural environment, we always choose lasting solutions.”

The goal of Arctic Paper Kostrzyn is to minimize the negative environmental impact of the company’s operations.

Means of Achieving This Goal:

- 1. Raising employee awareness regarding environmental protection,
- 2. Maximizing the use of certified raw materials,
- 3. Optimizing water consumption,
- 4. Reducing specific energy consumption,
- 5. Minimizing noise emissions to the environment,
- 6. Preventing pollution and managing all generated solid waste,
- 7. Complying with legal environmental protection requirements.

Arctic Paper Kostrzyn S.A. adheres to legal standards and transparently communicates the impact of its activities on the environment.

The environmental policy of Arctic Paper Kostrzyn is known to all employees and available to all interested parties.

**Michał Jarczyński**  
**President of the Management Board**  
**Arctic Paper Kostrzyn S.A.**

# Paper Production

## Pulp Reception

The mill does not produce its own pulp but purchases it in the form of bales from external suppliers. Once delivered to the mill, the pulp bales are stored in the pulp warehouse until they are needed.

The pulp bales are dissolved in internally purified process water and then ground in mills to soften and swell the fibers. Grinding is important for the strength properties of the paper. Various raw materials and additives are added, such as fillers, sizing agents, and starch. The pulp is filtered in several stages to remove foreign particles.

## Paper Machine

### Headbox and Wire Section

The function of the headbox is to distribute the diluted pulp evenly across the entire width of the wire. In the wire section, dewatering and sheet formation takes place.

### Press Section

The partially dewatered sheet then moves into the press section. Here, the paper gains the proper density and surface structure.

### Surface Treatment

After drying, both sides of the paper surface are treated in a sizing/coating process. This treatment gives the paper a smoother and more durable surface with better printability. After this process, the surface is dried in infrared dryers and in a second drying section containing 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

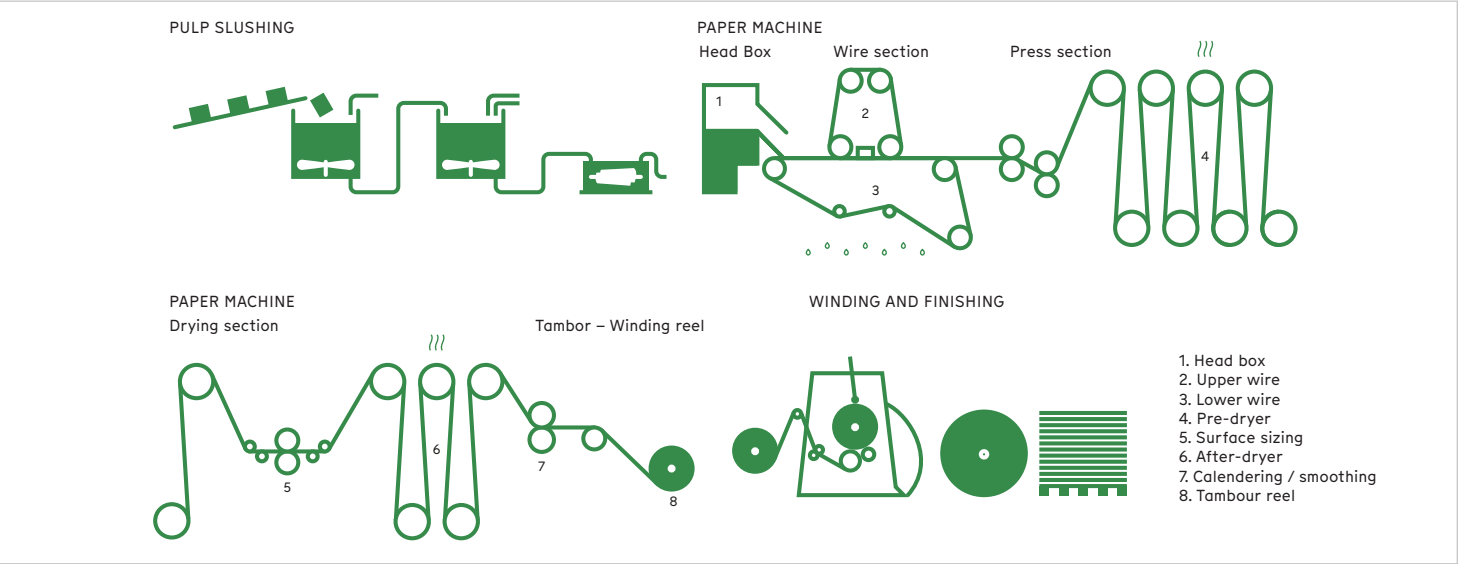
Pallets with sheets are provided with a cardboard top cover and then shrink-wrapped.

### 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.





Local Processes

Energy Use

- 1. The primary fuel used for energy production is natural gas from local deposits. Backup fuels include light fuel oil and high-methane natural gas.
- 2. The parameters of the gas are continuously monitored before combustion.
- 3. The heat generated is used to produce process steam, which is then used for paper drying.
- 4. Electricity for paper production is obtained from two generators coupled with gas turbines, two generators connected to steam turbines through steam pressure reduction, and renewable photovoltaic (solar) energy sources.
- 5. Air emission monitoring is carried out continuously or periodically, in accordance with current reference methodologies.

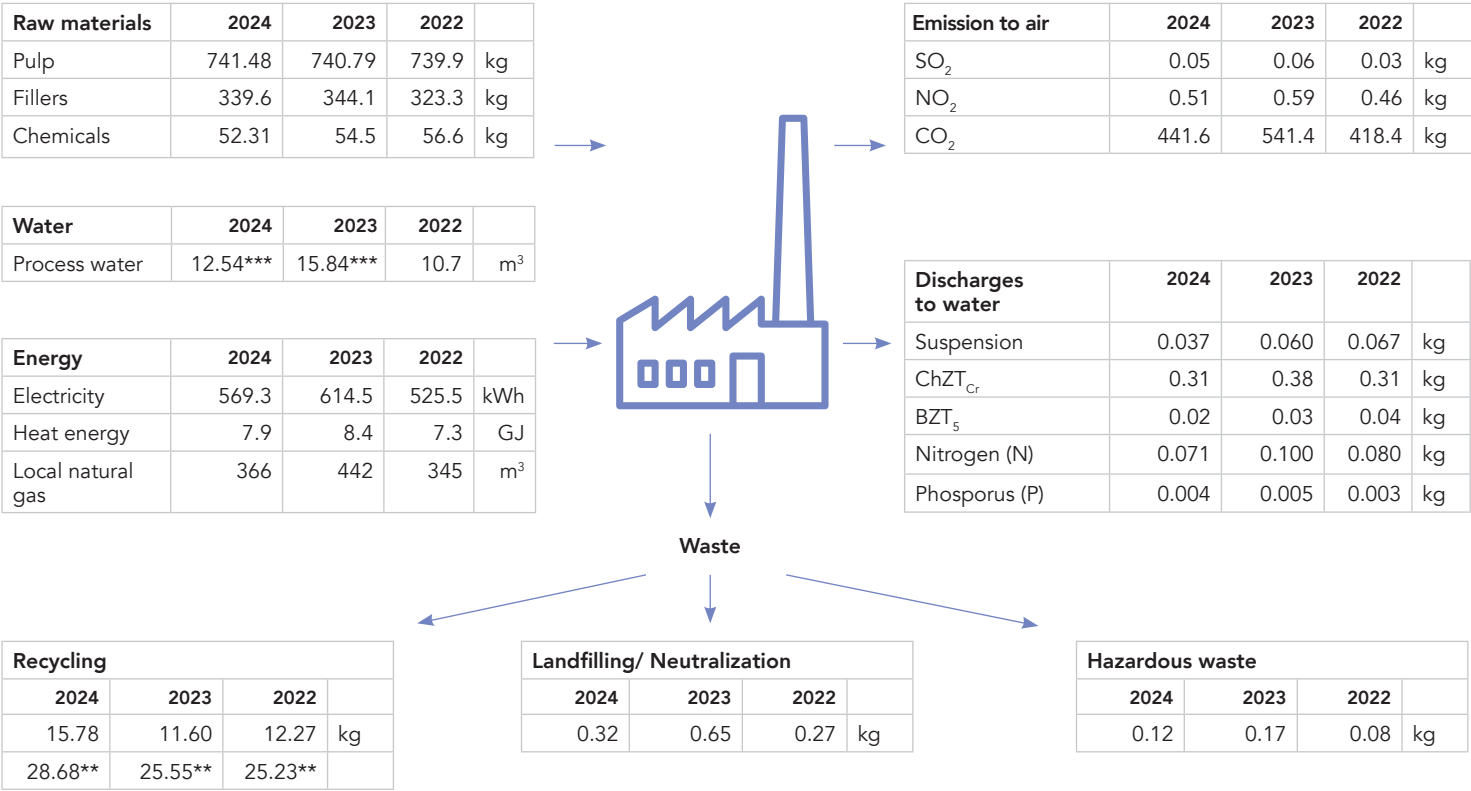
Wastewater Treatment

- 1. The first stage of wastewater treatment involves the removal of contaminants generated during paper production (mainly cellulose fibers and filler particles). This is carried out in settling tanks, where the contaminants settle freely at the bottom and are removed, while the pre-treated wastewater flows to the next stage.
- 2. The second stage occurs in two aerobic bioreactors. These are tanks supplied with air. The prefix “bio” indicates that the dissolved pollutants in the wastewater are broken down by microorganisms.
- 3. In the third stage, the treated wastewater is separated in a clarifier from the byproducts of bacterial activity and then directed to a flotation chamber, where it undergoes final cleaning using air and chemical agents. The cleaned water is discharged into the Warta River.
- 4. Separated sludge from the mechanical and biological treatment is mixed and dewatered, and then sent for recycling, such as composting.



Main and Detailed Environmental Performance Indicators

The following lists the raw materials, auxiliary materials, and energy required to produce 1 tonne of paper in 2024 (2023 and 2022). Additionally, emissions to air and water, as well as the amounts of waste generated by this process, are provided.



The above figures refer to the net production values according to BAT for paper and board production.

| Compliance with the conditions of the integrated permit | Permissible value according to the integrated permit | Result 2022 | Result 2023 | Result 2024 | Unit       |
|---------------------------------------------------------|------------------------------------------------------|-------------|-------------|-------------|------------|
| Production (level net)                                  | 380,000                                              | 298,320     | 176,156     | 214,176     | tonne/year |
| Discharges to water                                     |                                                      |             |             |             |            |
| ChZT <sub>Cr</sub>                                      | 1.5                                                  | 0.31        | 0.38        | 0.31        | kg/tonne   |
| Suspension                                              | 0.35                                                 | 0.07        | 0.06        | 0.04        | kg/tonne   |
| Total Nitrogene (N)                                     | 0.1                                                  | 0.08        | 0.10        | 0.07        | kg/tonne   |
| Total Phosphorus (P)                                    | 0.012                                                | 0.003       | 0.005       | 0.004       | kg/tonne   |
| BZT <sub>5</sub>                                        | 30                                                   | 3.44        | 2.29        | 1.98        | mg/l       |
| Discharges to air                                       |                                                      |             |             |             |            |
| Dust                                                    | 13.04                                                | 1.7         | 1.2         | 0.8         | tonne/year |
| SO <sub>2</sub>                                         | 41.58                                                | 11.7        | 12.1        | 11.9        | tonne/year |
| NO <sub>2</sub>                                         | 348                                                  | 157.8       | 128.7       | 125.0       | tonne/year |
| CO <sub>2</sub>                                         | nd                                                   | 144,702     | 118,825     | 109,327     | tonne/year |
| Other conditions                                        |                                                      |             |             |             |            |
| Noise                                                   | 55 (day) / 45 (night)                                | do 55/45    | do 55/45    | do 55/45    | dB(A)      |
| Fresh water intake                                      | 12,000                                               | 9,116       | 8,292       | 8,510       | m³ per day |
| Amount of wastewater                                    | 11,000                                               | 8,731       | 7,441       | 7,335       | m³ per day |
| Wastewater temperature                                  | 35                                                   | 17-32       | 16-31       | 12 – 32     | °C         |
| Sludge                                                  | 7,500                                                | 6,313**     | 4,096**     | 4,346**     | tonne/year |

We comply with all legal and other applicable requirements related to the operations of Arctic Paper Kostrzyn S.A. In 2024, no environmental incidents were recorded.

\* Free allocation of CO<sub>2</sub> emission allowances for the year 2024; parameter not subject to limit values.  
\*\* Indicator [t/year] based on the wet weight of waste.  
\*\*\* Refers to normal operation of paper production lines.



# Biodiversity



Currently, one of the major environmental problems on Earth is the decreasing area of forests. This phenomenon has serious consequences, the main ones being: disruption of the water cycle in ecosystems and increased soil erosion, loss of livelihoods for local communities, and loss of biodiversity. One of the causes of this situation is the illegal trade in wild fauna and flora.

Since 2007, Arctic Paper Kostrzyn S.A. has primarily used pulp made from certified wood (FSC or PEFC) for its production, which means that:

- The wood does not originate from illegal sources,
- The wood does not come from endangered areas or regions with high conservation value,
- The wood is not derived from genetically modified trees,
- The harvesting of wood does not violate the rights or traditions of indigenous peoples.

| Efficiency indicators                                          | Annual share value | 2024 | 2023 | 2022 |
|----------------------------------------------------------------|--------------------|------|------|------|
| Share of pulp suppliers holding FSC® and/or PEFC certification | %                  | 100  | 100  | 96*  |

\* supply chain disruptions due to the situation in Ukraine

# Significant Environmental Aspects

The environmental aspects – elements of Arctic Paper Kostrzyn SA’s activities, products, or services that impact the environment – were identified based on the process map of the operations within the plant. For each individual process, input data were collected and output data were defined, with particular attention paid to:

- Emission to air
- Discharges to water
- Waste management
- Soil contamination
- Use of natural resources
- Other issues related to the local environment and community

An aspect is considered significant if it receives an evaluation above a defined threshold, based on the following criteria:

- Compliance with legal and regulatory requirements
- Scope of environmental impact
- Probability of exceeding emission limits or standards
- Severity of the environmental impact
- Likelihood of the impact occurring

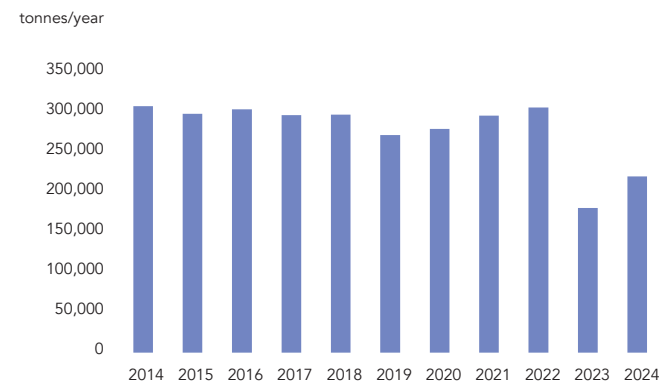
The following have been recognized as the most significant direct and indirect environmental aspects:

- Pulp consumption (depletion of natural resources)
- Water consumption (depletion of natural resources)
- Gas consumption (depletion of natural resources)
- Discharge of papermaking wastewater (pollution of surface waters and soil)
- Sewage sludge (waste-related pollution)
- Improper waste and packaging management (waste pollution, biological risk from wood pests, contamination of water and soil)
- Consumption of electric and thermal energy (depletion of natural resources)
- Potential leakage of chemicals and oils (contamination of water and soil)
- Emission of dust and gases – CO<sub>2</sub>, sulfur oxides, nitrogen oxides, dust, F-gases (air pollution, greenhouse effect)
- Potential gas explosion (air and waste pollution)
- Fire (air and waste pollution)
- Product and service design – implementation and validation (environmental pollution by waste, creation of emergency situations) – preventive/supportive parameter
- Supplier environmental aspect oversight (air, waste, water, and soil pollution, noise) – preventive/supportive parameter

# Core Indicators

## Net Production (Annual Reference Values)

When describing the company's progress in terms of environmental performance, net paper production is an important point of reference. The net production, as shown in the attached trend chart, serves as the basis for calculating operational efficiency in relation to the core environmental indicators. In 2023, due to a significant reduction in the effective operating time of the production line, while maintaining process readiness, there was a deterioration in the unit environmental indicators.

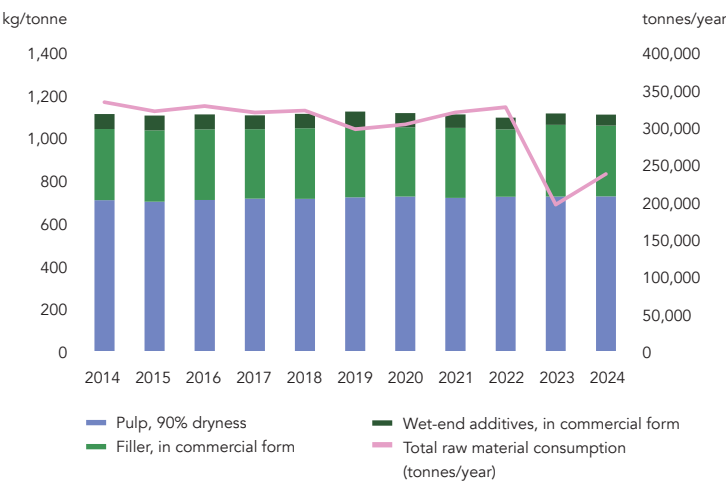


| Net paper production – reference values for the calculation of unit environmental performance indicators (years 2022–2024) |         |         |            |
|----------------------------------------------------------------------------------------------------------------------------|---------|---------|------------|
| 2024                                                                                                                       | 2023    | 2022    | Unit       |
| 214,176                                                                                                                    | 176,156 | 298,320 | tonne/year |

The data present the net production volume in tonnes for the last three years. These values serve as a reference point for calculating resource consumption efficiency and emissions per unit of production (see page 9). The chart above shows the long-term production trend for the years 2014–2024.

## Material

The main raw materials used in paper production include pulp, filler, and auxiliary substances. These materials are delivered to the mill via sea, road, and rail transport. For key unit values, see page 9.



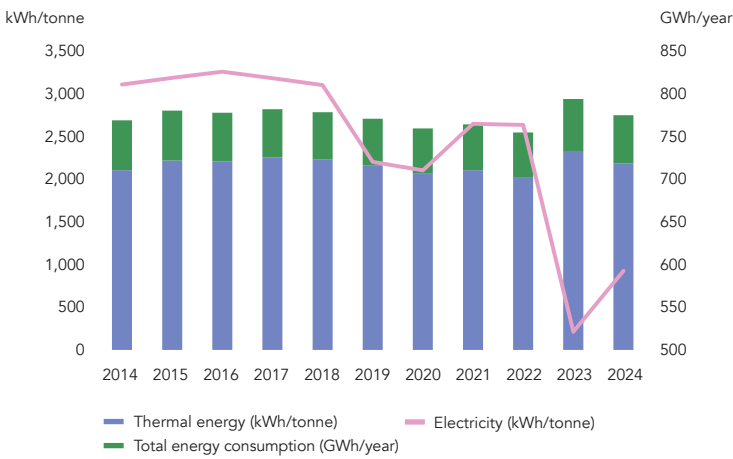
|                                 | 2024    | 2023    | 2022    |
|---------------------------------|---------|---------|---------|
| Total consumption [tonnes/year] | 242,747 | 200,722 | 334,059 |
| Pulp [tonnes/year]              | 158,808 | 130,494 | 220,718 |
| Filler [tonnes/year]            | 72,734  | 60,623  | 96,453  |
| Wet-end additives [tonnes/year] | 11,204  | 9,605   | 16,888  |

The data present the material consumption in tonnes for the last three years. These values serve as a reference point for calculating material use efficiency per unit of net paper production. The chart above shows the long-term trend in material consumption from 2014 to 2024.

# Core Indicators

## Energy

The most energy-intensive processes in paper production are steam generation and the operation of paper machine motors, mills, and pumps. Steam is distributed to the drying cylinders, where it is used to dry the paper. The chart shows the total energy consumption as well as the breakdown between electric and thermal energy. For key figures on energy use and main energy carriers, see page 9.

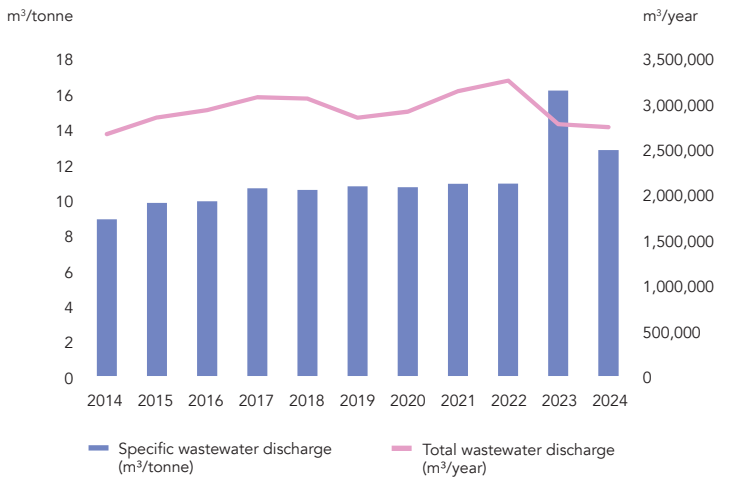


|                                                   | 2024 | 2023 | 2022 |
|---------------------------------------------------|------|------|------|
| Total energy consumption [GWh/year]               | 593  | 521  | 766  |
| Including renewable energy consumption [GWh/year] | 8    | 1.2  | 1.3  |

The data present the energy consumption values over the past three years. These values serve as a reference point for calculating energy use efficiency per unit of net paper production. The chart above shows the long-term trend in energy consumption from 2014 to 2024.

## Water

In the papermaking process, water is used for dispersing pulp into fibrous slurry and for transporting the slurry to the headbox of the paper machine. On the paper machine, during sheet formation, the slurry is dewatered. Most of the water is reused and circulates within the paper mill. Water that is not recirculated is sent to the on-site wastewater treatment plant. Water consumption is measured based on the volume of wastewater discharged from the mill after treatment. For key figures on water consumption and wastewater discharge, see page 9. The higher unit water consumption in 2023, compared to previous years, does not indicate a deterioration in the process, but is rather a result of its specific operational characteristics.



|                                     | 2024      | 2023      | 2022      |
|-------------------------------------|-----------|-----------|-----------|
| Process water* [m³/year]            | 2,684,521 | 2,716,086 | 386,672   |
| Surface water consumption [m³/year] | 3,114,516 | 3,026,563 | 3,327,447 |
| Total water consumption [m³/year]   | 3,143,730 | 3,047,874 | 3,359,633 |

The data present the water consumption values over the past three years. Water use is measured as the volume of water leaving the factory after passing through the water treatment station. These values serve as a reference point for calculating material use efficiency per unit of net paper production. The chart above shows the long-term trend in water consumption from 2014 to 2024.

\* Water consumption is measured as the wastewater volume discharged from the facility after treatment.

# Core Indicators

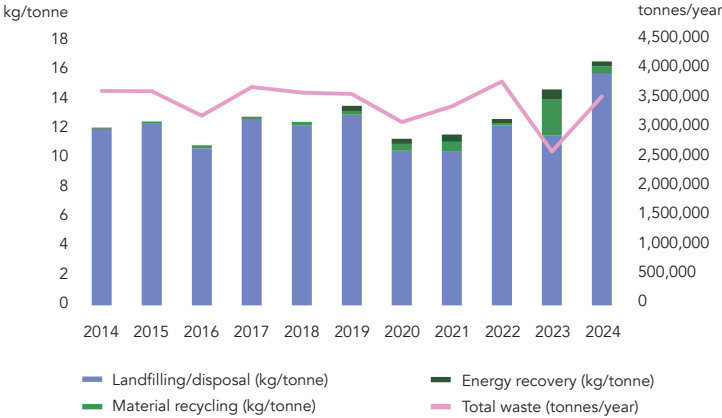
## Land Use in Relation to Biodiversity

The data present the types of land use associated with the mill's operations over the past three years. It includes the total site area, impermeable surfaces, and areas remaining in a natural or semi-natural state. These indicators serve as a reference point for assessing the mill's impact on biodiversity and changes in land use structure. The goal of this monitoring is to minimize transformation of ecologically valuable areas and to support the preservation of green infrastructure.

| Land use in relation to biodiversity, expressed in area units [m²]: |           |           |         |
|---------------------------------------------------------------------|-----------|-----------|---------|
|                                                                     | 2024      | 2023      | 2022    |
| Total land use                                                      | 1,066,237 | 1,066,237 | 106,237 |
| Total impermeable surfaces                                          | 172,494   | 169,577   | 169,577 |
| Total nature-oriented area outside the site                         | 799,183   | 798,481   | 799,183 |

## Waste

The chart illustrates the amount of mill-generated waste in relation to production. Wherever possible, waste is recycled. Waste that cannot be recycled is either used for energy recovery or landfilled/sent to a processing facility for disposal. For key figures on waste, see page 9.



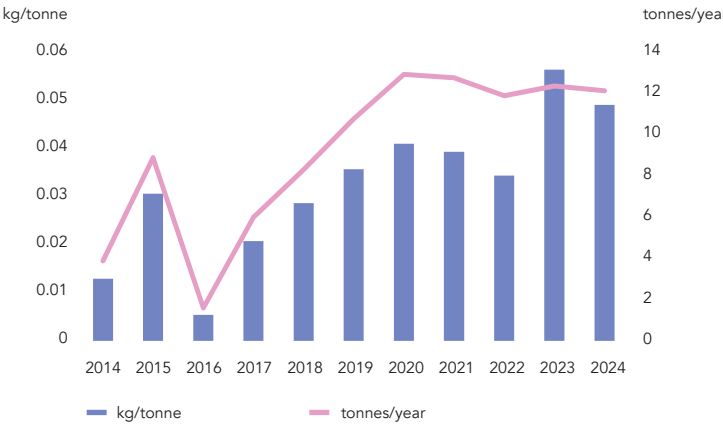
|                                                               | 2024  | 2023  | 2022  |
|---------------------------------------------------------------|-------|-------|-------|
| Annual amount of waste generated [t/year]                     | 3,559 | 2,623 | 3,814 |
| Including annual amount of hazardous waste generated [t/year] | 0.12  | 0.17  | 0.08  |

The data present the amount of waste generated over the past three years. These values serve as a reference point for calculating material use efficiency per unit of net paper production. The chart above shows the long-term trend in waste generation, including the dry mass of sewage sludge, for the years 2014–2024.

# Core Indicators – Emission to Air

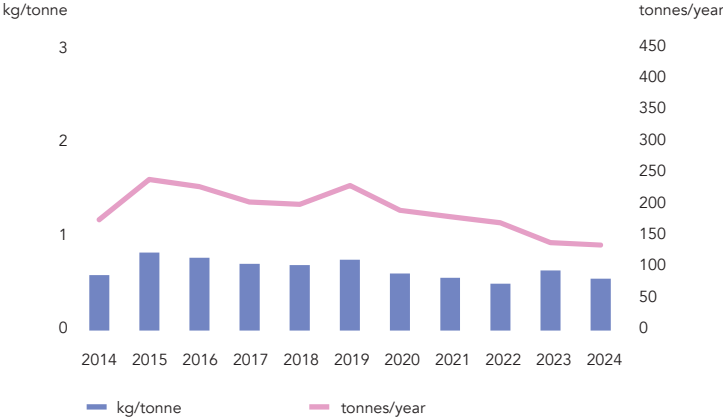
## Sulphur Dioxide (SO<sub>2</sub>)

Sulphur dioxide is generated during the combustion of fuels containing sulphur, such as oil and coal. SO<sub>2</sub> contributes to acidification of soil and water. (Fluctuations in the values result from the measurement methodology. All values comply with BAT requirements). For key figures related to air emissions, see page 9.



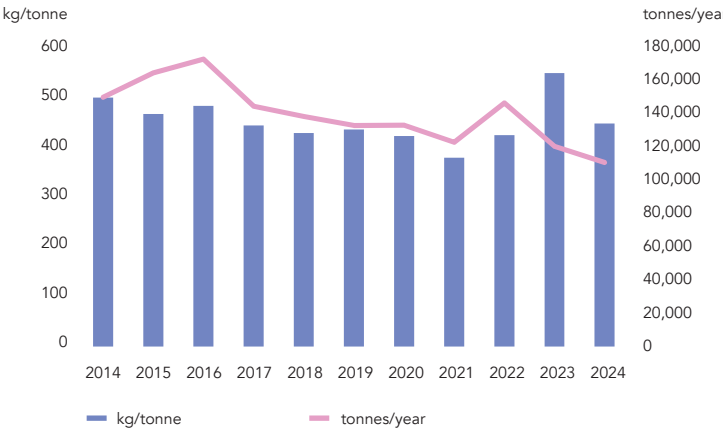
## Nitrogen Oxides (NO<sub>x</sub>)

A collective term for nitrogen oxides produced during combustion processes, which may contribute to acidification of soil and water. For key figures related to air emissions, see page 9.



## Carbon Dioxide (CO<sub>2</sub>) from Fossil Fuels

Carbon dioxide is produced during the complete combustion of carbon compounds in an oxygen-rich atmosphere. When fossil fuels are burned, additional CO<sub>2</sub> is released into the atmosphere, since the carbon had previously been stored outside of the natural cycle for a very long time. The increasing concentration of CO<sub>2</sub> in the atmosphere is considered one of the main contributors to global warming. In the long term, the use of renewable energy sources, such as biofuels and hydropower, does not increase atmospheric CO<sub>2</sub> levels. For key figures related to air emissions, see page 9. The higher unit CO<sub>2</sub> emission in 2023, compared to the previous year, does not reflect a deterioration in process performance, but is rather a result of the nature of the operation.





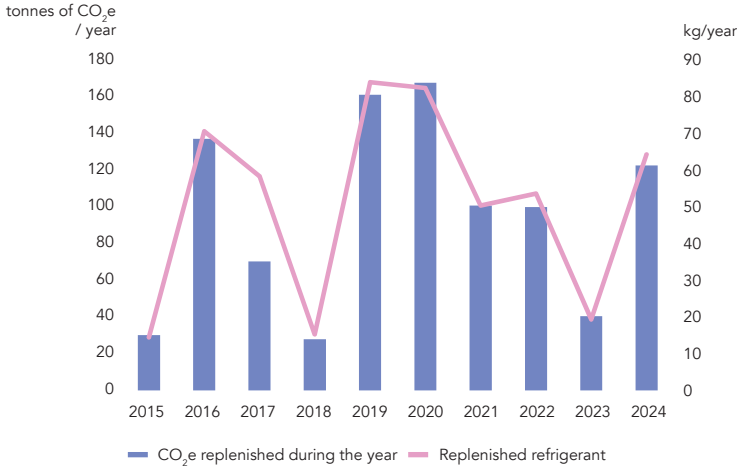
# Core Indicators – Emission to Air

## Fluorinated Greenhouse Gas (F-gas) Emissions from Refrigeration Systems

Refrigeration systems use so-called F-gases – fluorinated greenhouse gases, including compounds from the HFC (hydrofluorocarbon) group. While these gases do not deplete the ozone layer, they have a significant impact on the greenhouse effect.

To assess their impact on the climate, F-gas emissions are converted into carbon dioxide equivalents (CO<sub>2</sub>e). The Global Warming Potential (GWP) factor expresses how much more strongly a greenhouse gas affects the climate compared to 1 kg of CO<sub>2</sub>. For CO<sub>2</sub>, the GWP is 1, while for F-gases it can reach several thousand.

The CO<sub>2</sub> equivalent is calculated by multiplying the mass of the emitted gas by its GWP factor. Presenting emissions in this way enables easy comparison of different substances in terms of their climate impact and allows the inclusion of refrigerant emissions in an organization's total carbon footprint.



|                                            | 2024 | 2023 | 2022 |
|--------------------------------------------|------|------|------|
| Replenished refrigerant quantity [kg/year] | 32   | 19   | 52   |
| CO <sub>2</sub> e emissions [t]            | 118  | 39   | 96   |



# Core Indicators – Emission to Water

## COD<sub>Cr</sub>

Chemical Oxygen Demand (COD) – a measure of the amount of organic compounds in water that consume oxygen during decomposition. For key parameters related to wastewater discharge, see page 9. The higher values in 2023 compared to the previous year do not indicate a deterioration of the process, but are rather due to the nature of the operation.



|  | 2024 | 2023 | 2022 | Unit        |
|--|------|------|------|-------------|
|  | 67.1 | 66.3 | 91.5 | tonnes/year |

The data present the amount of organic compounds in wastewater over the past three years. These values serve as a reference point for calculating efficiency per unit of net paper production. The chart above shows the long-term trend for the years 2014–2024.

## BOD<sub>5</sub>

Biochemical Oxygen Demand (BOD<sub>5</sub>) – a measure of the amount of oxygen consumed by microorganisms during the breakdown of organic substances in water over a period of five days.



|  | 2024 | 2023 | 2022  | Unit        |
|--|------|------|-------|-------------|
|  | 5.32 | 5.93 | 10.99 | tonnes/year |

The data present the amount of organic compounds in wastewater over the past three years. These values serve as a reference point for calculating efficiency per unit of net paper production. The chart above shows the long-term trend from 2014 to 2024.



# Core Indicators – Emission to Water

## Suspended Solids (SS)

Suspended solids refer to fiber fragments and other solid substances (e.g. filler) present in wastewater, which cause the water to become turbid. These suspended particles block light from penetrating the water, which reduces aquatic plant growth.



| 2024 | 2023  | 2022  | Unit        |
|------|-------|-------|-------------|
| 7.94 | 10.57 | 20.12 | tonnes/year |

The data present the wastewater quantities over the past three years. These values serve as a reference point for calculating efficiency per unit of net paper production. The chart above shows the long-term trend from 2014 to 2024.

## Nitrogen (N)

Nitrogen is an element found in large quantities in the atmosphere. Elevated levels of nitrogen compounds, along with phosphorus compounds and organic matter, can lead to increased biological activity in water, which in turn may cause the overgrowth of watercourses.



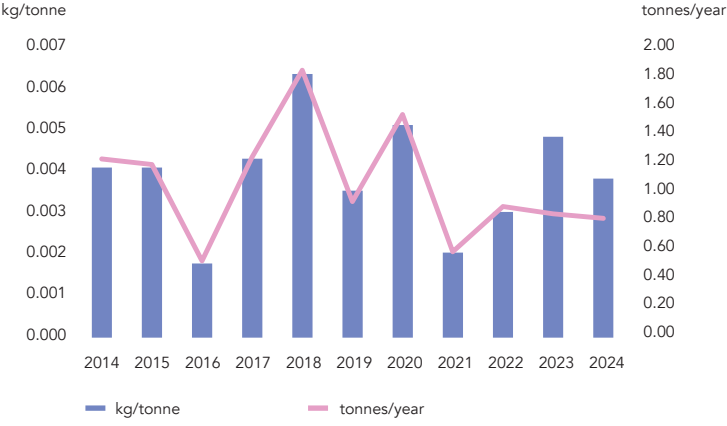
| 2024  | 2023  | 2022  | Unit        |
|-------|-------|-------|-------------|
| 15,20 | 17.62 | 23.77 | tonnes/year |

The data present the quantities in wastewater over the past three years. These values serve as a reference point for calculating efficiency per unit of net paper production. The chart above shows the long-term trend from 2014 to 2024.

# Core Indicators – Emission to Water

## Fosfor (P)

Phosphorus is a chemical element. High levels of phosphorus compounds, together with nitrogen compounds and organic substances, can lead to increased biological activity in water, which in turn may cause overgrowth in watercourses.



| 2024 | 2023 | 2022 | Unit        |
|------|------|------|-------------|
| 0.80 | 0.83 | 0.88 | tonnes/year |

The data present the amounts of substances in wastewater over the past three years. These values serve as a reference point for calculating efficiency per unit of net paper production. The chart above shows the long-term trend for the years 2014–2024.





Environmental Performance 2024

| Lp. | Cel                                                                                                                              | Projekt                                                                                                                                                 | Planowane efekty                                                                                                                                                                                                                                                                                            | Status                                                                                                                                                                                                   |
|-----|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Reduction of natural resource use by minimizing losses of hydrant water drawn from the Warta River                               | Modernization of the fire water network at APK SA – stage 10 (from pulping to flat settlers)                                                            | Maintaining water intake parameters below 100 m³/day despite the increasing average age of the water system.                                                                                                                                                                                                | A section of the network was constructed in the area from the pulping hall building to the flat settlers. Six new hydrants were installed. The set objective has been achieved.                          |
| 2   | Improved efficiency of the PM1 heat recovery system (reduction of energy costs)                                                  | Heat recovery system PM1: stage 3 – design phase                                                                                                        | Reduction of fresh steam consumption in the modified section of the heat recovery system from approx. 5,770 kg of steam/h to 3,150 kg of steam/h – enabling more efficient use of waste heat. Reduction of installed power from 194 kW to 120 kW (fans).                                                    | Design work has been completed. The project implementation was combined with the modernization of the PM1 drying section. Currently, the Management Board has not approved the execution of the project. |
| 3   | Minimization of leaks and failures                                                                                               | Separation of the combined sewer system on APK grounds; construction of a new sanitary wastewater pumping station PG-B                                  | 1. The first stage of an investment project aimed at reducing the amount of sanitary wastewater pumped to the municipal sewage treatment plant and utilizing rainwater in the production process;<br>2. Operational stability of the installation;<br>3. Improvement of health and safety conditions (OHS). | The project was not implemented. Management approval for the investment was not obtained. The objective has been rescheduled for implementation in 2025.                                                 |
| 4   | Optimization of the wastewater treatment process; standardization of measurement equipment.                                      | Replacement of two sampling stations at the wastewater treatment plant with new ones – at the inlet to reactor 1 and the outlet from the flotation unit | Obtaining reliable measurements of samples taken from the wastewater treatment process (improved sample quality through storage at 4°C), which will contribute to more accurate control and operation of the treatment process.                                                                             | The project was fully completed. The stations are operating without any issues.                                                                                                                          |
| 5   | Reduction of natural resource use by utilizing excess warm water from the warm water tank, eliminating overflow into the channel | Construction of an overflow pipeline from the warm water tank to the filtrate tank (PM2)                                                                | Elimination of warm/clean water discharge into the sewer system, amounting to approx. 200 m³ per month – resulting in a reduction of wastewater load on the biological treatment plant.                                                                                                                     | Project completed. The intended objective has been achieved – 100% of the overflow water is now directed to the first water tank.                                                                        |

Environmental Performance 2024

| Lp. | Cel                                                                              | Projekt                                           | Planowane efekty                                                                                                                                                                                                                                                                                                                                                                           | Status                                                                                                                                                                                                                                                                                                  |
|-----|----------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6   | Elimination of refrigerant leaks. Reduction of electricity consumption           | Modernization of ventilation unit number 1 (PM1)  | Over the past five years, a total of 52 kg of R410a refrigerant has been replenished due to system leaks. Because of its poor technical condition, the ventilation unit operated at full capacity, yet the output air parameters supplied to the hall significantly deviated from the desired levels. This mode of operation led to frequent shutdowns and accelerated wear of components. | The project has been completed. The chilled water unit was replaced, and the equipment is operating flawlessly. Its performance has contributed to improved working conditions in the paper machine hall. There are also no refrigerant leaks in the system – a frequent issue with the previous setup. |
| 7   | Reduction of steam usage – minimizing heat loss and heat emissions into the hall | PSI Replacement of end dryer hoods on PM1 and PM2 | The values will be confirmed following the audit scheduled for August 2024.                                                                                                                                                                                                                                                                                                                | The task was cancelled.                                                                                                                                                                                                                                                                                 |
| 8   | Reduction of electricity consumption by compressors                              | PSI Expansion of the compressed air system at APK | The estimated energy gain, based on the report, should amount to approximately 6.3 MWh per week.                                                                                                                                                                                                                                                                                           | The new compressor has been delivered to APK. Installation work is in progress. Commissioning is scheduled for the end of Q2 2025.                                                                                                                                                                      |
| 9   | Reduction of electricity consumption through the use of new pulpers              | PSI Modernization of the pulping department       | Reduction of installed power from 1,110 kW to 760 kW (based on the conceptual design).                                                                                                                                                                                                                                                                                                     | Management has approved the execution of the project across all disciplines. The first stage has been completed. Requests for quotations have been sent out. Project completion is scheduled for the end of Q2 2025.                                                                                    |

| No. | Environmental Objective                                                | Project / Action                                                                  | Related Environmental Aspect                      | Expected Environmental Outcome                                           |
|-----|------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------|
| 1   | Reduction of hydrant water losses                                      | Modernization of the fire protection network – Stage XI                           | Water Consumption                                 | Maintain intake below 100 m³/day; improve fire protection                |
| 2   | Reduction of failures and wastewater losses                            | Separation of the sewer system and construction of PG-B pumping station           | Papermaking Wastewater Discharge                  | Reduction of sanitary wastewater and recovery of rainwater               |
| 3   | Modernization of ventilation unit PM2                                  | Replacement of equipment and improvement of ventilation in the paper machine hall | Electricity Consumption, F-gas Emissions          | Reduction of installed power from 74 kW to 60 kW                         |
| 4   | Reduction of energy consumption – compressors                          | Expansion of the compressed air system                                            | Electricity Consumption                           | Savings of approx. 6.4 MWh/week                                          |
| 5   | Protection of Biological Wastewater Treatment Plant blowers            | Modernization of the blower station                                               | Energy Consumption, Risk of Failure               | Backup in case of power outage; improved safety                          |
| 6   | Modernization of siding (railway) lighting                             | Replacement of lighting with LED including automation                             | Electricity Consumption                           | Reduction of consumption by 25.16 MWh/year                               |
| 7   | Sludge drying test                                                     | Pilot project for belt dryer                                                      | Sewage Sludge                                     | Assessment of waste mass reduction potential                             |
| 8   | Heat recovery PM1 – stage III                                          | Modification of the heat recovery system                                          | Thermal Energy Consumption                        | Reduction of steam usage from 5,770 to 3,150 kg/h                        |
| 9   | Heat recovery PM2 – conceptual design                                  | Measurements, analysis, and modernization concept for PM2                         | Energy Consumption, Noise Emissions               | Assessment of energy recovery potential and noise reduction              |
| 10  | Modernization of wastewater reception from Pulp Preparation Department | Modernization of the wastewater system                                            | Risk of Chemical and Oil Leaks                    | 100% of wastewater redirected to a controlled tank                       |
| 11  | Noise emission reduction – PM1 and PM2                                 | Installation of silencers + measurement station                                   | Noise Emission                                    | Maintaining noise level LAeq,D ≤ 45 dB (nighttime)                       |
| 12  | Reduction of water consumption – PM1 and PM2                           | Modernization of disc filters                                                     | Water Consumption                                 | Savings of approx. 200 m³/day per machine                                |
| 13  | Maintaining sustainable sourcing of fibrous raw materials              | Supply chain oversight of pulp                                                    | Pulp Consumption (Reduction of Natural Resources) | Maintaining 100% share of certified pulp; protection of forest resources |



## OŚWIADCZENIE

WERYFIKATORA ŚRODOWISKOWEGO  
W SPRAWIE CZYNNOŚCI WERYFIKACYJNYCH I WALIDACYJNYCH

TÜV NORD Polska Sp. z o.o.  
o numerze rejestracji weryfikatora środowiskowego EMAS PL-V-0001  
akredytowany w odniesieniu do zakresu NACE 1212, (Kod NACE) oświadczają,  
że przeprowadził weryfikację, czy Organizacja, o której mowa w Deklaracji Środowiskowej z dn.: 04-06-2025

**Arctic Paper Kostrzyn S.A.**  
ul. Fabryczna 1, PL / 66-470 Kostrzyn nad Odrą  
numer rejestracyjny: PL 2.08.001-13

spełnia wszystkie wymogi rozporządzenia Parlamentu Europejskiego i Rady (WE) nr 1221/2009 z dnia 25 listopada 2009 r. dotyczące dobrowolnego udziału w systemie ekozarządzania i audytu we Wspólnocie (EMAS).

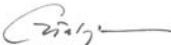
Podpisując niniejszą deklarację oświadczam, że:

- weryfikacja i walidacja zostały przeprowadzone w pełnej zgodności z wymogami rozporządzenia (WE) nr 1221/2009;
- wyniki weryfikacji i walidacji potwierdzają, że nie ma dowodów na brak zgodności z mającymi zastosowania wymaganiami prawnymi dotyczącymi środowiska;
- dane i informacje zawarte w deklaracji środowiskowej organizacji dają rzetelny, wiarygodny i prawdziwy obraz całej działalności organizacji w zakresie podanym w deklaracji środowiskowej.

Niniejszy dokument nie jest równoważny z rejestracją w EMAS. Rejestracja w EMAS może być dokonana wyłącznie przez organ właściwy na mocy rozporządzenia (WE) 1221/2009. Niniejszego dokumentu nie należy wykorzystywać jako oddzielnej informacji udostępnianej do wiadomości publicznej.

Oświadczam, że przeprowadzona weryfikacja spełnienia mających zastosowanie wymogów Załączników I, II, III i IV rozporządzenia (WE) 1221/2009 odbywała się w oparciu o nowe treści Załączników określonych:

- Rozporządzeniem Komisji (UE) 2017/1505 z dnia 28 sierpnia 2017 r. zmieniającym załączniki I, II i III do Rozporządzenia Parlamentu Europejskiego i Rady (WE) nr 1221/2009 w sprawie dobrowolnego udziału organizacji w systemie ekozarządzania i audytu we Wspólnocie (EMAS);
- Rozporządzeniem Komisji (UE) 2018/2026 z dnia 19 grudnia 2018 r. zmieniającym załącznik IV do rozporządzenia Parlamentu Europejskiego i Rady (WE) nr 1221/2009 w sprawie dobrowolnego udziału organizacji w systemie ekozarządzania i audytu we Wspólnocie (EMAS).



Grzegorz Tuleja  
Kierownik Jednostki Certyfikującej  
TÜV NORD Polska Sp. z o.o.

Oświadczenie nr EMAS/0240/2621/2025\_0  
Katowice, 18-07-2025

Sprawdź autentyczność certyfikatu na [https://listareferencyjna.tuv-nord.pl/Lista\\_Referencyjna.php](https://listareferencyjna.tuv-nord.pl/Lista_Referencyjna.php)



VERIFIED  
ENVIRONMENTAL  
MANAGEMENT

PL 2.08-001-13



For more information or to request environmental reports:

Arctic Paper Kostrzyn SA  
Ul. Fabryczna 1, 66-470 Kostrzyn nad Odrą, Poland  
Tel: +48 95 7210600, Fax: +48 95 7524196  
e-mail: info-kostrzyn@arcticpaper.com  
www.arcticpaper.com

The Arctic Paper Kostrzyn SA Environmental Report is also available in Polish in both electronic and printed versions.

The next scheduled update will be published in spring of the following year.

Environmental Contacts

Konrad Bobrowki  
Environmental Manager  
Tel: +48 95 72 10 663  
e-mail: konrad.bobrowski@arcticpaper.com

Sławomir Gralak  
Management Systems Representative  
Tel: +48 95 72 10 664  
e-mail: slawomir.gralak@arcticpaper.com

Jonas Dahlqvist  
Group Environmental Coordinator  
Tel. +46 10 45 171 83  
e-mail: jonas.dahlqvist@arcticpaper.com

Sales Contact

Piotr Kowalski  
Sales Director  
Tel. +48 95 72 10 700  
e-mail: piotr.kowalski@arcticpaper.com



ACCREDITED COMPANY

A company approved by an official institution to carry out specific analyses and controls in industrial processes.

BIOLOGICAL WASTEWATER TREATMENT

A method of wastewater treatment using microorganisms to break down organic substances.

BLEACHING

A process to increase, for example, the brightness of pulp. Chemicals used may be ECF (Elemental Chlorine Free) or TCF (Totally Chlorine Free).

BOD<sub>5</sub>

The amount of oxygen required by microorganisms to break down easily degradable organic matter within five days.

CARBON DIOXIDE (CO<sub>2</sub>)

A naturally occurring gas produced by biological degradation and during combustion of fuels.

CHEMICAL PULP

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

CELULOZA MECHANICZNA

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

COD<sub>Cr</sub>

The amount of oxygen required to chemically decompose organic compounds in water.

dB(A)

A-weighted decibel; a method of measuring sound that reflects human sensitivity to different frequencies.

EMAS

An EU-based environmental management system requiring an audited, publicly available annual environmental report.

EUTROPHICATION

Phosphorus (P) and Nitrogen (N) are nutrients that promote plankton growth. Excessive nutrient levels can lead to plankton blooms and oxygen depletion.

FINE PAPER

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

HAZARDOUS WASTE

Waste especially harmful to the environment, such as certain chemicals, oils, used batteries, and electronic materials.

ISO 14001

An international standard for environmental management systems. Certification is issued after compliance.

PERMISSIBLE VALUE

A defined limit, set by environmental authorities, that must not be exceeded.

NITROGEN DIOXIDE (NO<sub>2</sub>)

A gas formed during combustion of nitrogen, contributing to eutrophication.

RECEIVING BODY

An environmental component (e.g., river, sea, lake, or atmosphere) into which emissions are discharged.

OXYGEN-DEMANDING SUBSTANCES

Materials in wastewater that reduce the oxygen available to aquatic life. Measured as COD<sub>Cr</sub> and BOD<sub>5</sub>.

SUSPENDED SOLIDS (SS)

Fine particles (e.g., fibers) visible in wastewater, causing water to appear cloudy and reducing light penetration, which inhibits plant growth.

SULPHUR DIOXIDE (SO<sub>2</sub>)

A gas released from burning sulfur-containing fuels, contributing to acid rain.

UNCOATED PAPER

Paper without an additional surface coating layer, applied using dedicated mixtures and equipment.

FSC-CERTIFIED RAW MATERIAL

Material guaranteed by the Forest Stewardship Council® (FSC) to exclude wood sourced illegally, in violation of customary rights, from high conservation value forests, genetically modified trees, or converted plantations.

