

Environmental work at Braviken Paper Mill

Braviken Paper Mill produces MF Magazine, book paper, newsprint and coloured newsprint from thermo-mechanical pulp (TMP). The mill is located alongside Bråviken, a deep bay in the Baltic Sea with good water turnover.

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Environmental activities 2019

All limits for emissions to water and air as set out in Braviken’s environmental permit were complied with in 2018. A guideline value for emissions to water of organic material (COD), was exceeded in June–September. One complaint about odour was received from a member of the public. Braviken judged that the odour did not come from Braviken’s operations. No disruptions to operations or similar incidents occurred on the site that could lead to adverse effects on people and the environment.

To improve wastewater treatment, Braviken installed an additional treatment step on a partial flow of process water from the production of thermo-mechanical pulp. The process water, which contains high amounts of COD (organic substances) is now treated using MBBR (Moving Bed Biofilm Reactor) technology. The equipment is being calibrated.

Braviken has spent many years minimising its combustion of oil, and has brought its oil consumption down from around 25 500 m³ in 2005 to around 6 000 m³ in 2018, representing a cut of approximately 80 per cent. The fall in oil consumption is largely attributable to improvements in the operational strategy for Braviken’s steam system, greater efficiency in the solid fuel boiler and increased steam recovery from the production of thermo-mechanical pulp. The mill’s steam and heat needs can now usually be covered by steam recovery from the production of thermo-mechanical pulp and from the combustion of biofuel. Braviken’s oil-fired boiler is primarily used during shutdowns of the solid fuel boiler for maintenance.

Energy integration between the paper mill and nearby Braviken Sawmill makes it possible for the paper mill to meet the sawmill's heat energy needs. The sawmill supplies chips to the mill that are used in the production of paper, which cuts down on the need for transport, among other benefits. The sawmill also supplies the paper mill with biofuels.

In 2019 older light fittings using mercury bulbs were replaced with new LED lighting in a warehouse for finished products at Braviken. The new lights will consume just under 300 MWh/year, a third of the consumption of the previous bulbs.

Permits for operation

- Braviken Paper Mill holds a permit for its operations granted under the Environmental Code in 2002.
- Braviken Paper Mill applied for and was granted a temporary change to its conditions for COD and SS in 2018–2020.
- The mill also has a water judgment from 1975 concerning its sourcing of raw water from Motala Ström.
- The mill is covered by the rules on fossil carbon dioxide emissions trading, under which it holds a permit for carbon dioxide emissions and has been allocated emission allowances for the period 2013–2020. An application for the next trading period (2021–2030) was submitted in 2019.
- Since the 2015 Environmental Report, the mill's outcomes and status have been reported in relation to current BAT conditions. These conditions were made more stringent on 1 October 2018.
- Braviken is applying for a new environmental permit for its entire operations. The new permit would then cover the production of exclusively light products. The application documents were sent to the Land and Environment Court in early 2020.

Environmental certification

- The environmental management system has been certified to ISO 14001 since 1999.
- The energy management system has been certified to ISO 50001 since 2012. Before that, the energy management system had been certified to SS 62 77 50 since 2006.
- The health and safety management system has been certified to OHSAS 18001 since 2015.
- Braviken Paper Mill has held chain-of-custody certification for wood raw material since 2008.
- In 2013, Holmen Paper had its graphic paper approved to carry the EU Ecolabel. Products awarded the EU Ecolabel meet the ecolabel's criteria concerning the manufacturing process in terms of certified wood raw material, chemical consumption, energy consumption and emissions to air and water.
- Braviken's products also fulfil the requirements for Nordic Swan Ecolabelling of paper products.

Disruptions to production and complaints

The guideline value for emissions to water of organic matter (COD) was exceeded in June–September. Measures to improve water treatment continue. Four occasions in which values were exceeded were reported to the County Administrative Board. Braviken also reported a blockage in feeding in wood fuels on one occasion, but this did not cause the value for emissions to air to be exceeded. One complaint about odour was received from a member of the public. Braviken judged that the odour did not come from Braviken's operations.

Investments/environmental and energy measures

To improve wastewater treatment, Braviken installed an additional treatment step on a partial flow of process water from the production of thermo-mechanical pulp. The process water contains high amounts of COD (organic substances) and is now being treated using MBBR (Moving Bed Biofilm Reactor) technology. The equipment is being calibrated.

In 2019 older light fittings using mercury bulbs were replaced with new LED lighting in a warehouse for finished products at Braviken. The new lights will consume just under 300 MWh/year, a third of the consumption of the previous bulbs.

Follow-up of environmental and energy targets in 2019

Braviken is to help reduce emissions of fossil carbon dioxide. Braviken had a target for 2019 of limiting oil consumption to a maximum of 3 000 m³. Oil consumption for 2019 was around 4 500 m³ and the target was not achieved. This was due to problems keeping the oil-fired boiler in warming mode, more and longer maintenance shutdowns on the solid fuel boiler (wood-fired) than planned. During shutdowns of the solid fuel boiler for maintenance, the mill's oil-fired boiler was used. The target will be retained for 2020 with a focus on preventive work to minimise the need for maintenance shutdowns on the solid fuel boiler.

Braviken had a target for 2019 to bring specific electricity use for the production of paper down to 2.8 MWh per tonne of paper, including the electric boiler, which equates to 1 per cent less than the budgeted electricity use. The target was not achieved. The specific electricity use for the production of paper was 2.9 MWh per tonne of paper in 2019. The target will remain the same for 2020.

Planned environmental and energy measures in 2020

Work on minimising the use of oil to meet the mill's steam and heat needs will continue into 2020. A considerable portion of the mill's steam and heat needs will be covered by steam recovery from the production of thermo-mechanical pulp and from the combustion of biofuel.

There are plans to continue optimising steam production during periods of low steam demand (summer months).

To improve water treatment at Braviken, a project is being planned in which another partial flow of the process water will be treated in a closed existing microflotation unit in the mill's recovered paper plant. Organic material (COD) will be removed using microflotation and the process water will be reused in the process. Both a reduced level of organic matter (COD) and a reduced flow rate to the water treatment plant are expected to lead to more effective water treatment. A similar plant for treating partial flows of process water via a previously closed microflotation unit has existed for a couple of years and produced good results.

In 2020 Braviken plans to build one more chip silo and a new reception bay for sawmill chips, to reduce the need to store chips in piles outdoors. Sawmill chips are exposed to sunlight and heat out in the open, which causes them to rapidly darken in colour. Darker raw material requires more bleaching for pulp to reach the desired brightness. More bleaching also means that more wood substances are released in the form of COD, which puts pressure on the water treatment process. The move is expected to result in lower consumption of bleaching chemicals and reduced COD load at the water treatment plant compared with the current situation. It is also expected to considerably reduce the need for internal transport of sawmill chips using wheel loaders, so cutting diesel consumption.

Environmental and energy targets 2020

- Braviken has targets relating to areas including energy efficiency and oil consumption. Braviken has managed to reduce its oil consumption and the mill continues to focus on keeping its oil consumption low. The energy targets are intended to reduce the use of electricity and heating and to increase heat recovery.
- Braviken is to help reduce emissions of fossil carbon dioxide. Braviken has a target for 2020 of limiting oil consumption to a maximum of 3 000 m³.
- Braviken has a target for 2020 to bring specific electricity use for the production of paper down to 2.8 MWh per tonne of paper, including the electric boiler.

Water environment at Braviken Paper Mill

Bråviken

Bråviken as a receiving body of water is monitored by the Motala Ström Water Conservation Association, of which Braviken Paper Mill is a member. This association submits an annual report of tests on the level of pollution and other factors of significance to the condition of the water throughout the aquatic system.

The description of the condition of Bråviken below is based on data from the Motala Ström Water Conservation's compilation for 2018. The Motala Ström Water Conservation Association's compilation for 2019 will be posted on the website motalastrom.se in May 2020.

The north coast of Bråviken is a fault scarp with a few vertical, tall cliffs that tumble down to the bay. The southern shore of Bråviken is significantly flatter and largely consists of farmland. At the innermost point of the bay, Bråviken is fairly shallow and has a large inflow of freshwater from the River Motala Ström. Water turnover is relatively rapid in the bay, and the entire volume of water is replaced in about one month. The coastal waters of Bråviken are affected by nutrient inputs from agriculture in the southern reaches and by inward transport from the whole catchment basin of the Motala Ström.

Plant nutrients

An overall assessment has been made of the status of the coastal points with regard to nutrients according to the Swedish Environmental Protection Agency's principles of assessment. The assessment was carried out over three years (2016–2018). The assessment includes summer values for total nitrogen and total phosphorus with winter values for total nitrogen, total phosphorus, dissolved inorganic nitrogen and dissolved inorganic phosphorus. The status of the inner reaches of Bråviken, which are close to the Braviken Paper Mill, was unsatisfactory in 2016–2018. According to the Motala Ström Water Conservation Association summary for 2016–2018, the status was unchanged in inner Bråviken but in the outer reaches of Bråviken the status had improved from unsatisfactory to moderate compared with the previous year's measurements. The status as regards total nitrogen was much better than the status for total phosphorus.

Oxygen

Points which were not below the limit value stated in the principles of assessment (3.5 ml/l in the bottom water) in any measurement have been classified as having high status (no oxygen deficiency occurs). The status of the inner reaches of Bråviken was high in 2016–2018.

Visible depth

The status of the coastal points with regard to visible depth has been assessed on the basis of the principles of assessment. The status of the inner and outer reaches of Bråviken was unsatisfactory in 2016–2018. In the coastal waters, there is a clear link between visible depth and chlorophyll levels. The visible depth is often less in the summer, due to the higher quantity of particles in the water, in the form of plankton. Visible depth can therefore be a good indicator of plankton levels in the water, which in turn is affected by the supply of nutrients. If sampling is performed close to major freshwater inflows with high levels of humus and clay particles due to high surface run-off, this may have an impact on the visible depth.

KPI production and environment Braviken Paper Mill

Production and environment	2019	2018	2017	2016	2015
<i>Braviken Paper Mill,</i>					
<i>Production, '000 tonnes</i>					
Paper	519	521	521	520	486
<i>Raw materials, '000 tonnes</i>					
Wood, million m ³ solid volume under bark	1,14	1,17	1.17	1.16	1.07
Purchased pulp	-	-	-	8.8	2.0
Water consumption, million m ³	17,5	16.1	14.5	13.9	15.3
Chemicals ¹⁾	21,2	19.9	17.2	13.9	13.6
Filler, pigment ¹⁾	49,9	49.2	42.4	41.9	49.5
<i>Thermal energy, GWh</i>					
Production at mills from recovered liquors, bark and wood residues	228	235	280	223	261
Recovered in the TMP process ²⁾	489	468	468	551	484
Fossil fuels	39	56	47	42	30

<i>Electrical energy, GWh</i>					
Production at mill	-	4	4	3	5
<i>Emissions to air, tonnes</i>					
Sulphur dioxide (counted as sulphur, S)	11,2	6.4	5.3	0.7	1.8
Nitrogen oxides	63	71	74	65	82
Particulates	0,7	0.6	0.5	0.5	0.4
<i>Carbon dioxide, '000 tonnes</i>					
Fossil	9,3	13,9	11,0	10,0	6.6
Biogenic	101	108	84	77	78
<i>Emissions to water, tonnes</i>					
COD (organic matter), '000 tonnes	2,2	2.4	2.3	2.0	1.3
Suspended solids	230	447	424	176	136
Nitrogen	51	54	49	38	38
Phosphorus	1,3	3.2	3.1	2.9	2.5
<i>By products, '000 tonnes</i>					
To energy production, internally/externally	134	137	139	135	103
Utilised or for recovering ³⁾	56	52	53	48	58
<i>Waste, '000 tonnes</i>					
Hazardous ⁴⁾	0,12	0.18	0.10	0.08	0.13
Sent to landfill (wet)	0,2	0.3	0.2	0.2	0.3
<i>Energy deliveries, GWh</i>					
Thermal energy, GWh ⁵⁾	106	93	91	104	104

1. 100 per cent active substance. The quantity of commodities was 28 900 tonnes for chemicals and 78 300 tonnes for filler and pigment.
2. Thermal energy is produced from the electricity used in the production of thermo-mechanical pulp at Braviken Paper Mill this is recovered and used in production.
3. By-products used, for example, as filling material, construction material or for the production of soil products.
4. Hazardous waste is dealt with by an authorised collection and recovery contractor.
5. Thermal energy from the mill to Braviken Sawmill.