HOLMEN

Environmental work at Iggesund Mill

Iggesund Mill is located just south of Hudiksvall on the Iggesundfjärden bay. The mill produces high quality solid bleached paperboard for consumer packaging and graphical printing. A few kilometres north of Hudiksvall lies Strömsbruk, where paperboard from both Iggesund Mill and Holmen's mill in Workington is laminated and plastic coated. Skärnäs Terminal belongs to Iggesund Mill and is located next to the mill.

Content

Environmental activities in 2019

In 2019 there was a major focus on biogenic steam production, part of work towards a fossil-free factory. Efforts included replacing fossil heating oil with 1 700 tonnes of biogenic pitch oil.

Minimising water was another focus area during the year. Measures were put in place which have reduced waste water flows and water consumption. In parallel with this work, an investigation was conducted to identify additional potential to minimise water use.

Two important investments were made during the year. A 7-effect evaporator has been taken into operation for more efficient energy use. Oxygen bleaching has been installed on the hardwood line, which both reduces the TOC load in the wastewater treatment plant, and reduces the use of bleaching chemicals.

A major inquiry into provisions for production waste has been completed and within the remit of that project, trial incineration of sludge from wastewater treatment has been carried out, with promising results.

Permits for operation

In October 2018 Iggesund Mill received a new permit under the Environmental Code for production of 500 000 tonnes of pulp and 450 000 tonnes of paperboard. This new permit incorporates Skärnäs Terminal. The permit was first used on 1 January 2019.

The coating and laminating plant at Strömsbruk has been classified as a 'C' plant with an obligation to notify its environmental activities to the authorities since 2007/2008.

The company is covered by the rules on fossil carbon dioxide emissions trading. It holds a permit for carbon dioxide emissions and has been awarded emission allowances for the trading period 2013–2020. An application for a permit for the period 2021–2030 has been submitted to the Swedish Environmental Protection Agency.

Certified environmental and energy management systems

Iggesund Mill's environmental management system has been certified to ISO 14001 since 2001. The energy management system was certified in 2005, and this system was upgraded in line with ISO 50001 in 2011.

The company also has both FSC® (FSC-ID) and PEFC™ certification for the wood raw material.

The health and safety management system has been certified to OHSAS 18001 since 2016. Certification under ISO 45001 will be attained in 2020.

The production unit at Strömsbruk and Skärnäs Terminal are covered by all certifications.

Investments/environmental and energy measures

A new 7-effect evaporator was taken into operation during the year. The investment will increase the dry content of the liquor, so resulting in an energy saving of approximately 50 GWh/year.

Oxygen bleaching was installed on the hardwood line in November. This will reduce the TOC load in the wastewater treatment plant and cut consumption of bleaching chemicals.

The aerated basin has been upgraded with 4 new aerators and 4 new stirrers to increase breakdown in the basin.

Capping of the Skärnäs landfill site continued during the year and approximately 2.5 hectares has been capped. In 2020, 1 hectare will be capped, making final capping of the Skärnäs landfill site complete.

A reduced amount of soot blowing steam in the recovery boiler has led to a saving of 20 GWh as steam compared with 2018.

A reduced amount of blown steam has led to a saving of 11 GWh as steam compared with 2018.

An increase in the strength of white liquor has led to a saving of 5 GWh as steam compared with 2018.

1 700 tonnes of pitch oil have replaced heating oil in the kiln.

Six sources of noise have been tackled to bring noise down to 45 dB(A) and work will continue in 2020.

Disruptions to production and complaints

Iggesund Mill is focused at all times on designing out risks that could cause environmental incidents. In 2019, incidents requiring reporting to the supervisory authority occurred on 15 occasions. The events mainly concerned leaks from wastewater pipes (5) and driving over different media, e.g. liquor and pulp (10). The wastewater pipe between the mill and the wastewater treatment plant which caused the discharge of untreated wastewater was replaced during the year. No orders were received from the supervisory authority following the reports but on its own initiative the company has chosen to make temporary emissions a theme of the periodic inspection in 2020.

About 10 complaints were received during the year. The complaints concerned odours and noise. As regards noise, the source of the noise was identified as the sound of an alarm and steps have been taken to redirect one of the alarms to reduce noise impact on neighbours. As far as odours are concerned, more complaints were received than normal over a short period. The odour was also described as ‘a different smell from before’. Due to this, an investigation has been launched to identify the source of the odour.

Follow-up of environmental and energy targets in 2019

Roadmap for a fossil-free mill

The proportion of biogenic steam production is to exceed 98 per cent.

Reduced water consumption

Wastewater flow is to be cut by 5 per cent during the year compared with 2018.

Sustainable waste management

In 2019 a plan will be produced for a sustainable solution for managing waste products.

Outcome

Iggesund Mill has met its three environmental and energy targets for 2019.
The proportion of biogenic steam production amounted to 98.6 per cent.
Wastewater flow was cut by 7.7 per cent compared with 2018
A plan for sustainable waste product management solutions was produced in the ‘Waste products 3.0’ project.

Planned environmental and energy measures in 2020

In 2020 work will begin to cap the company’s industrial landfill site in Strömsbruk. The capping schedule will be determined in Q1 of 2020.

Investment in one-way soot blowing in the recovery boiler is estimated to lead to an energy saving of approximately 20 GWh/year.

A heated filtrate from the softwood pulp line will be connected to feedwater pre-heating, and is expected to lead to an energy saving of 1 GWh/year.

About 13 sources of noise will be tackled during the year to reduce external noise to 45 dB(A).

Selective non-catalytic reduction (SNCR) technology will be installed at boiler P12 in 2020 or in early 2021.

Environmental and energy targets 2020

Roadmap for a fossil-free mill

- The proportion of biogenic fuel consumption (excluding vehicle fuel) is to exceed 98%
- We are to draw up a roadmap for a fossil-free mill

Optimised energy use

- Energy use per tonne of Invercote is to be less than 5.0 MWh/tonne

Reduced water use

- Wastewater flow is to be less than 65 000 cubic metres per day

Sustainable waste management

- By 30 June 2020 it must be possible to sort household waste throughout Iggesund Mill.
- The volume of household waste is to fall by 30% compared with 2019.
- The weight of unsorted small-scale production waste is to fall by 50% compared with 2019.

Water environment at Iggesund Mill

Iggesund Mill is located on the narrow inlets of Iggesundsfjärden and Gårdsfjärden, which have low water turnover.

The company takes part in the programme for coordinated monitoring of receiving bodies of water in north-eastern Hälsingland, which involves monitoring the environmental impacts of different activities on the water systems concerned, including lakes, watercourses and coastal waters. The company's self-inspections also include sampling from receiving bodies of water in the vicinity of the mill 6 times during the ice-free period of the year.

Data from monitoring the receiving bodies of water in 2018 and 2019 is shown below, as is an assessment of the status of Gårdsfjärden regarding plant nutrients based on the summary from the North-east Hälsingland Water Conservation Association in 2018. Results for 2019 for all parameters will be available in early April 2020.

Chemical Oxygen Demand (COD)

Iggesund Mill was the land source of an estimated 30% of the total chemical oxygen demand (based on measuring total organic carbon) in Iggesundsfjärden and Gårdsfjärden in 2018.

Oxygen saturation

The bottom water in Gårdsfjärden had an oxygen saturation level of 87% in 2019 as an annual average. The surface water in the vicinity of the mill had an oxygen saturation level of 89% as an annual mean, while the annual mean value for the bottom water in the immediate vicinity was 81% in 2019.

Plant nutrients

Nitrogen: The annual average level of total nitrogen in the surface water of Gårdsfjärden was 304 micrograms per litre in 2019.

Iggesund Mill's proportion of the total nitrogen entering Gårdsfjärden was estimated at approximately 20% in 2018. The annual average level of total nitrogen in the surface water of Gårdsfjärden was 354 micrograms per litre at that point.

Phosphorus: The annual average level of total phosphorus in the surface water of Gårdsfjärden was 16 micrograms per litre in 2019.

Iggesund Mill's proportion of the total phosphorus entering Gårdsfjärden was estimated at approximately 50% in 2018. The annual average level of total phosphorus in the surface water of Gårdsfjärden was 16.8 micrograms per litre at that point.

Overall assessment

The overall assessment of Gårdsfjärden's nutrient status (nitrogen and phosphorus) following the Swedish Environmental Protection Agency's principles of assessment was carried out for the period 2016–2018. The status was judged to be good. For total phosphorus the average content in 2016–2018 was among the lowest measured in the period 2002–2018

Comments

The mill's emissions of eutrophicating substances have fallen sharply since the 1980s. In trial fishing in 1987, the fish life in Gårdsfjärden was characterised as typical of areas of water high in nutrients. Some changes in the direction of more normal status were noted in 1996, but fish production remained high and with a preponderance of the carp family.

Recovery proceeds slowly in such enclosed areas as Gårdsfjärden, where large amounts of organic material and mineral nutrients from earlier emissions have accumulated on the bottoms.

In 1996 impairment of liver function and reproduction was observed in perch in Gårdsfjärden. However, growth and survival were normal. Further studies of perch in the waters off Iggesund were performed, with similar results to those found in the study in 1996.

Reproductive studies were performed on both perch and zebra fish in 2001 and 2002. The results show that perch that have spawned in the receiving body of water produce eggs with just as good hatchability and larval survival as the perch in an unaffected reference area, and the studies in the laboratory on zebra fish did not indicate any effects.

In late 2009 a treatment plant was brought on line with chemical flotation after the existing aerated lagoon. This has resulted in a reduced load on the receiving bodies of water, particularly regarding mineral salts.

In connection with an application for a new environmental permit, the company conducted a follow-up fish study in autumn 2009, which showed that a small number of significant differences, which cannot be regarded as biologically significant, existed between the sites studied. No evidence was discovered of the inhibition of reproduction found in previous studies, and the results therefore indicate clear recovery. The fish study was conducted before the chemical flotation plant was commissioned, which means that the recovery that has occurred must have had another cause, such as internal measures already taken.

As part of the permit application procedure, a hard-bottom inventory was also conducted in August 2010, and the study showed that there has been a large-scale improvement in the inner reaches of Gårdsfjärden and the outer reaches of Enångersfjärden since 1987. It is impossible today to differentiate the effect of outflow from the Iggesundsån river in the studied reaches of Gårdsfjärden on the plant communities on the bottoms from the effect of the point source Iggesund Mill in the same receiving body of water. There is no visible toxic effect.

The sediments in Gårdsfjärden are finely divided, oxidised and teeming with life. Filtering organisms such as freshwater fungi, barnacles and hydras occur on rocks. Nor do TOC concentrations in water and sediment suggest any unusual conditions

The existence of what is termed fibre sediment – sediment with elements of pulp fibres and other waste products from earlier pulp and paper production – outside Sweden's forest industry facilities has attracted considerable attention in recent years. Fibre banks have been found outside Iggesund Mill in the inner part of the Iggesundsfjärden bay and in the adjoining Byfjärden. In autumn 2017, fish were caught at different distances from Iggesund Mill with the aim of studying the spread of sediment-bound pollutants and their uptake in fish. The fish were analysed for content of metals and organic substances.

All morphological measurements, fish growth and fat content were at a level that can be considered normal for coastal fish and the differences between the locations were numerically small. For the variable GSI (gonadosomatic index), the median value varied considerably between the sites and the spread between individuals at each site was significant. A larger number of individuals in different length classes would have been needed to evaluate any significant differences in this variable between fish areas. Mercury content at all sites was below the EU's limit values for fish for consumption by a reassuring margin. From a general Swedish perspective too, the mercury content can be considered to be low.

Content of other studied trace metals was determined in liver samples. There was a small numerical difference in content between the sampling locations and it was not possible to distinguish any site with substantially different values. The results confirm the general picture obtained from other recipient surveys, that metals originating in forest industry emissions are often found in sediment but have low bioavailability.

When it comes to the chlororganic substances studied (PCB, DDT, HCB PCDD/Fs), generally a weak gradient was observed with slightly higher levels in Byfjärden, which gradually tail off. In comparison with chemical status assessment criteria for PCDD/Fs and PCBs, findings were below current threshold values by reassuring margins. Nor can the levels in themselves be considered to be high in relation to measurements taken in other areas around the Swedish coast, including background locations with no impact from urban activity.

Overall, the survey shows that the sediment-bound pollutants found as higher content levels in parts of the area have a limited spread to the surrounding ecosystem and minor uptake in fish. The levels in the fish studied are relatively low and in the region of those measured in background areas without any direct anthropogenic effects.

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KPIs production and environment at Iggesund Mill

Production and environment	**2019**	**2018**	2017	2016	2015
Iggesund Mill, Production, 1 000 tonnes					
Paperboard	311	290	293	296	283
Market pulp	79	66	54	56	56
Raw materials, 1 000 tonnes					
Wood, million m^3 solid volume under bark[1)]	1,76	1,30	1.65	1.66	1.55
Water use, million m^3	34,9	38.0	38.5	37.5	33.7
Chemicals[2)]	108	90.1	80.2	82.4	68.7
Filler, pigment[2)]	46,5	47.5	47.3	46.5	44.0
Thermal energy, GWh					
Production at mills from recovered liquors, bark and wood residues	2558	2 479	2 434	2 522	2 365
Fossil fuels	53	101	105	105	73
Electrical energy, GWh					
Production at mill	309	304	256	347	289
Emissions to air, tonnes					
Sulphur dioxide (counted as sulphur, S)	27	36	33	33	45
Nitrogen oxides	528	585	586	611	539
Particulates	21	40	26	31	40
Carbon dioxide, 1 000 tonnes					
Fossil	12,1	25.7	24.0	27.7	17.7
Biogenic	847	876	811	884	793
Emissions to water, tonnes					
COD (organic matter), 1 000 tonnes	4,8	5.1	4.8	4.8	5.8
Suspended solids	718	874	813	975	1 157
AOX (chlorinated organic matter)	43,3	47.5	46.3	50.2	55.2
Nitrogen	50	59	53	59	77
Phosphorus	4,8	4.8	4.1	4.1	8.9
By-products, 1 000 tonnes					
To energy production	244	246	252	250	212
internally/externally					
Utilised or for recovering[3)]	64	36	70	84	57
Wate, 1 000 tonnes					
Tall oil, 1 000 tonnes[4)]	10	13	14	13	12
Hazardous[5)]	1,7	1.4	1.1	1.3	0,8
Sent to landfill (wet)	0,4	7.0	1.8	0.1	0,2
Energy deliveries					
Thermal energy, GWh[6)]	142	142	125	113	119

1. At Group level, wood consumption is computed net, taking into account internal deliveries of chips from the Iggesund Sawmill to Iggesund Mill.
2. 100 per cent active substance. The quantity of commodities were 137 900 tonnes for chemicals and 61 000 tonnes for filler and pigment.
3. By-products used, for example, as filling material, construction material or for the production of soil products.
4. For delivery to the chemical industry.
5. Hazardous waste is dealt with by an authorised collection and recovery contractor. Oil-containing waste from docking ships at Skärnäs Terminal is dealt with. The volume of this waste in 2019 totalled 295 (282) tonnes (not included in the figure).
6. 138 GWh of thermal energy from the mill to Iggesund Sawmill and 4,0 GWh thermal energy to the district heating network of the local community.