# 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.**

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

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## Innehåll



## Environmental activities in 2018

2018 saw Iggesund Mill continue with its focus on a biofuel-generated energy supply. 97 per cent of steam production was generated by biofuel, a slightly lower proportion than in 2017. This is mainly due to a somewhat higher use of heating oil due to production problems with the biofuel boiler and shutdown of the recovery boiler. These activities also affected emissions of fossil $CO_2$, which were slightly higher for 2018 compared with 2017.

In 2018 environmental work largely focused on start-up of two major projects:

- Saving water
- Future waste product management

Measures in the centrifuges of the external treatment plant made it possible to increase the dry content of the chemical sludge, a waste product from water treatment, resulting in less transport.

Iggesund Mill has been working to cap the old industrial landfill site in Skärnäs since 2009. Just over 3 hectares were completed in 2018. The total area to be capped covers 8.7 hectares.

The limit value for NOx under Ordinance 2013:252 on major incineration facilities (which implements the Industrial Emissions Directive in Sweden) was exceeded on three occasions in 2018. A number of measures were carried out to investigate the causes of this, including follow-up at daily meetings and showing the values in monitoring systems. This enables active supervision and monitoring.

**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.

**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.

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

**Investments/environmental and energy measures**

Dredging of the aerated basin began in 2017. The dredging work was completed in 2018 and the effects will be evaluated in 2019.

Six identified sources of noise were tackled as planned, following a noise survey.

Separation of non-contaminated water (primarily cooling and seal water) aims to reduce the flow of wastewater to the external wastewater treatment plant by around 5 000 $m^3$ per day.

A focus on reducing steam for hot water production has resulted in a saving of 3 GWh compared with 2017. Work has also focused on reducing liquid for evaporation, producing a saving of 11 GWh steam compared with 2017.

**Disruptions to production and complaints**

Iggesund Mill is focused at all times on designing out risks that could cause environmental incidents. In 2018, incidents requiring reporting to the supervisory authority occurred on 14 occasions. These events concerned the discharge of untreated wastewater (three occasions), a coating cooler leak (two occasions), polluted land, driving over different media such as lye and pulp (three occasions), oil incidents (twice) and three cases of exceeding the limit values for NOx under Ordinance 2013:252 on major incineration plants.

Ten external complaints were received during the year, nine of which concerned odours and one noise. The complainants were informed about the underlying causes and measures taken.

**Follow-up of environmental and energy targets in 2018**

We constantly strive to improve our energy efficiency and reduce our environmental impact, while also working towards a zero vision for emissions of fossil carbon dioxide.

**Energy**

- Electricity and steam consumption per tonne of product. Reduction in average consumption compared with 2017, target level 1 per cent.

**Environment**

- Proportion of biofuel in steam production, target level 98 per cent.
- Environmental index – reduction in environmental impact on average compared with 2017, target level 4 per cent. This applies to emissions of suspended solids and TOC plus water flows from the external wastewater treatment plant. This environmental index also includes the amount of chemical sludge from the chemical flotation plant (treatment stage).

**Outcome**

Target levels are evaluated monthly. The target level for electricity and steam consumption has been met for the year; the outcome shows a reduction in use of just under 5 per cent. The proportion of steam produced from biofuel was 97 per cent, partly due to higher use of heating oil in conjunction with production problems in the biofuel boiler.

In terms of the environmental index, the target level for the year was not attained and emissions of suspended substances and TOC increased in 2018.

**Planned environmental and energy measures in 2019**

In 2019 work will begin to install oxygen bleaching and wash presses on the hardwood line. The investment will lead to lower water use and a reduction in TOC and AOX to the external treatment plant.

Final capping of the old landfill site at Skärnäs continues and work will begin to investigate opportunities to use waste products from the factory to cap the old industrial landfill site at Strömsbruk.

Increased aeration in the aerated basin through the addition of aerators and stirrers.

Evaporation 5 will be taken out of operation in the second quarter of 2019. The investment will mean a steam saving of about 50 GWh per year.

**Environmental and energy targets 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.

# Water environment at Iggesund Mill

The company takes part in the programme for coordinated monitoring of receiving bodies of water in north-eastern Hälsingland which refers to monitoring of the environmental effects of different activities in different catchment areas and in the coastal waters. Through the company's self-monitoring, samples are also taken from the receiving bodies of water in the vicinity of the mill six times per year during the ice-free period.

**Chemical Oxygen Demand (COD)**

Iggesund Mill is the source of about 38 per cent of the total Chemical Oxygen Demand in Iggesundsfjärden and Gårdsfjärden.

**Oxygen saturation**

The bottom water in Gårdsfjärden had an oxygen saturation level of 82 per cent in 2018 as an annual average. The surface water in the vicinity of the mill has an oxygen saturation level of 99 per cent as an annual mean, while the annual mean value for the bottom water in the immediate vicinity is 97 per cent.

**Plant nutrients**

Nitrogen: The annual average in the surface water of Gårdsfjärden in 2018 was 354 micrograms per litre (µg/l). The mean value in surface water for summer (303 µg/l) is also classified by the Swedish Environmental Protection Agency as 'low. Iggesund is the source of 31 per cent of the total nitrogen entering Gårdsfjärden.

Phosphorus: The annual average level in the surface water of Gårdsfjärden in 2018 was 17 µg/l. The mean value in surface water for summer (15 µg/l) is classified by the Swedish Environmental Protection Agency as a 'low level'. Iggesund is the source of approximately 56 per cent of the total phosphorus entering Gårdsfjärden.

**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.

# KPIs production and environment at Iggesund Mill

| Production and environment | **2018** | 2017 | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| *Iggesund Mill, Production, '000 tonnes* | | | | | |
| Paperboard | 290 | 293 | 296 | 283 | 277 |
| Market pulp | 66 | 54 | 56 | 56 | 67 |
| *Raw materials, '000 tonnes* | | | | | |
| Wood, million $m^3$ solid volume under bark[1)] | 1,30 | 1.65 | 1.66 | 1.55 | 1.58 |
| Water use, million $m^3$ | 38.0 | 38.5 | 37.5 | 33.7 | 37.4 |
| Chemicals[2)] | 90.1 | 80.2 | 82.4 | 68.7 | 67.0 |
| Filler, pigment[2)] | 47.5 | 47.3 | 46.5 | 44.0 | 43.1 |
| *Thermal energy, GWh* | | | | | |
| Production at mills from recovered liquors, bark and wood residues | 2 479 | 2 434 | 2 522 | 2 365 | 2 424 |
| Fossil fuels | 101 | 105 | 105 | 73 | 40 |
| *Electrical energy, GWh* | | | | | |
| Production at mill | 304 | 256 | 347 | 289 | 256 |
| *Emissions to air, tonnes* | | | | | |
| Sulphur dioxide (counted as sulphur, S) | 36 | 33 | 33 | 45 | 44 |
| Nitrogen oxides | 585 | 586 | 611 | 539 | 525 |
| Particulates | 40 | 26 | 31 | 40 | 20 |
| *Carbon dioxide, '000 tonnes* | | | | | |
| Fossil | 25.7 | 24.0 | 27.7 | 17.7 | 10.0 |
| Biogenic | 876 | 811 | 884 | 793 | 812 |
| *Emissions to water, tonnes* | | | | | |
| COD (organic matter), '000 tonnes | 5.1 | 4.8 | 4.8 | 5.8 | 5.3 |
| Suspended solids | 874 | 813 | 975 | 1 157 | 932 |
| AOX (chlorinated organic matter) | 47.5 | 46.3 | 50.2 | 55.2 | 50.8 |
| Nitrogen | 59 | 53 | 59 | 77 | 74 |
| Phosphorus | 4.8 | 4.1 | 4.1 | 8.9 | 5.9 |
| *By-products, '000 tonnes* | | | | | |
| To energy production, internally/externally | 246 | 252 | 250 | 212 | 226 |
| Utilised or for recovering[3)] | 36 | 70 | 84 | 57 | 65 |
| Tall oil, '000 tonnes[4)] | 13 | 14 | 13 | 12 | 13 |
| *Waste, '000 tonnes* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Hazardous[5)] | 1.4 | 1.1 | 1.3 | 0,8 | 0.4 |
| Sent to landfill (wet) | 7.0 | 1.8 | 0.1 | 0,2 | 0.1 |
| *Energy deliveries* | | | | | |
| Thermal energy, GWh[6)] | 142 | 125 | 113 | 119 | 115 |

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 119 100 tonnes for chemicals and 62 300 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 2018 totalled 282 tonnes (not included in the figure).
6. 136 GWh of thermal energy from the mill to Iggesund Sawmill and 6,0 GWh thermal energy to the district heating network of the local community.