2021

HOLMEN

Environmental work at Workington Mill 2021

Content

Workington Mill

Iggesund Paperboard's Workington mill is located in north-western England, outside the town of the same name. The mill is located very close to the coast, which is open and subject to strong tidal flows.

Environmental work 2021

The Workington Mill achieved Platinum in the 2020 EcoVadis evaluation, reflecting the integrated approach to environment and energy performance within the mill's operations. The 2021 submission is being assessed by Ecovadis at the time of writing.

The biomass-fuelled Combined Heat and Power Plant (CHP) continued to provide the mill's power and steam requirements and to export electricity to the UK National Grid, until the planned outage in May 2021. Following this outage, damage to the steam turbine rotor has meant that the mill's electricity has been imported from the National Grid for the remainder of the year. Steam has continued to be generated in the biomass boiler, with the auxiliary gas-fired boilers also available as required. The turbine will be returned to service during Q1 2022.

Air emissions were within the permitted levels and the CHP plant has maintained all of the required certifications, including the Good Quality CHP (GQCHP) quality assurance. All certifications were audited by government authorities during 2021.

Energy and Environment KPIs are published monthly and visible to all employees. Top level objectives and targets are in place for generation of sustainable electricity, power and steam consumption efficiency, water usage efficiency and emissions of Solids and COD per tonne of paperboard produced. Investment activities during 2021, in particular the size press replacement, have resulted in 10 percent lower COD generation per tonne of paperboard produced.

CO2 and GHG emissions are primarily driven by energy efficiency. Electricity and steam consumption per tonne of paperboard produced was approximately 10% higher in 2021 than the previous year's record low, as a result of the extended planned outage, but still 6 percent lower than the 2014 baseline. This ongoing reduction has been achieved through a combination of capital investments, for example heat recovery, and by developing the boardmachine operation for production efficiency. During 2021 the process improvements were focussed on the pulpmill electricity consumption per tonne and the boardmachine runnability and production efficiency.

A new primary effluent treatment plant will be constructed during 2022, to replace the existing ageing plant and as the first phase of the effluent treatment upgrade. The new plant will give a significant reduction in solids emissions to the Solway Firth. It is planned to be operational in the first half of 2023.

Annual shoreline surveys are carried out near the mill's wastewater outfall pipe and have found that any impact is less than from the natural year-to-year variations.

The Workington Mill operates according to the Waste Hierarchy, with a continuing focus on reducing waste from, and within, the process. Waste streams are segregated at source where possible, with further sorting at the receiving site for mixed wastes. Hazardous wastes were approximately 0.6 percent by mass of the total and are recovered or recycled as appropriate. Examples of activities to reduce waste include replacing fluorescent lighting with LEDs, which are more energy efficient and have a longer lifespan, and using Lean Manufacturing methods to streamline processes throughout the Mill.

Water is cleaned and reused within the process multiple times before it is returned to the environment. Incoming freshwater is heated by the outgoing wastewater streams, and flows counter-current to the production processes in order to maintain cleanliness in the final product. Storage capacity is in place for the different fractions of water to absorb variations in production rate at each stage with reduced overflow from the whitewater system. Where possible, freshwater usage is replaced with clarified fractions while maintaining product quality.

Permits of operation

The Workington Mill's environmental permit was last reissued at the end of 2016, taking into account implementation of the BAT reference document and its requirements. Work has continued towards meeting the new BAT Associated Emission Limit (BAT-AEL) values for the emissions to water. Several studies have been completed, including a BAT options assessment and a mill water balance. The result was the development of a phased operational and investment plan to allow permit compliance to be achieved. The initial phase, started already in 2014, was a capital investment project aimed at reducing the emissions of both fibre and coating pigment to the effluent. The solids emissions per tonne of paperboard have been reduced by around 13 percent from the permit baseline level (set at the 2012-14 average).

Following this initial phase, the focus turned to the water balance to both stabilise and reduce the overall use, and to modified bleaching chemistry. Increased process water storage capacity has been created to enable greater re-use of water streams and so reduce fresh water requirements. Water use per tonne of paperboard is now approximately 20 percent lower than the permit baseline and continues to be reduced through efficiency projects.

COD emissions to water have also been reduced through these activities and are now approximately 20 percent below the baseline level.

At the end of 2020, the Workington Mill submitted an application for a revised derogation on the BAT-AEL requirements, based on the lack of a suitable location for the planned effluent treatment facility and the local impact if a new location was to be developed. Instead, a phased approach is underway which will give a significant reduction in emissions to water

while requiring a smaller footprint than the full-scale design previously considered. Discussions with the government authorities are ongoing and should be finalised during 2022.

The Holmen Board has approved the investment a new primary effluent treatment plant which forms the first phase of the revised plan. The new plant will be operational during 2023 and will be more resilient to variations as well as giving a significant reduction in solids emissions to the Solway.

Certifications

ISO 14001

Workington mill has been certified to ISO 14001 since 2003, and the certification was last renewed in 2020.

ISO 50001

Workington mill has been certified to ISO 50001 since 2015 for its Energy Management System, which is fully integrated with the ISO 14001 environmental system. The certification was last renewed in 2020.

ISO 45001

Workington mill's health and safety management system has been certified according to OHSAS 18001 since 2005 and was upgraded to ISO 45001 in 2020.

FSC® (FSC-ID)

Since 2005 the mill has been certified according to the FSC® (FSC-ID) standard.

National certifications for the production of renewable energy

All national certifications have been achieved associated with the production of renewable energy from the biomass CHP plant.

As of 1st April 2014, the UK Government introduced requirements that all renewable fuels need to meet the Sustainability Criteria as defined in the European Renewable Energy Directive (RED) and UK Renewables Obligation Order (ROO). This means that all fuels have to be classified by consignment and have to meet requirements and greenhouse gas emissions (GHG) and Land Criteria. This requires a monthly calculation and submission of carbon emissions throughout the full supply chain, back to the forest, and including all transport and process stages. Threshold limits are applied in order to satisfy the requirements. For the land criteria, it has to be demonstrated that all fuel is legal and sustainable by applying the government's Timber Standard. In order to satisfy this, an assured report by an accredited organisation (to standard ISAE3000) has been submitted annually. This has been approved by the UK Government's regulatory body, Ofgem (The Office of Gas and Electricity Markets).

Ofgem carried out its first full audit of the CHP operation during 2015. The audit was successfully closed in the beginning of 2016. Since then, annual audits have been carried out on EUETS, CHPQA and Sustainability Criteria, with successful outcomes.

Since January 2021, the UKETS system has replaced the EUETS for the Workington Mill.

A review has been carried out against the Large Combustion Plant (LCP) BREF requirements, in line with the Industrial Emissions Directive (IED). All measures were accounted for in the revised consolidated permit issued in 2016.

Investments/environmental and energy measures in 2021

Environment and energy activities continue to have a high focus within the Workington Mill. Monthly meetings are held with the Production, Engineering and Technical teams to review performance and identify improvements. For example, activities around the water system microbiology-control regimes have resulted in a significant reduction in COD generation in the pulpmill which has been maintained over time.

The recent investment in a new size press on BM2 gave a COD reduction of approximately 10 percent per tonne of paperboard produced, by preventing loss of sizing chemicals to the effluent system.

The focus on boardmachine runnability and efficiency continues, consolidating the reductions already achieved in steam and electricity consumption per tonne.

The Holmen Board approved investment in a new primary effluent treatment plant, which will be in service during 2023.

Production disturbances, incidents, and complaints in 2021

Production Disturbance

The Workington mill took an extended annual maintenance shut during May 2021, during which time the new size press, drive system and reel-up pulper were successfully installed. The biomass CHP also took a planned outage of 35 days for statutory inspections and major routine maintenance on the boiler and turbine. Soon after start-up the new turbine rotor was damaged, with the outcome that the steam turbine has been out of use for the remainder of the year.

As a result, the mill has been importing electricity from the UK National Grid and using the biomass boiler to generate the mill's steam requirements. The auxiliary natural gas-fired boilers have also been available for process steam generation as required. The steam turbine is expected to be back in service during Q1 2022.

External complaints

Historically, noise concerns have been the main theme when it comes to external complaints received at the mill. A noise management plan was formulated in 2014 to address the suspected causes. The attention was focused on the vacuum stack vent which is located on the west side of the mill and on buzzing from transformer pens also located on the west side of the mill. A device was installed during 2015 into the vacuum system vent to alter the sound characteristics and reduced the impact at the neighbouring property.

Noise monitoring was carried out during 2017 in co-operation with the Environment Agency which was used to identify the next steps in the management plan, and a number of steam exhaust vents were improved. Complaint numbers have been low in recent years; the main issue in 2021 related to an electrical transformer outage in the summer for which there were 3 complaints.

All incidents are logged and investigated with information fed back to the complainant. Incidents of this nature are also reviewed at the community liaison meeting which has representation from the local community and authorities.

Permit Compliance

Regarding the permit, thirteen incidents were reported to the authorities in 2021. Of these, eleven were related to blockages at the effluent treatment plant and two were for high pH measurements in the surface run-off water. The effluent treatment plant concerns are being addressed with the construction of a new primary treatment plant during 2022.

All incidents have been investigated and discussed with the authorities. No harm has been identified in any of these cases.

Follow-up on environmental and energy targets 2021

Environmental activities underway in support of permit:

- Ongoing activities to sustain benefits of reduced suspended solids in emissions to water, by approximately 13 percent of the permit baseline.
- Ongoing bleaching optimization work, resulting in improved bleaching chemistry.
- Replacement of size press, resulting in approximately 10 percent lower COD emissions per tonne of paperboard produced.

- Sustained level of water consumption per tonne of board, approximately 20 percent lower than the permit baseline.
- Continuing identification of opportunities for water efficiency improvements, with reductions already achieved. Clear potential identified for further reduction overall.
- Design of future effluent treatment process and development of proposal for next stages.
- Continued optimization of renewable electricity generation.

Planned environmental and energy measures 2022

The new primary effluent treatment plant will be constructed during 2022 and is to be in operation during 2023.

The biomass CHP will be returned to full operation during Q1 2022.

Alongside this, the Workington Mill activities can be summarized as:

- Continue with the project work in support of the BREF and permit compliance requirements.
- Continue activities towards reduced water use, alongside lower COD and suspended solids in the site's emissions to water. The focus remains on reducing emissions at source wherever possible.
- Develop detailed design for future effluent treatment plant requirements, building on process optimization activities already identified and carried out. Phase 2 of the effluent plant rebuild is to design and build an AD treatment plant for the pulpmill wastewater.
- Continue with optimization of energy generation and consumption.

Environmental and energy targets 2022

Environmental and energy performance continues to have high focus with the Workington Mill. Targets are in place for renewable electricity generation, steam and electricity consumption efficiency, water usage efficiency, and emissions of COD and solids per tonne of paperboard produced. These are communicated throughout the mill and reviewed regularly.

Water environment at Workington mill

The Irish Sea

The coast off Workington is open and is affected by strong tidal currents, which makes the turnover of water high in and around the points of emissions. The water along this stretch of coast is also affected by a nearby treatment plant which processes municipal sewage and chemical industry effluent and by the River Derwent, which flows into the sea very close to the paperboard mill.

Degree of oxygen saturation

The oxygen content off the mill and at other measurement sites: More than 90 percent.

Plant nutrients

Nitrogen

Workington's share of total input: Approximately 2 percent.

Phosphorus

Workington's share of total input: Approximately 6 percent.

Comments

The diversity and abundance of species in the area around the pipe is documented. The outcome is liable to fluctuate over the long period of the study. Factors considered are the mill effluent quality in addition to naturally occurring predators, deposits of sand, other industrial activities and general metrological conditions. The study documents the diversity and general abundance of species recorded on the shoreline as well as looking for any specific toxic effects. The shoreline ecology has been reported as being healthy in terms of the diversity of recorded species and general status. There is no indication of any specific toxic effects. The Solway coastal environment is relatively shallow and has mobile sand bed. Recent extreme and sustained weather has had a large effect on the west coast shoreline in general. It is anticipated that the immediate shoreline ecology will be affected, although currently unquantified. Impact assessment is currently a discussion with the local authorities as part of the evolving industry BREF discussions.

Environmental key figures

Workington mill	2021	2020	2019	2018	2017
Raw materials					
Wood, million m^3 solid volume under bark	0,29	0,33	0,33	0,31	0,31
Chemicals, 1 000 tonnes[1)]	22,1	23,8	28,8	23,7	24,5
Filler, pigment, 1 000 tonnes[1)]	24,5	27,0	25,3	25,0	23,8
Purchased pulp, 1 000 tonnes	73,7	76,7	76,6	73,0	72,0
Water use, million m^3	7,1	7,2	6,8	6,5	6,7
Thermal energy GWh[2)]					
Production at the mill from wood residue	787	1 589	1 641	1 722	1 674
Fossil fuels	200	154	194	140	171
Recovered in the mill	26	36	37	48	0
Electrical energy, GWh					
Production at the mill	123	338	351	370	352
Emission to air					
Sulphur dioxide (counted as sulphur, S), tonnes	4,2	11,0	16,0	10,6	6,7
Nitrogen oxides, tonnes	95	209	236	267	190
Particulates, tonnes	0,4	1,8	3,3	1,0	0,6
Fossil carbon dioxide (Scope 1), 1 000 tonnes	40,6	32,4	39,1	26,0	29,5
Biogenic carbon dioxide, 1 000 tonnes	274	519	536	580	571
Effluents released to water					
COD, (organic matter), 1 000 tonnes	9,5	10,6	11,0	9,6	9,7
Suspended solids	2 064	1 975	1 810	1 510	1 320
Nitrogen, tonnes	29	39	38	38	25
Phosphorus, tonnes	5,1	5,9	5,4	4,7	4,1
By-products, 1 000 tonnes					
To energy production, internally	4,4	10,8	14,1	21,9	21,7
Utilised or for recovering[2)]	9	20	23	21	21
Waste, 1 000 tonnes					

Hazardous[3)]	0,05	0,03	0,001	0,01	0,3
Deposited (wet)[4)]	2,9	4,2	0,04	0,09	0,05

1. 100 percent active substance. The quantity of commodities was for chemicals 36 000 tonnes and 31 000 tonnes for filler and pigment.
2. By-products used, for example, as filling material, construction material or for the production of soil products.
3. Hazardous waste is dealt with by an authorized collection and recovery contractor.
4. Can also be considered as non-hazardous waste