





SKJERN PAPIRFABRIK

Survey 2017

Staff members

P. 10 14.1 years is the average seniority for Skjern Papirfabrik's staff members across all job functions.

Waste management

P. 21 92.6% of waste arisings were recovered in 2017.

Water consumption

P. 25 32.8% reduction of specific water consumption over five years.

District heating supply

P. 29 44,552 MWh of district heating was supplied during 2017. This corresponds to the average consumption of 2,461 households.

Emissions to the air

P. 32 75.6% reduced CO_2 emissions per tonne of paper compared with 2016.

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Preface

Dear Reader

When I look into the future, a year seems like a long time; however, now that we are to publish a new report, a year gone by seems like a very short period of time.

First, I would like to give readers a general tour of the market development in which we operate. We take our starting point at the end of 2016: the year ended with positive trends towards increasing demand in most markets. During the year gone by this trend has stabilised and even intensified in just about all the segments of Skjern Papirfabrik's field of business. The most evident explanation for the increasing demand is found in the general improvement of global economy. Furthermore, for some of our products it is due to increasing internet trade, which leads to an increasing need for different types of packaging.



As we speak, it seems at a first glance that the producer level in the above-mentioned markets has exhausted the available production capacity. Based on increasing demand the mill has been able to meet the budgeted requirements for sales volume and utilisation of the production capacity, respectively.

When we then turn to look at the current year of operation, market prospects may change relatively quickly in several directions. From the perspective of Skjern Papirfabrik the immediate expectations for 2018 are very positive, with opportunities for the development of existing product types as well as new ones.

At the mill in Skjern, 2017 did not see major expansion of machinery nor substantial renovation works. The primary reason for this is found in a so-called five-year plan that was drawn up to make sure that the mill goes through continuous developments in capacity and quality improvement, respective-ly. The main components of this plan consist as a first step of a replacement of the existing hood over the drying sections and furthermore a replacement of part of the paper machine drive. This refurbishment is expected to take place during the summer holidays of 2019.

UN Global Compact

The UN Global Compact is a strategic initiative for companies committed to running a business in accordance with ten universally accepted principles within the areas of human rights, workers' rights, environment, and anti-corruption.

Skjern Papirfabrik acknowledges the growing importance of companies' corporate social responsibility, and as a reflection of this the mill has since 2013 been a member of the UN Global Compact, the world's largest initiative for propagation of corporate social responsibility - CSR.

Environmental segments

A major part of the company's focus areas are related to the mill's occupational health and safety. Occupational health and safety is a combination of staff members' safety and the physical and mental impacts that they are exposed to in their daily work. In this field, an external consultant has conducted a total risk assessment of all production facilities. The result of these assessments will be used in the future by our occupational health and safety organisation as a tool for enhancement of issues with scope for improvement.

Speaking of the mill's impacts on the internal and external environment, we definitely must mention our wood chip fired boiler plant that now ensures steam production in replacement of our natural gas fired boiler. We wish to emphasize a number of very important issues in connection with the wood chip fired boiler's operation. First of all, CO_2 emissions from the production have been reduced by more than 4,000 tonnes. Secondly, the mill has utilised and supplied waste heat from our own production to the district heating facility of the nearby City of Skjern. The volume of heat corresponds to the typical consumption of approx. 2,500 households. And thirdly, the City of Skjern has reduced its total CO_2 emissions thanks to the supply of heat from the mill to the district heating grid.

Paper production is generally known for being very energy intensive, also using large volumes of water in the production. Evidently, these are fields in which the mill invests many efforts in view of avoiding any unnecessary use of these resources. Thanks to focused work for many, many years we have been able to reduce our water consumption by almost 33% over a five-year period.



It will not come as a surprise to you that recycled paper used in the mill as a raw material in our production contains many impurities such as wood, styrofoam, glass, stones, plastics, etc. Naturally, these materials cannot be used in the production of paper, so input materials are cleaned before the recycled paper enters the production. The waste that remains is as far as possible delivered to facilities able to recover it for various purposes. A statement of our recovery of waste in 2017 shows a rate of recovery of some 93%.

All the above issues are results of the past; however, we generally take a larger interest in the future and what we can expect from it.

Nobody can predict the future. However, with the prevailing economic and other conditions that seem to have stabilised for a long period of time, I do expect that the markets in which the company does business will keep up the positive trend and develop favourably throughout the current year.

CEO Jørgen Thomsen

Facts about the mill

Name and location

Skjern Papirfabrik A/S Birkvej 14, 6900 Skjern Tel +45 9735 1155 E-mail: Skjernpaper@skjernpaper.com Website: www.skjernpaper.com

Industry/NACE code

21.12 – Production of paper and paperboard 17.12 – Production of paper pulp

Supervisory authority

Waste and wastewater: The Municipality of Ringkøbing-Skjern Other: Danish Environmental Protection Agency, City of Aarhus

Major environmental approvals

20.12.2000: Environmental approval, revised general approval. This approval is under review.

- 08.07.2010: Environmental approval of natural gas fired boiler plant.
- 27.10.2015: Environmental approval of wood chip fired boiler plant.
- 01.09.2017: Approval of connection of wastewater to Tarm wastewater treatment plant.

Most important legislation

Danish Environmental Protection Act Liability for Environmental Damage Act Statutory Order on Waste REACH BAT conclusions for Pulp & Paper



Certifications

Skjern Papirfabrik is certified according to the following standards: ISO 14001 ISO 50001 FSC®

Extent of certifications

Production of paper and paperboard. Applies to all of Skjern Papirfabrik, including the company's auxiliary processes.

Period covered

01.01.2017 - 31.12.2017

Date of Issue

Mid April 2018

O 50001

SUREAU VERITAS





The mark of responsible forestry

Applies to FSC[®] certified products



Since 2005 Skjern Papirfabrik has been owned by S.P. Holding, Skjern A/S, which is again owned by Buur Invest and three of the employees from the mill's management.

Management

Chairman of the board CEO CFO Sales manager Charlotte Buur Jørgen M. Thomsen John T. Nybo Nikolaj Thybo

Paper machine

Type Machine width Grammage Fourdrinier 294 cm 90 – 480 g/m²

About Skjern Papirfabrik

Skjern Papirfabrik is an order producing mill, and all products are made in close cooperation with customers.

Skjern Papirfabrik produces paper and paperboard consisting of 100% recycled paper and paperboard. The primary production is semi-product cardboard and paper delivered for further processing at our customers around Europe.

The products are delivered in large rolls, in narrow cut reels, or in sheets delivered on pallets.

The products are produced with a high respect for the surrounding environment, and Skjern Papirfabrik has been environmentally certified under ISO 14001 since 1998. Since then, this certification has been expanded with ISO 50001: Energy management certification.

Meeting customers' expectations and requests has high priority at Skjern Papirfabrik. As a consequence, it has been decided to work towards an ISO 9001 quality certification, and we expect to have it implemented by the end of 2018.



was the rate of complaint in 2017

Since 2013 it has been possible to buy FSC certified products from Skjern Papirfabrik.

As a relatively minor paper mill Skjern Papirfabrik's strength lies in being a good business partner, supplying quality products on time, and showing large flexibility when it comes to varying customer needs.

Investments in production efficiency are made continuously. This includes the reduction of energy consumption and other environmental impacts caused by our paper production.

In 2015, the installation of a new large wood chip fired boiler was initiated, replacing the existing natural gas consumption with wood chips. In 2017, steam for drying of paper has primarily been generated at the wood chip fired boiler plant.

After commissioning of the wood chip fired boiler, total specific CO_2 emissions have decreased by 89.2%. In a comparison with other European paper mills, Skjern Papirfabrik has very low specific CO_2 emissions today.

Furthermore, Skjern Papirfabrik supplies large volumes of district heating generated from waste heat from the drying section of the paper machine and residual heat in the flue gas from the boiler. The district heating is supplied directly through the district heating grid of Skjern to the users in the City of Skjern.

Based on the above we claim that Skjern Papirfabrik is among the most environment-friendly paper mills in Europe.

Skjern Papirfabrik

Strategy for selected parameters

	Status 2016	Status 2017	Targets 2018	Value for Skjern Papirfabrik and society
Paper production	59,783 net tonnes	64,064 net tonnes	64,500 net tonnes	Improved financial basis, which is a precondition for the further development of the mill. Increased paper production also has a positive impact on other environmental parameters.
Specific energy consumption	1,588 kWh/ net tonne	1,649 kWh/ net tonne	1,600 kWh/ net tonne	Affects finances and CO_2 emissions per tonne of paper. Calculated on the basis of gas, wood chips, and electricity for production.
Supply of district heating	40,580 MWh	44,552 MWh	45,000 MWh	Increasing district heating volumes produced from waste heat reduces the consumption of fuels at the Skjern district heating company.
Share of biomass as a fuel	64%	92%	95%	Substitution of natural gas leads to substantially reduced CO ₂ emissions.
CO ₂ emitted from production ¹⁾	5,483 tonnes	1,368 tonnes	800 tonnes	Substitution of fossil fuels with biofuels leads to substantially reduced CO ₂ emissions.
Water consumption	315,546 m ³	311,662 m ³	310,000 m ³	Lower water consumption reduces the burden on water resources.
Wastewater quantities	286,079 m ³	282,641 m ³	281,000 m ³	Wastewater quantities affect the hydraulic load on the Tarm wastewater treatment plant.

1) CO_2 originating directly from paper production and reported to the Danish Energy Agency.

(In mass balances later on in this publication CO₂ emissions are slightly higher, since secondary contributions from internal transport have been included).

Photo: »Black Sun« phenomenon at the Lake of Skænken



Skjern Papirfabrik

Staff members

At Skjern Papirfabrik the number of staff members is very constant. There is a positive trend of staff members staying at the mill for many years. Thanks to this, there is a good stability among staff members and a very experienced workforce in all divisions.

The mill has 75 employees with the following composition:

- 4 skilled metalworkers
- 2 automation mechanics
- 54 blue-collar workers
- 15 white-collar workers

Skjern Papirfabrik sees it as a natural part of our activities to treat staff members with respect and dignity, thus avoiding discrimination. This is a natural part of being a responsible company in Denmark. We believe that this is highly contributable to the high seniority of our staff members.



In Denmark we have many nationalities, and Skjern Papirfabrik sees it as a natural part of our activity to offer people of foreign nationalities work at the mill on equal terms with Danish citizens.

A substantial part of training in the production is in the form of mentoring, where experienced staff members train new staff members thereby sharing their experience. And we do have a lot of experience to share: 54.7% of the staff members have been at the mill for more than ten years.

In addition to mentoring, staff members are offered courses when expedient. This may be courses in the operation of equipment and machines, IT courses, occupational health courses, and many other subjects. A recent initiative is the implementation of a scheme, where staff members from the production can apply for participating in long-term process worker training. In 2017, two staff members have attended a process worker training course.



Occupational health and safety

At Skjern Papirfabrik we believe that a good working environment strengthens the mill's productivity resulting, among others, in a low sickness absence, higher job satisfaction, and more flexibility of the individual staff member.

The management and the health and safety organisation both play an active role, just as they have a large responsibility with regard to safeguarding a good and safe working environment for all staff members. The occupational health and safety organisation at Skjern Papirfabrik consists of seven health and safety representatives, three foremen, and the health and safety manager. In addition, since early 2016 an agreement has been in place with an external occupational health consultant who participates, among others, in the meetings of the occupational health and safety organisation to make its work more efficient.

All members taking a seat in this occupational health committee go through mandatory occupational health training. All members of the occupational health and safety organisation are active in the daily health and safety work. The health and safety work is an ongoing process with, among others, continuous activities to implement the proposals from the workplace assessments.

Occupational health and safety is a combination of staff members' safety and the physical and mental impacts that staff members are exposed to.

Again in 2017 much focus was on the safety of staff members, and many measures relating to occupational health have been implemented. For example, a total risk assessment of the entire production was conducted, under which an external consultant in cooperation with internal staff members went through all production facilities. As a follow-up, reports were prepared over issues with scope for improvement. These reports are a key tool for the occupational health and safety organisation.

In addition, efforts relating to the registration of nearmiss incidents have been improved, and it will also be a focal point in 2018.

In 2017, two notifiable accidents were registered. Thereby, the target of zero accidents was unfortunately not achieved for 2017. On the company's info board the number of days since latest accident is presented.



Development in number of accidents, accidents per million hours, and days of absence due to accidents

The target for 2018 is zero serious accidents. In addition, the registration of near-miss incidents will continue to be in focus in 2018.



Environmental impacts

Paper production is known to be a most energy intensive method of production. Therefore, at Skjern Papirfabrik we are proud to use primarily wood chips for the steam production. The steam mainly feeds the drying section of the paper machine, which is the main consumer of energy in the form of drying of the paper web.

 NO_x emissions will go up as a result of using wood chips as a fuel. In return, CO_2 emissions are reduced radically through the substitution of fossil fuels with biomass.

This CO₂ reduction gains even more value since Skjern Papirfabrik supplies a large volume of district heating generated from waste heat. The largest volume of district heating is produced by utilising energy contained in waste heat in the exhaust from the drying section of the paper machine. From the wood chip boiler district heating is also generated from the residual heat contained in the flue gas system as well as from excess steam that is utilised in an excess production heat exchanger for district heating in connection with minor unplanned stops of the paper machine.

We have worked actively with projects aiming at the supply of district heating and thereby the utilisation of waste heat during the past five years, and large investments in the facilities have been made. In 2012 Denmark's largest heat pump facility was established at Skjern Papirfabrik, exactly with the aim to increase the temperature of the waste heat from the drying section to a level where it can be led directly to the district heating grid of the City of Skjern.

The same technology was used to efficiently utilise the heat from the flue gas emitted from the wood chip fired boiler: Also here a heat pump and an additional accumulator tank were acquired.



The supply of district heating to the City of Skjern saves large volumes of CO_{2^r} as the boilers of Skjern district heating facility would otherwise have to generate this district heating from other sources.

Total CO_2 emissions from the City of Skjern have been reduced drastically thanks to the district heating contribution generated from waste heat at Skjern Papirfabrik.

The paper production, however, also causes other environmental impacts. The most significant environmental impacts have been evaluated on the basis of approvals, legislation, and the largest possible potential impacts on the external environment and the immediate surroundings.

For Skjern Papirfabrik the most significant environmental impacts are:

- Energy consumption
- Consumption of auxiliary materials
- Water consumption
- Discharge of wastewater
- Waste management
- Noise

It is a natural consequence of Skjern Papirfabrik's 20 years of environmental certification that we have a good grasp of the above environmental impacts. Therefore, it is assessed that we have a very low risk of causing a significant negative impact on the environment.

Back in 2016 Skjern Papirfabrik was awarded with the Green Network Diploma that is given to companies for a remarkable contribution to environmental sustainability.

For the last 20 years Skjern Papirfabrik has had defined principles and guidelines for the mill's environmental work in the form of an environmental policy:

Environmental policy

In accordance with our business strategy Skjern Papirfabrik will contribute to the protection of the environment and will prevent pollution on the surrounding environment. This is achieved, among others, by utilising raw materials and energy in the best possible way, and by reducing emissions produced from the mill's processes.

Skjern Papirfabrik wants to reduce our burden on the environment by:

- Having an open communication about the environmental impacts associated with the company's processes and products
- Making sure that staff members act in an environmentally responsible way.
- Having positive and open cooperation with supervisory authorities.
- Complying with relevant legislation and other binding commitments that the company has endorsed.

- Ensuring ongoing environmental improvements, regardless of the fact that regulatory requirements have already been met.
- Setting up quantifiable environmental targets and action plans and following up on them.
- Carrying out environmental assessments of new projects and new auxiliary materials.
- Ensuring to the largest possible extent the recovery of waste products.
- Encouraging staff members to participate in preventive environmental work.
- Ensuring that buyers of the company's products are informed of environmental issues associated with the manufacture of the company's products.

The company publishes our environmental policy on the company's website and in this annual Sustainability Report.





Corporate Social Responsibility, CSR

For many years Skjern Papirfabrik has considered it a natural part of our activities to contribute to a harmonic cooperation with the local community. This means, among others, that we invite local craftsmen to participate in tenders in connection with new projects.

Skjern Papirfabrik conducts many tours at the mill, and for instance educational institutions, associations, and local authorities make good use of this offer, wanting to show their students / employees what happens in the recycling of paper, thus helping them understand how important it is to separate and recycle this important resource. Schools are encouraged to work with reuse and environmental issues, when they wish to organise tours of the company. The aim is to promote pupils' thinking in relation to the environment and circular economy, and also to maximise pupils' learning during their tour.

Skjern Papirfabrik supports a large number of small local and national NGOs. Examples of NGOs are associations supporting vulnerable groups or people suffering from various diseases, or local sports associations.



Skjern Papirfabrik invites its staff members to participate in sports events during the year. In order to motivate our staff members into participating in such events, the mill organises joint registration, payment of any fees, and equipment needed for the event.

This is not only meant as an initiative to improve staff members' health, but also to strengthen the social community at the mill. Many staff members welcome this opportunity, participating in those events that suit them best.

In 2013 Skjern Papirfabrik joined the UN Global Compact's principles and is thus obliged to show an ethically correct execution of business.

Skjern Papirfabrik is an independent company with only one production site located in Denmark. In Denmark the respect of human rights, including the dissociation from forced and child labour is an integrated part of Danish mentality, and Skjern Papirfabrik considers this a natural part of operating on an international market.

Skjern Papirfabrik complies with Danish law, thereby supporting the above-mentioned issues. This is also substantiated by Transparency International, as this organisation for several years has rated Denmark as one of the least corrupt countries in the world.

Skjern Papirfabrik is a partner company with Green Network, thereby demonstrating our desire to continuously develop our efforts within CSR/sustainability by sharing knowledge with other companies.

This partnership means that Skjern Papirfabrik has a third party who is ready to provide critical opinions and input for our present activities. Skjern Papirfabrik has a continuous dialogue with Green Network about our own efforts, and our staff members participate in seminars focusing on CSR and sustainability.

As a substantiation of the above-described issues, Skjern Papirfabrik has prepared a CSR policy.



CSR policy

Social responsibility is a fundamental element for us as an organisation to appear as a legitimate and responsible company within the industry.

Today, there is an international expectation that companies include social responsibility in their activities.

At Skjern Papirfabrik we are convinced that it also gives us commercial benefits to focus on environmental protection, staff development, health and safety, and other aspects of social responsibility.

Skjern Papirfabrik wants to show Corporate Social Responsibility by:

- complying with existing laws in all respects
- demonstrating transparency and an accommodating attitude also in social areas
- being open for conducted tours for amongst others educational institutions, associations, and other interested parties
- supporting association's work in the local community
- contracting as much external work as possible to local craftsmen and contractors
- having zero tolerance towards bribery
- demanding fair competition and fair trade with customers and suppliers

Skjern Papirfabrik's commercial advantages are to be found in the supply of good products and services, and never in unethical and illegal sales promotion.

Skjern Papirfabrik has joined the UN Global Compact as a natural continuation of the company's activities as a legitimate and responsible company and player on the international market.

Skjern Papirfabrik wants to comply with the ten Global Compact basic principles by:

- supporting and respecting human rights
- upholding the freedom of association and the effective recognition of the right to collective bargaining
- dissociating ourselves from forced labour
- dissociating ourselves from child labour
- avoiding discrimination when it comes to conditions of employment
- promoting greater environmental responsibility
- working against corruption in all its forms, including extortion and bribery

This Sustainability Report is made to serve as the COP reporting to UN Global Compact.



Skjern Papirfabrik

Mass balance

CO₂ emissions from the combustion of natural gas, auto gas, and fuel oil 1,455 tonnes of CO₂

Evaporation of water 34,006 m³



Input and output of materials



- Waste/reject
- \cdot Reject for soil improvement 190 tonnes DM
- \cdot Incineration

 \cdot Suspended solids

· Bottom ashes

- \cdot Fly ash
- 1,554 tonnes DM 59 tonnes DM
- 354 tonnes DM

10.4 tonnes

127 tonnes DM 2.1 tonnes

255 tonnes DM

- · Hazardous waste
- \cdot Metals for recycling

Paper raw materials 62,188 tonnes DM

Auxiliary materials

Production
588.2 tonnes
Maintenance and boiler 42.6 tonnes **Finished products** 59,900 tonnes DM



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Skjern Papirfabrik

Input and output of materials (continued)

Auxiliary materials

Many auxiliary materials are used at Skjern Papirfabrik. The majority is used in the production process. The auxiliary materials for production mainly consist of glue to make the paper water repellent and a number of auxiliary materials to improve dewatering. In addition, cleaning agents are used to clean the felts and wires of the paper machine.

Auxiliary materials in this report are materials of a relatively large consumption, which means that for example the consumption of spray bottles in the metalworking department are not included. By contrast, materials used for maintenance of the production equipment, such as oil, grease, and cleaning agents, are included.



Auxiliary materials compared to quantity produced,

The graph shows the distribution of auxiliary materials compared to quantity produced. It is seen that the consumption of auxiliary materials in the production is higher than in 2016. This is due to changes of the production mix deciding which auxiliary materials must be used, and in which amounts.

The consumption of auxiliary materials for maintenance and boiler facility has gone up compared with 2016. This is due to the fact that the new wood chip fired boiler has had substantially more operating hours in 2017. In this facility relatively large quantities of lye, among others, are used for the neutralisation of the condensate generated in the facility.

Furthermore, auxiliary materials are used for band-pass filter cleaning of the condensate from the plant, before it is led with the process wastewater to public wastewater treatment.

A, B, and C substances

The guidelines on environmentally harmful substances in industrial wastewater from the Danish Environmental Protection Agency operate within three categories of organic substances: A, B, and C substances.

A substances are undesirable substances that should be substituted or reduced to a minimum. B substances should be regulated using the best available technology. C substances are regarded as unproblematic. The remaining part consists of water and inorganic auxiliary materials.

The relative distribution of total consumption of auxiliary materials can be seen in the figure below:



Again in 2017, the relative share of A substances is at a remarkably low level. The use of auxiliary materials with contents of A substances is due to the production of specific products for which the use of exactly these auxiliary materials is necessary due to the properties of the product.

Input and output of materials (continued)

Generally, we have much focus on avoiding the use of new auxiliary materials with a content of A substances. This is a crucial factor when it comes to the very low level of total A substances. Before a new auxiliary material is being used, we always make a thorough assessment of its contents of A, B, and C substances along with an environmental assessment of the material. These assessments are submitted to the authorities.

Waste

Waste generated at Skjern Papirfabrik mainly consists of segregated impurities from paper raw materials containing a number of non-usable materials, such as plastics, paper clips, textile residues, etc. These residual products are segregated in several cleaning units.

In addition, the wood chip fired boiler generates a considerable amount of waste. The bottom ashes from this facility, which constitute the largest fraction, comply with requirements stipulated in the Statutory Orders on Bioashes and Sludge, respectively, and can thereby be recovered. The term »waste reject« covers waste segregated in the pulper. This reject primarily consists of metal bands from the paper bales along with plastic and textile residues. This fraction is also called the rag. The waste is wound to a long »rope«, which is drawn from the pulper to a container. The waste reject is sent for further processing, where the metal parts are segregated and recycled, and combustible waste is incinerated with energy recovery.

The term »reject for soil improvement« is a waste product primarily consisting of paper fibres mixed with a minor part of styrofoam and plastics. This waste fraction is subjected to controlled composting, before it is used for soil improvement. Thanks to its high fibre content this fraction can contribute to a better soil structure in agriculture.

The fraction of »suspended solids« is the residual solid matter remaining in wastewater when it is led for wastewater treatment. Suspended solids primarily consist of paper fibres too small for being retained in the mill's vargo filters.



By contrast, contents in the fly ash of primarily heavy metals are at such a level that this fraction must be managed separately by landfill disposal. Waste going to landfill amounted in 2017 to 0.9 kilograms per net tonne of finished product. This is far below figures published in CEPI's latest Sustainability Report from 2013 giving figures on sustainability in the Pulp and Paper industry. It appears from this report that the industry as a whole generates 14.3 kilograms of waste for landfill per tonne of finished product.



Input and output of materials (continued)

Overall, waste arisings have increased from 2016. This is due to a larger consumption of paper raw materials in 2017 compared with 2016. However, it is also assessed to be due to higher quantities of impurities in paper raw materials received. Part of the explanation is to be found in a change in the amount of various waste paper types. This again is due to variations in the type of finished products sold, which determines the consumption of the different types of paper raw materials.

An increase in the generation of ashes has been seen from 2016; this is a natural consequence of a major part of the natural gas consumption for steam generation being substituted with wood chips in 2017.



Waste and reject quantities in tonnes DM

Total waste arisings are expected to remain at the same level in 2018.

Waste and reject compared with quantities of paper produced in kg/tonne DM







Skjern Papirfabrik

Water balance



1,488 m³

Notes on specification of quantities

Municipal water	Consumption metered by local utility, Ringkøbing-Skjern Forsyning
Water in raw materials	Calculated from random sampling measurement
Raw water	Consumption metered by local utility, Ringkøbing-Skjern Forsyning
Evaporation	Calculated from mass balance of water
Water in waste	Calculated from random sampling measurement
Waste reject	Assessment, since rag is not suitable for sampling
Sanitary wastewater	Measurement of discharge
Discharge to Tarm wastewater treatment plant	Discharge metered by local utility, Ringkøbing-Skjern Forsyning
Water in finished products	Calculated/measured (average water content of 6.5%)

Water balance (continued)

Water intake

The mill's process water is primarily unfiltered groundwater from a former municipal drinking water well. The term used for this water quality in this report is »raw water«. The local utility of Ringkøbing-Skjern Forsyning supplies the mill with raw water. Supplies have been very stable, and thus no river water was used as process water during 2017.

In addition to raw water a small amount of municipal water is used. This water quality is used for sanitary water and drinking water as well as at few points in the process where completely clean water is needed.

Most of the process water is used through the spray nozzles on the paper machine. Then the recirculation of process water starts: the water is reused on average 15-20 times before discharge to the municipal treatment plant. The process water is filtered in vargo filters to retain fibres, before it is reused or discharged as process wastewater.

In 2017 the reduction of water intake attained 3,884 m³.

The target for 2017 was to maintain the low intake in 2016, which has been met with a very fine margin. The reason for the reduced water consumption is primarily a continuous high focus on water consumption in the process. The water consumption is monitored on a daily basis.



Water intake and wastewater discharge measured in m³

7.4% decrease in specific water consumption in 2017





The above figure shows the specific water consumption for the last five years. There has been a reduction of specific water consumption from 5.82 m³/net tonne DM in 2016 to 5.39 m³/net tonne DM in 2017.

Over a five-year period the specific water consumption has decreased from 8.02 m³/net tonne DM to 5.39 m³/net tonne DM.



decrease in specific water consumption over the last five years

Target for 2018

The target is to maintain focus on the very low water consumption attained in 2017. In addition, the target is a reduction by a further approximately 1,600 m^3 in 2018 despite a target of a slightly higher production.

Water balance (continued)

Wastewater from Skjern Papirfabrik is led to public wastewater treatment at Tarm wastewater treatment plant. Skjern Papirfabrik has its own sewage pipe from the mill to the treatment plant, and the process wastewater is led directly to Tarm treatment plant. In the below table the process wastewater limit values to be complied with at Skjern Papirfabrik are shown. A few limit values have been changed in connection with a revision in 2017 of the mill's discharge approval.

Furthermore, the average own control analysis results for 2017 are also shown. It is seen that there is a minor exceedance of the Cadmium limit value. This is due to the fact that the mill received several loads of wood chips containing poplar. This changed the nature of the boiler condensate so much that the chemical cleaning carried out in the band-pass filter did not work.

The wood chip suppliers have now been notified that we do not want such loads in the future.

The total wastewater volume amounted in 2016 to 286,079 $\rm m^3.$ The target for 2017 was to attain total wastewater volumes of 292,000 $\rm m^3.$

In 2017 only 282,641 m³ of process wastewater was discharged to the public wastewater treatment plant; thereby, a reduction in wastewater volumes of 3,438 m³ has been attained despite higher wastewater volumes from the wood chip fired boiler, which comes in the form of condensate.



The target for 2017 was thereby attained with a very fine margin.

The target for 2018 is a wastewater discharge of approx. 281,000 m³. Even if there is a target of a reduction of only approx. 1,600 m³ of wastewater, this corresponds to a larger relative reduction; we have a target of a higher operating time of the wood chip fired boiler plant, which generates more condensate.

Parameter	Limit value	Average discharge
Water volume	1.240 m³/day	817 m³/day
рН	6.0-9.0	6.9
SS	1,000 mg/l	448 mg/l
COD	11,000 mg/l	4,400 mg/l
BOD	6,200 mg/l	2,633 mg/l
Tot-N	45 mg/l	21.4 mg/l
Tot-P	6 mg/l	2.9 mg/l
Chloride	1,000 mg/l	97 mg/l
Oil/grease	20 mg/l	19 mg/l
Chromium	0.3 mg/l	0.013 mg/l
Zinc	3 mg/l	0.563 mg/l
Cadmium	0.003 mg/l	0.004 mg/l
Molybdenum	0.03 mg/l	0.021 mg/l
Lead	0.1 mg/l	0.026 mg/l



Skjern Papirfabrik

Energy balance



*) Relevant emissions according to environmental survey

Notes on specification of quantities

Electricity, natural gas, and wood chips	Measured, consumed amount
CO_2 and NO_x	Calculated from emission factors from the Danish Energy Agency's website (CO ₂) and key figures from the Danish excise duty guidelines (NO _x)
Auto diesel and auto gas	Purchased quantity
Electricity for paper production	Incl. consumption for electricity borne heating

nisab III

F1 F2 F3 F4



Development in district heating generation Mwh



approx.

5,000 tonnes CO,

Skjern district heating company reduces its annual emissions by approximately 5,000 tonnes of CO, thanks to the purchase of district heating from Skjern Papirfabrik



had their heating needs covered in 2017 by district heating generated from waste heat at Skjern Papirfabrik

District heating sales

Since 2010 district heating has been sold. District heating is generated in a flue gas exchanger from gas boiler and from heat pump facility installed in 2012 and using waste heat from the paper machine's drying section.

In addition, as from the end of 2015 district heating is also generated by one more heat pump utilising waste heat contained in the flue gas from the wood chip fired boiler. District heating is also generated in an excess production exchanger, utilising excess steam in connection with reduced absorption of steam from the paper machine, for instance in case of web break.

Development in specific district heating production kWh/net tonne



The development in specific district heating generation shows that there is an increase every year in the utilisation of the waste heat compared with the amount of produced net tonnage. This is due to the fact that we continuously find new options for the utilisation of waste heat as well as to our substantial and continuous efforts to optimise existing heat pump facilities.

Energy focus in 2017

The 2017 district heating production accounted to a total of 44,552 MWh, which is 1% below the target of 45,000. We still see limitations in transmission capacity during the transitional periods in spring and in autumn, which means that the mill cannot pump out the entire production capacity. Skjern district heating is continuously enhancing their grid, so we still expect to achieve 45,000 MWh.

The specific total energy consumption for paper production ended at 1,649 kWh/net ton, which is 49 kWh (3.1%) above target. Downtimes of the boiler and the subsequent start-up are inexpedient in relation to operating economy. Also, the wood chip quality has had a major influence on the energy recovery for steam generation. The total economic efficiency rate of the wood chip fired boiler has been at 100%, when deducting electricity consumption for heat pump 4; this is satisfactory. In future, the new steam flow meter, which was installed in November 2017, will form the basis for an assessment of the specific heat energy consumption in the paper production.

The specific total electricity consumption ended at 336.2 kWh/ net tonne, which is 6.2 kWh (1.9%) above the target of 330. However, there has been a slight improvement compared with the 2016 performance. The F1 exhaust fan has consumed 1,444 MWh. Reductions here in the magnitude of 300 MWh, which is to be expected with a conversion of the drying section, will in itself reduce consumption by 4.7 kWh/net tonne.

Since key figures are stated based on net tonnes, poor performances in the field of rejections will evidently have a negative impact.

Review of CO, accounts

Annual CO₂ emissions exceeded the target of 600 tonnes. The most significant reason for this exceedance is two breakdowns in January and October, respectively. In January, during a start-up after a revision, two large flange gaskets blew out. The breakdown resulted in a decision that all flange joints were to be disassembled and controlled quality-wise. This meant a downtime of eight days. Repair works were carried out under the warranty.

In October, corrosions were found in the boiler firebox. These were repaired and changes were made in view of avoiding future corrosion. This meant a downtime of seven days.

During the Christmas revision this area was subjected to a careful inspection, and it was seen that the corrosions had stopped.

During the year applications have been made for additional free CO_2 emission allowances further to the new installation with flue gas heat recovery from the wood chip fired boiler. An additional 3,934 allowances have been applied for in the period up to and including 2020. The calculated and verified volume must be finally approved by the EU Commission.

Target and results for energy 2017

Target and results are described in the following table:

Target and results for specific energy consumption	Target 31/12-2017	Result 31/12-2017
Specific electricity	330.0 kWh/	336.2 kWh/
Specific total energy	1600 kWh/	1649 kWh/
consumption	net tonne	net tonne

In key figures, the year has produced some disappointing results, which is seen in the above table. The table also shows that the energy targets for 2017 were not met.

The key figure for specific electricity consumption is 1.9% above the target, and the result of the specific key figure for total energy is 3.1% above the target.

Development in total energy consumption – MWh



Energy balance (continued)





Development in specific energy consumption kWh/net tonne





Energy balance (continued)

	Specific CO ₂ emissions	Specific No _x emissions
2013	258.7 kg/net tonne DM	0.131 kg/net tonne DM
2014	248.7 kg/net tonne DM	0.127 kg/net tonne DM
2015	232.3 kg/net tonne DM	0.155 kg/net tonne DM
2016	99.6 kg/net tonne DM	0.377 kg/net tonne DM
2017	24.3 kg/net tonne DM	0.509 kg/net tonne DM

Development in air emissions

Specific CO₂ emissions decreased by 75.6 %, which is ascribed to a considerably larger steam generation at the wood chip fired boiler facility. For the same reason No_x emissions have increased substantially, since the combustion of wood chips causes higher No_x emissions than natural gas combustion.



Targets and action plans 2018

Also in 2018 focus will be on the operation of the wood chip fired steam boiler as well as on the optimisation of its wood chip utilisation. We expect significantly higher operating time on the wood chip fired boiler in 2018, and the target is to generate 95% of the steam consumption in this boiler, leading to further substantial reductions in CO₂ emissions.

District heating supplies from the mill will also in 2018 be a significant focal point, and we expect total district heating sales of 45,000 MWh in 2018. Any expansions of sales have a positive impact on the mill's net energy balance.

89.2%

decrease in specific CO₂ emissions after commissioning of the wood chip fired boiler.

Global Compact

The report's relation to Global Compact

As a member of the UN Global Compact, Skjern Papirfabrik is committed to being in compliance with the ten basic principles.

The below table shows the correlation between the report and these ten principles.

Skjern Papirfabrik has been a member of the UN Global Compact and Global Compact's Nordic network since 2013.

Global Compact principles

	The company should:	Page
Human rights	01. Support and respect the protection of internationally proclaimed human rights02. Make sure that it is not complicit in human rights abuses	14, 15
Labour	 03. Uphold the freedom of association and the effective recognition of the right to collective bargaining 04. Support the elimination of all forms of forced and compulsory labour 05. Support the effective abolition of child labour 06. Eliminate discrimination in respect of employment and occupation 	10, 11, 14, 15
Environment	 07. Support a precautionary approach to environmental challenges 08. Undertake initiatives to promote greater environmental responsibility 09. Encourage the development and diffusion of environmentally friendly technologies 	12-13, 20-32
Anti-corruption	10. Work against corruption in all its forms, including extortion and bribery	14-15

Read more about the UN Global Compact and the principles of the organisation on

www.unglobalcompact.org



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