

Energy Management Systems

– a tool for the continuous improvement of energy performance

Experiences of six Swedish
industrial companies





Preface

With systematic energy management, companies have learned to find opportunities for profitable energy efficiency improvements. When utilising these opportunities, operating costs are decreased and competitiveness is improved.

The Swedish Energy Agency has encouraged more than 100 companies to implement such systems under the government policy Programme For Energy-efficiency in Energy Intensive Industries, “PFE”. At 250 separate production plants, Energy managements systems according to the Swedish standard SS 627750 have been implemented.

These plants are among the most energy intensive in the country, with managers expected to be most aware of their energy use and of cost reduction opportunities. Still, new investment opportunities, reducing annual electricity consumption by 1 TWh, were identified at a total investment of 1 billion SEK when applying the standardised management system. These investments were profitable, and in total less than 20% of the initial investments necessary to get the same amount of electricity from new wind- or nuclear power plants.

The achievements have attracted international attention. As a result, we provide this booklet in English presenting the experiences of six of the companies that have implemented the Energy management system to a wider audience.

The international dissemination of the methodology will be supported by the introduction of a European standard, EN 16001, in the autumn 2009. Moreover, the International Organization for Standardization (ISO) has started working on the development of an international standard for energy management.

This is yet another tool when trying to combine further economic growth with reduced greenhouse gas emissions.

A handwritten signature in blue ink, appearing to read 'Tomas Kåberger'. The signature is fluid and cursive.

Tomas Kåberger
Director-General

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Energy Management Systems and PFE

What is an energy management system?

Energy management can be described as a tool which helps companies to control, manage and improve their energy use. Through good energy management, a company can ensure that it has knowledge of how the energy is used and create a system which continuously detects and implements measures aimed at reducing energy use and energy costs.

A standard for energy management, SS 627750, has been in force in Sweden since 2003. As with the standards for environmental management systems, e.g. ISO 14001, the standard for energy management systems presupposes that the company formulates an energy policy. The company must also identify how and where it uses energy, establish targets and action plans aimed at reducing its energy use, create an organisational structure for energy management, monitor and measure energy use, as well as control its operations in other ways.

The basis for the company's energy management system is the mapping and analysis (often called "energy audit") of its energy use. The company should also identify energy aspects which can significantly influence energy use. The goal is to find aspects which can lead to:

- More efficient energy use
- An increased share of renewable energy
- An increased energy exchange with the surrounding community (e.g. waste heat supply from industrial companies to district heating networks).

Within the framework of its energy management system, the company should continuously attempt to find measures which can improve energy performance in one of the three ways mentioned above.

Companies may choose to allow an independent party, a certification body, to audit the energy management system. If the company fulfils the requirements of the standard, the certification body issues a certificate.

PFE – a programme for improving energy efficiency in industries

The Swedish Energy Agency has been running the five-year programme for improving energy efficiency in energy-intensive industries (PFE) since 2005. PFE provides energy-intensive companies with the opportunity to reduce their electricity tax in return for energy efficiency improvements. A requirement for the companies that take part in PFE is that they implement an energy management system and

become certified. At present, 110 industrial companies with around 250 separate production plants participate in PFE.

Experiences of energy management systems

The majority of PFE companies have now implemented energy management systems. The experience of the companies with regard to energy management systems are mostly very good. Even if a majority of the companies have previously had certified environmental management systems and have identified energy as an important environmental aspect in these systems, the energy management systems have, nevertheless, provided added value in several ways. Through energy audits, energy aspects and energy-efficiency measures have been identified at a significantly more detailed level than what had been done before within the framework of the companies' environmental management systems.

Some companies, which have previously conducted energy audits, have also experienced the *combination* – of an energy audit and an energy management system – to be very valuable, since the management system addresses ideas from the energy audit and ensures that measures for energy-efficiency improvements are actually implemented. Moreover, many companies believe that the work on the energy management system has involved competencies and personnel categories that were not actively involved in the environmental management work before, such as, for example, electricians, process engineers, equipment suppliers, etc.

Another added value of the energy management system is improved measuring of and follow-up on energy use which, according to most companies, is also very valuable for exercising better control and making energy use more efficient. The fact that many companies have had their staff trained in energy issues has also led to the emergence of suggestions which can lead to improved energy performance, e.g. reduced energy use. Several companies have, moreover, appointed separate energy coordinators with overall responsibility for energy use within the company, which has made energy work more focused and continuous.

In this brochure, you will become familiar with the experiences of six Swedish PFE industries which have implemented, certified and developed their energy management systems. In addition, a certification body recounts the experiences of certifying companies according to the Swedish standard. You will also learn how things developed when the Swedish standard was drawn up.

Sweden – a leader in the standardisation league

A European standard for energy management systems will replace the Swedish standard in autumn 2009. However, there will scarcely be enough time to implement this standard before it might be time for the next international standard, this time on a global level. Sweden has been a forerunner in this area and has had a leading role in the work on developing standards for energy management systems. And Swedish companies have seen energy management systems as a tool to save money.

When the Swedish Energy Agency started outlining the PFE, the agency turned to the Swedish certification body SIS for the development of a Swedish standard for energy management systems. According to the Swedish Energy Agency, companies in the programme were supposed to implement a management system which focused on energy, and the system was meant to resemble the environmental management system ISO 14001.

– We sat down and had a discussion regarding whether the environmental management system could possibly suffice. However, the system's requirements did not cover the requirements that the Swedish Energy Agency wanted to make on the companies, Lars Jonsson, former SIS employee, says.

The development of a new standard

A conclusion was reached that a separate standard was needed and companies in the energy-intensive industry were contacted. There was great interest in this decision, with power supply companies also responding to the enquiry. A technical committee with representatives from different branches of the industry started outlining a draft. The work was managed by Lars Jonsson as secretary.

Then, things developed quickly. In 2003, a standard for energy management systems became ready after 13 months, and it was assigned the designation SS 627750.

– Although ISO 14001 was not fully sufficient, it covered a great deal of the new standard, and most companies already had the environmental management system, Lars Jonsson explaining the smooth process.

Factors which needed to be clarified and implemented in the energy management system included, above all, the requirement for an energy audit, rules for procurement and purchasing, an increased exchange of energy with the surrounding community and a requirement for an increased share of renewable energy.

– The industry backed this up. Swedish companies are so used to thinking on these lines. PDCA – Plan, Do, Check, Act – is a working method which is found in both standards. Just like the requirement for continuous improvement, review and recertification.

The fact that the companies caught on naturally also meant that they realised that there was money to be made by living up to the requirements of the Energy Agency, says Lars Jonsson.

– Several companies are saying the same things – that it has been profitable to implement the energy management system.

Consensus is important during development

Standardisation is based on consensus. Everyone should be in agreement. Meetings of the working group are scheduled at intervals of a few months, so that representatives from all parties concerned have the opportunity to discuss things and come up with viewpoints.

– Referral for consideration is at the basis of the consensus, Lars Jonsson explains.

The standard is reviewed once every three years. It may need to be updated, in particular, because of the technical developments.

Denmark already had an energy management system when Sweden was in the process of introducing its own,



When creating Swedish and European standards for energy management systems, Lars Jonsson managed the teams as secretary.

and Ireland was on its way to doing the same. Now, the European Commission (EC) started to think along the same lines. The EC contacted the European standardisation body CEN, which considered how things should proceed in order to develop a European energy management system.

It did not take the CEN long to reach the conclusion that Sweden was the best at this. Lars Jonsson received an invitation to manage the European team as secretary, while Inge Pierre, from Swedenergy, was to serve as chairman. And it was to happen quickly. Lars Jonsson worked for one and a half years.

- The experiences of the Swedish companies contributed to our immense success. We quickly gained the acceptance of all countries that took part in the negotiations, Lars Jonsson says.

The draft for the European standard for energy management systems, EN 16001, was ready for presentation during spring 2009. The standard was put to the vote and the member states unanimously backed up the proposal.

Nevertheless, the European standardisation work was not completely painless. There were those who did not initially understand why the environmental management system ISO 14001 was to be used as a basis. The experts around the negotiating table who had no experience of standardisation work for management systems and who lacked an industrial background were another stumbling block.

- They wanted to use other terms and definitions. However, it becomes difficult to apply standards if you change the meaning of generally accepted concepts. I had to spend a long time educating and making experts understand why certain expressions are used, Lars Jonsson says.

International activity in the area of standardisation

However, the European standard for energy management systems was hardly implemented before it was time for the next international standard. The issue was discussed outside the borders of the EU, and the ISO turned its gaze towards Sweden. Several large nations also expressed an interest:

- We have had Chinese delegates who have come on visits to study how things work in Sweden, and South Africa has been applying the Swedish national standard for many years, Lars Jonsson says.

So while the European standardisation work was going at full speed, the ISO started working, on a global level, in order to create an international standard for energy management systems. Lars Jonsson wanted to stall the future EU standard but the EC wanted to have results.

Under the guidance of the USA and Brazil, a document, which is based on the environmental management system ISO 14001 and the European energy management system EN 16001, is being developed right now. The new international standard will be called ISO 50001 and will be ready in 2011. It is predicted to have great significance for reducing the emissions of greenhouse gases in the world.

- It will be even better than the European standard, Lars Jonsson believes, and it points at the direction taken towards a more process-orientated way of thinking.

This was USA's hobby horse from the beginning. The Americans adamantly pursued the issue and delivered their own document, which was voted down by the other participants; the European standard was supposed to form the basis of the work. Nevertheless, their way of thinking managed to make an impression.

- And the USA is leading the work in an exemplary way, Lars Jonsson points out.

But those who think that the international standard for energy management systems is the last link in the chain should not be over confident. The number of standards for different types of management systems continues to increase, and voices have been raised that these should become more uniform.

- Things can become problematic with standards reaching out in different directions. A big issue in ISO is, therefore, to coordinate the different standards for management systems. One suggestion is to attempt, in the long run, to create a universally applicable basic standard to which different complementing parts can be linked, Lars Jonsson says. However, this lies far ahead in the future. Trying to make things easier is a complicated process.

The new European standard for energy management systems will replace the Swedish one in September 2009. The new standard will be assigned the designation SS-EN 16001 in Sweden. This means that many companies will have to be recertified. In order for this to proceed smoothly, SIS have agreed, with the accreditation body SWEDAC, on a gradual transition in the form of a three-year certification period.

Certification

– “Proof of optimum energy savings”

– Most companies welcome a thorough certification of the energy management system they have chosen. In this way, they obtain proof that they are on the right track. This is what Elisabet Bröms Sterner at the certification body Det Norske Veritas (DNV), one of a total of six companies entitled to certify energy management systems, says.



Certification is a requirement for participation in the PFE, the Swedish programme for improving energy efficiency in energy-intensive industries. The inspection must be conducted during the first two years and then followed up twice a year. Before the certification is initiated, the company must, however, perform a thorough audit and analysis of energy use at the company. It is also vital to show how, specifically, the company aims at saving energy and how it sets its targets.

– It is our duty to check if the respective companies actually live up to the requirements specified in the PFE, says Elisabet Bröms Sterner, who has worked in environmental issues for 30 years, including as an auditor over the past six years.

– You could say that energy management certification is similar to a financial audit, but with a different content.

The standard which the PFE companies need to live up to has the designation SS 627750. It is a Swedish standard which has great similarities with the quality and environmental management systems ISO 9001 and 14001. It is, therefore, possible to integrate the energy management system with environmental management and quality management systems and systems for occupational health and safety.

– Energy issues are often an important part of a company's own environmental management systems. This facilitates the systematic mapping of energy use.

When the companies that take part in the PFE programme feel that they have done “their homework”, they first make contact with one of the approved certification companies.

– We first review the documentation the company has submitted to us. Afterwards, we meet the company managers and the people responsible for energy issues at the company. Even workers on the shop floor can have important viewpoints, Bröms Sterner thinks.

Then, we start the inspection work, finding answers to the following questions: “Does the management system that has been set up work and how has it been integrated with other similar systems?” “How does the company set its targets?” and “How do internal auditors (if the company has such) work?” These are the kinds of things that are looked at by Elisabet Bröms Sterner and her colleagues.

– Everything is based on spot checks. We review the standard requirements listed in the standard and see to what extent the procedures specified there are followed. However, we have no capacity to check all of the details. But not all items in the regulation are relevant for all companies, Bröms Sterner says.

If the certification body discovers something which needs to be remedied, we ask the company to take care of it.

– It is often enough to give them a list of what we lack and all corrections and completions are undertaken without any need for us to check everything again, Bröms Sterner observes, while comparing the whole procedure to a “motor vehicle inspection”.

– However, if we discover serious defects, we must inspect everything during a separate visit to the company.

According to Bröms Sterner, the companies lack good procedures for measuring energy use.

– However, these are often things which are easy to adjust, she adds.

On the other hand, it can be more difficult for a certification body to determine if a company has chosen the most energy-saving alternative.

– Have they examined all conceivable solutions? This is something we try to get to the bottom of in our evaluation of the company’s efforts, Elisabet says.

Despite all requirements made on the companies that want to take part in the PFE programme, many of them want to do more than what is required.

– If you have really decided to save energy, there seems to be an endless amount of ideas.

This is what makes work additional fun, Elisabet Bröms Sterner declares happily.

At the same time, the work of DNV and the other certification bodies can be inspected as well. This is done by SWEDAC, the governmental authority which accredits the Swedish certification bodies.

They evaluate our competence and review our routines, says Elisabet, who welcomes this review as a guarantee of quality.

– We need an impartial body to review our work efforts. This is of benefit. Otherwise, our work would stagnate, she states.



Approx. 80,000 litres of fruit yoghurt is produced in Gothenburg every day. It covers the needs of the whole country and requires large cold stores.

Arla Foods views energy savings with a fresh pair of eyes

– The energy management system has made us look at our energy use in a whole new way. Even though we joined late, we have saved 5.5% throughout the duration of the project, Lars-Erik Stöllman, Project Manager at Arla Foods, says.

The dairy industry in northern Europe has undergone an extreme concentration and centralisation process during the past 50 years, and this is still continuing today. From one dairy in practically every village, there are now only 11 dairies left in Arla Foods in Sweden.

– We have prepared environmental impact assessments in connection with the closure of dairies. When I calculate things in terms of energy, they weigh pretty much the same. What we gain in economies of scale we lose in transportation, Lars-Erik Stöllman, Project Manager at Arla Foods AB, says. He divides his time between the company's headquarters in Denmark and the office at the dairy in Kallebäck, in Gothenburg. He is the Project Manager of the company's participation in the PFE programme and has been chiefly responsible for the implementation of the energy management system in Arla's Swedish operations.

At present, 3 of the 11 dairies in Sweden are focused primarily on milk, cream and sour milk production. There are also two drying plants, which produce powdered milk, and a number of cheese factories. Fresh cheese and specialist cooking products each have their own dedicated dairy.

In addition to traditional milk products, Arla also produces approx. 80,000 litres of fruit yogurt every day in Kallebäck.

Energy-intensive chilled products

A dairy is an energy-intensive activity. Apart from the steam which is produced for the process, both the process itself and large storage areas need to be chilled.

– Arla joined PFE a bit late. When the programme started, we did not have any staff resources to allocate to the project, so we started six months later. But once we got going, the implementation of the energy management system was surprisingly easy. We already had



Lars-Erik Stöllman, Project Manager at Arla Foods.

ISO 14001 – and the standards are very much alike, Lars-Erik Stöllman says.

– As soon as the energy audit of all dairies was ready, we saw extremely clearly where our energy was going. We immediately found lots of things that could be addressed.

– This brought energy to the fore of the agenda. And once we had developed a central training package, everyone started to think in a completely new way.

We at Arla chose to implement the energy training course at our regular department meetings. The training package was both general and local – “What can I do at my department?”



Facts

LINE OF BUSINESS: Dairy.

COMPANY: Arla Foods. Arla had a turnover of DKK 40 billion in 2008. The company has its headquarters in Århus, Denmark, and has approx. 16,000 employees in 32 countries. It has 11 dairies in Sweden.

PLACE: Gothenburg.

NUMBER OF EMPLOYEES:
Approx. 270 (in Gothenburg).

TYPE OF ENERGY: Electricity and natural gas.

ENERGY USE: Natural gas – 16,000 MWh/year. Electricity – 17,000 MWh/year (Gothenburg).

YEAR OF CERTIFICATION OF THE ENERGY MANAGEMENT SYSTEM:
2006.

OTHER MANAGEMENT SYSTEMS:
ISO 14001 and ISO 9001.

The dairy industry is energy-intensive. After pasteurisation, the products require an unbroken cold chain all the way until the consumer. Both oil and electricity are used in the production process in the dairy in Kallebäck, in Gothenburg.

“ The energy management system has made us look at our energy use with a fresh pair of eyes. Until now, we have reduced our energy costs by SEK 11 to 12 million.”

– Lars-Erik Stöllman, Project Manager

– The development of the package was immensely time-consuming. It would have been better if there had been key material which was continuously updated.

– Our line organisation is divided up in a way which makes it a bit complicated to assign people to such a project. This is why we were a small group which carried a rather heavy burden, but then we got the management on our side.

– And, nowadays, we have appointed an “energy captain” at each dairy.

Many variants of energy savings

Energy-saving work has been conducted in many ways. This can include everything from reducing leaks and sectioning compressed air to switching to more energy-efficient equipment and sealing the cold-storage loading gates better.

– We have also followed up with “night tours”, to ensure that we do not waste energy at the times of the day when there is no production.

Arla uses a number of different types of energy on a national level: electricity, natural gas, oil, woodchips and district heating.

The conversion of milk to milk powder is a very energy-intensive process. By closing down several drying plants and building a new, bigger, woodchip-fired plant in Vimmerby, we have made both operations more efficient and brought about a transition from oil to biofuel.

– Here in Gothenburg, we have replaced oil with natural gas when we generate steam. Natural gas is also a fossil fuel of course, but it is more efficient and it produces less emissions.



Dairy products are transport-intensive. Arla consumes 18,000 m³ of diesel every year – as yet, there is no alternative fuel for the refrigerated lorries.

Transport-intensive operation

Arla has a very complicated transport apparatus which consists of, in part, the incoming transport of milk from the farms and, in part, the transport of finished dairy products to the consumers. Diesel consumption is approx. 18,000 m³ per year.

- The farms continue to produce the largest environmental impact. This is why it is important that no milk goes to waste. In Sweden, we have an extremely optimised system for incoming deliveries, which arrive around the clock. It is hardly possible to refine the logistics, Lars-Erik Stöllman thinks.

- With regard to vehicles, we have our eyes open for alternative fuels. Among other things, we have taken part in a pilot project with a natural-gas-powered lorry. We believe that: as soon as there is an alternative which works just as good as diesel, we will buy it immediately.

Million-kronor profit

It is hard to calculate what the exact profit is that has been generated by the energy-efficiency improvements. In the meantime, production has been reorganised, several plants have disappeared and new, more energy-intensive products have appeared.

- However, a careful calculation shows that we have saved at least 27,000 MWh and reduced our energy costs in Sweden by SEK 11 million to SEK 12 million since 2005, a satisfied Lars-Erik Stöllman says.

He thinks that all energy-intensive industries should absolutely implement an energy management system. This applies irrespective of whether they participate in PFE and if they choose to certify themselves or not.

- We will also continue to work in accordance with these principles in the future, even if we do not know at present what the methods will be.

- It feels as if energy-efficiency improvement has become a kick-start for many of Arla's employees, and there are ongoing environmental discussions in the media all the time too, he says.



On start-up in the boiler house,
steam must sometimes be released.

Thinking sustainability has a firm footing at Södra Cell Värö

The audit of the energy use was taxing when Södra Cell Värö implemented its energy management system in 2006. Now they will be able to benefit from all the work they have done. What is most important is that energy issues have come to the fore of the agenda and that thinking sustainability has gained a footing in the organisation, Energy Coordinator Christian Lyckehed thinks.

The noise in the clinically spotless turbine hall is deafening. While bellowing at the highest volume, the new turbine at Södra Cell Värö squeezes approx. 20% more electricity from the steam than the old one. By 2010, the amount of electricity generated by the mill is expected to exceed the electricity generated in 2002 by 100 GWh. However, this depends on the state of the market. The greater the pulp production, the more steam there is which can produce even more electricity. 2007 was a better year than 2008.

Värö's soda recovery boiler (with the green Södra logo), fixed with colossal bolts to impressive plate girders in the high facade, is also there. This is where the black liquor from the pulp cooking is fired.

Heat, which the mill has managed to economise in the process, is led to the municipal district heating network and to the sawmill on the property. You could turn the concepts upside down and say that Södra Cell Värö

is an energy producer in the form of a combined heat and power plant which manufactures paper pulp as a by-product. Christian Lyckehed, Environmental and Energy Coordinator for Värö and the whole Södra Group, nods in approval:

– The way things are nowadays, we earn more money selling energy than pulp, he says.

Using as little energy as possible for your own ends and selling the energy that has become available because of efficiency improvements is a good deal. Värö's goal from 2002 has been to realise energy-efficiency improvements which correspond to the energy needs of 31,000 private houses, or 620 GWh, by 2010.

– The price of the pulp is forcing us to become more energy efficient and makes energy investments more profitable. Approx. 80% of the investments are energy related, Christian Lyckehed notes.



Södra Cell Värö is a comparatively small plant on the coast of Kattegatt.



Timber, timber and yet more timber, in a constant flow from the arriving timber lorries to pulp production. The main part of the raw materials comes from forests owned by Södra's members.

“ The liquor will be drained so efficiently in the new evaporation plant that bark will not be needed in the boiler.” – Christian Lyckehed, Environmental and Energy Coordinator

Energy-efficiency improvements on the agenda

When Södra joined the PFE, planning was sped up.

– This means that we started working systematically with electrical energy-efficiency improvements and examining what targeted actions we needed to undertake, Christian Lyckehed says.

– At the meetings with the management on Thursday, the implemented electricity efficiency improvements are discussed as cost-efficiency improvements. It was so cool! Christian Lyckehed exclaims enthusiastically.

The programme's requirement for an energy management system initially meant a lot of work. The energy coordinators at the mill and the people on the floor – electricians, designers, engineers, operators and tool makers – performed an audit of the mill's energy use together, which was compiled into a joint energy report.

– The energy report was a great job, Christian Lyckehed says, praising his predecessors who were in charge then.

– You see, it is not only a question of measurement results, you also need to think through how you should proceed, where you should measure, as well as measuring correctly. The internal auditors provided great assistance during the work, he adds.

In Södra Cell, the energy management system has, above all, changed the measuring of and follow-up on

energy use. Among other things, common key figures for electricity, steam, fuel and secondary heat, i.e. the surplus energy which can be supplied to the market, have been calculated for the mills in Södra Cell.

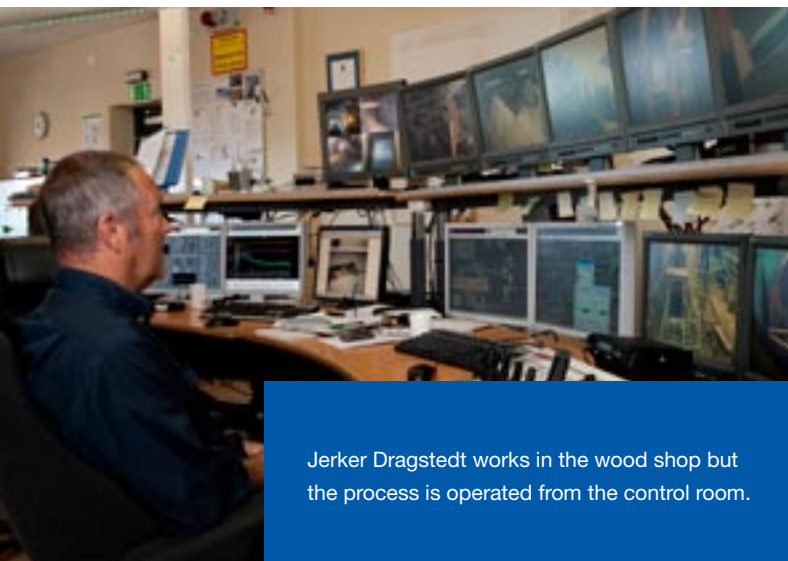
– The key figures work like benchmarks between the mills. Comparisons lead to reflections on what the others do differently and what you can learn from them. The energy management system has led to the development of energy cooperation between all of the units in the group, Christian Lyckehed emphasises.

He also points out other advantages:

– A management system provides extremely good support for things you do rarely, such as stock adjustments of oil and reporting emission rights and electricity certificates. The procedures are established there and you do not have to think about it from the very beginning every time. The system also provides support when people switch jobs and new employees are hired.

However, what is perhaps most important is that the energy management system has secured the energy issue a place on the daily agenda. During the morning meeting, we review not only the previous day's production results but also the results in all management systems.

The values are downloaded and summarised on an Excel spreadsheet, which is updated every day. They are located in the same portal as the other management systems, which allows easy navigation between them. Measurement technique procedures for the energy management and environmental management systems are the same. The management system reflects “the daily grind”, as Christian Lyckehed expresses it. It's all the little things that have been done and how it contributes to the whole. The daily report has, for example, been an important part of the work on adjusting the control systems in order to decrease oil consumption.



Jerker Dragstedt works in the wood shop but the process is operated from the control room.



Christian Lyckehed is Environmental and Energy Coordinator for the whole of Södra.

What is less positive is that the management systems lead to a certain amount of bureaucracy, Christian Lyckehed thinks. One has to be careful not to create something only for the sake of its existence.

Big energy savings

Heat consumption in different parts of production, e.g. in evaporation, where the thin liquor from pulp cooking is concentrated into thick black liquor, and power consumption are the central energy aspects at Värö. When the new evaporation plant (costing 0.5 billion kronor) is put into operation in November 2009 and a new bark drying kiln is ready in 2010, the two new installations will have a combined effect of 280 GWh per year in terms of energy savings. This corresponds to the energy use of 14,000 private houses. When evaporation is 30% more efficient, the plant will no longer need to burn bark in the boiler but can instead sell it to the biofuel-fired heat and power plants in the surrounding area. Furthermore, the in-house use of fossil oil can be reduced, bringing down carbon dioxide emissions by 25,000 tonnes per year.

The next bark dryer will be able to dry the bark to a humidity level of at least 60%.

– In this way, there is going to be more energy in each load, which results in a more efficient transportation system. And through the heat we supply in the form of bark, we avoid quite a bit of oil-fired heating in society. The more efficient we make our operations, the more produce we can dispatch, Christian Lyckehed says.

The bark will be transported by train and, apart from using trains to transport the bark, Södra Cell has not included external transportation in the energy management system.

– We supply our products as cheaply as possible, and we do this by carrying as many kilowatt hours as possible for each individual shipment, Christian Lyckehed explains.

He was the one who analysed energy use in the pulp cooking process. The pumps turned out to be in a class of their own in terms of installed power. The pumps provided the biggest power gain at Värö – and this was carried out extremely simply, as it would turn out. By turning down an existing impeller, 110 kW, or 940 MWh was saved per year. In another case, connecting two pumps with a small pipe-end made it possible to turn off the pump which was not needed. This resulted in 450 MWh of savings per year. The latter measure paid for itself in one and a half years.

At the same time, this was a suggestion which came from the factory floor. Södra has a set of procedures in place regarding suggested activities, so that no idea can be ignored.

– All proposals are dealt with in the database. The coordinator forwards the suggestions to the person who is responsible for the area which is affected by the suggestion and this person establishes contact with the person who came up with the idea.

Facts

LINE OF BUSINESS: Paper pulp.

COMPANY: Södra Cell Värö is one of the five pulp mills of Södra Cell, three of which are located in Sweden and two in Norway. Södra Cell is part of the member-owned Södra Group which, apart from paper pulp and electricity, also manufactures wood products, interior wood, bioenergy and provides forestry services.

Värö produces 425,000 tonnes of bleached sulphate pulp a year. The mill was the first one in the world to manufacture high-brightness pulp with chlorine-free bleaching.

PLACE: Väröbacka, Varberg Municipality, Halland County.

TURNOVER: Södra Cell's total turnover for 2008 was SEK 9.5 billion.

NUMBER OF EMPLOYEES: Approx. 350.

ENERGY USE: Approx. 2,800 GWh, of which bark (180 GWh), in-house produced black liquor (2,400 GWh), in-house produced producer gas (90 GWh) and 10,000 m3 of fossil oil.

The mill is a net supplier of energy. Of own electricity production of 324 GWh, 288 GWh are used in the operations. In addition, 116 GWh of heat are delivered to the district heating network, 100 GWh of which are secondary heat (surplus heat).

YEAR OF CERTIFICATION OF THE ENERGY MANAGEMENT SYSTEM: 2006.

OTHER MANAGEMENT SYSTEMS: ISO 14001 (environment), ISO 9000 (quality), OHSAS 18001 (occupational health and safety management system), PEFC (private forestry certification system for traceability of wood raw material) and FSC CoC (certification system for traceability of wood raw material).



Lars Andersson is Environmental Manager at Pilkington Floatglas and one of the people in charge of the work on implementing the energy management system.

Big plus already in the second year for Pilkington Floatglas

“ The energy management system has provided more than what we expected. We first looked at the tax refund in the PFE programme and thought it could suffice, but the big cost saving is the energy savings that we realised. However, you probably need the company to be of a certain size to be able to implement an energy management system. We had the resources, but it is more difficult for smaller companies.” – Lars Andersson, Environmental Manager at Pilkington Floatglas



Glass plates are waiting for collection by custom-made lorries for further transport to the Nordic and Baltic countries. Most of the produce goes to window manufacturers.

Float glass is exactly what it sounds like: floating glass in an unbroken path. After the mixture has been put into the kiln for melting, the molten glass gradually runs out on a bed of floating tin. The molten glass is shaped here to the right width and thickness and solidifies into glass. The glass then slides slowly over to rollers while cooling down and is finally marked and cut. This is why Pilkington's plant outside Halmstad almost seems to have no end. The glass requires the 140-m-long distance in order to have the time to harden and cool down at a reasonable pace. If the process takes place too quickly, the glass cracks.

In order for sand to be able to melt into glass, it needs to be properly heated. This is understood by pretty much everyone.

– We use as much energy per hour as two and a half normal houses use per year, Lars Andersson, Environmental Manager at Pilkington Floatglas in Halmstad, says.

Energy costs us SEK 200 million per year, but there is not much that can be done about this in the present situation. The last kiln, which is from 1999, consumes one-fifth less energy than its predecessor, which, in turn, was 25% more efficient than the one before that.

– In a processing industry like this one, it is not possible to fall below a certain level. Development takes place in leaps and bounds, and when a kiln is replaced a giant step is taken. In the meantime, you can align and trim, Lars Andersson says.

Or you can, on the other hand, produce more – when production increases, energy use per tonne of produced glass decreases.

Renewable fuels such as black liquor and tall oil have been proposed, but they do not work with the current technology – they contaminate the glass.

– The kiln is not a frying pan but a grill, Lars Andersson explains. The only renewable fuel that we could use is biogas. We save carbon dioxide but energy use becomes higher as biogas has less energy than oil. Furthermore, we currently do not have access to as much biogas as we need.

The process generates heat so we have more than enough of it. Pilkington wants to sell more surplus heat but the power company in Halmstad has not agreed to this until now. Nevertheless, negotiations are under way about increasing the heat supply. Together with other industries, Pilkington also provides an active contribution to the enforcement of competition in the district heating network in the same way as in the power supply network.

– Unfortunately, we lose a lot of energy in cooling. We could get rid of quite a bit of the surplus heat, but this would mean that we would have to cool even more, Lars Andersson says.

Profitable control over energy use

Pilkington in Halmstad implemented the environmental management system ISO 14001 in 2000. The system focused on oil and gas emissions and the use of chemicals.

– However, we did not pay any attention to electricity consumption, Lars Andersson points out.

Electricity consumption constitutes only a small part of the total energy use at Pilkington Floatglas, so the question, when the invitation came, was how much benefit the company could have from participating in the PFE.

The electricity bill is comparatively small – but, nevertheless, it is a question of quite a lot of money for the energy-intensive glass manufacturer.

So even if the energy savings were not expected to be overwhelming, it was still a question of a lot of money. Electricity, heat and ventilation are the important energy aspects at Pilkington.

– With PFE, we got the energy management system into the bargain. This opened our eyes to other aspects other than just fossil fuels, Lars Andersson says.

It is easy to become blind to the defects in your own workplace. By taking the time to review what energy use looks like, you gain control over it, Lars Andersson emphasises. There is so much that happens on the technical side, for example, equipment improves, he points out.

And it actually turned out that there was quite a lot we could economise on.

– We found 16 improvement possibilities, invested SEK 1.5 million and have saved SEK 5 million since 2005. In addition, we have been refunded SEK 1 million

in energy tax. The investment started paying off in savings immediately and the second year ended with a big plus! Lars Andersson says.

Fans and pumps swallowed an unnecessary amount of electricity. We managed to reduce our power consumption by 25% with a variable speed drive. A transformer was operating completely unnecessarily in a stockroom, and after we switched it off and laid a cable across the premises, energy use in this part dropped to one-tenth, saving hundreds of thousands of kronor.

One person devoted three months to discovering this and saved what was equal to half of his annual salary, Lars Andersson comments.

However, the company has not saved any carbon dioxide through PFE, and the implementation of the energy management system, as carbon dioxide comes from the raw materials and the fuel in the glass kiln.

This had been done earlier when waste-water heaters replaced electric heaters for preheating the oil.

Facts

LINE OF BUSINESS: Glass.

COMPANY: Pilkington Floatglas AB in Halmstad is part of the global NSG Group. The factory manufactures plate glass, part of which is coated, and/or tempered plate glass, mainly for the construction industry in the Nordic and Baltic countries. Other plants in Sweden produce sealed glass units and car glass.

NSG is one of the biggest manufacturers of glass and glass products in the world, with production in 27 countries and with 32,500 employees. The company specialises in float glass, a production method which was developed in Pilkington. Pilkington has been part of the Japanese NSG Group since June 2006.

PLACE: Halmstad, Halland County.

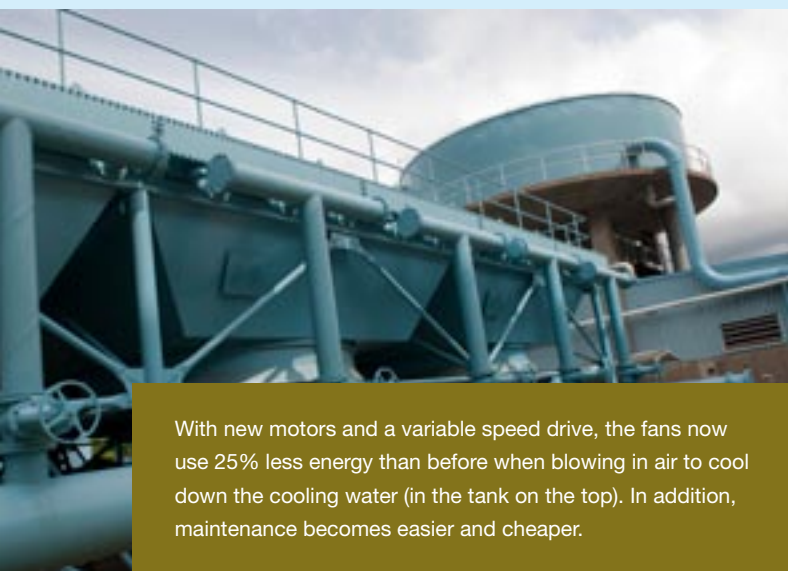
TURNOVER: SEK 1.2 billion. The whole NSG/Pilkington – approx. JPY 739 billion.

NUMBER OF EMPLOYEES: Approx. 270.

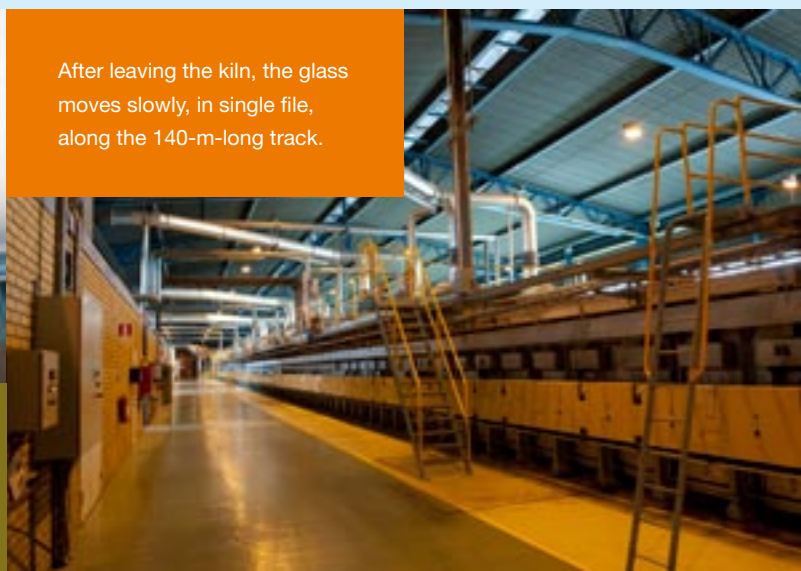
ENERGY USE: Approx. 537 GWh, of which 360 GWh of fossil oil, 90 GWh of natural gas, 87 GWh of electricity. Approx. 25% of the 67 GWh of recovered waste heat is supplied to the district heating network.

YEAR OF CERTIFICATION OF THE ENERGY MANAGEMENT SYSTEM: 2005.

OTHER MANAGEMENT SYSTEMS: ISO 14001 (environment), ISO 9000 (quality) and an internal management system in Pilkington in relation to the working environment. All systems are united into one business management system.



With new motors and a variable speed drive, the fans now use 25% less energy than before when blowing in air to cool down the cooling water (in the tank on the top). In addition, maintenance becomes easier and cheaper.



After leaving the kiln, the glass moves slowly, in single file, along the 140-m-long track.

Integrated management system

Because of the experience with the environmental management system, the implementation of an energy management system went smoothly.

– The standards for the two management systems are extremely similar. This is why integrating environmental and energy management was also simple, Lars Andersson says. A certain measure of administration is something you have to have, he thinks.

Pilkington has combined all management systems into one business management system, for example, all documents in the systems are designed according to the same template.

It took about 10 people approx. six months to complete the work, which was roughly the effort the company had expected. External staff were hired for certain installations, but everything else was taken care of by the company itself. It meant a lot that the motivation of the participants in the project was high, Lars Andersson thinks. In the end, it all comes down to the individual people involved in the process.

All employees were offered half a day of training, and certain groups attended separate courses which were not directly connected with the energy management system but could be regarded as general further education.

Pilkington Floatglas did not set up any targets in relation to the implementation of the energy management system:

– The system is based on a great number of intermediate objectives. Generally speaking, for the environment and energy, our objective is to save a certain amount of energy. We also have an action plan for the development of the programme, Lars Andersson says.

An energy audit is conducted once a year – this is when possible areas of improvement and innovations get a chance to emerge.

Continuous attempts to find new solutions

Outside the window, custom-made green lorries drive in and out through the gates of the factory area. The name Pilkington is written on them, but the transportation system is conducted on a contractual basis and is not part of the energy management system.

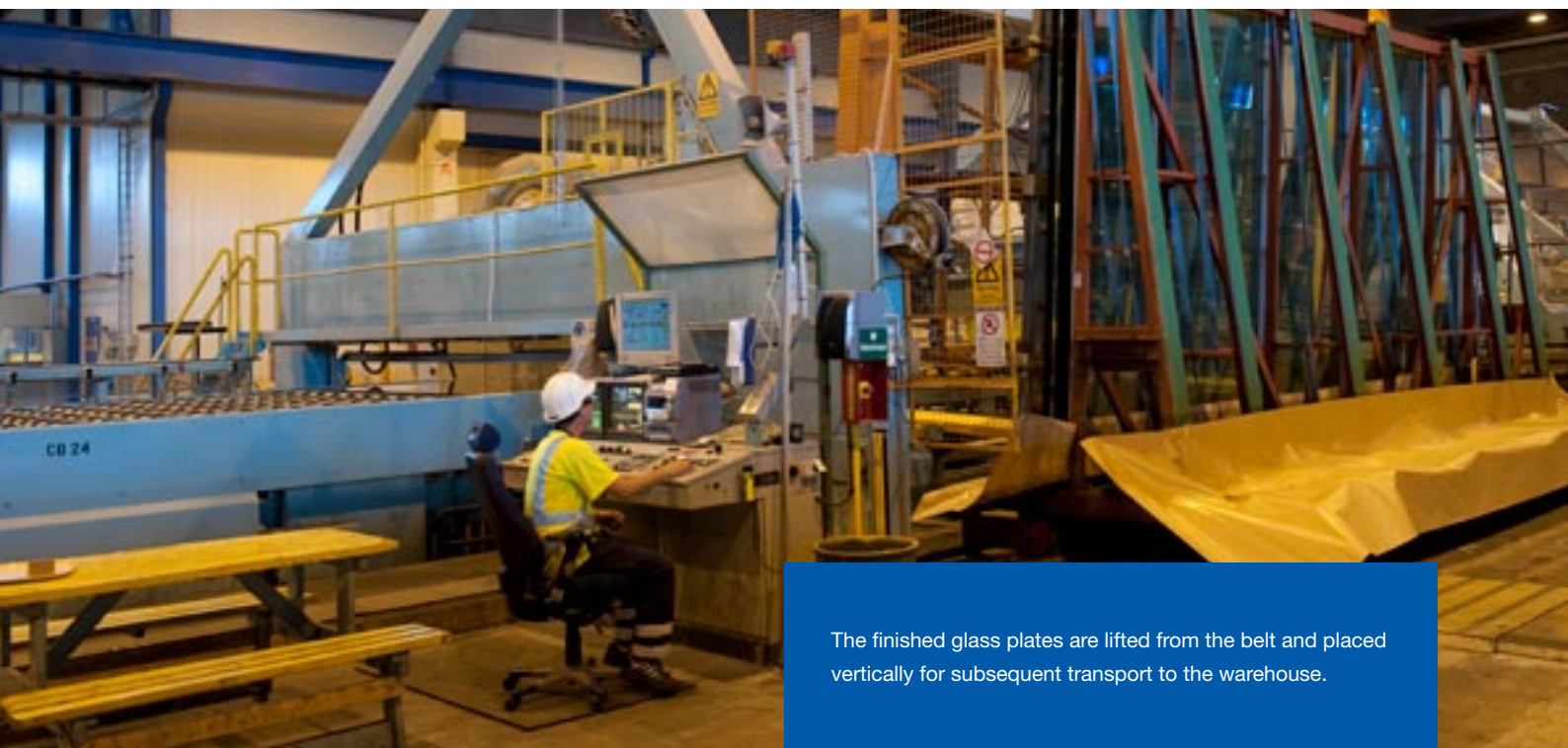
– We used to have the transport issue in the environmental management system before, but no active aspect exists there now. Transport is procured at a higher level, but requirements for energy-efficiency improvements are also made there, Lars Andersson explains.

The energy management system has not influenced the routines there. On the other hand, it has taken place in another way:

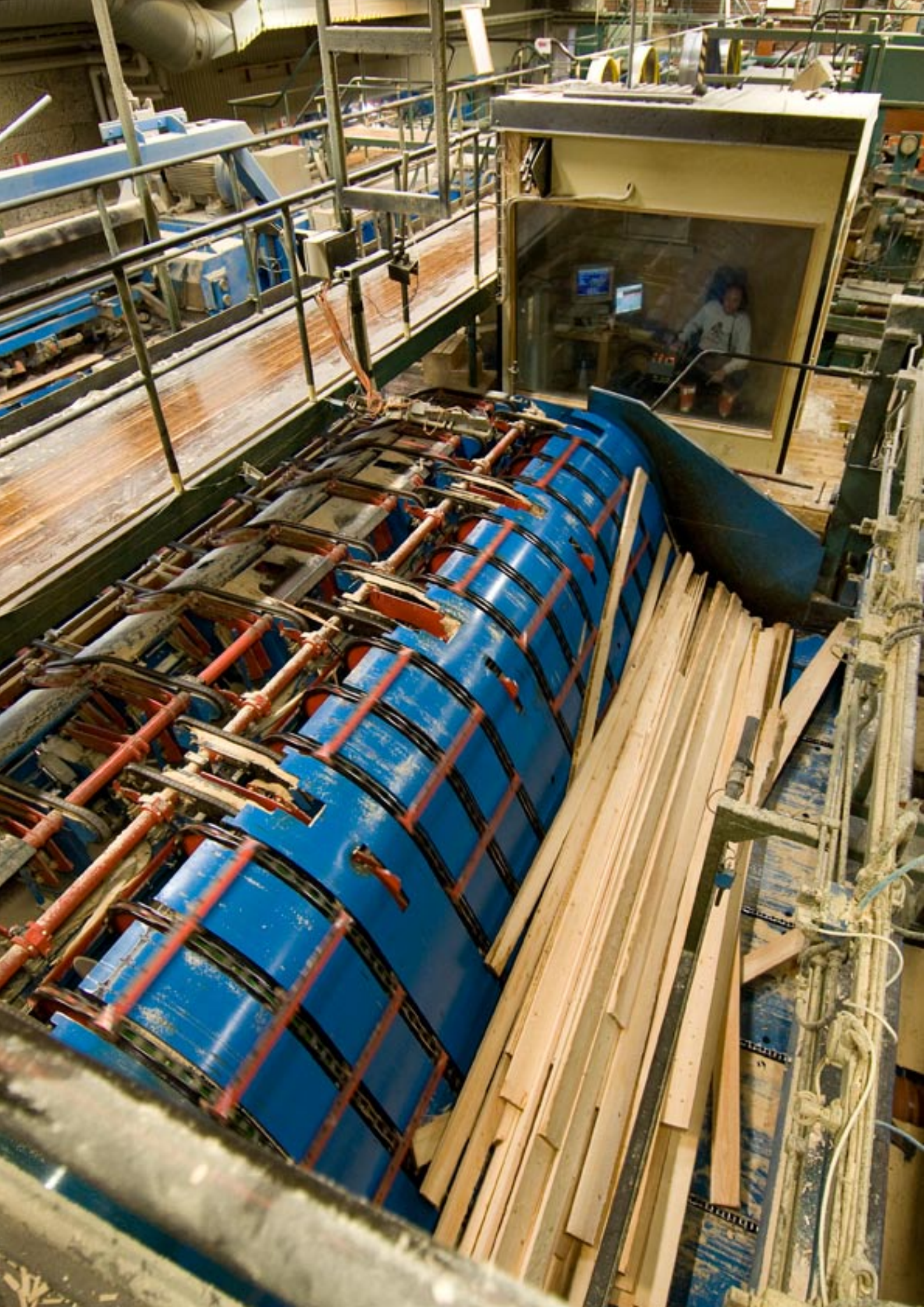
– The system changed our way of measuring and following up on values. We have installed a number of energy meters, and data from these meters is collected in a database from which we can download the information. Because of a lack of resources, however, we do not have any systematic presentation. There is also another data system where we can measure at transformer level, not just the level of individual machines.

The struggle at Pilkington in Halmstad continues in the same way as before:

– We have picked the low-hanging fruit. The next round will probably be a bit harder. However, there are certainly things left to do – to make the staff turn off the computers, for example. I am not familiar with any company that does not want to save money, Lars Andersson says.



The finished glass plates are lifted from the belt and placed vertically for subsequent transport to the warehouse.



The right tool for energy-efficiency improvements at Siljan Timber

The enormous bandsaws that process log after log with an ear-splitting roar at Siljan Timber AB in Mora uses a large amount of energy.

– The Swedish sawmills have not been modernised in-line with the rest of the industry. It was when we first launched the energy management system in the PFE programme that we got the right tool for reducing our energy use, Göran Lundquist, Environmental Director, says.

The family company Siljan Timber, which split its first logs in 1897, is a large-scale producer of timber for industrial customers. A significant part of the timber, 80%, is exported to 33 countries.

The company is part of the Siljan Group, which has a number of forest products in its list of goods. A total of 340,000 m³ of timber are delivered annually to Siljan Timber AB, a figure which is the equivalent of 9,500 long-distance lorries. The timber from the forests in the region is processed into sawn timber and important residual products include woodchips, briquettes and sawdust, which is processed into pellets.

Siljan Timber is an important industry for Mora, not only because of the many jobs the company provides, but also because of the surplus heat which is sold by the company. The district heating power plants in Orsa, Rättvik and Mora receive large amounts of bark, briquettes and sawdust from Siljan.

– If it wasn't for us, people would really freeze here in Dalarna, Göran Lundquist says.

A total of 300 GWh of energy is supplied by the Group. In addition, 4 GWh of electricity is sold to Nord Pool and the company buys back electricity at a favourable price.

New methods

Göran Lundquist is responsible for environmental and energy issues at Siljan Timber.

– Thanks to the new measuring methods that were provided by the energy management system, we can immediately see the slightest deviation that needs to be corrected, he says.

At present, the bandsaws, for example, do not always run at the highest speed – the number of revolutions is instead adjusted to the intake of logs. The drying sheds with their approx. 70 motors are also large-scale energy consumers, as the fans blow circulating high-temperature air against the damp timber. The annual use of energy is 50–55 GWh.

– We can save a lot of money by turning the fans off for short periods of time. The timber is not affected in any way.

The drying sheds are powered by heat from renewable energy sources, in this case using bioenergy-fired boilers. All heating of the factory premises takes place with waste heat from production. On the transport side, 50% of the finished products are transported by train, it is only the lorries that burn fossil fuels.



“ The energy management system has helped us to keep down the energy costs of the power-intensive production at Siljan Timber AB.”

– Göran Lundquist, Environmental and Energy Manager

Total overhaul of energy use

After the implementation of an energy management system in 2005, the company has realised significant energy savings.

– Energy was the third largest item of expenditure for us after the cost of purchasing timber and salaries for the staff, Lars Lidholm, Managing Director of the company, says. According to him, it was natural to implement the energy management system into the company's production. The system has also led to a total overhaul of energy use for Siljan Timber.

– We have been forced to reconsider everything we do and evaluate each stage of production from the point of view of saving energy.

In addition, we have clear goals for what we want to achieve. We simply think more in terms of saving energy, Lars Lidholm says.

A more sensible policy in connection with the purchase of new machinery has also played its part in reducing energy use:

– Investments in the right technology are important for keeping down energy use. At the same time, when production is optimal, the energy costs per produced m³ of timber are at their lowest.

An eye-opener for the staff

The energy management system has become something of an “eye-opener” for the staff, especially for those who are right in the middle of production, Göran Lundquist says.

The staff have discussed energy savings in coffee rooms and lunchrooms like never before. This has led to good improvements; at the same time, it can be ascertained that it is not always so easy to alter ingrained behaviour.

All in all, the energy management system has become an important step forward for Siljan Timber. Power consumption has decreased from 21 GWh in 2006 to approx. 19 GWh in 2008.

At the same time, it is important to note that the company has not been able to allocate an unlimited amount of resources to the implementation of the system:

– We simply do not have the clout larger industries have. For example, we do not have a special department to deal with energy issues, Lars Lidholm points out.

In the light of this, both Lars Lidholm and the Environmental Director, Göran Lundquist, would welcome an energy management system which was tailored to smaller companies.

When the energy management system was implemented in 2005, the company did not hire any external help but relied only on its own forces. Now Siljan Timber is considering employing an energy expert in order to put the finishing touches to the energy management system.

Facts

LINE OF BUSINESS: Sawmills which manufacture timber, briquettes and woodchips.

COMPANY: Siljan Timber AB. Part of the Siljan Group, which consists of the following companies: Siljan Skog, Siljan Wood Products, Wedde Sveg Timber AB and Siljan Energi. The Group had a turnover of approx. SEK 1 billion in 2008.

PLACE: Mora.

NUMBER OF EMPLOYEES: 85.

TYPE OF ENERGY: Electricity.

ENERGY USE: 19 GWh.

YEAR OF CERTIFICATION OF THE ENERGY MANAGEMENT SYSTEM: 2005.

OTHER MANAGEMENT SYSTEMS:
Forestry Stewardship Council.





Steel production is a business with old traditions, and it is not easy to change processes. However, the energy-efficiency improvement work at Sandvik SMT is now picking up speed.

Several millions in energy savings for SMT

Sandvik Materials Technology (SMT), manufactures different types of special steels and alloys which are made into everything, from razor blades to wind turbine propellers, reactor pipes and titanium implants.

Steel production is very energy intensive, but the company has, nevertheless, realised several million kronor in energy savings since 2005, when it implemented an energy management system.

The little community of Sandviken, in Central Sweden, is completely dominated by the 300-hectare area of the steelworks, the country's second largest industrial complex. Only the Torslanda Plant in Gothenburg is bigger.

The complex comprises a heated area of 500,000 m² in 113 buildings and includes, in addition to the steel furnace itself, vast amounts of other energy-intensive peripheral equipment. For example, 18,500 electric motors, 2,000 pumps and thousands of fans.

– Sandvik Materials Technology accounts for approx. 90% of the energy use in the area, Susanne Lindqvist, Energy Engineer at SMT, says.

One TWh of energy is used every year, the majority as electricity which is used for melting scrap in the big steel furnace. LPG is needed to heat the ladles – the moulds – so that they do not crack when filled with floating steel. In addition, quite a bit of oil is still used for heating.

– It goes without saying that there is an enormous potential for efficiency improvements here, Susanne Lindqvist, who is responsible for the PFE and for the company's energy management system, says.

Painless implementation

– I worked alone on these issues from 2005 until spring 2009. However, two additional people have now been hired to tackle energy-efficiency improvements.

The implementation and integration of an energy management system at SMT went very well, as the operations had already been certified according to ISO 14001.

– It took only three to four months to extend the environmental management system with an energy management system. We did not need to hire consultants at all, as we already had several people in our environmental department who were very competent. Now the systems are integrated, but they are certified individually.

– The next step was to make an energy audit of all processes and buildings. Although, at first, this felt like an insurmountable task, it actually took only four to five months to make an inventory of this whole enormous area.

Training for everyone

The relevant industry body – the Swedish Steel Producers' Association – has developed, in cooperation with SMT, SSAB Borlänge and LKAB in Kiruna, an energy training course for all employees, which consists of three classes of 40 minutes each.

– The energy training course has been extremely important for focusing on these issues, in particular, in the implementation phase and for disseminating the information to as many employees as possible.

Nowadays, over 80% of the employees have attended the energy training course. New employees now watch a training film instead of the previous course, which consisted of sketches and presentations.

– The training has made my job much easier and I still hear employees talk in positive terms about it, although it has been several years since it was conducted.



“We have always done things like this ...”

The actual work on improving energy efficiency – which went much more sluggishly than expected – started after that, Susanne says, and laughs.

Steel production is a business with old traditions where you cannot easily go and change things:

- The big obstacle was that all departments were so protective of their processes – I often hear “we have always done things like this”. And, of course, I still sometimes hear people sigh when I come.

- However, with more experience, I have learned which routes to take and how I should present the work to those who have to do it. And the more successful projects I can point at, the easier it gets to “sell” new ones.

She does not have an exact figure as to how many GWh they have managed to save. But she estimates that, since the implementation of the system in 2005, it has resulted in savings of approx. 2% of the total energy cost and, despite this achievement, there is still much more that SMT can do.

The energy management system has helped to simplify instructions for energy work and the annual follow-up on the energy audit makes it easier to find potential targets, while, at the same time, raising awareness.

“ There is a much greater potential for energy improvements than what I had thought in the beginning, when the energy management system was implemented. But now I am also aware that things take time.”

– Susanne Lindqvist, Energy Engineer at SMT

Compressed air savings

In the initial stage, Susanne has focused mainly on reducing heat consumption in the premises. She works on “picking the lowest-hanging fruit first”. In total, some 30 different projects have been implemented since 2005. An example is the consumption of compressed air which has been reduced by 6.5% compared with 2006.

- The shortest payback period for an energy-efficiency improvement measure is five days, but it is most often a question of two to three months. If many years need to pass before we can get our money back, we do not deal with it – there are still so many simple measures left.

- Some of our buildings are now also heated by a heat pump, which utilises the heat in our waste water. This has reduced oil consumption. The bulk of Sandvik’s steel is shipped out through the port in Gävle. It is transported to the port on lorries. Susanne has also looked at the possibilities of using train transport instead, but this has not led to anything tangible yet.



The energy audit of the 300-hectare area of the steelworks in Sandviken took less than six months.

District heating

Susanne's office, on the ninth floor of the building, which houses the environmental department, offers a clear view of the smokestacks of Sandviken's heat and power plant 3 km away. Nowadays, it is fired with woodchips and peat, but there are more advanced plans to replace this with surplus heat from Sandvik.

Calculations show that there is more than 40 GWh of surplus heat available in the industrial area.

– At present, our buildings are heated with steam. If the project becomes reality, we will pass our hot water on to the heat and power plant. Then, it should be possible to produce more electricity during the winter and heat the hot water for the whole community of Sandviken during the summer.

Global efficiency improvement

Susanne Lindqvist is also active in the work on developing a new international SIS standard for energy management systems.

She recommends this important tool to all industries. The experiences of the Swedish part of Sandvik SMT have, among other things, now made the company investigate, on a global level, how each of its units around the world can implement its own energy management system.

– This is an extremely interesting job! The improvement potential is much greater than what I had thought in the beginning. But now I am also aware that things take time. And it is best when you help people in the departments find out by themselves what has to be done, Susanne Lindqvist says.



Sandvik's steel is used for many different steel products, for example, razor blades, reactor pipes and wind turbine propellers.

Facts

LINE OF BUSINESS: Stainless steel, special alloys and resistance materials.

COMPANY: Sandvik Materials Technology in Sweden is one of the three business areas which are part of the Sandvik Group.

Sandvik had a turnover of SEK 93 billion in 2008. The company operates in 130 countries.

PLACE: Sandviken.

NUMBER OF EMPLOYEES: 3,300 in Sweden (at SMT).

TYPE OF ENERGY: Electricity, oil and LPG.

ENERGY USE: 1 TWh/year.

YEAR OF CERTIFICATION OF THE

ENERGY MANAGEMENT SYSTEM: 2005.

OTHER MANAGEMENT SYSTEMS: ISO 14001, OHSAS 1800 (working environment system), as well as a number of national and international quality systems.



Steam lines in the turbine hall,
Östrand pulp factory.

“ It is interesting to see how many points of contact there are between the energy management systems and the environmental management systems that I have worked with before. Everything is connected.” – Solveig Eriksson, Director of the management systems.



Solveig Eriksson, Director of the management systems in the SCA Forest Products AB business area, one the three business areas of the SCA Group.

Changing ways of thinking results in great savings for SCA

The work on improving energy efficiency at SCA's plants in the Sundsvall region begins in the purchasing department and continues all the way down to the factory floor.

The SCA Group has several big plants in Sundsvall and the neighbouring municipality of Timrå. There are sawmills, pulp and paper mills here.

The Östrand pulp factory in Timrå manufactures chlorine-free sulphate pulp and CTMP pulp for, among other things, the manufacture of paper and hygiene products. The raw material is pulpwood from coniferous trees and hogged chips.

The Ortviken paper mill in Sundsvall is SCA's biggest plant and manufacturer of newsprint and coated printing paper. The Tunadal sawmill, which is part of SCA Timber, is also located in Sundsvall.

As a trained mechanical engineer, Solveig Eriksson has a solid background in the forest industry. Among other things, she has been a designer and project manager, as well as the first female maintenance manager at the Östrand pulp mill.

Solveig Eriksson's job was to implement and get the management systems approved. This is why she is now part of the steering committee which works on developing energy-saving proposals at Östrand and Ortviken, as well as at SCA Timber.

– PFE provided the driving force for the implementation of the energy savings we already realised we should be doing. There was no hesitation that it could be good for the company to implement an energy management system, she says.

– The tax reliefs were an important incentive during the initial stages. However, the energy savings provide much bigger gains today.



Waste heat from the Östrand pulp mill is transmitted via the district heating network in Timrå to the Norrplant nursery, where it is responsible for heating greenhouses with millions of pine trees. The picture shows Jonas Yttergård, Norrplant.

Optimised pulp factory

The Östrand pulp mill was an early pioneer in saving electricity. In 1989, it even received international distinction for being an “excellent economiser with energy”. However, it was first with PFE and then in the implementation of an energy management system that the thinking in terms energy savings came to permeate the whole operation of the mill.

When it comes to energy saving, pump optimisation occupies a central position at Östrand. There are a total of 6,000 pumps in different sizes which are used to move water, liquor or paper pulp.

– By continuously tuning and regulating the pumps, we have managed to save large amounts of money, Solveig Eriksson says.

Savings have also been realised on the purchasing side, where the procedures for large investments in machinery have been revised.

– The purchasing department has been given a clearer role in the hunt for energy-saving measures. Previously, energy use meetings used to be held only if it was felt they were needed. Now on the company looks out for areas in which to make improvements all of the time.

All in all, energy use at Östrand has been reduced by 8% during the period from 2005 to 2007, a target which surpassed, by a wide margin, what was initially anticipated.

Everyone participates

– Savings at the Östrand pulp mill would not have been possible unless everybody in the factory had been working towards the same goal. The ambition has been to weave the efforts on improving energy efficiency into the company’s day-to-day work.

– To a great extent, it is a matter of “changing the way of thinking”, of making everyone on the factory floor change their behaviour. It can be as simple as turning off machinery which does not need to be on – things which used to be routine before.

All employees, wherever they are in production, now keep their eyes open for measures to save energy, says Jens Olsson, chairman of the steering committee at the Östrand pulp mill, which coordinates energy savings.

Jens Olsson works in production as a block manager at the Department for Black Liquor and Power:

– I think that if you want to catch all suggestions for energy savings, it is important to be right in the middle of production.

Jens Olsson’s task is to evaluate all energy-saving suggestions that come from the “factory floor”. It is a matter of seeing what is practically feasible.

– I have to ask myself what is feasible and how each suggestion influences energy aspects all the time, Jens points out.

Ortviken paper mill.

Facts

LINE OF BUSINESS: Forest industry products.

COMPANY: The Östrand pulp mill and Ortviken paper mill are part of SCA Graphic AB, Sundsvall which, in turn, is part of the SCA Group, in the SCA Forest Products business area. The Tunadal sawmill is part of SCA Timber. The SCA Group had a turnover of SEK 18 billion in 2008.

PLACE: Timrå/Sundsvall.

NUMBER OF EMPLOYEES: Östrand – 380, Ortviken – 850 and Tunadal sawmill – 120.

TYPE OF ENERGY: Electricity.

ENERGY USE: 2.4 TWh/year.

YEAR OF CERTIFICATION OF THE ENERGY MANAGEMENT SYSTEM: 2005.

OTHER MANAGEMENT SYSTEMS: ISO 14001:2004 and ISO 9001:2008



Complete cycle

Through the district heating network in Timrå, the Östrand pulp mill also supplies waste heat to Norrplant, a nearby nursery, where the waste heat is responsible for heating enormous greenhouses with millions of pine trees which are to replace the trees felled in Norrland.

In this way, the waste water which is generated during pulp production is used for the production of new plants. Felled trees contribute to the growth of new trees.

– Here, we can really talk about a complete cycle, since the original raw material is renewed all the time, Solveig Eriksson says.

And the nursery has been able to scrap the diesel-powered heat pump which used to be responsible for heating purposes.

Stingier paper mill ...

Trimming work in day-to-day operations and the investment in biofuel at the Ortvikens paper mill has led to radically lower oil consumption. The refiners, the big mills which are used for grinding wood pulp, consume large amounts of electricity, in total 1.9 TWh per year. However, a large part of the electric energy is recovered and turned into heat energy in the form of steam for paper production.

It has not been easy to save energy at the Ortvikens paper mill, as the mill works with very energy-intensive technology. Nevertheless, the mill has managed to reduce its energy use by 2% during the corresponding period.

– It has been significantly easier to save heat, Bjarne Öberg, Block Manager of the Energy Department and Energy Coordinator at Ortvikens, says.

By installing flue gas condensation, the mill is currently utilising the waste heat from the boilers at Ortvikens. The waste heat is supplied to the municipality's district heating network, where it provides the annual heating for 5,000 private houses.

... and more efficient sawmill

The waste heat from Ortvikens is also transmitted via Sundsvall Energi AB to the Tunadal sawmill, where it has replaced electricity-powered heat pumps and direct electricity.

The district heating project has meant an energy-efficiency improvement of approx. 20% for SCA Timber. The previous use of 117 kWh/m² of sawn goods has been reduced to 86 kWh/m² in 2008.

– Although the efficiency improvements have often far surpassed our expectations, energy investments in the future will have to compete with other types of investments, for example, with the purchasing of contractor services, Solveig Eriksson says.

Östrand pulp factory in Timrå.



Energy Management Systems

Energy management can be described as a tool which helps companies to control and manage their energy use in a systematic way. A standard for energy management, SS 627750, has been in force in Sweden since 2003. Approx. 100 industrial companies with some 250 separate production plants have, so far, implemented and had their energy management systems certified according to the Swedish standard.

Energy management systems have turned out to be a very valuable tool if companies are to succeed with their energy-efficiency improvement work and thereby reduce their energy costs and their effects on the climate.

Six Swedish industrial companies and one certification body present their experiences of energy management systems in this brochure. You will also learn how things developed when the Swedish standard for energy management systems was drawn up.

Our objective – smarter energy use

The Swedish Energy Agency is a state authority which works for the achievement of a safe, environmentally friendly and efficient energy system. We can help to achieve the climate objectives through international cooperation and commitment. The authority finances research into and development of new energy technologies. We actively support business ideas and innovations which can lead to the establishment of new companies. We also show Swedish households and companies the way to achieving smarter energy use.



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