

A MAGAZINE FROM OPCON, THE ENERGY AND ENVIRONMENTAL TECHNOLOGY GROUP

OPCONTACT

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Boiler Anton ramps up boiler performance



**WASTE HEAT RECOVERY
WASTE TO ENERGY
WASTE TO VALUE**



WORLD BIOENERGY 2012
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THE SAWMILL THAT GOT AN ENERGY KICK

Opcon's technology for recycling waste heat has increased the efficiency of Poland's largest sawmill by almost 50 %.

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CLEANER, MORE EFFICIENT GREENHOUSE

Kwekerij Wouters get more energy but fewer emissions thanks to flue gas condensation from Opcon and SRE.

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BIO-GIANT CHOOSES SAXLUND

Saxlund is supplying handling equipment to what will be the UK's largest biomass-powered power station.

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FALBYGDENS ENERGI FIRST WITH ORC TECHNOLOGY

Opcon Bioenergy is main contractor for equipment to Falbygdens Energis new CHP-plant Marjarp 2, the first plant of its kind in the Nordic region to use ORC technology.

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BOILER ANTON ON CALL

Anders "Boiler Anton" Larsson knows what's maintenance and organization are needed to keep a boiler plant working as efficiently as possible.

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ENERGY RESEARCH AT CHALMERS

Chalmers University of Technology's flue gas condenser has performed well, and now it will be used for energy research.

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ENVIRONMENTAL BENEFITS AT HÄLLEKIS

Thanks to its Opcon Powerbox WST-CU, Svenska Foder's factory at Hällekis, Sweden, achieves environmental benefits.

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GREEN ELECTRICITY FROM 83 °C WATER

At Munksjö Aspa mill an Opcon Powerbox ORC produces 800 kW of green electricity from low-temperature waste water.

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CHOSE SECOND HAND FROM SAXLUND

Pellets producer Pemco was tired all of the breakdowns on its old push floor and bought a second-hand system from Saxlund.

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INCREASED CAPACITY FOR ASSEMBLY

Opcon Bioenergy AB in Hagfors, Sweden, is now being expanded to enable increased assembly and service capacity.

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SRE increases energy efficiency by 50 percent at pellets factory

Coming inside from the cold, it suddenly gets very warm. We are at Poland's largest sawmill, Olczyk in Swidno, where Opcon has for some time now been operating its new solution for improving energy efficiency by up to 50 percent.

"This is a marvelous solution. It's simple, very smart and economic all at the same time," says Adam Sitko, Opcon's partner in Poland. "It works perfectly. I already have a lot of people interested in these installations. We can't afford to keep the air warm for the birds in Europe. Both for the sake of our finances and for the environment."



Recycling of waste heat

The concept is recycling of waste heat. In Poland, Opcon has installed its SRE flue gas condenser at a sawmill that is also a combined heat and power plant and a pellets factory, or a bioenergy combo. This solution produces 10,5 MW, of which 1.76 MW is electricity. By recovering energy from the flue gases the plant can squeeze a further 4.9 MW of heat from its system. This heat is used directly in the plant's existing belt dryer.

Two tons per hour

"This solution saves around two tons of woodchips per hour," explains Ola Nordin, sales manager for SRE's system. "That's two tons an hour that a sawmill or pellets factory can use instead to dry and sell. That works out to around one ton per hour of pellets that can be sold instead of going up in smoke."

"In many of the customer cases we have looked at we can offer a payback time of less than three years including installation while we reduce emissions of particles at the same time so that a business can meet new environmental requirements."

Well tested technology

The condenser traps the energy in the flue gases and recycles it for use in heating the belt dryer. This also means that the plant has its greatest benefit in the winter when the increase in energy efficiency can reach 50 percent. This figure is lower in the summer. The plant is flexible and can be adapted to all belt



The flue gas condenser at the sawmill and combined heat and power plant in Olczyk, Poland, was assembled during harsh winter conditions. The condenser now produces up to 4.9 MW of heat.

dryers used in existing factories or new ones.

"This technology is well tested. We have over 150 installations of our flue gas condenser in 13 countries. But this is the first time we have used

it for this application. Considering how well it works and what benefits there are, we expect there to be more soon," says Ola Nordin.

Cleaning flue gases a money spinner

Around Europe, environmental requirements are being extended and in more and more countries businesses are facing tougher demands to clean particles from flue gases.

"Environmental requirements do not need to be a cost, however," says Christofer Rhén, PhD of energy and forestry and head of bioenergy plants at Opcon.

"I know that many industries view these increased demands from the authorities for lower emissions of particles as a difficult extra cost in hard times. But it doesn't have to be that way. We have solutions that help these companies to earn money by installing tech-

nology that reduces emissions of particles."

The trick is called active purification. Instead of using filters that only clean flue gases and do nothing else, Opcon supplies its customers with SRE's flue gas condenser which can improve the energy efficiency of a bioenergy plant by 20-30 percent while at the same time cleaning the flue gases.

Extremely robust

"We have over 150 installations in operation in 13 countries. This is an extremely robust and reliable plant and we can guarantee low emission levels while recycling energy that is otherwise lost up the chimney. This can mean an investment with a payback period of less than three years – and you get gas particle treatment as a bonus."



Marjarp 2, Falbygdens Energi's new combined heat and power plant, will be completed by the end of 2012. Opcon Bioenergy, with its Saxlund brand, is supplying the biofuel oven and associated equipment. Opcon is also supplying flue gas treatment and flue gas condensation under its SRE brand. Kenneth Johansson, left, Opcon Bioenergy's assembly manager, together with the project manager of the site, Leif Tjärnén.

First in Scandinavia to use ORC technology for electricity production

When Falbygdens Energi's new combined heat and power plant in Falköping, Sweden, begins supplying district heating and producing electricity it will be the first such plant in Scandinavia to use ORC technology for electricity production.

The plant will be powered by wood chips, bio-oil and briquettes. The initiative is part of

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Falköping's efforts to become a sustainable eco-city. The plant will be completed by the end of 2012.

The lead supplier of equipment is Opcon Bioenergy. Opcon is supplying the oven and fuel and ash handling equipment under its Saxlund

brand, and flue gas treatment and condensation equipment under its SRE brand.

The plant will supply 2.34 MW of electricity and 10 MW of heating supplied as district heating. SRE's flue gas condensation equipment will increase the energy-efficiency of the plant, and heat will also be recovered from flue gases while being treated at the same time. Flue gases are then given final treatment in a wet electrostatic precipitator to minimize emissions of particles. This will make the plant highly efficient, with low levels of energy use and very low emissions.

The system is robust, reliable and almost maintenance-free.



Opcon to deliver to Skara Energi's bioenergy plant

Opcon Bioenergy will deliver machinery for the expansion of Skara Energi's bioenergy plant, Uddetorp.



Skara Energi's existing installation was supplied by Saxlund.

The expansion of 8 MW will – like the existing installation – be equipped with SRE's flue gas condenser that generates around 2 MW.

The business deal is a complete machinery contract, with Opcon supplying all machines, including oven, hot water boiler, fuel and ash handling equipment as well as advanced flue gas condensation and treatment equipment that will increase energy efficiency while reducing emissions.

When the expansion is completed, bioenergy capacity at Uddetorp will double from the 2010 level of around 45 GWh produced from around 55,000 cubic metres of wood chips.

The delivery, which will be carried out in 2012.



The Wouters family is one of the major flower producers in the Netherlands with a production of well over 100 million plants a year in their facility in Ens.

Kwekerij Wouters – a greener greenhouse in the Netherlands

Right now some 64 million bedding plants like begonias, petunias, lobelias, tagetes and impatiens, and four million geraniums and 35 million viola (pansy) are growing in the 28-hectare greenhouse operated by Kwekerij Wouters in the Netherlands.

– These are seasonal plants that really help in bringing the maximum visual appeal to your garden. They are very popular all over Europe, says Ad Wouters who have been heading the Kwekerij Wouters for the last 25 years. We are shipping some 1.4 million every day now. Later this season we will have garden mums and poinsettias as well.

In general though, green plants are not always grown using green methods. Most of the greenhouses in the Netherlands are heated using fossil fuels such as natural gas or oil. The Wouters family, however, who are one of the major flower producers in the Netherlands with production of more than a 100 million plants per year and modern cash & carry open to the public, are among the few who have switched to biomass for the heating of their greenhouses.

An excellent project

– We wanted to reduce our environmental impact, to become even greener. Switching to a heating system fired by biomass was a great way to do that, says Ad Wouters.

After their neighbours across the road installed energy and environmental technology from Opcon Bioenergy last year, Kwekerij

Wouters decided to follow suit and order flue gas condensation equipment and treatment from Opcon. With the installation of the SRE Renergi flue gas condensation in place Kwekerij Wouters is now recycling the energy that was earlier being wasted as smoke.



– This has been an excellent project with everything working as intended and promised. It is all up and running. We are getting more than 1 MW extra out of our 5 MW boiler without using any more fuel. With this investment I am looking at a very limited pay-back time at same time as I am further reducing our emissions. Being able to make investments like this that are equally beneficial from an economic standpoint as well as an environmental is very satisfying.

– We have delivered over 150 of these plants to 13 countries. We mostly supply district heating plants powered by biomass, although we are now seeing new customers in other sectors, such as sawmills and greenhouses. But there are still not many greenhouses that have switched from fossil fuels to biomass. When they do start using biomass they learn that our technology can significantly cut emissions while the improvement in energy efficiency makes the investment profitable," says Lars Rådberg, the manager of Opcon Bioenergy's new office in France.



Millions of flowers are growing in the green greenhouses of Kwekerij Wouters in the Netherlands.



"We have achieved very good results with our flue gas condenser," says Per Löveryd, operations manager at Chalmers University of Technology's Energy Centre. The centre supplies energy to the extensive Johanneberg campus as well as enabling full-scale research and learning.

Top spot for Chalmers' flue gas condenser

The new flue gas condenser at Chalmers University of Technology in Göteborg was started up last winter and has delivered more power and energy than the customer expected.

This coming autumn it will start being used for research and development within environmental and energy technology in the mechanical engineering department.

"It will be included in exercises where the efficiency of the boiler is calculated," says Per Löveryd, operations manager and technical maintenance manager at Chalmers Energy Centre, which is operated by Akademiska Huset in Göteborg.

The energy centre supplies the Johanneberg campus, which covers 250,000 square metres, with district heating, hot water and refrigeration, as well as being the research base for energy research and teaching at Chalmers University.

"We started up the flue gas condenser during the last season and we have got more power and energy out of it than we expected. I imagine that we will get around 3,500 MWh per season, and normally we produce 20,000 MWh in total," explains Per Löveryd.

The heating season starts at the end of Octo-

ber and lasts until the middle of April. Heating supplied to the campus on a cold winter's day is equivalent to what a small municipal district heating company produces.



Equivalent to an extra boiler

"On some very cold winter days we have not had enough power and we have bought heat from Göteborgs Energi. But this means an extra cost. The flue gas condenser has given us extra power, almost 1 MW – or equivalent to having an extra boiler."

The flue gas condenser from Opcon Bioenergy/SRE is connected to a 8 MW CFB research boiler, a circulating fluidized bed boiler specially designed for scientific measurements. Chalmers helped design the boiler so that it would generate energy data and help with teaching. This boiler operates on a variety of fuels, but mostly it is run on biomass. There is an additional 10 MW boiler at the Energy Centre.

Akademiska Huset did not only invest in a flue gas condenser to clean the flue gases. They already use textile filters and cyclones.

Location high up the chimney

"The gases are already treated when they reach the condenser, but since there is some dirt remaining in the gases, we get a little extra cleaning. The condenser captures the final particles,



The flue gas condenser is so compact that it could be located in an extension at the very top of the power station.

but we don't really need it for that purpose," admits Per Löveryd.

There was a problem of finding space to install the flue gas condenser.

"We didn't really think we had room for it before now. There are competitors to Opcon, but those solutions are pretty big. Opcon's SRE unit is so compact that we could lift it to the highest point in the Energy Centre. We placed it next to the chimney and then built a little room around it. I think it's a good solution."

Opcon makes delivery to Dalkia's first bio-energy installation with flue gas condensation

In 2011 Opcon won its first order from Dalkia in France for SRE's leading flue gas condenser, SRE Renergi, which increases energy production by up to 20-30 percent without requiring more fuel. The condenser, which also limits particle emissions, has already been sold to well over 150 sites in 13 countries.

Through the order to Dalkia's subsidiary, Fimat Entreprise, the 2 MW plant at the heating plant in the residential area of Cholet, near Nante, will be extended with a facility for waste heat recovery. This is the first of Dalkia's facilities in France to be supplemented with flue gas condensation.

"We have already supplied several units to Dalkia's foreign subsidiaries and are pleased that Dalkia chose our leading technology now when they are starting to use this energy technology in their home market in France. We see a growing market in small-scale district heating in France," says Lars Rådberg, manager of Opcon Bioenergy's operations in France.

Södra Skogsägarna choose technology from Opcon

Opcon Bioenergy, has received an order from Södra Timber AB for its leading SRE Renergi flue gas condenser to be installed at the Kinda sawmill in Kisa, Sweden. The sawmill, which produces pure spruce products, currently operates a biomass-powered 14 MW boiler. In addition to supplying energy to the sawmill, the boiler also supplies eco-friendly district heating to the heating network which is run by Tekniska Verken in Linköping.

Opcon's flue gas condenser enables Södra Skogsägarna to improve the energy efficiency of the Kinda sawmill and utilize the waste heat that was previously unused. When the installation is completed in 2012 Södra will be able to increase supplies of eco-friendly district heating from the sawmill by around 2 MW without requiring more fuel. The installation also provides further purification opportunities so that the entire sawmill's emissions of particles are reduced considerably.

"This is part of the extensive work Södra is carrying out to reduce our environmental impact and our energy consumption," says Dan Forslund, Södra Skogsägarna.



Hamburg Köhlbrandhöft, Germany's largest waste water treatment plant, which has invested in a number of sludge pump systems from Saxlund.

Material handling from Saxlund cuts fossil fuel consumption in Hamburg

In December 2011, Saxlund concluded the delivery of material handling equipment for the extension of a Waste-to-Energy solution at Germany's largest waste water treatment plant, Hamburg Köhlbrandhöft.

The customer was the City of Hamburg. The order comprised a turnkey plant that will enable the waste water treatment plant to increase its capacity and handle waste sludge from other plants in the vicinity. The sludge becomes biofuel that can be used to produce renewable electricity and heating, replacing fossil fuels in Hamburg's energy mix.

Incineration of sludge in this highly modern plant also means a significant reduction in emissions of heavy metals.

Saxlund is an active partner in the development of the solution, where waste is converted into valuable energy.



Since Germany banned sending sludge to landfill, the country has pioneered development of solutions that convert waste into energy. With 20 years of experience and excellent references such as the City of Hamburg, Saxlund has established a leading position in this field.



Christoph Groffmann, CEO of Saxlund International GmbH, Germany.

Saxlund to deliver to new CHP in Wiesbaden

Saxlund International GmbH, a fully-owned subsidiary of Opcon AB, the energy and environmental technology Group, has been given responsibility for delivery of state-of-the-art recycled wood handling for the new combined heat and power plant that

will be built by ESWE BioEnergie GmbH in Wiesbaden, Germany. The delivery includes push-floors, conveyors and magnetic separators to separate metal for additional recycling. All designed for efficiency, minimum maintenance



and high availability as well as low emission of dust and noise.

Total order value is around SEK 12 million with delivery in 2012/2013 and commissioning in April 2013.

The 43 MW biomass-fueled CHP in Wiesbaden is expected to provide green electricity and heat to around 12,000 single family homes previously supplied with fossil fuels. As such ESWE expects it to contribute to achieving a fifth of Wiesbaden's climate targets for 2020.

Saxlund builds UK's largest waste wood-fired biomass plant

It's a dark 11 PM on site here in Markinch when the roof, of the first of three considerably large feedstock silos, is being lifted into place. The recycled and virgin wood silos are part of a new £200 million bio-mass plant being developed by energy giant RWE npower renewables for paper maker Tullis Russell, Fife, Scotland.

At this hour you might expect Saxlund International Ltd.'s new Managing Director Matt Drew to be tired, but instead he rather looks excited :
"This will be the largest waste wood-fired biomass facility in the UK", Matt starts.

"The plant will burn some 400,000 tonnes of recycled and virgin wood-chip each year, generating some 50 MWe and will reduce Tullis Russell's annual carbon emissions by some 250,000 tonnes.



Saxlund is responsible for the design, delivery and commissioning of the complete fuel reception and storage area, a task that demands top quality material handling, which is just what we provide", he enthuses.

Each of the 26 m high silos will store up to of 5,000 m3 volume. Fitted with Saxlund's TubeFeeder® rotary dischargers these will reclaim the material from the silos, feeding it into the elevating chain conveyor system to the combustion plant.

The most superior reclaim solution

"This is an energy efficient system that provides continuous, high-volume reclamation of bulk materials. Our TubeFeeders® consume as little as 25 percent of the power needed for traditional exposed screw reclaimers while gently handling the processed material. This is by far the most superior reclaim solution for flat-bottomed bunkers and silos with large spans and diameters", says Matt Drew.



The roof of the first of the three silos that Saxlund is building is lifted into position late in the evening. This is a part of the bioenergy plant that energy giant RWE npower renewables is installing for paper maker Tullis Russell in Fife, Scotland.





Each 26-m tall silo can contain up to 5,000 square metres of woodchips and is equipped with Saxlund's rotating TubeFeeder®, which will convey the woodchips from the silos into the combustion plant.



Hallo there! Matt Drew – new MD at Saxlund International Ltd.

In January, Matt Drew took the helm as Managing Director at Saxlund International Ltd in Southampton, UK. His progression has been well received both by his colleagues in the company and more broadly by his contacts within the industry. His years of industry knowledge complemented with an engineering degree added to the fact he really knows the business make him a sound choice for the future of the company.

It has been said: "His enthusiasm and logical engineering grounding mixed with a commercial feel for the market gained from his industry exposure over the years make for a potent mix".



• What do you say to that?

(Laughs) "Did someone really say those things? No really, I am honoured to be appointed to follow Frank Boyles at a very exciting time for the company. We already have a respected brand in the UK, and an extremely competent team of engineers and project managers able to tackle complex projects in a variety of fields. So I'm very positive and excited about the future."

• So, what does the future hold for Saxlund in the UK?

"Well, even in these times of austerity for the British economy, we are fortunate to see growth in our particular markets. The UK biomass sector is still in its infancy. With the quality of our engineering, project management competence, Swedish technology and ability to provide cost effective solutions, I am confident we will grow Saxlund and enhance the company's reputation within the bulk solids handling and biomass energy sector".

• On a more personal note. What do you do when you're not working, lifting silo roofs in the middle of the night?

"Yes, the silo lift was an interesting event; this was the lifting of the first of three silo / roofs for the Tullis Russell Biomass Power Station. The 43 tonne roof required a complex rigging arrangement that took a long time to prepare. These combined with the threat of high winds the following day, meant it was an anxious wait until the roof was lifted onto the silo roof just before midnight. It is a testament to the team that they completed this task under such pressure and kept the programme on track".

"But, outside of work, I like relax and spend time with my wife and two daughters. We recently purchased an old stone cottage in a small village in the countryside and are currently taming the gardens and planning our renovations".



Opcon Powerbox WST-CU on site at Svenska Foder in Hällekis, Sweden.



Lars-Göran Andersson, Svenska Foder's project manager for the installation of an Opcon Powerbox WST-CU at the animal feed factory in Hällekis, Sweden.

Innovative use of steam turbine by animal feed manufacturer, Svenska Foder in Hällekis

Johan Nordenblad, deputy CEO of Svenska Foder AB, is proud of his company's animal feed plant in Hällekis, Sweden. This is one of the company's four plants in Sweden, and annual production here is 130,000 tons of animal feed. The production process requires large amounts of steam, generated from wood chips.

Asked why his company invested in Opcon Powerbox technology, which generates electricity from wet steam, Johan Nordenblad counts on his fingers: firstly because of the improvement in efficiency, secondly for the environment and climate and thirdly due to the risk management benefits of hedging electricity prices.

"We like rolling several benefits into one," says Johan Nordenblad.

The efficiency gains come at several levels. Since production at the plant is not always

consistent and operation is not 24/7, steam requirements vary significantly over the week and over each day. Running the wood chip boiler up and down is inefficient, it causes wear on the boiler and leads to higher operation and maintenance costs.

"Those things cost large amounts, so we are always looking for ways to improve efficiency. Together with Opcon we developed a concept that we really believe in and which we expect to use at other sites within the Group," says Johan Nordenblad.

Third largest in Europe

Svenska Foder is part of the Danish DLG Group, Europe's third largest producer of animal feed, with sales of around SEK 50 billion and activities in 24 countries.

Instead of using the boiler to regulate how much steam would enter production, Svenska Foder decided to install Opcon's new turbine and use that for steam regulation instead. This would help them run the boiler at a consistent, optimum level. When production of animal feed is operating at full speed the turbine shuts off, or slows down. The turbine then increases speed at low levels of production and during the nights and weekends.

"This means we get process steam, green electricity and hot water that we can sell to the municipality's district heating network, while wear on the boiler is reduced and less maintenance

is needed. This really is improved energy efficiency over the long term, and it means major gains for the environment and better profitability for us," says Johan Nordenblad.

In 2011 a new boiler was installed along with Opcon's turbine, an Opcon Powerbox WST-CU (Wet Steam Turbine/Condensing Unit). Not all the equipment is on site yet.

"We encountered some difficulties running our new boiler so we don't yet have access to the steam we expected, but the Opcon Powerbox steam turbine is functioning well. We already run it at the weekend and at other times. I look forward to when we have the entire system in place including supplies to the district heating network. This is the type of improvement that you will be proud to tell your children about!"

An exciting project

Opcon has great belief in this technology.

"It has been very exciting working together with Svenska Foder on this project," says Ingemar Olson, Opcon.

"This is a new application and it's fun to see the opportunities that this technology opens up for our customers. We can use wet steam without overheating with a small turbine that is very robust so this creates new possibilities. It is easy to add this system after the initial installation if you have not planned to integrate it right from the start."



Aneby – from district heating plant to small-scale CHP-plant

Lars-Åke Persson, CEO of P o B Energi AB, switches on the steam turbine supplied by Opcon. It's operating and phasing in after just a couple of minutes. And just one minute after that it is already over 300 kW.

"It starts supplying straight away," he says.

Lars-Åke has always been an entrepreneur and a pioneer in bioenergy, so it was no coincidence when he became the first to invest in Opcon's newly developed steam turbine, Opcon Powerbox WST-CU (Wet Steam Turbine/Condensing Unit).



"There are many of us who have been looking for ways to add new electricity generation to existing district heating plants. But before now the alternatives either had poor technology or they were too expensive to deliver economic benefits. Opcon's system works well, it does not involve overheating. It has every chance of being a really good solution. It's a smart concept," says Lars-Åke Persson.

At Aneby, Sweden, Opcon Powerbox was installed on the district heating plant's existing 5 MW boiler. A turbine installation was not among the original plans.

Easy to find space

"The physical installation was never a problem, even though it was not originally planned. The machine is small, it doesn't weigh more than 5 tons, and there are virtually no vibra-



P o B Energi was able to place its Opcon Powerbox between a wall and the existing boiler.



tions. You could place a coin on the corner and it would stay there. I have had to add a little more sound absorption and heat insulation, that's all," says Lars-Åke Persson.

The compact size means that installation could be fitted on an extra steel framework, one storey above the boiler room. This solution is nearly always possible, even when space is restricted. The Powerbox has been running during the winter for over 3,500 hours. A few adjustments and upgrades have been carried out.

"It's a big advantage having an entrepreneur like Lars-Åke as your customer, with the

competence he has and the enthusiasm to get involved in development. Not only does he suggest improvements, he also offers technical solutions for implementing them. We have already made a few changes that have made things better," says Ingemar Olson, sales manager for Opcon's steam turbine.

Existing staff can operate it

On top of the turbine being compact and suitable for converting existing district heating plants into combined heat and power plants as well as construction of new combined heat and power plants, Ingemar Olson lists further benefits:

"There is no overheating. You can run it with saturated and wet steam. Your existing staff can operate it. The turbine is cost-effective, robust and simple. Furthermore it can be operated remotely so you can have unmanned production.



Skellefteå Kraft's steam-powered Opcon Powerbox WST-CU at the plant in Ersmark, Sweden.

Skellefteå Kraft was first out with new technology

In 2010 Opcon, supported by the Swedish Energy Agency, installed the first steam-powered Opcon Powerbox at one of Skellefteå Kraft's small district heating plants. Skellefteå Kraft, Sweden's fourth largest generator of electricity, thus became the first company to test a technology that enables the profitable conversion of small district heating plants to CHP.

The steam-powered Opcon Powerbox produces electricity from wet, saturated steam without overheating, which means clear advantages over traditional turbines. In addition to a competitive price, other benefits include a relatively easy installation and increased flex-

ibility due to the relatively low weight and limited size. At the same time the robust design ensures high availability with limited maintenance.

One potential market is converting small district heating plants to CHP, like they have done at Skellefteå Kraft.

In Sweden, according to statistics from the Swedish district heating association, there are 66 district heating networks with combustion plants without CHP in the 21-80 GWh range (approximately 2.35 TWh in total) and 40 district heating networks in the 11-20 GWh range (a total of 0.65 TWh).

800 kW green electricity from 83 °C waste water at Aspa Munksjö Bruk

It might look like a container with some added pipes squeezed against a wall next to the bleachery at Aspa Munksjö pulp mill. But inside is one of the most modern examples of waste heat recovery and energy efficiency – an Opcon Powerbox producing green electricity from low-temperature waste heat. Remarkably, the water is no hotter than your breakfast cup of coffee.

“This is energy efficiency and technical innovation at its best. Aspa mill needed to cool down around 300 cubic metres of 70-85 °C water discharged from the bleach plant before they could treat it and release it into the lake,” explains Peter Lundström, Opcon sales manager.

Saving energy and money

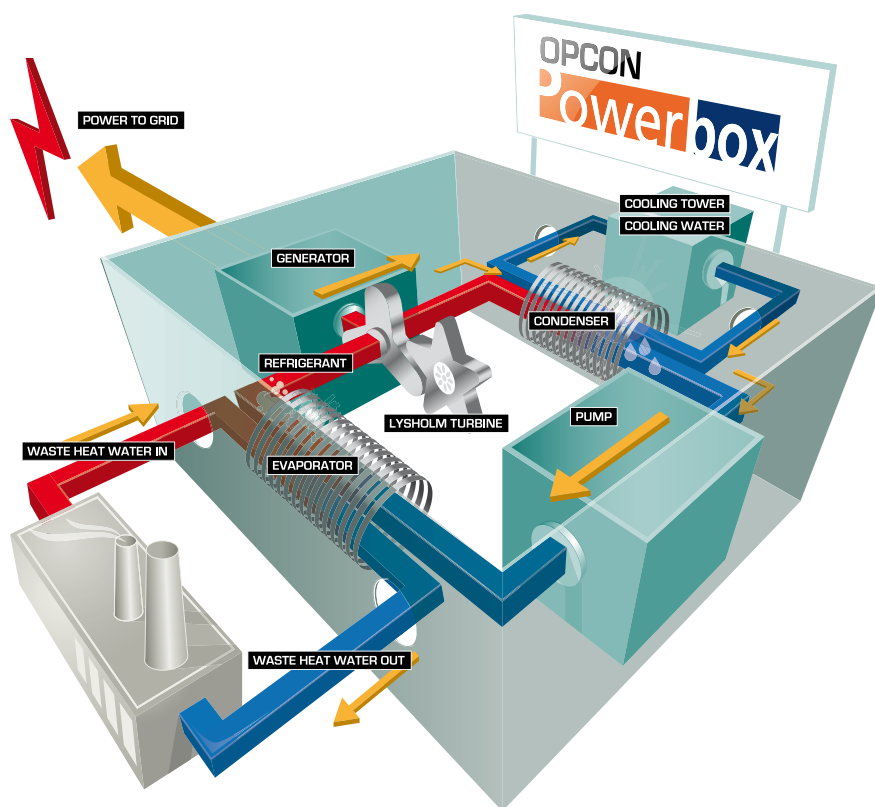
“Installing Opcon Powerbox has created several benefits. Firstly, we meet the water cooling requirement while saving energy and therefore money. Then, most important of all, we generate new, green electricity from the waste water, around 3,500 MWh per year over the nine months we operate. We also get to pre-heat water for other parts of the process.”

The installation acts rather like an inverted heat pump. The waste heat boils a medium that drives a special Lysholm turbine.

Up to 800 kW of electricity

“Put simply, it’s the difference in temperature between the hot waste water and the cooling agent, whether it be a lake, river or cooling tower. The Powerbox can generate up to 800 kW of electricity. Here at Aspa, where flows are favourable we have reached 800 kW of electricity in the winter when the waste water was at a temperature of just over 80 °C. That tells you a lot about the possibilities,” says Peter Lundström.

And it is possible to record many hours of operation. The system does not need natural elements such as wind or sun, like certain other sources of green electricity. As long as there is waste water from the factory or power plant,



How Opcon Powerbox ORC works:

- A boiler containing waste water (and waste heat) from an industrial activity or diesel engine – onboard a ship, for example – raises the temperature and pressure to establish the highest possible pressure difference over the Lysholm turbine. Liquid turns into gas.
- The gas expands over the Lysholm turbine, driving a generator that supplies electricity into the electricity grid.
- A heat exchanger containing cold water reduces the temperature and pressure, to establish the highest possible pressure difference over the Lysholm turbine. Gas is turned back into liquid.
- A pump raises the pressure of the liquid and pumps it round the system.



Aspa Munksjö pulp mill in Sweden, where an Opcon Powerbox is installed next to the bleach plant.

Opcon Powerbox will deliver electricity.

“We are also relatively insensitive for swings in temperature. Technically we could even generate electricity at temperatures as low as

55 °C. This opens up a series of completely new opportunities for profitable green electricity production, especially where biomass is the base material,” says Peter Lundström.



Second-hand Saxlund system solved push floor problem

After repeated breakdowns on their push floor in the woodchip section, the guys at the pellets factory in Säffle had had enough.

"There was no screener, which meant that the dryer broke down repeatedly. We decided that we would always buy the best quality equipment. It was too expensive to fix," says Per Sjöberg, site manager at Pemco Träpellets AB, a pellets factory in Säffle, Sweden.

"But buying top quality only is easier said than done, especially when you haven't done it that way right from the start. The cost calculations change when you find you have to replace something that is poor quality after just a couple of years. But we had no choice. The equipment wasn't working any longer."

Restricted budget

With a restricted budget but a clear focus on investing in high quality, Pemco decided to buy a second-hand, retrofitted Saxlund system. They found what they wanted in Laxå. Just a few small adjustments were needed to replace the system they had seen enough of.

"It's like night and day. We have had this Saxlund equipment since the autumn of 2011 and we have not had any problems. We are the third owners of this push floor. It is already 16 years old and it has been cut back and relocated twice during its lifetime. That's something you can only do with really good quality equipment. It wouldn't surprise me if we can sell this again in 5-10 years," says Per Sjöberg.



Top: The second-hand push floor from Saxlund solved quality problems for Pemco Träpellets pellets factory in Säffle, Sweden.

Middle: Factory manager Per Sjöberg and production operator Lennart Andersson.

Bottom: The factory in Säffle is Sweden's oldest pellets producer.





Customers often call Anders "Boiler Anton" Larsson directly to ask him to come and inspect their boiler installation. Chipboard manufacturer Byggelit in Ambjörby, Sweden, needed help cleaning and fine-tuning their biofuel boiler.

Name: Anders Larsson, nicknamed Boiler Anton
Age: 52
Profession: Boiler operator and teacher at Opcon Bioenergy. Every third week he is a volunteer fireman in Heby.
Works with: Biofuel equipment from Saxlund and other manufacturers
Home: Heby, Uppland, Sweden
Family: partner, two adult children
Days per year spent travelling: 100-150
Leisure interest: outdoors, helping friends fix things

Boiler Anton's top three tips for improving boiler effectiveness:

1. Regular service, cleaning and fine-tuning improve incineration and produce better environmental results.
2. An effective operational organization, with one individual responsible for the boiler plant, staff who have knowledge of the boiler, and a good log-book of operations.
3. Good hot coffee served when Boiler Anton calls a meeting.

On the road with Boiler Anton

Yesterday Anders "Boiler Anton" Larsson was as black as a chimneysweep after cleaning out the multi-cyclone at the boiler plant operated by Byggelit in the Swedish village of Ambjörby. Today he's making a presentation for the operating crew.

"It's important that the people who work on a boiler are well trained and understand how the boiler works. Each boiler is an individual," says Anders Larsson.

Byggelit manufactures chipboard and they have asked Anders Larsson to help them as recently their boiler has been performing below normal. After an inspection, Anders explains that the multi-cyclone and the hot oil boiler are clogged.

Anders Larsson travels round Sweden and other countries serving, fine-tuning and adjusting biomass boilers and flue gas condensers. At the same time he trains the operating staff, teaching them what to look for and think about in their daily work with the boiler. A biomass boiler should produce as much power as possible while giving good fuel economy and strong environmental performance. For all this to work you need to clean the equipment, sweep the chimney and fine-tune operation. All of that

should be done at least once a year together with further training to keep staff expertise up-to-date.

Dedicated organization

"Some of the places I visit do not take a lot of care of their boiler plants. What's needed is a dedicated organization, with a single individual responsible for the boiler plant who can take an overview of the situation and see the bigger picture," explains Anders Larsson.

"For example, often it's not the boiler operator who buys the biofuel, even though the fuel mix is absolutely decisive for good performance and the boiler operator is the one who knows the most."

A popular boiler expert with a nickname like Boiler Anton gets to do a lot of travelling.

Anders Larsson has tested and fine-tuned all of Opcon Bioenergy's Saxlund installations in Sweden and the rest of Europe. Even though he spends a lot of time with Saxlund equipment he also serves boilers made by other suppliers.

"I have been in Egypt to start up equipment at a new treatment plant there. Next week I'm off to France to check an oven and do a performance test on a flue gas condenser, and then it's Scotland for start-up and fine-tuning of a new major Saxlund installation. Each assignment is a new challenge," says Anders Larsson.

 **OPCON BIOENERGY**

 **SRE**
OPCON Group

 **SAXLUND**
OPCON BIOENERGY



Anders Larsson is an expert at servicing and fine-tuning boiler installations, and at passing on his knowledge to his customer's boiler operators.

Small investment in repairs and service delivers major savings

Last January, Lars Norrmann took over the post of After Sales Manager at Opcon Bioenergy following a long career at Ageratech. His first assignment was to lead a campaign for service of SRE's flue gas condenser, water treatment and electrofilter system.

"We have managed to inspect over 20 installations so far. They have a variety of ages. A district heating plant wants to carry out this type of work before or during their annual summer stoppage. It's very high quality equipment and



Lars Norrmann, After Sales Manager at OBE.

generally the installations we have looked at are in excellent condition, I have to say. But there is nearly always something that needs correcting and that means we can improve performance or help to reduce emissions," says Lars Norrmann.

Activities include calibration of instruments and components as well as full-scale cleaning and a replacement of the condenser's mouthpiece.

"This is the best kind of maintenance because the customer can see payback for the expense almost immediately. If there is too much dirt and the mouthpiece has closed up, then the performance of the condenser will be reduced considerably. We can fix that pretty quickly. It's also important to control the treatment so that particle emissions don't get too high and there is difficulty meeting legal requirements. Quite often we can provide immediate profitability from the service while we also extend the life length of the equipment. And while you do that you are of course preventing and reducing the risk of serious incidents," says Lars Norrmann.

Opcon Bioenergy expands assembly and service capacity

Opcon Bioenergy AB in Hagfors is expanding its workshop to enable increased assembly capacity. The company specializes in assembly of energy installations, service and aftermarket support for equipment from Opcon and other suppliers.

"Here in Hagfors we perform final assembly of flue gas condensation equipment from SRE and take care of the delivery to the customer," says Tommy Jansson, site and assembly manager.

"We also assemble Saxlund's materials handling systems for sawmills and pellets factories, as well as conveyors and associated equipment. We also assemble quite a lot of equipment for companies outside the Opcon Group."

Opcon Bioenergy has over 20 fitters and technicians employed at their site in Hagfors, central Sweden, which is also the base for Opcon's aftermarket and service organization for Sweden and Norway.

The company works on equipment supplied by Opcon Bioenergy under its SRE (Svenska Rökgasenergi) and Saxlund brands. The site also services and repairs equipment from companies outside the Opcon Group.

"We have been performing this type of work for nearly 30 years and we have established a lot of contacts," says Tommy Jansson.



Some of the team at Opcon Bioenergy in Hagfors, Sweden, on the site of their new assembly hall. Tommy Jansson, site and assembly manager, in the middle.



Tommy Jansson, site manager at Opcon Bioenergy in Hagfors, Sweden, has 30 years of experience in assembly of bioenergy equipment.

Forestia Saxlund oven to receive service this summer

Tommy Jansson at Opcon Bioenergy's plant in Hagfors is currently planning the crewing for this year's service of Forestia's chipboard factory in Braskereidfoss, Norway. The plant has been in operation for many years and is one of Saxlund's largest, with a 42 MW oven.

"We have helped them with maintenance since 1988. It's not finalized yet, but we should be an 8-12 man team working there for five weeks during the summer stoppage. Among other things we will be replacing steel frames on the presses. Last year we replaced the cyclones in front of the dryer, and that required a team of 16 men," says Tommy Jansson, site manager at Opcon Bioenergy's plant in Hagfors.



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