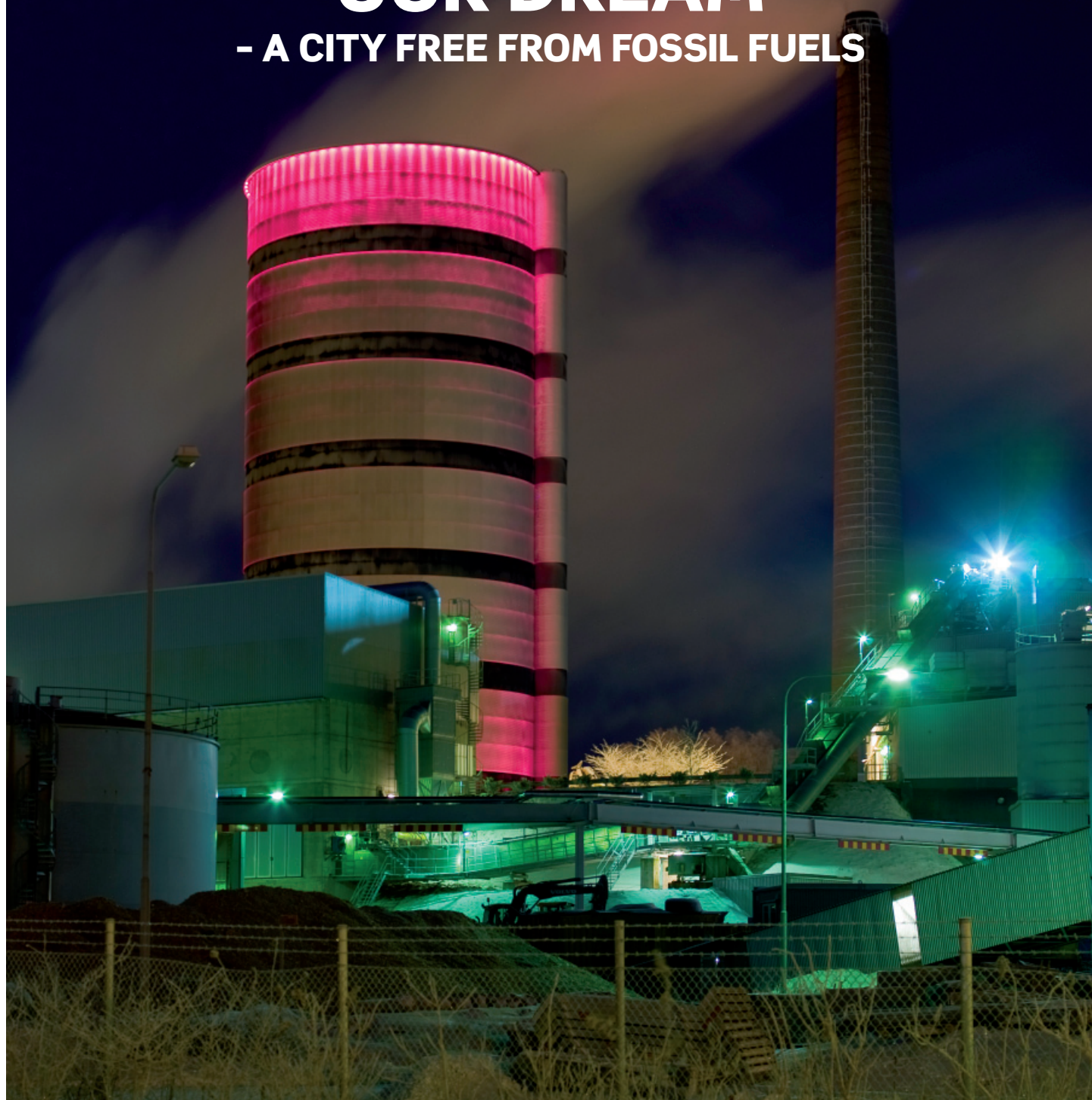


# OUR DREAM

## - A CITY FREE FROM FOSSIL FUELS



Application – Global District Energy Climate Awards, modernization of existing scheme

### **Production of district heating, district cooling, electricity and biogas**

Borås Energi och Miljö AB, Sweden

**Borås Energi och Miljö AB**, is a municipally owned company and part of Borås Stadshus AB.

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# BORÅS RECYCLING MODEL



## JUSTIFICATION: MODERNIZATION OF EXISTING SYSTEMS

We have a dream of becoming a fossil fuel free city, in which we aim to convert the city's fossil energy sources to renewable sources in both the heating and transport sectors and to generate electricity sufficient to meet the city's needs from renewables. We will achieve this by using our unique recycling model (figure 1) which entails our taking care of communal resources such as waste and transforming it into various benefits such as district heating, district cooling, biogas and electricity.

**We have continued** on our journey towards the fossil fuel free city since winning the first Global District Energy Climate Awards in 2009. We have done this by refining our recycling model and setting up new recycling processes within the city. This year we incorporated the city's water and sewage operations into the company. Examples of significant recycling processes from this operation are the recovery of heat from sewage for transformation into district heating, and the extraction of biogas from sewage sludge.

Our first district heating customer was connected in 1959 and since then the grid has expanded greatly and today district heating serves around 35,000 inhabitants; we supplied 751 GWh of district heating to our customers in 2010. We work constantly on modernizing and streamlining our district heating system so that developments keep pace with our dream of a fossil fuel free city. Examples of important steps on our journey during the past year are:

- the inauguration and commissioning of the city's new environmental symbol, the accumulator tank
- the commissioning of a biogas installation
- the reduction of flow temperatures in the district heating grid
- the reduction of nitrogen oxides emissions

As a single project, the accumulator tank saved no less than 5,623 tons of carbon dioxide during 2010 by avoiding the use of fossil fuels such as oil and LPG and increasing the production of electricity.

We have invested a great deal in our advanced energy services in order to help our customers save energy and optimize their consumption. We have been accredited to issue energy declarations for several years.

To succeed in achieving our dream it is crucial to motivate the city's inhabitants to become dedicated participants in the city's environmental efforts. The company has therefore also invested in various information initiatives such as exhibitions, focus groups and information to schools.

We know that our recycling model can be applied anywhere in the world. In 2010 we carried out our first international project, a biogas undertaking in Indonesia. The project was financed by foreign aid and Borås Energi och Miljö managed the project, which entailed the construction of a biogas installation to take care of fruit waste from a local fruit market and to produce biogas for the generation of electricity. The installation was inaugurated in February, 2011. We currently have new international projects under way in the USA, Brazil and Nigeria. The projects are aimed at both district heating and biogas.

In September 2011 the Swedish King and Queen will visit Borås to see how our successful recycling initiatives work within district heating, district cooling and biogas, and how we are working with international projects.



## SUMMARY

Borås Energi och Miljö (BEM) is a municipally owned company within Borås Stadshus AB. The company has 220 employees and annual sales of SEK 950 million. Borås has approximately 100,000 inhabitants and is Sweden's 13th largest city.

**The company has** a dream of a fossil fuel free city which means that all of the city's fossil energy sources will be removed and replaced with renewable energy sources. The company works with a unique recycling model which entails the setting up of various recycling processes within the city, examples of which are the transformation of waste into district heating, district cooling, electricity and biogas.

The company's first district heating customer was connected in 1959 and since then the grid has expanded greatly and today district heating serves around 35,000 inhabitants. Production is based primarily on waste-to-fuels and biofuel.

We work constantly on modernizing and streamlining our district heating system so that developments keep pace with our dream of a fossil fuel free city. Examples of important steps on our journey are last

year's inauguration and commissioning of the city's new environmental symbol, the accumulator tank. The accumulator tank saved no less than 5,623 tons of carbon dioxide in its own right during 2010 through our avoidance of the use of fossil fuels such as oil and LPG and increasing the production of electricity.

We have invested a great deal in our advanced energy services in order to help our customers save energy and optimize their consumption. We have been accredited to issue energy declarations for several years.

To succeed in achieving our dream it is crucial to motivate the city's inhabitants to become dedicated participants in the city's environmental efforts. The company has therefore also invested in various information initiatives such as exhibitions, focus groups and information to schools.



## SYSTEM DESCRIPTIONS

The inhabitants of Borås sort their domestic waste into differently coloured plastic bags – white for combustible waste and black for biodegradable waste. Recyclables, e.g. packaging such as metal cans, plastic bottles and newspapers, are separated and deposited at one of the company's five recycling centres or the 80 recycling stations. When the black bags and white bags arrive at the Sobacken waste management plant, they are automatically optically separated. The white bags are used as fuel for generating e.g. district heating, while the contents of the black bags are converted into biogas.

### DISTRICT HEATING, COOLING AND ELECTRICITY GENERATION

#### DISTRICT HEATING PLANT

BEM has several different district heating plants. The main unit, Ryaverket, is a combined heat and power plant. It has two biofuel boilers, two waste boilers and two generators. There is also an electrical heater plus two LPG/biofuel/oil-fired boilers used as back-ups.

The biofuel boilers are grate-fired steam boilers. The biofuels mainly comprise forest fuel, i.e. left-over materials from the forestry industry. Flue gases are cleaned by electrical filters connected to each boiler. Ash from the boilers is then used as a forest fertilizer.

The waste incineration plant has two fluidized bed boilers using the latest technology. They burn the combustible portion of domestic waste (the white bags) and combustible waste from non-domestic sources. To ensure incineration is complete and to guarantee low emissions, the boilers are fitted with start-up and support burners. The waste boilers are connected to a flue gas cleaning system, in which slaked lime and activated charcoal are used to reduce pollutants. Particulates are then collected in a textile filter before the flue gas is passed to the chimney. Once metals are sorted from the bottom ash the ash is used as construction material at the BEM landfill. Fly ash is sent to Norway for treatment and permanent storage as a part of an environmental project.

During 2010 BEM signed an agreement with Konvex regarding the delivery and erection of a biomal reception facility at Ryaverket. Biomal is a type of animal by-product (certain abattoir waste and fallen stock) that must be destroyed through incineration. Biomal is classed as waste but is also a renewable fuel that BEM burns in its waste furnaces in order to generate electricity, heating and cooling. BEM will receive around 10,000 tons of biomal annually. Handling will be governed by an EU regulation known as the "Animal By-Products Regulations". A pilot plant went into operation during 2010.

Construction of Ryaverket began in 1965 and over the years the plant has been modified several times towards a more eco-friendly production. In the beginning, production was mainly based on fossil oil and a small percentage of waste.

In 1984 the two large oil-fired boilers were converted to burn solid fuel (biofuel, 75%, and coal, 25%). A dryer was installed in 1994 to increase efficiency and allow boilers to be run on biofuel alone.



*The Ryaverket with the accumulator tank.*

The first two waste incineration furnaces were opened in 1966, and a third was installed in 1972. The first two furnaces were shut down in 1987 for environmental reasons. The third boiler remained in operation until 1991 and was then closed.

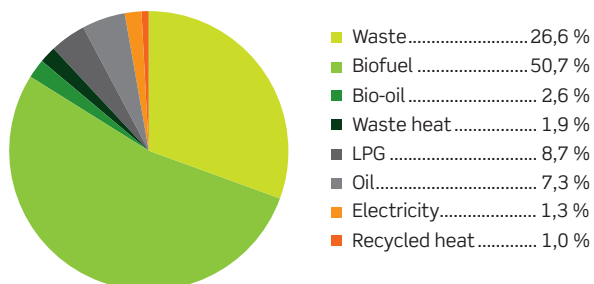
At the beginning of the 21st century the City of Borås decided to build a new waste incineration plant at the same location as the old one. The plant, with its two fluidized bed boilers and modern flue gas cleaning technology, was opened in 2004.

To ensure a sufficient amount of energy in the district heating grid there are six smaller back-up and support plants located along the grid. The most frequently used is located at Ryaverket and consists of two boilers. Both boilers can run on LPG but in 2007 one was converted to also run on bio oil. The remaining five plants, which run on fossil fuels, are only used in very cold weather or during scheduled and unscheduled maintenance at Ryaverket.

One step taken during 2010 was an investment in an accumulator tank. This works in such a way that district heating water supplied via pipelines to heat houses can be stored in the tank to act as a buffer. Household heating requirements vary during the day. The need for heat is bigger in the morning when many people want to take a shower for example, while demand is lower during the day when most people are at work. To meet the morning demand we can now use the buffer tank instead of firing up an extra furnace as we did before – an oil-burning peak load furnace, thus reducing the requirement for fossil fuel.

The accumulator tank reduced emissions by 2,423 tons of carbon dioxide from energy production during 2010. When we consider the fact that the accumulator tank also contributed to electricity generation, the environmental benefits were even greater since the reduction of CO<sub>2</sub> emissions amounted to 5,523 tons.

The figure below shows the fuel mix in the central district heating grid.



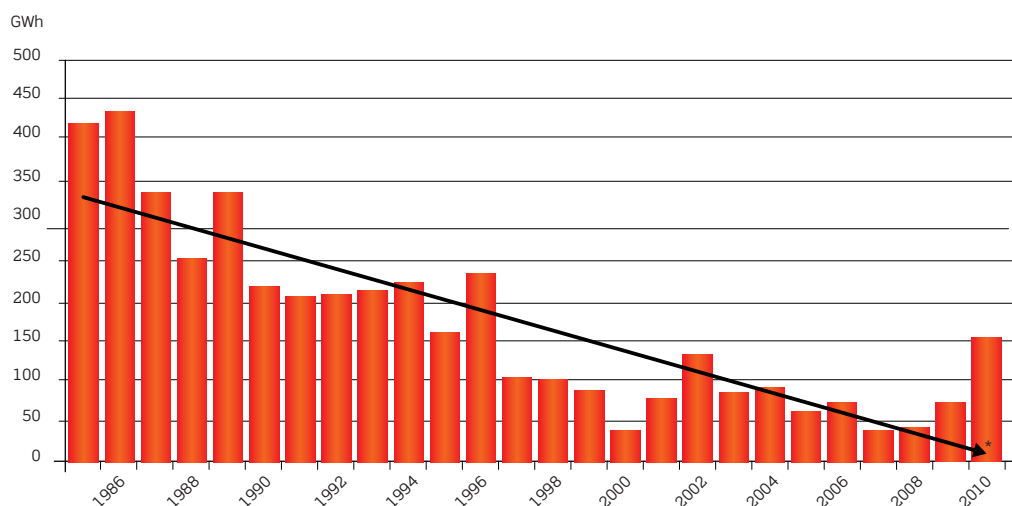
There is also a heat pump used as a support plant; it extracts heat from sewage water at our sewage treatment plant.

#### DISTRICT HEATING GRID

District heating is distributed via underground pipes to homes and other properties in Borås and is used partly to heat water circulating through radiators, and partly for heating tap water.

Construction of the Borås district heating grid began in 1959. Today there are approximately 300 km of district heating piping. There were 4,299 customers at the beginning of 2011, compared to 1,892 at the beginning of 2000. Approximately 35,000 inhabitants rely on district heating. In addition to the large district heating grid in the centre of Borås there is also a smaller grid in the small community of Fristad (located about 15 km north of Borås). The district heating in this grid is supplied by its own hot water plant with four biofuel boilers and two oil-fired boilers used as back-up. Previously, the company had facilities similar to the Fristad plant in the communities of Sandared and Dalsjöfors. These areas were connected to the central grid in 2006 and 2008 respectively, which resulted in a more efficient generation of district heating and a reduction in emissions.

A preliminary study is under way to review the alternatives for making the Fristad grid more efficient from both the financial and environmental points of view.



The figure shows the use of oil and LPG from 1985 to 2010 in the central grid.

\* Due to extreme weather during 2009 and 2010 the share of fossil fuels rose.



### DISTRICT COOLING

In 1996 BEM built a district cooling grid to provide its customers an eco-friendly, economically-viable alternative to air conditioning. Today it produces up to 7,5 GWh of district cooling via the central grid. District cooling is produced mainly at Ryaverket. There are two absorption chillers run by water from the district heating grid instead of electricity; only small amounts of electricity are needed for pumps and fans etc. Brine is used to transfer the heat between the different media. There are also three machines using conventional technology where cooling is produced by the use of electricity, and there is a small conventional cooling unit used as back-up on another site in the district cooling grid.

District cooling is produced in absorption chillers from surplus heat from the waste boilers. When no surplus is available, conventional technology is used. Two of the three conventional cooling units include heat recovery technology in order to exploit heat extracted from various buildings. This means that all the heat transferred from customers to the district cooling water is recovered in the district heating grid, including heat from the electric compressors in the conventional unit.

This variety of cooling plant options enables us to provide district cooling in the most economical and eco-friendly manner possible. The district cooling grid supplies industries, offices, shopping centres and the local hospital with cooling to create comfortable indoor environments. In addition to Ryaverket there are two other production sites in the city that provide cooling to two locations not connected to the central cooling grid. One of these is at the local hospital and consists of an absorption pump and two conventional units, the other is at an office centre and uses a conventional technology unit.

### ELECTRICITY

Electricity is generated at Ryaverket and four different hydropower plants.

The two generators at Ryaverket are driven by steam produced by the combustion of biofuel and waste. The generators were built in 1965, but were rebuilt and renovated in 2008 to obtain a higher electricity/heat ratio. In 2010, 147 GWh were generated at Ryaverket, and 33 GWh by the hydropower plants.

Electricity generated at Ryaverket and the four hydropower plants is sold to Nasdaq OMX Commodities (former Nord Pol), the Nordic electricity market.

### WIND POWER

One of the challenges facing Borås Energi och Miljö in creating a fossil fuel free city is the generation of more renewable electricity. One extremely good way of doing this is to use wind power. Wind power is a mature renewable energy technology that has low life-cycle greenhouse gas emissions. Wind power also has a very short payback time regarding the energy used in its manufacture and construction, often as low as six months of operation.

This is the background to BEM's current planning for two wind farms in the City of Borås — Rångedala and Borgstena.



*An illustration of what a wind farm next to the highway outside Rångedala might look like.*

## BIOGAS - AN ALTERNATIVE TO FOSSIL FUELS

Sobacken is a waste treatment plant owned and run by BEM. Several operations take place at the plant, but in respect of the climate, the production of biogas is the most interesting.

Biodegradable household waste is mixed with biodegradable waste from non-domestic sources and placed in a digestion chamber. Raw biogas is given off during the digestion process.

Domestic waste is collected by the company's waste trucks. At the end of 2010, 85 per cent of domestic waste was collected by trucks running on biogas, and the goal is for as many trucks as is technically feasible to run on biogas. One factor holding this development back is a lack of choice regarding adequately sized biogas vehicles. By the end of 2010 a majority of the local buses were running on biogas.

Digested sludge is mixed with garden waste and manure to produce a soil improvement product called Boråskompost (Borås compost), in many cases used to replace artificial fertilizer. Because the production and transport of artificial fertilizer is energy intensive, the distribution of Boråskompost contributes to a reduction in greenhouse gas emissions.

Biogas is distributed at five different filling stations in Borås. Three of these are open to the public, one is located at the local bus garage and the other at the Sobacken plant for filling BEM's vehicles.

The current biogas production facility at the Sobacken plant was opened in 2004. The first public filling station was opened in 2003, the filling station at the local bus garage opened five years later, and the second public filling station was opened in June 2009. At the end of 2010 the third public filling station for biogas was opened at Hulta in Borås.

2010 gas sales amounted to 2,330,000 Nm<sup>3</sup> compared to 1,516,000 Nm<sup>3</sup> in 2009. The increase in the sold volume reduced carbon dioxide emissions with 1,137 tons compared to petrol consumption.

Total biogas sales rose by 53 per cent during 2010.

## ENERGY SERVICES

In addition to the operations previously described, BEM also provides a number of services to help consumers with the reduction of energy consumption and the emission of greenhouse gases.

### ENERGY STATUS

An energy status report is a summary of a property's specific energy consumption, based on existing data. The aim is to assess the property's potential for energy savings. The tool allows the owner of multiple properties to compare different buildings and apply measures where they will have the best effect.

### ENERGY ANALYSIS

In an energy analysis, a property's energy consumption is plotted and proposals made for cost-effective measures aimed at energy savings and climate improvement. The analysis can be seen as a complement to the energy status service. If the client wishes, BEM can request and evaluate tenders for the measures proposed.

The results can be used by the property owner whenever energy and climate-related decisions are taken with regard to the property.

### ENERGY FOLLOW-UP WITH KEEPAN EYE

The KeepAnEye tool ensures that the property owner always has up-to-date energy statistics concerning the property, and it allows the property owner to continuously monitor the costs and consumption of heating, cooling, electricity and water.

### CLIMATE SERVICE

Through continual monitoring and maintenance a property owner can rectify faults, damage and leaks before acute problems arise. With Climate Service, BEM carries out checks and maintenance on that part of the district heating/cooling distribution system inside the property, i.e. the part for which the property owner bears responsibility for checks and maintenance.

### CLIMATE CONTRACT

Under a climate contract, BEM works together with the facility owner to optimize energy use in the facility. Work begins with an energy analysis to determine what can be done to optimize energy use in the property, and tenders for proposed measures are reviewed. If the client wishes to proceed, BEM takes on the role of project leader for the entire project. This allows facilities owners who otherwise lack the time or expertise necessary for the analysis to find the best solutions for optimizing their energy use.



### ENERGY DECLARATION

According to Swedish legislation (based on EU-legislation) an energy declaration must be prepared whenever a house is built, sold or rented out. The declaration must be prepared by a qualified energy expert, such as those at BEM. Since BEM already has knowledge of the properties we are able to help owners with their energy declarations in the most effective way.

## OTHER CLIMATE SAVING ACTIVITIES

### COLLECTION OF RECYCLABLES

BEM runs a large number of recycling stations and five recycling centres. The inhabitants of Borås can deposit recyclables i.e. packaging and paper, at the recycling stations, while various other types of waste such as hazardous substances, demolition waste, green waste from gardening and recyclables can be handed to recycling centres. The different types of waste are then transported to treatment facilities.

The provision of a place to dispose of their sorted waste gives the inhabitants of Borås an incentive to recycle e.g. plastics instead of discarding them together with non-recyclable waste. By enabling recycling BEM contributes to a reduction in the need for raw materials and a corresponding reduction in energy consumption and emissions.

### COLLECTION OF LANDFILL GAS

Gas has been collected from the landfill at the Sobacken plant since the spring of 2009. Were we not to make use of the gas it would seep away to the atmosphere. The gas collected is used to fuel the process incinerator at the biogas plant, thus making more biogas (otherwise being burned) available for refining and use as vehicle fuel.



*Our facility to collect landfill gas.*



*One of our three public biogas stations.*

## ENERGY USE AND CO<sub>2</sub> EMISSIONS

This section contains information about the conversion of energy from input to product and the emissions produced and saved from BEM's main operations – the production of biogas and the generation of district heating, cooling and electricity. Benefits arising from the use of the BEM products biogas and district heating, cooling and electricity will be described in a later section. The use of e.g. petrol in company cars is not included; neither is the production and transport of chemicals required for processes.

### ENERGY USAGE IN BORÅS ENERGI OCH MILJÖ OPERATIONS

The figure below illustrates input and output energy streams at BEM. The figures describe conditions in 2010. The main energy sources were forest fuels and waste. The remaining fuel types were used as support fuels when outdoor temperatures were particularly low. In 2010 BEM used 1,133 GWh in processes that generated outputs equivalent to 906 GWh.

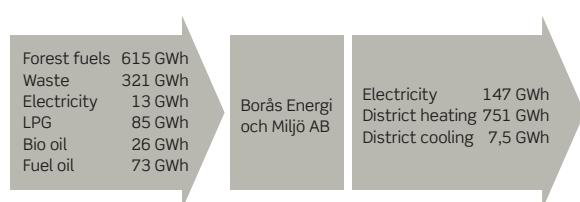


Figure shows energy input and output at Borås Energi och Miljö at 2010.

### EMISSIONS FROM THE PRODUCTION OF BIOGAS AND DISTRICT HEATING - CONTRIBUTIONS AND SAVINGS

Emissions result from both the production of biogas and the generation of district heating, cooling and electricity. But overall, BEM operations lead to a net reduction in emissions. By taking care of waste products and converting them into something useful, BEM has a positive effect on emissions.

The use of fuels to generate district heating, cooling and electricity, leads to emissions. By making decisions based on awareness of the environment, the size and effects of those emissions can be reduced. The combustion of fossil fuels unavoidably leads to emissions of fossil CO<sub>2</sub> and, depending on choice of fuel, N<sub>2</sub>O emissions. The choice of biofuel reduces direct emissions of fossil CO<sub>2</sub> to zero, but with some remaining N<sub>2</sub>O emissions. By choosing locally

produced fuels that do not involve energy consuming production processes, emissions resulting from production and transportation can be reduced.

The major proportion of emissions comes from the use of the fuel itself. The exceptions are electricity and forest fuel. Electricity does not produce emissions at the point of use, and forest fuel emissions are carbon neutral, although the transportation of forest fuel does often include the use of petrol or diesel.

The cleanest fuel with the lowest climate impact from greenhouse gas emissions is forest fuel. In Sweden, the amount of trees being planted exceeds the number being harvested, therefore the use of forest fuel is not seen as a threat to the environment. Forest fuel makes up more than 52 per cent of the energy input, but leads to emissions of greenhouse gases that are lower than those from fuel oil or LPG, which only make up 3 and 4 per cent of energy input respectively.

The largest source of emissions is the combustion of waste since waste is presumed to contain a certain amount of fossil materials such as plastics, but that does not mean that waste is a bad fuel. By using combustible waste as an energy source instead of dumping it in the landfill BEM annually avoids emissions amounting to 50,000 tons of CO<sub>2</sub> equivalents.

By using biodegradable waste to produce biogas instead of dumping it in the landfill, BEM annually avoids emissions amounting to 10,000 tons of CO<sub>2</sub> equivalents. By producing electricity from non-fossil fuels, the need to produce electricity elsewhere by using fossil fuels is reduced, thus reducing emissions.

## BENEFITS OF DISTRICT HEATING, COOLING AND BIOGAS

### GENERAL BENEFITS

There are many benefits from district heating compared to individual heating, both for the environment and the consumer.

- By replacing a number of individual heating systems, e.g. oil or wood furnaces, all emissions are concentrated in one place for treatment by organizations with the necessary expertise and equipment, which results in more advanced, efficient flue gas cleaning and pollution control.
- Ryaverket is a combined heat and power generation plant, which makes it more energy efficient than individual heating systems due to simultaneous production of heat and electricity.
- This provides a stable heating/cooling system that requires less effort from the customer. The customer does not need to purchase and transport fuel.

The benefits from district cooling are largely the same as those from district heating. Moreover, district cooling solves the problem of environmentally harmful CFCs often found in air conditioning units.

The use of biogas reduces demand for conventional fossil fuels and leads to reduced fossil CO<sub>2</sub> emissions. Biogas is about 20 per cent cheaper than conventional fuels. Biogas-fueled cars park free of charge in Borås City.

### EMISSION BENEFITS

*The table below shows BEM's savings in emissions during 2010.*

### WHAT ARE 584,178 TONS OF CO<sub>2</sub> EQUIVALENT TO?

In a petrol-driven car (e.g. a Volvo V70) with emissions of 170 g CO<sub>2</sub>/km, you would be able to drive around the world 85,909 times. In other words, 85 per cent of Borås residents could each make one trip around the world and produce the same amount of carbon dioxide that our operations managed to save our community during 2010.

### THE ACCUMULATOR TANK

Reduction in fossil fuel from accumulator use instead of oil or LPG.

The environmental benefit is 2,423 tons.

There is an additional aspect – electricity generation increased thanks to the accumulator.

The environmental benefit is 3,200 tons.

This gives a total environmental benefit of 5,623 tons.

### REDUCED FLOW TEMPERATURES IN THE CENTRAL DISTRICT HEATING GRID

During a test period (approx. 15 weeks) when flow temperatures were reduced we noted an increase in electricity generation at the district heating plant of approximately 3 GWh, which provides an environmental benefit of 2,400 tons of CO<sub>2</sub>.

### ENERGY SAVINGS AT RYAVERKET

Action: Variable frequency drives for feed-water pumps and fans.

The environmental benefit is 3,200 tons of CO<sub>2</sub>.

### REDUCTION IN NO<sub>x</sub> EMISSIONS

Action: Rendering ammonia injection more effective.  
Outcome of waste incinerator project:  
NO<sub>x</sub> levels reduced by 15–20 per cent.

| ACTIVITY  | REDUCED CARBON DIOXIDE EMISSIONS     |
|---|--------------------------------------|
| Vehicle fuel sold 2,330,000 Nm <sup>3</sup> with 76 per cent biogas content, where the increase from the previous year contributed to an emissions reduction of 1,137 tons of CO <sub>2</sub> | - 4,808 tons CO <sub>2</sub>         |
| District heating delivered 751 GWh, where new sales contributed to an emissions reduction of 275 tons of CO <sub>2</sub>  | - 435 000 tons CO <sub>2</sub>       |
| Electricity generation was 33 GWh from hydro and 147 GWh from district heating  | - 144 000 tons CO <sub>2</sub>       |
| Energy declarations during 2010   | - 370 tons CO <sub>2</sub>           |
| <b>Total avoided CO<sub>2</sub> emissions</b>   | <b>- 584 178 tons CO<sub>2</sub></b> |



## ENVIRONMENTAL COMPLIANCE STRATEGIES

### AVAILABILITY

The Ryaverket production plant comprises several different boilers connected to the same grid, which means that backup is always available, and that the plant, viewed as a single production unit, never suffers an outage.

The Ryaverket plant comprises several boilers; the table below shows availability per boiler.

| Boiler             | Availability 2009 | Availability 2010 |
|--------------------|-------------------|-------------------|
| Waste boilers      | 97 %              | 97 %              |
| Biofuel boilers    | 98 %              | 99 %              |
| Electricity boiler | 100 %             | 100 %             |

Availability is calculated as followed: hours in operation / total hours in period.

Scheduled maintenance times and planned construction work not included.

## CUSTOMER RELATIONS

### ANNUAL MEETINGS

In order to increase customer satisfaction further, all customers are invited to an annual meeting called REKO where they are informed about events during the past year and what to expect in the coming year. Customers are given a chance to ask questions and discuss matters face to face.

We have also begun a focus group comprising Borås residents to discuss various issues concerning operations plus what and how we should improve.

### IMPROVED COMMUNICATIONS

During the year we began to use social media in our communications with customers. We started a blog – [www.kretsloppsbloggen.se](http://www.kretsloppsbloggen.se) – where we explain and discuss various environmentally-related or customer-related events that concern the company and Borås residents. We also opened a Facebook page, primarily to reach out to a younger target group in Borås and provide our “followers” with information quickly and cost effectively.

In order to improve our communications and quickly provide, especially business customers, with up-to-date information about any operational disruptions and so forth, we launched a text messaging service where customers can select the information they would like to receive (concerning district heating, biogas, etc.). If anything happens we send text messages to customer telephones.

### SERVICE AND MAINTENANCE

To further increase customer satisfaction concerning district heating Borås Energi och Miljö own the distributing system at our residential customers. This means that BEM takes care of system service and maintenance.

### NEW CUSTOMERS

New customers receive a welcome gift, and all customers moving into houses with district heating receive a letter with important information on prices and the benefits of district heating. These efforts are made to ensure customers get off to a good start with district heating.



*Gina Tricot, a new comprehensive customer who chose district heating, district cooling and waste collection because of a good pricing, but above all for the environmental aspects.*



*Kretsloppet, an annual running event, a part of Kretsloppsveckan.*

### **100,000 PEOPLE WORKING TOWARD THE SAME GOAL!**

The key to achieving our dream of a fossil-free city is for everyone who lives and works in the city to be committed and participate in this environmental effort. This can involve everything from sorting waste, using district heating and cooling for their properties and using biogas to run vehicles. It is also important for residents to use energy efficiently so that we can reduce the size of the energy channels flowing into the city.

In recent years, we have provided information that is targeted to everyone who lives and works in the city. Recycling and sorting information has been sent to all households. In 2010, our environmental public relations staff visited 5th graders in the city to inform about waste, recycling, etc. We are participating in the sponsorship of a big exhibition about "The Sustainable City" at the Navet Science Center in Borås, which is visited by most pupils in Borås.

We had 1500 visitors at our facilities on study trips during 2010, both national and international visitors.

In 2009 we started a Recycling Day in Borås. The purpose of the event was to generate interest and participation in climate and environment issues. One activity during the day was a running event, Kretsloppet, which attracted almost 3000 participants.

In 2010 we increased this to an event lasting for a week with different activities throughout the week (Kretsloppsdagarna).

We arranged visits to our plants, a breakfast lecture for selected companies from the city and we held an official opening ceremony for the accumulator tank with a free rock concert. We coordinated a conference with the University of Borås, inaugurated the "Sustainable City" exhibition at the Navet Science Center and rounded off the week with the Kretsloppet competition run and festival. During the Kretsloppet festival we highlighted various aspects of the environmental initiatives we are putting into effect and provided facts and information about recycling in Borås. All of these are steps in the right direction toward our dream of achieving a fossil fuel free city.

Our international collaborations were a success; they generated good results and drew attention from the media and Borås residents alike. See [www.wasterecovery.se](http://www.wasterecovery.se).

We are also involved with several trade associations. We are on three different committees at Svensk Fjärrvärme-Swedish District Heating Association: the Environmental Committee, the Communications Committee and the Technology Committee. At Avfall Sverige – Swedish Waste Management, we are represented on the board of directors and in a number of working groups. At Biogas Väst, we are involved in a number of different working groups. We hold the chairmanship of Waste Refinery, a joint association including several companies, University of Borås and SP Technical Research Institute of Sweden that is trying to develop various uses for waste.