14 LOCAL WAYS TO GREEN ACTION

Nordic Climate and Energy Solutions

- Ambitious Akureyri**
Municipality of Akureyri 3
- The Albertslund concept: Pioneering council addresses the issue of ageing housing stock**
Municipality of Albertslund 4
- Transparency: Sunshine island co-ordinates EU project**
Municipality of Bornholm 5
- School joins fossil-free energy network**
Municipality of Drammen 6
- Freight takes the train to the biggest Nordic port**
City of Gothenburg 7
- Giant compost heap generates district heating**
Municipality of Jomala 8
- Lahti turns waste into energy**
Municipality of Lahti 9
- Lidköping converts food waste into biogas for heavy vehicles**
Municipality of Lidköping 12
- Skaftkärr – green living in Porvoo**
Municipality of Porvoo 13
- Energy 2020: an enterprising region building on tradition**
Municipality of Ringkøbing-Skjern 14
- Small community, big ambitions**
Municipality of Sunndal 15
- Turning the Tampere tankerhousing stock**
Municipality of Tampere 16
- Eco-tourists welcome in the Westman Islands**
Vestmannaeyjarbær 17
- Self-heating high-rise block in Växjö**
Municipality of Växjö 18

SHARING NORDIC SOLUTIONS

The Global Green Transition

Shaping green economies and sustainable communities is one of the most important challenges of our time. Coping with this effectively, however, requires innovative thinking and strong collaboration across borders and sectors. It also requires that we share solutions. This publication highlights the 14 leading sustainable energy and climate related solutions on a local scale in the Nordic region.

14 Nordic Solutions

The 14 solutions were the nominees for The Nordic Energy Municipality 2011 Award under the Nordic Council of Ministers. The award recognizes efforts by local actors, business communities and citizens, and engages the local community, and the region at large, in the global green transition.

Award Winner 2011

The initiative supports and highlights sustainable energy, green growth, and energy related climate actions introduced and undertaken in the Nordic region. The Danish municipality of Albertslund was appointed the Nordic Energy Municipality 2011.

Moreover, the Norwegian municipality of Drammen and the municipality of Lidköping from Sweden received a special recognition for their projects.

www.nordicenergymunicipality.org

Ambitious Akureyri

The small town of Akureyri in the north of Iceland (population 18,000) has ambitious environmental policies. The local council aims to minimise greenhouse-gas emissions and maximise local potential by producing environmentally friendly fuel in the area.

Akureyri
Iceland

cheap travel
fuel production

Municipality of Akureyri - <http://www.akureyri.is/>

Akureyri has launched a four-pronged project that involves making use of greenhouse gases from old rubbish tips near the town; recycling household waste as much as possible instead of transporting it further afield; reducing emissions from road traffic in the area; and producing biofuels, i.e. methane and biodiesel.

Akureyri has closed its own rubbish tip, at Glerárdalur just outside the town, and now transports all its waste to Skagaströnd, 150 km away.

By law, Akureyri is obliged to prevent methane from old rubbish tips turning into a climate gas.

"We've studied the potential for recycling waste from old tips and making use of the methane, which otherwise turns into a harmful emission," says Mayor Eiríkur Björn Björgvinsson.

"We are currently looking at the quantities involved and how we can recycle the gas in future."

Cheap travel

One of Akureyri's goals is to transport as little waste as possible to rubbish tips, partly by intensifying its programme of waste separation.

"We have identified what can be recycled, and significantly reduced what is transported to tips," the mayor explains.

The process separates paper, plastic and glass for recycling. Bio-waste is transported to the compost unit at nearby Molta, which in turn produces fertiliser. It has the capacity to handle 11–13,000 tonnes of waste p.a., enough to reduce emissions of carbon dioxide from organic waste by some 15,000 tonnes a year.

The local bus service will play an important role in achieving Akureyri's policy goals. The twin aims are to provide local people with cheap travel and to reduce vehicular traffic. Schoolkids and senior citizens have enjoyed free bus travel since 2007. The mayor is pleased with the results to date, and reports a considerable drop in emissions.

Fuel production

Akureyri is also developing production of methane fuel for cars by recycling greenhouse gases from rubbish tips. It hopes to produce 2,100 tonnes of fuel p.a.

"That's enough for 300–500 cars," Björgvinsson calculates. He also points out car manufacturers would like production to start as soon as possible.

"They've already started to adapt vehicles to run on methane fuel, and want us to start producing and selling it as soon as possible. The time scale frame is unclear though, so we don't

know exactly when we'll be able to start marketing it."

Akureyri also has a small plant that produces biodiesel from recycled waste fats from households in the town. Its current capacity is approximately 300 tonnes of biodiesel p.a., corresponding to the energy needs of 300 vehicles. The target is to 2,500 tonnes p.a. The local bus services already run on biodiesel.

Björgvinsson explains that it is not just a matter of the council's image, but about sustainability and energy efficiency.

"For us, it's about not being forced to buy fuel because we'll be able to produce it ourselves locally, saving large sums in the process," he continues.

"The composting plant at Molta will also make money by selling fertiliser."

The mayor points out that Akureyri is currently at an experimental stage and nobody quite knows how successful its environmental policies will be. He's an optimist though.

"The policy might be ambitious but by investing in the environment, we're also investing in the future," he concludes.

The Albertslund concept: Pioneering council addresses the issue of ageing housing stock

Albertslund
Denmark

energy saving
retrofitting
prefabrication

Award Winner
2011

Albertslund, west of Copenhagen, is a famously proactive local authority, a tradition maintained by a major new plan to renovate vast swathes of the local housing stock.

Albertslund, to the west of the capital, has shown the way forward in key areas such as town planning and the environment on several occasions over the years. The menus in its day-care institutions consist of organic food, all council offices are environmentally certified as per EU regulations, and, in 2008, it became the first local authority in Denmark to be 100% environmentally certified.

At the moment, Albertslund is involved in a large-scale project that once again highlights the pioneering council's talent for planning and innovation. Much of the high-density low-rise housing built in the 1960s and 70s is now in need of renovation and modernisation. As is only fit and proper for a local authority with a strong environmental profile, Albertslund is seizing the opportunity to incorporate energy efficiency into the project.

This has evolved into the "Albertslund concept", which develops, tests and demonstrates methods for energy-efficient renovation, e.g. by using modular building techniques.

Make a difference

A great deal of new housing was built in the 1960s, 70s and to some extent the 80s, and it's no secret that sometimes it was all done a little hastily. Albertslund distinguished itself at the time by carefully controlled town planning and a vigorous expansion of its housing stock, much of which is now in need of renovation.

"If we really want to do something about domestic energy consumption, we need to start by looking at the existing housing stock. This is where we can make a difference," says Hans-Henrik Høg, project manager for the Albertslund concept.

"Major energy savings will be made if we bring older stock up to the standards for new buildings, and we'd like to go even further than that. The potential is huge, but so are the challenges. Working hand in hand with a range of suppliers, knowledge centres and advisers, and with funding from the Danish Energy Agency's Energy Technology Development and Demonstration Programme (EUDP), our first step has been sample projects in selected private and rented residential areas."

"In Albertslund South, six rented apartments were chosen and renovated to comply with various energy standards. As a bare minimum, they had to comply with the rules for new buildings, and at best they were to be completely CO₂-neutral. All of them will have low-temperature district heating installed. The idea was that the project would pave the way for the renovation of approximately 550 terraced houses, to be started in 2012."

"In another area dominated by rented housing, Hyldebjerg, an extra precondition was added – three of the homes were to be completely free of external energy, meaning that the district-heating lines would be disconnected. Instead, a solar prism was to be mounted, containing solar cells, solar panels, heat pumps, ventilation, etc. We wanted to show that it's possible to renovate a building's entire energy system without having to rehouse the tenants!"

"At the moment, we're working on low-energy tests in two private housing areas – one in a detached house, the

other in a terrace. Here, the challenges are greater. The council can't just decide that the time has come to renovate all of the homes in the area. We have to think in terms of local development plans, building projects, legislation and taxation. But plans are now in place and the projects are scheduled to commence early in 2012. The idea is that these projects will generate detailed descriptions of how energy renovation work can/must be done. Local people will be able to access the plans via their home-owners' association, so the buildings have a similar architectural look."

"When those houses are finished, the actual EUDP project, and therefore the government funding, will come to an end. However, we intend to keep refining the concept along with all the other partners that have worked so well together over the last three years," Høg explains.

More than energy

All homes in Albertslund are potentially covered by the project. In the first

stage, 500 terraced houses in Albertslund South will be renovated. Then, 1,500 homes built around courtyards will be next in line. Future renovation activities over the coming decades will be determined by a list of priorities, and rented homes will be renovated as and when the National Building Fund releases the funding.

The targets are clear: The projects must, as a minimum, result in renovated homes that meet the standard requirements for new buildings. If sufficient funds are available, the requirements may be made even stricter. However, in the first instance, Høg does not envisage actual zero-energy homes, disconnected from the district heating system.

The Danish Technological Institute provides the secretariat function for the EUDP project, which involves a whole range of partners. Naturally, the local housing association is involved, as are interested industrial partners such as Rockwool, Danfoss, Velux, Niras, Cenergia and Kuben.

"There are many, including major players, who are keen to gain experience of this type of work," Høg explains.

"The market potential for energy renovation is huge, so it's all about finding the right solutions. We have a collective interest in developing the industrial side of the work so that the various solutions become profitable, including when applied to private housing. It's extremely important that home owners see visible evidence of success before committing to what are often considerable investments."

"It's worth remembering that energy renovation is about more than just energy solutions. To a large extent it is also about comfort, and residents have already expressed their satisfaction with the comfort levels. They don't have to put up with damp and cold exterior walls any more, they get more daylight, and generally enjoy healthier and nicer homes with a better indoor climate."

"In such major renovation projects, it's also natural to take architectural considerations into account. The old houses are covered with new façades, and it's important that they are endowed with an attractive, modern aesthetic."

So the renovation process is also about added value," he notes.

Part of the Albertslund concept consists of developing prefabricated solutions for use in similar residential areas all over Europe. The concept is not just about methods and technical solutions to make energy renovation less expensive, however, the ambition also includes developing holistic solutions for the benefit of individual tenants and whole residential areas alike.

Albertslund has been awarded a number of prestigious prizes for its environmental and climate work in recent years. These include: the Nordic Council Environment and Nature Prize 2007, the Danish Town Planning Institute's Town Planning Prize 2008, the Climate Cup's Town Prize 2008, and the Danish Energy Association's ELFORSK Prize 2009. In April 2009 Albertslund was also made an "Energy Town" by the Danish Ministry of Climate and Energy. ■

Albertslund
DANMARKS KLIMALABORATORIUM

renewable energy
heating system
selfsufficiency

Transparency: Sunshine island co-ordinates EU project

The decision to be even greener and more attractive has spawned a whole range of local initiatives on Bornholm, the rocky Danish island in the Baltic Sea.

Municipality of Bornhom - <http://www.brk.dk/brk/>

The Danes call Bornholm the sunshine island because the sun tends to shine a little bit longer on the main town, Rønne, and surrounding area. The frequency of the sun may allow the island to generate extra electricity from solar panels, but solar power is only one of a wide range of measures initiated by the local authority and the island's energy company to promote renewable energy.

Bornholm's politicians have decided that the island will be 100% green and attractive by 2025, and they are doing everything in their power to realise this vision. One of the main milestones on the road to success is the EU project Transplan (Transparent Energy Planning and Implementation). Bornholm acted as the co-ordinator of this initiative, which officially ended in March last year, but lives on in the form of a series of projects.

Louise Lyng Bojesen was the project co-ordinator for Transplan. As a biologist and head of the regional council's Technical and Environmental Services, she plays a key role in energy and environmental initiatives on the island.

"Transplan was basically a tool for energy planning. Along with local stakeholders, we decided what we wanted, what was possible, and where to start the communication and implementation process," she explains.

Set targets

"Transplan was important because it resulted in a clear description of the over-arching political objectives, and it identified specific actions that need to be taken," she continues.

"That clarity of purpose is a huge strength, because everybody involved now knows where we are heading. It also means that all the different initiatives and projects can be seen in the same context."

"In order to achieve the objective of self-sufficiency in the energy sector by 2025, we are deploying a whole range of options. This is, of course, a dynamic process, as technology changed and evolves all the time. For example, there wasn't much interest in solar power back in 2008 but this has now changed dramatically. It's easy to imagine the same kind of change happening with wave power."

"A lot has already been done with district heating. In 2007, we launched a plan to extend the district-heating system. The idea was make it possible for home owners to jettison oil-fired heating voluntarily by 2017. This is important, because houses account for a substantial proportion of energy

consumption. It's gratifying that we've already reached our target. It means we can get on with the next phase, when we'll look at extending the network to houses built on rocky surfaces. Of course, laying pipes in areas where you have to blast instead of dig presents totally different challenges."

"We are also looking at new technologies. Bornholm has a number of straw-fired plants, but this is a limited resource. So we're looking closely at how we can utilise solar power, heat pumps, etc.. We're also looking at whether a geothermal plant would be feasible in Rønne."

"Another top priority is the transport sector, which accounts for 40% of energy consumption. Electric cars are an obvious solution, but the technology isn't quite there yet, so we've launched a number of development and demonstration projects. These are taking place under the auspices of the Edison project run by our local energy

company. It also involves looking at whether it is possible and practical to get the batteries for electrical cars to act as buffer storage for surplus energy from renewable sources such as solar and wind," Bojesen explains.

Useful laboratory

Electric cars and their owners are not the only ones who will – perhaps – contribute in a localised way to the ongoing development of energy strategies. A number of smaller energy-producing units will supplement the island's main power sources. Feeding into the grid puts demands on the electricity company's administration and management – and here, too, there is much to learn. This work is being done by the Ecogrid project, which involves partners such as IBM and Siemens.

"In general, Bornholm is well suited to developing and testing energy strategies," Bojesen believes.

"In principle we could even turn off the undersea cable to the mainland and switch to island power. This would make the whole island a closed circuit and the ideal place to test solutions. We account for approximately 1% of Denmark's area and population, so you might say that it's just a matter of multiplying by a hundred to see what would happen in the rest of the country."

"Bornholm also serves as an interesting example to all of the other islands in Europe," she points out.

Holiday island

A good, old Danish song calls Bornholm "the loveliest holiday island". It's a line redolent with renewed topicality. Bojesen and her fellow islanders have noticed a whole new type of visitor: energy tourists flocking to the island from far and wide.

"There's huge interest in our projects and experiences of new technology, as well as our efforts to draw up a coherent energy policy and disseminate information about it," she says.

"The biogas project, Biokraft, has attracted particular attention. Interest has also been shown in district-heating systems, wind power, energy renovation of houses and all of the other opportunities Bornholm affords as a testing ground."

"At local level, various people and groups provide support in a number of ways. For example, the local environment and energy association is deeply committed, and we have seen, via the district-heating plan, that home owners are also on board," she notes.

As well as Bornholm, Transplan is also involved in a number of different ways on the islands of Gotland, Saaremaa, Sardinia and Åland. The EU Commission set the project in motion partly because it was often difficult to understand the different European energy plans and transfer them to other sites. The official evaluation concludes that Transplan has shown the way forward when it comes to making energy planning transparent and coherent. The EPT (Energy Planning Tool) has also proven to be useful in this context.

Drammen
Norway

biogas
heating network
solar power

Marienlyst is an environmentally friendly and energy efficient school in Drammen. Along with many other buildings, including local sports centres, not to mention a fjord and various other local stakeholders, it forms part of a local energy network.

School joins fossil-free energy network

Municipality of Drammen - <http://www.drammen.kommune.no/>

Two hundred years ago, a group of small communities on either side of the River Drammen in Østlandet, 40 kilometres south-east of Oslo, merged to form a single town called Drammen. Now home to a population of 64,000, Drammen is also the regional capital for some 150,000 Norwegians. A the town marks its 200th anniversary, the local people enjoy the benefits of a unique fossil-free energy network, one element of which is the first Norwegian school to be housed in a passive building.

"We get a lot of visitors from Norway and abroad, and the school is one of the main attractions," explains Geir Andersen, Technical Director at Drammen Council.

School and sports centre

The school in question is Marienlyst, a 6,500m² upper secondary with

550 pupils. The three-storey building is simple, compact and designed according to passive-building principles, which means that it uses an array of techniques to reduce and recycle energy. For example, the building is super-insulated, the windows and doors are highly insulated and thermal bridges have been minimised.

Up to 84% of the energy from the ventilation system is recycled and air conditioning is strictly based on need. The classrooms are fitted with CO₂ and temperature sensors and the lighting system is equally energy efficient.

The many technical solutions mean that the school is almost completely self-sufficient in energy. During the summer it actually supplies heat – the school's underfloor-heating pipes service the nearby outdoor pool, the biggest one in the country.

"The school is also part of a local

heating network based on pumps beneath two artificial football pitches," Andersen explains.

"The network supplies heat to sports centres, offices, football pitches and a care home. During summer, the network supplies excess heat from the school and the indoor swimming pool to the outdoor pool, which consumes a great deal of energy. This keeps the indoor climate in the school and indoor pool comfortable, effectively acting as a free cooling system."

A very large solar panel

The heat pumps beneath the two pitches work like a gigantic solar panel. When the temperature rises above 2°C, they supply all the buildings in the network with 2.5 million kWh of solar power per annum.

"Of course we don't get any heat from the pitches in the winter when it's really

cold," the technical director continues.

"So we also use heat from a district-heating plant running on biomass, as well as heat from Drammen Fjord."

When it is extremely cold, everything is covered with ice and the pitches produce no heat, energy is supplied from district heating based on biomass (briquettes) and heat from Drammen Fjord.

"On the whole, it is a highly sustainable solution," he says.

Striving for perfection

Marienlyst School was completed in August 2010 and Drammen outdoor pool welcomed its first guests in 2009, but the energy plant that made all of this possible had to be commissioned first.

"The fossil-free network is, of course, the result of deliberate planning," the director points out.

"Along the way we've been quite lucky in terms of spotting and making the most of opportunities. Despite the anticipated start-up problems, I must say that I've been pleasantly surprised. The network faced its first real test last summer, and passed with flying colours!"

"It has been a hugely exciting process – and it's not over yet," says Andersen. "In fact, it's an ongoing project and we will continue to strive for perfection. At the moment, the plan is to connect another school to the network, but we are also looking at ways to improve overall operations."

Andersen reckons that the whole project, which also includes traditional solar panels, has cost NOK 7–800 million. ■

Freight takes the train to the biggest Nordic port

Gothenburg
Sweden

freight
transport

City of Gothenburg - <http://www17.goteborg.se/english/>

Gothenburg is home to the biggest port in the whole of the Nordic Region. Thanks to its “RailPort” concept, the local authority’s commitment to the environment has not gone unnoticed.

“It’s great! Our policy is to be world class on the environment. This applies not only to the port, but to everything we do,” says Kia Andreasson, the councillor responsible for the environment.

RailPort has significantly increased the number of containers shipped to and from the port by train instead of truck, facilitating a major reduction in carbon emissions.

“Our target is that a minimum of 50% of freight should be transported by rail, and we’re almost there,” says Åsa Wilske, Sustainability Manager for Port of Gothenburg AB.

Implementing this change required extensive logistical preparations, which started more than a decade ago. The main features of the project were building transshipment terminals around the country, increasing the capacity of the rail tracks into the port and laying new railway lines between the port and the new terminals.

There are now 26 of these freight terminals within 15 and 500 km of Gothenburg. Most of them are located in Sweden, with one or two in Norway. Thanks to the new inland terminals and lines, VAT and customs can be cleared before freight reaches the port. As a result, everything runs smoothly, and the benefits in terms of energy and the environment are considerable.

“It means that we have been able to move the ports’ functions to the inland terminals and give freight owners and industry a sense of proximity to the port,” Wilske explains.

“In the port area in Gothenburg, a series of measures have also been taken to ensure that the logistics chain works properly. Freight always used to have to switch to a diesel-powered locomotive for the final stretch, but now the same electric locomotive can make the whole journey.”

A variety of stakeholders were involved in building the hubs. As well as the Port of Gothenburg and its owner (the City of Gothenburg), they include the Swedish Transport Administration (formerly the Swedish Rail Administra-

tion), many of the new train operators, other local authorities, shipping agents, hauliers, shipping lines, etc.

Wilske is particularly enthusiastic about the close working relationship with the new train operators.

“I think rail deregulation has played a major role in the success of the project. But I’d also like to pay tribute to the Rail Administration, which removed many of the bottlenecks. We’ve all worked really well together and found a business model that has something to offer everybody involved,” she says.

The results have been positive, in both environmental and financial terms.

When RailPort began in 2001, 22% of all containers to and from the port went by train. This has now doubled to 45%. The corresponding reduction in road traffic has cut emissions, wear and tear on the roads, noise, accidents and congestion.

Carbon emissions are estimated to be 50,000 tonnes p.a. lower, the equivalent of 10,000 cars circumnavigating the globe. Emissions of nitrogen oxides have decreased by 330 tonnes compared to shipping by truck. The project has also reduced total energy consumption by 160 gigawatt-hours.

“To be completely honest, we weren’t really thinking so much about energy at first. It was more a general idea about sustainability—that it would be good to move more freight by rail,” she recalls.

What next?

Kia Andreasson says that now is the time to raise the bar further. And sustainability manager Åsa Wilske would like to continue the same (rail)way:

“We’ll continue to refine the concept. Not all freight is carried by rail yet, and our logistics could be even more efficient. We’d also like to share the concept with others,” she says.

Gothenburg is home to the biggest port in the whole of the Nordic Region. Thanks to its “RailPort” concept, the local authority’s commitment to the environment has not gone unnoticed.

Giant compost heap generates district heating

Jomala
Åland

district heating
biogas

A large white spherical object, 13-metres in diameter, catches the eye as you drive through Jomala on Åland. It looks like a giant golf ball that just happened to land among the other buildings that make up the local co-operative dairy. It is, in fact, a large-scale environmental project in the small-scale context of Åland.

The dairy stores up to 1,000m³ of biogas in a membrane bag inside the ball. When production exceeds the dairy's heating needs, the surplus is piped to a biogas boiler and into the Jomala power system via the council-owned district heating plant next door.

Jomala Council and Ålands Central- andslagslag (ÅCA) completed work on the district heating unit, which is linked to the biogas plant in early 2010. They may have been built separately but the two plants are the result of a close working relationship between the public and private sectors. Between them, they generate enough heat to replace 900m³ of fossil fuel. The project was co-funded by the European Regional Development Fund and the Åland government.

"We're extremely pleased with the results," says Johannes Snellman, managing director of ÅCA, the dairy.

He explains that the biogas plant, which he describes as a giant compost heap, not only puts waste to good use but has also led to close and productive partnership with the local authority.

"The public and private sectors have learned to work together in lots of small ways, e.g. on land use and on smaller issues like ditch-digging and ploughing."

The biogas plant uses whey, a waste product from the dairy that used to be shipped elsewhere, saving 70,000 km p.a. on vehicle transport. The gas provides heat for the production process in the dairy. The plant also cleanses the waste water from the dairy before

it is sent for final treatment at the Lotsbro plant in Mariehamn.

"This was a necessary investment for us. The volume of waste transported was growing all the time," Snellman adds.

The link to the district heating plant provides the dairy with an added layer of security.

"If we don't produce enough biogas for our own needs we can top it up with heat from wood chips."

Carolina Sandell, Director of Jomala Council, is equally positive.

"We found a joint solution to two separate problems. The council wanted to build a district heating plant. The dairy wanted to solve its waste and transport problems. Working together made it a win-win situation for both of us as well, as for the environment."

Sandell also notes that the practical work of linking up the two projects led to the discovery of other advantages of the two sectors working together. The Council's thermal power station was mainly fired by wood chip, which had to be brought in. The more biogas the dairy produces, the less the wood chip is needed.

The dairy currently uses 80% of its milk for cheese production, and it takes 10 litres of milk to produce one kilo of cheese. Whey is what is left of the milk after cheese production – water, carbohydrates and residual proteins. Some 10,000 tonnes of whey have to be disposed of every year.

The plant currently produces 1,000m³ of gas a day. The methane content, which provides the energy, averages

64% but can be as high as 70%. The energy output is around 6000 kWh per day.

The plant also processes 26,000 tonnes of waste water from the dairy every year. The more it cleanses the water, the lower the charges paid to pipe the water for further treatment elsewhere in the system.

The waste water is processed in the aerobic reactor and bio-fertiliser is extracted and sold to local farms. The degree of purification marginally surpasses the values estimated by the dairy and the main contractor, Goodtech Environment.

Turing whey into energy opens up huge opportunities for ÅCA to increase cheese production. Snellman also believes that there is room for growth in the export market, but that would require an increase in milk production on Åland.

"We envisage growth, although there are no specific plans at the moment," he says. "The plant also consumes a certain amount of external waste material, particularly in liquid form, and has been earmarked for potential expansion."

The link to the district heating network provides a market for surplus heat in the future.

The local council also has plans.

"The district heating network will be extended and we may talk about partnerships with neighbouring councils," Carolina Sandell concludes.

FACTS

THIS IS BIOGAS

Biogas, which mainly consists of methane and carbon dioxide, is formed when organic material is broken down by micro-organisms in an acid-free environment.

Natural biogas is produced all the time in environments with limited access for acids, e.g. in bogs, seabed sediment and in the stomachs of ruminating animals. Biogas is an efficient energy source from a natural cycle. The gas can be used for electricity production, heating and vehicle fuel.

THE PLANT IN FIGURES

The raw material for the biogas plant consists of 26,000 tonnes of waste water, 10,000 tonnes of whey and 300 tonnes of butter-milk/waste milk p.a.

The plant expects to produce the equivalent of 250 tonnes of fuel oil and 1,500 tonnes of bio-fertiliser p.a. It also aims to cut the number of kilometres covered by heavy vehicles by 70,000 p.a.

1m³ of unpurified biogas corresponds to 0.7 litres of fuel oil. 1m³ of purified biogas provides 3–4 kWh of electricity or 6–7 kWh of heating. 1m³ of purified biogas corresponds to 1.1 litres of petrol.

Every EU citizen produces an average of more than 500 kg of waste p.a. – most of which goes directly to landfill. But Lahti sees waste as an opportunity. The ambitious project KYVO2 – Waste to Energy aims to provide the city with electricity and heat generated from recycled waste by spring 2012. The concept will dramatically reduce the use of fossil fuels, emissions and the need to transport and dispose of waste.

Lahti turns waste into energy

Lahti
Finland

gas waste management

Every EU citizen produces an average of more than 500 kg of waste p.a. – most of which goes directly to landfill. But Lahti sees waste as an opportunity. The ambitious project KYVO2 – Waste to Energy aims to provide the city with electricity and heat generated from recycled waste by spring 2012. The concept will dramatically reduce the use of fossil fuels, emissions and the need to transport and dispose of waste.

Lahti Energia, a power company owned by the local authority, runs the new power plant, next door to an old one in Kymijärvi. The plant represents the new generation of environmentally friendly technology, and will produce about 50 MW of electricity and 90 MW of district heating for the whole region. It will be powered by about 250,000 tonnes of gasified landfill waste p.a. The plant started running tests in autumn 2011. One of the major and technically advanced innovations in the new plant is the gas purification process. Another is the energy-efficient gasification process.

For years, Lahti has been a Finnish pioneer in sorting and recycling waste. No less than 94% of the waste produced in the city is recycled, compared with a national average of around 50%. Local people's willingness to sort their rubbish has been one of the driving forces behind KYVO2.

"Sorting rubbish is ingrained in the people of Lahti – it's just a natural part of everyday life," says Saara Vauramo, development manager for Green City, Lahti's programme for a sustainable and energy-efficient society.

She stresses that the close partnership between the city, the energy company and the waste-processing company, Päijät-Häme Jätehuolto, was a prerequisite for the project.

Municipality of Lahti - <http://www.lahti.fi/>

Halving carbon emissions

Vauramo describes the new power plant as a necessity. The EU is constantly tightening up its emissions standards, but the city's existing power plant in Kymijärvi still runs on fossil fuels. Lahti set a target of halving its carbon emissions by 2025 compared to 1990 levels. The KYVO2 project is one of the main means of achieving this goal.

The project will cost around €160 million, a big investment for a city with a population of just over 100,000. An investment on this scale is, of course, the result of an in-depth political process involving decisions by multiple official bodies. The project began in 2008. Given that the power plant will go into service in spring 2012, the whole process has been fast and surprisingly painless.

"This shows how united our politicians are about the project's positive effects," Vauramo explains. Thanks to the new plant, Lahti will almost be self-sufficient in energy. The plant will only lack the capacity to meet demand during the coldest winter months.

Innovations attract interest

Part of the funding for KYVO2 consisted of loans from the Nordic Investment Bank and the European Investment Bank. That fact that the banks were willing to grant such large loans is a sign of the project's credibility and innovation.

Lahti's green initiative has also attracted interest from outside the region, both in Finland and abroad. The power plant's innovative gasification technology can, of course, also be exported.

"There has been considerable interest in KYVO2 from around the world. We've been approached by the organisers of the London Olympics, for example," Vauramo adds.

In response to this interest, a new auditorium has been built to welcome visitors to the new plant.

A greener city

KYVO2 is just one important element in a larger, holistic, project – turning Lahti into an even greener and more sustainable city. The Green City programme is described as a realistic dream of an energy efficient eco-city in which the voices of the local people are heard.

Many factors point to Lahti being on the right track. Päijät-Häme Jätehuolto is one of Finland's pioneering waste-sorting companies, and recycles an impressively high percentage of rubbish

by Finnish standards. For example, in 2000, separate bins were introduced for energy-, bio- and general household waste in buildings with more than ten homes.

The city also invests almost €17 per capita p.a. on environmental research, an exceptionally high figure by Finnish standards. The local authority is even investing in green solutions for its own work. For example, it is the first city to use the WWF's Green Office system, which aims to reduce the environmental impact of workplaces.

"Our goal is to be the leading eco-council in Finland. The KYVO2 project puts us well on the way," Vauramo concludes. ■

How can innovative energy solutions support green growth and enhance life quality for all ?

“The Nordic countries are prioritizing green growth, because it creates jobs, affects the environment in the right way, and gives fantastic competitive opportunities on the global playing field. Nordic Energy Municipality 2011 plays its part and I would like to congratulate Albertslund for their efforts”

**Prime minister Jyrki Katainen, Finland,
at the Nordic Energy Municipality 2011
Award ceremony**

“A large number of buildings will be renovated in the years to come, and to that end we need clever and sustainable solutions.”

**Mayor Steen Christiansen,
Albertslund (Denmark),
winner of Nordic Energy Municipality 2011.**

Lidköping converts food waste into biogas for heavy vehicles

Lidköping
Sweden

Lidköping vid Vänern (population 38,000) has a new and unique facility for producing liquid compressed natural gas (CNG) for vehicles. The local council's environmental strategist, Yvonne Träff, thinks that the time has come for the automobile industry to start producing gas-powered heavy vehicles on a large scale.

biogas
environment
green growth

Municipality of Lidköping - <http://www.lidkoping.se/omwebbplatsen/inenglish>

"Everyone's been waiting for somebody else. You couldn't make cars because there were no filling stations. And you couldn't build filling stations because there were no cars. With this plant, everything is now in place," she points out.

It remains to be seen how Volvo and other manufacturers will respond to her message, but it is clear that the biogas project in Lidköping is both forward-looking and successful.

The liquid biogas plant at Kartåsen, outside Lidköping, is one of the first in the world. The initiative was inspired by the local authority's target for reducing emissions from fossil fuels. The new plant is a joint venture between the council, Gothenburg Energy and Swedish Biogas International AB.

"Collaboration is the most important factor for ground-breaking new initiatives," Träff says.

Actually, there are two parts to the plant – one for waste putrefaction, which produces the gas, and one for liquefying the gas.

"For a small local authority like Lidköping to make this work financially, the gas has to be liquefied and transported elsewhere. Of course, we want to use it in the local community too, but the critical mass isn't there to make it financially viable," Träff adds.

The process starts by feeding food and agricultural waste into the plant's two digesters to produce methane gas. The putrefaction starts in an oxygen-free environment in which, after some time, methane is formed. This passes through the treatment plant and comes out as 97% methane, which is the percentage required to be classified as CNG gas.

Some of this gas is transported in compressed form to filling stations, while the rest undergoes further purification to achieve an even higher methane content. This gas is then cooled to about -140 degrees. "At this point it becomes liquid and is easier to transport," Träff explains.

Once the gas has been extracted, the residue that remains in the digesters

doesn't go to waste. It is turned into excellent bio-fertiliser for use by local farmers.

One side effect – and a pleasant one, according to Yvonne Träff – is that the residual products have become a commodity.

"This is because we're starting to think more sustainably. We no longer drive to the tip and throw waste away. We want to use it," she says.

When production at the plant in Kartåsen reaches full capacity, it will produce 60 GWh of biogas a year – enough to run 6,000 cars for over 10,000 miles a year. If those cars replaced petrol-driven motor vehicles, carbon dioxide emissions would be reduced by 16,000 tonnes p.a.

"That's approximately three times the local authority's total emissions," Träff explains.

Mayor Kjell Hedvall (Soc Dem) considers it an honour that the council's environmental efforts have received attention at Nordic level.

"I see it as confirmation that we are heading in the right direction. We decid-

ed early on that we want to be at the forefront of work to combat the effects of climate change. We are also involved in international efforts to demonstrate that it is possible, in practice, to address the world's over-consumption of fossil fuel. As a small council, we contribute by setting a good example."

Hedvall also points out that there are plenty of opportunities to sell biogas to the rest of Sweden.

According to the mayor, investment in biogas was a natural step for Lidköping.

"This is typical agricultural country – from farm to table. We put a great deal of thought into what we could do with the waste from our raw materials."

What next?

"Lidköping happens to have one of the highest levels of sunshine in Sweden, so we need to exploit that, too. As the technology improves, we intend to invest heavily in solar energy," Hedvall concludes.

Skaftkärr – green living in Porvoo

Porvoo
Finland

CO₂ emission reduction energy efficiency

“Energy efficiency is one of the most important elements of the city’s strategy. The Skaftkärr project marks the start of a wide-ranging programme of measures aimed at steering Porvoo towards carbon-free living. Such a major and direct investment in energy efficiency is unique in Finland,” explains Deputy Mayor Fredrick von Schoultz.

Skaftkärr is a joint venture involving the Finnish Innovation Fund (Sitra), the City of Porvoo, Porvoon Energia Oy and the development company Posintra Oy.

The planning and construction work involves a broad partnership between official agencies, energy producers, developers, builders, appliance manufacturers, other businesses and prospective residents.

The pilot project is part of Sitra’s five-year energy programme, which aims to apply experiences gained elsewhere in Finland.

Energy efficiency starts with planning

The Skaftkärr project has three main objectives. The first is to develop the planning process so that energy efficiency is accorded greater prominence. According to von Schoultz, good planning often has a greater impact than people think.

“We’ve calculated that, thanks to detailed planning, we’ll be able to reduce greenhouse-gas emissions by 30%.”

“Studies of emissions, energy and planning help local authorities to understand the implications of planning solutions for the climate,” says Jukka Noponen, director of Sitra’s Energy Programme.

Vehicles tend to be one of the major sources of pollution in cities, so special attention has been paid to traffic planning in Skaftkärr.

“We’ve worked on the assumption that the quickest and shortest routes should be reserved for pedestrians, cyclists and public transport,” von Schoultz explains.

The second objective is to put into practice the Living Lab project – a control and management system designed to promote energy efficiency and reduce electricity consumption. One of the objectives of Living Lab is to encourage people to think about energy efficiency in the home. Whenever people are able to see right away how much power they are using when they switch on the coffee machine or the TV set, it has an immediate impact on consumption.

“We studied energy-efficiency in identical homes, where some were able to

Porvoo, some 50 kilometres from Helsinki, is in the vanguard of energy-efficient housing in Finland.

Sustainable development and energy efficiency are the key ingredients that will shape the entirely new Skaftkärr district over the next few years. The whole district, which will house approximately 6,000 residents, will be planned and built so that the houses, the living environment, traffic and services are all as energy efficient as possible.

Municipality of Porvoo - <http://www.porvoo.fi/>

measure consumption and others weren’t. In buildings where residents were able to keep an eye on their usage, it dropped by 15%,” von Schoultz says.

Living Lab also collates data for use in future research.

The third objective is to develop business models for local-authority energy companies that will support low-energy and passive buildings in the future. For example, Porvoon Energia is planning a power station that generates district heating from solar power.

First residents in 2013

Skaftkärr is about three kilometres south-east of the centre of Porvoo. Currently uninhabited, it covers approximately 400 hectares. Skaftkärr will consist of a number of small “villages”, of which Majberget will be the first. Majberget will house 1,400 people in a mixture of high-rise flats, terraced houses and detached homes. Work has already start-

ed on the pedestrian and cycle paths that will connect the area with the centre and with local services.

According to Fredrick von Schoultz, the actual construction work at Skaftkärr will begin in 2012. However, in autumn 2011, land sales have not yet begun, and construction contracts have not yet been signed. Despite the uncertainty, von Schoultz remains an optimist.

“There’s considerable interest among construction companies. We’ve calculated that the first residents should be able to move in by 2013,” he says.

The whole city taking part

The local authority is also involved with the programme for carbon-free housing in other ways. For example, Vårberga Library’s energy-advisory service enables residents to borrow a meter, free of charge, to monitor their energy use. Work is also being done in the education sector.

“The Inveon vocational institute has incorporated energy-efficiency into its

teaching programmes, and students have recently built a passive house in Haikko. These are just some examples of our wide-ranging programme of measures,” von Schoultz adds.

Positive side-effects

The Skaftkärr project has given a boost to the entire local area and made an impact further afield. The ambitious programme has directly affected many sectors, but its influence has also been felt more generally.

“Although Skaftkärr is just a project, it has, because of its size, helped change

attitudes throughout local government. Climate and energy issues have become a major focus in many other processes,” he points out.

It is not only in Porvoo that Skaftkärr has made its mark. The government in Helsinki has also shown interest, particularly in Porvoo’s best-practice solutions.

“Others have also been curious about Skaftkärr, including the neighbouring council in Loviisa. They want to build a similar green residential area, only better than Skaftkärr,” von Schoultz concludes, with a twinkle in his eye. ■

Energy 2020: an enterprising region building on tradition

Ringkøbing-Skjern
Denmark

Ringkøbing-Skjern Council in West Jutland does not suffer from any lack of ambition. Quite the contrary, it has set itself the target of being self-sufficient in renewable energy in less than a decade.

biogas selfsufficiency

A young blacksmith, H.S. Hansen, arrived in Lem, in what is now Ringkøbing-Skjern, in 1898. The company he founded would later evolve into Vestas, the world's biggest producer of wind turbines. Now, more than a century later, the local council is mobilising similar local entrepreneurs in a multi-pronged, renewable-energy programme.

The objective of the Energy 2020 plan is fairly straightforward. Ringkøbing-Skjern has quite simply calculated how much energy its citizens and businesses use, and a corresponding amount of renewable energy will be produced locally.

"It's simple and ambitious. Our job is to make sure that we reach the target," says project manager Henning Donslund.

Multi-pronged strategy

Henning Donslund, who heads the council's energy secretariat, also acts as coordinator of the local "Energy Council", which brings together a range of stakeholders from the local authority and businesses as well as ordinary people from both local towns and rural areas.

The strategy has five pillars: buildings, wind, bio-energy, other renewable sources of energy and transport, spread across four beams: the green growth laboratory, planning and active partnerships, the energy-supply structure and communications and dissemination. Unsurprisingly, wind turbines will play a key role in this self-sufficient future.

"We get plenty of wind around these parts," Donslund says.

"The council has adopted a windmill plan consisting of 30 sites, each of which is capable of housing up to 12 turbines in the 3-megawatt class. We've already

Municipality of Ringkøbing-Skjern - <http://www.rksk.dk/>

made so much progress that we'll be self-sufficient in electricity this year. In a few years' time, we'll be up at twice as much electricity as the area used in 2007."

"In spite of some debate and initial scepticism about turbines in several of the locations, we enjoy strong local support. I think it's important that Vestas was born around here and still provides a lot of jobs. The council has also agreed that the income it receives for each turbine will be pooled and used to benefit other local initiatives," he explains.

Decentralised bioenergy

Ringkøbing-Skjern covers a greater land-mass than any other council in Denmark. The population of 58,000 has plenty of space, so there has always been room for green sites and agriculture.

"We're well placed to make use of biomass, e.g. from agriculture," Donslund says.

"In this respect, it is a matter of linking up the towns and surrounding coun-

tryside. We've done this by getting farmers and district-heating plants interested in a decentralised model, in which farms deliver biogas to the plants. This looks like it will prove popular, and a new company, Bioenergy West, will put it into practice."

"To a great extent, our efforts are about creating synergy and coherence in the production of electricity, gas and heat. There isn't necessarily a great need for electricity when it's windy, for example, so we have to look at how we store energy. Three of the district-heating plants are already working on storing electricity for water-heating purposes."

"Our main task is to bring people together and develop a holistic approach to thinking about technology," the project manager points out.

Buildings as an energy source

Houses and other buildings in Ringkøbing-Skjern account for 40% of total energy consumption, so the Energy 2020

plan is also addressing this issue. New buildings must be in the low-energy class by 2015 or, preferably, produce more energy than they need. Energy consumption in existing housing is to be halved. There is certainly no lack of ambition.

With the North Sea on its doorstep and plenty of outdoor space, West Jutland is home to many summer houses – almost 10,000 to be precise. Their owners comprise a special target group when it comes to energy savings. They have a natural interest in extending the rental season, of course, but electricity and gas meters have a tendency to speed up outside of the summer months.

This presents Henning Donslund & co. with a challenge.

"Last year, the council's Development Department sent an invitation to all holiday-home owners," he recalls.

"They were each given two free tickets to a fair here by the North Sea, at which local tradesmen gave presentations of the many opportunities for saving ener-

gy. I think it was the right way forward. The local exhibitors were well pleased, and the signs are that progress is now being made on that front."

"That kind of thing is a good example of how local commitment can be tied in with over-arching global targets. The whole world has an interest in doing something about CO₂ emissions, and we have a local interest in finding out what resources will be available to us in the future."

"Our plans to cope with high tides in the fjord caused by climate change incorporate thinking about local business development, for example. Fortunately, we have a population of fishermen, craftsmen and other enterprising types. It would do no harm if some of them were to follow in H.S. Hansen's footsteps and set up half a dozen or so new Vestas," Donslund says.

Some enterprising West Jutlanders have already started. Among the many examples are West Jutland College, which beat the local authority to it and is already self-sufficient in wind, solar and geothermal energy. In 2010, Ringkøbing District Heating opened the world's second largest solar-thermal power plant (15,000 m²), which meets 7% of the heating needs of the town of Ringkøbing. In 2008, the first hydrogen filling station in the country also opened here, servicing the council's two hydrogen vehicles. No doubt the manager thinks it will be some time before the customer base is big enough to start selling soft drinks and snacks – but Vestas also started out small. ■

Storkalkinn, the tallest sea cliff in the North of Europe, soars above the small Norwegian town of Sunndalsøra, which has equally towering ambitions.

Small community, big ambitions

Municipality of Sunndal - <http://www.sunndal.kommune.no/artikkel.aspx?MId1=4&AId=1>

Sunndal, a local authority in Nordmøre, nearly 500 km north of Oslo, has a population of just over 7,000, half of whom live in Sunndalsøra. Not that size has proven any impediment when it comes to the council's vision of turning the area into a local powerhouse and making climate concerns a strategic consideration in its planning process.

"Traditionally, we've produced and used more energy than most other places in Norway," says mayor Ståle Refstie, explaining the basis for the council's plans.

"We've been a centre for hydro-electricity for many years, as well as home to the biggest aluminium plant in Europe, Hydro Aluminium Sunndal. So it felt like the natural choice to make use of all the waste heat from local industry to heat homes and for other public and industrial purposes. This will provide no less than 35 gigawatt hours a year of power."

"Something else we were keen on was to base all our town planning on a climate perspective," he adds.

Strategic plan

Two-thirds of the areas covered by the local authority, including parts of Dovrefjell-Sunndalsfjellene national park, are subject to nature-conservation orders. However, even in the midst of the magnificent scenery of mid-Norway, there is still scope for development – and that is where strategic planning comes in.

"We've drawn up a strategic plan for how we see the town developing," Refstie continues.

"The plan might be seen as a kind of pilot project for incorporating climate-change plans into the development of small communities. It focuses on a relatively dense urban area in which workplaces and services are easily accessible. The idea is to create a car-free town centre with plenty of cycle paths."

"We've now reached the stage where we have the town-planning tools at our disposal, but it is, of course, an ongoing process. We have to keep making better use of waste heat, improve the infrastructure and expand the network of cycle paths."

The method is in place at any rate, and the strategy already well known, which is an advantage as it provides inspiration for future planning."

"It's also important that everyone knows what our intentions are. Town planning always has a tendency to generate debate and conflict. Introducing tough climate regulations isn't going to make it any less controversial. For example, demands for urban density without vehicles impose limitations on local businesses and others who'd like to use sites further away from the town centre. What we've done here is to formally announce our strategic plan, so everybody knows what is and isn't possible."

"The great advantage of the plan is that it maximises the potential of local energy sources at the same time as it cuts CO₂ emissions from both private and public sector companies and institutions," the Refstie concludes.

Analyses

Two important elements of Sunndal's environmental and energy planning have been its painstaking analyses and its prioritisation of the environmental aspects, which have then been taken into account in the planning work. The council has also introduced a system for documenting the impact of its initiatives.

Sunndal was also quick off the mark back in 2009, when it was one of the first local authorities in the country to produce a local climate plan at the behest of the government. The Norwegian Association of Local and Regional Authorities (KS) and the Ministry of Local Government and Regional Development have also selected Sunndal for a pilot project on the development of urban planning from a climate-change perspective. ■

Sunndalsøra
Norway

walkability
waste management
energy

Turning the Tampere tankerhousing stock

Tampere
Finland

energy efficiency

The city of Tampere in Finland made some major decisions in 2010. Over the next decade, the city plans to reduce CO₂ emissions and base all of its planning and development work on environmental targets. This new green policy will transcend departments, institutions, etc.

Municipality of Tampere - <http://www.tampere.fi/>

Turning around the huge and unwieldy tanker that is a modern city and steering it in a more environmentally friendly and energy-efficient direction will, however, require a holistic approach on multiple levels.

ECO2 is a 10-year project, funded for the first two years by the Finnish Innovation Fund (Sitra). The target is a per capita reduction in CO₂ emissions of 20% by 2020 and 40% by 2030 (compared with 1990).

Pauli Välimäki is the project manager, one of four council officials working on the project. He is responsible for planning, management and finance.

"Tampere has the second fastest growth rate of any region in Finland. Population growth, new jobs and services all generate emissions and demand for energy," Välimäki explains.

"The council launched this project to get to grips with that problem. The targets Tampere has committed itself to fall within the framework of the EU's Covenant of Mayors Programme, for example."

How do you keep a project going when it spans so many years, involves so many different parts of local government and transcends all sorts of existing structures?

"The ECO2 project is being run by the City of Tampere. The Mayor chairs the board and all the important council bodies are represented. This facilitates the co-ordination of targets and measures across the various departments. It's an important aspect of our approach that ECO2 is not a separate project but part of a joint strategy made binding by the budget pro-

cess and by action plans," Välimäki points out.

The budget for ECO2 will be approx. €0.5m p.a. for 2010–12, but that only covers the project costs.

"Every council unit has budget items earmarked for its energy and climate targets," Välimäki continues.

Sixteen more specific targets have also been set within the general framework of ECO2., e.g. new buildings will be as energy-efficient as possible, energy-efficiency guidelines will be produced for the construction industry and planning is due to start on a tram system.

The scale of the project is perhaps best illustrated by the fact that some of the elements have yet to make it past the theoretical drawing board; e.g. a report on the potential for car-sharing, funding for research into energy-effi-

cient construction and a competition to see who cycles to work in the city the most often. The police, the hospital and a range of other workplaces in the city are all taking part in the competition, which is expected to become a regular event.

Energy-efficient construction and transport are at the centre of much of Tampere's ECO2 project. Long-term effort is being put into housing fairs in Virolainen and Koukkuranta and into brand new type of homes. Guidelines are also being drawn up for the energy-efficient renovation of older housing stock. Finland's biggest concentration of solar-powered houses is planned for the Koukkuranta area.

Välimäki is particularly keen to draw attention to Tampere's decision that all new council-owned property must comply with the Energy Class A standard.

"This is a hugely significant step because the city is such a major property owner. From 2012, this requirement will also apply to private developments on city land."

One of the biggest ECO2 plans is for a new multi-purpose arena. In order to make the construction project as energy efficient as possible, Optiplan Oy has been engaged to evaluate the use of materials, the parking facilities and the potential for using renewable energy.

Any traffic solution that really cuts down on fossil fuels will be on rails, so Tampere wants to build a tram system, a traditional method of transport currently enjoying something of a renaissance in many cities struggling with emissions and with the logistical problems caused by the massive pre-

dominance of the car. The tram project is still only at the planning stage and the estimated cost of the first line is €180m.

"The project has been approved as part of the city's development plan and is currently winding its way through the council machinery," Välimäki explains.

"Our target is to have the first tram line up and running by 2015, linking central Tampere with the biggest suburb, Hervanta. From there we want to continue towards another suburb, Lentävänniemi, making the line 20 kilometres long," he continues.

When Line 1 is ready, 65,000 inhabitants will live within 500 metres of a tram stop.

The ECO2 project is not for those who prefer quick and simple solutions. It is a holistic exercise in city planning, planting seeds now that will grow into tangible environmental benefits in a decade or so. Indeed, it is tempting to compare the project with forestry — something people in Finland know all about. ■

Eco-tourists welcome in the Westman Islands

Perhaps best known for a major volcanic eruption in the 1970s, the Westman Islands are now encouraging eco-tourism with an ambitious environmental policy. The small local authority off the south coast of Iceland has reduced its energy consumption by 20%. This was achieved by such simple measures as turning off lights in public buildings in the afternoon, and by promoting and monitoring increased awareness of electricity consumption.

Municipality of Vestmannaeyjar - <http://www.vestmannaeyjar.is/>

Perhaps best known for a major volcanic eruption in the 1970s, the Westman Islands are now encouraging eco-tourism with an ambitious environmental policy. The small local authority off the south coast of Iceland has reduced its energy consumption by 20 %. This was achieved by such simple measures as turning off lights in public buildings in the afternoon, and by promoting and monitoring increased awareness of electricity consumption.

The aim of the council's ambitious environmental policy is 100 % sustainability based on renewable energy.

"The Westman Islands could even become something of an eco-paradise," says the local council's project manager Friðrik Björgvinsson.

He points out that tourists are already very much interested in the islands' magnificent scenery. Environmentally friendly energy will just be an added attraction.

Access to water

Björgvinsson is aware that he lives on an island that doesn't enjoy free and direct access to energy and water. The island has a closed energy system, and water comes from the mainland. He stresses that islanders are acutely aware of the need to make the best of the available resources.

"It's vitally important to us," he says.

"I remember, when I was a kid, we had to get water from wells. Those of us who live here know that it pays to save water and avoid shortages."

Westman Islands Council has a number of ecological targets. The fishmeal industry will focus on a sustainable energy

Westman Islands Iceland

energy efficiency sustainable development energy

policy, for example. The aim is to reduce or even eliminate the use of oil and improve energy efficiency. Other projects involve generating environmentally friendly energy from the rubbish tip on the island and using seawater to heat homes, a new heating method in Iceland, and one that Björgvinsson sees as particularly promising.

The target is for energy-efficiency initiatives and sea-based heat pumps to reduce electricity consumption by about 43 %. This would make more energy available to other industries.

Wind turbines

In the 1970s, the Westman Islands used energy from its for domestic heating.

The council is now investing in the sea-based heat pump in the hope of im-

proving living standards. It is also interested in wind power, and hopes that a wind farm will be completed by the end of 2020.

At present, electricity is supplied by an underwater cable from the mainland. Björgvinsson says the capacity is insufficient, and that the private owners are unwilling to invest in a new cable.

"Economic growth suffers because there are shortages of electricity on the island." He points out that, in the worst-case scenario, the islanders would be dependent on electricity from the Coast Guard ships in the harbour.

However, the council is optimistic, and believes that environmental policy will be beneficial for society as a whole, including both residents and local businesses. Björgvinsson thinks that the is-

landers will be open to new technology and willing to do their bit to make the Westman Islands a more sustainable society than it is at present.

The council would also like to experiment with electric cars and bikes.

"We have a lot of hills here in the town," Björgvinsson points out. "It's hard to get around on foot, and that's why there are so many vehicles on the roads. It would be great to have electric cars and bikes here."

Self-heating high-rise block in Växjö

Växjö is often referred to as Europe's greenest city, and now the Nordic Council of Ministers has also taken notice of the local authority's environmental efforts.

Sweden
Växjö

biogas
local energy
solar heating

Municipality of Växjö - <http://www.vaxjo.se/>

"It feels good," says Mayor Bo Frank (Moderate Party). "We've been pretty spoiled with honours. Without being too immodest, it's fair to say that we always end up at the top of the various environmental rankings."

He points out that this is the result of many years of determined effort.

"It's no great mystery. Any council should be able to do what we've done. You need to have a vision and then consciously translate it into action."

The council's many awards are the result of some 15 years of work towards freeing the city from fossil fuels. This is the ultimate objective of the council's environmental programme, and the target is to reach it in 2030.

An important feature of this work is an EU project implemented by the council, along with other European cities, called SESAC (Sustainable Energy Systems in Advanced Cities). The project's focus is on greater energy efficiency and increased use of renewable energy. Involvement in the project also paved the way for Växjö being nominated for the Nordic Energy Municipality prize.

So what, exactly, is Växjö doing?

Firstly, it is reducing energy consumption in new homes. The housing department has built around 400 energy-efficient homes, including a number of eight-storey wooden buildings in which more than 90 % of the energy is renewable. Several houses have even been built without heating – what are known as "passive" houses.

How is that possible?

"Passive houses use waste heat, e.g. from cooking, thermal gain and heat recovery from waste water. All of this means that you don't have to bring in external energy for heating, only for hot water and electricity," explains Henrik Johansson, the local authority's environmental officer.

Växjö has also been something of a pioneer when it comes to building wooden high-rise blocks. The aim is to imbue the homes with a sense of well-being, but the actual energy-efficiency gains are mainly made during the construction process, as manufacturing concrete is much more energy-intensive.

As part of the SESAC project, the council also renovated a 1960s school that serves 500 students, improving its indoor climate and reducing energy consumption.

"We've done basic stuff like improving ventilation and insulation, which has built up our expertise. We'll apply what we've learned when we renovated the existing housing stock," Johansson says.

The second phase of the Växjö programme involves renewable energy, including investment in solar power.

"We've always said that there's no point investing in solar energy in Växjö because the sun hardly ever shines here," he says. "But now we've set up solar power panels on several schools and on the town hall. And it works better than expected."

One side effect is the ability to provide cooling systems via the district-heating network.

But who needs cooling systems in a place with hardly any sun?

"A lot of people, actually — hospitals, factories, supermarkets and so on. They used to use electricity but will be able to use the district-heating system, which will further reduce electricity usage."

The project also involves turning sludge and food waste into biogas, primarily to produce heat and electricity, but also to provide fuel for vehicles. As

a result, some of the local authority's vehicles now run on biogas, and soon there will be enough gas for the buses, too.

Changing people's behaviour is another part of Växjö's programme. This is being done through a combination of installing meters in homes and by providing information on how to reduce energy use.

The evaluation of the SESAC project, conducted six years after it was launched, shows that the results have exceeded expectations. One of the goals was to reduce carbon emissions by 20% compared to previous building standards. In fact, there has been a 23% reduction. The reduction in overall energy use has also exceeded the target. The same goes for the decrease in fossil-fuel energy, which has dropped by 39 %.

However, as far as the increase in renewable energy is concerned, the target of 8,800 megawatts has not quite been reached.

"Overall, the picture is better than expected. And the renewable production infrastructure we've established is still there, paving the way for new ventures," Johansson concludes.

Mayor Bo Frank looks ahead:

"We have two major challenges that we will now start to address. One is to save even more energy by renovating buildings. The second is to get more people and businesses to run environmentally friendly cars."

Sharing Nordic Solutions

nordicenergymunicipality.org

norden

Nordic Council of Ministers

Ved Stranden 18
DK-1061 Copenhagen K
www.norden.org

14 Local Ways to Green Action
ANP 2012:702
<http://dx.doi.org/10.6027/ANP2012-702>
Editor: Mats Holmström
maho@norden.org
Tel. +45 2171 7153
Layout: Jette Koefoed
Photos: Energistyrelsen/Colorbox; Lene Rose; norden.org
Print: Arco Grafisk, Skive
Copies: 2000

Printed in Denmark

Printed on environmentally friendly paper
www.norden.org/publications

14 LOCAL WAYS TO GREEN ACTION

The Nordic Council of Ministers is the forum for Nordic governmental co-operation and is amongst the most extensive regional co-operation in the world involving Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and the Åland Islands, sharing a common vision of shaping a green economy and a better tomorrow for its citizens powered by local resources.

www.norden.org

The Nordic Energy Municipality 2011 is based on a cooperation between the Danish and Finnish Presidencies of the Nordic Council of Ministers for Energy. From October 2010 to January 2011, 44 Nordic municipalities forwarded an application to the Nordic Energy Municipality 2011, of these, 14 municipalities were nominated for the award in March 2011.