

Local Action on Climate Change – Swedish Experiences



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Print: Arkpressen, Västerås April 2009

Foreword - Local action for success



One of the foremost challenges today is a radical reduction in our climate impact, both at the global and local level, while at the same time securing energy supplies and ensuring prosperity. Municipalities and regions have major roles to play in this process.

Sweden's municipalities, county councils and regions are prepared to assume responsibility for a broad range of initiatives aimed at reducing climate impact, securing energy supplies and adapting to climate changes.

This report presents the views of the Swedish Association of Local Authorities and Regions (SALAR) on energy and climate policy. It also highlights many examples of successful climate efforts, illustrating existing and potential solutions.

It is intended as a contribution to international climate efforts and, in particular, the climate negotiations to be held during the Swedish EU Presidency of 2009.

Just as we have a great deal to learn from others, we hope that these examples will be an inspiration to stakeholders in other countries.

Stockholm, April 2009

A handwritten signature in black ink that reads "Anders Knappe". The signature is written in a cursive, flowing style.

Anders Knappe

President
Swedish Association of Local Authorities and Regions (SALAR)

SALAR's standpoints

Sweden's municipalities, county councils and regions are prepared to assume responsibility for a broad range of initiatives aimed at reducing climate impact, securing energy supplies and adapting to climate change.

To highlight the local and regional perspectives in energy and climate policies, SALAR has adopted a number of standpoints and proposals in our position paper of 2008, that is summarised here.

In order for municipalities, county councils and regions to handle energy and climate issues effectively, the national government must assume responsibility for long-term and ambitious goals, strategies, regulatory structures and economic policy instruments.

The national government's responsibilities include extensive investment to develop a transport infrastructure with a clear climate profile. Better central co-ordination is called for in planning and development, in terms of investment, operations and regulatory structures.

Regulatory structures also need to be adapted to enable local authorities to adopt a climate-smart approach in spatial planning and urban development. Municipal planning must be supported by a cohesive and suitable knowledge base provided by national agencies. Financing solutions for natural disasters must be developed.

The government must also support and clarify opportunities for addressing climate concerns in public procurement processes.

In brief, the central government and the EU must:

- establish long-term objectives, ground rules and general economic policy instruments,
- support municipalities, county councils and regions in their energy and climate efforts,
- include municipalities, county councils and regions in national and EU energy and climate policy making.

Municipalities, county councils and regions want to do the following, once the appropriate prerequisites have been established by the national government:

- promote safe and competitive energy supplies
- invest in public transport and an efficient and sustainable transport system.

Municipalities, county councils and regions want to pursue the following independent initiatives:

- expand renewable and efficient energy production,
- promote energy efficiency and conservation,
- orient spatial planning and urban development to climate change mitigation and adaptation,
- stipulate clear energy, environmental and climate requirements in public procurement,
- focus on a dialogue with citizens and greater civic participation.



How active are municipalities and regions on climate change?

A SALAR survey of Sweden's municipalities, county councils and regions in 2007 shows extensive climate efforts in many areas, in which the local and regional levels have important roles to play. It also indicates that there is room for further action.

Cross-sector action plans for reducing emissions are in place in 52 percent of municipalities and were in the pipeline in another 28 percent. Of the regions, including county councils, 70 percent have action plans and targets and 20 percent were working on them. The table below lists the share of municipalities that are making efforts in various areas and the degree of activity. In general, the regions were even more active in comparable areas.

Municipal climate efforts (% of municipalities)	Ongoing	Extensive
Energy conservation in own premises	92	56
Energy conservation in municipally owned housing	80	44
Environmental requirements in procurement of vehicles	84	38
- Proportion of "green cars", national definition of 2007	21	
Initiatives to increase public transport	82	33
Own travel: Carpools	75	42
Eco-driving	75	16
Spatial planning in climate efforts	87	15
- Planning wind power, Planning district heating expansion	50	
- Climate consideration when locating shopping centres	20	
Informing/ involving citizens	80	20
Cooperating with the business community	80	11

Ambitious Mayors and regional Presidents

In a SALAR survey, 98 percent of Mayors and Presidents/Chairpersons of the County Council and Regional Executive Boards are prepared to strive to increase efforts and initiatives, and 75 percent are prepared to do so to a considerable extent. The seriousness of the issue was emphasised along with everyone's responsibility. At the same time the financial situation requires a gradual approach. The national government's responsibility for infrastructure and policy instruments was also underlined.

The priorities of these political leaders spanned over a broad spectrum, ranging from the energy efficiency and vehicles of their organisations, to public services and infrastructure and cooperation with the business community and the public.

Facts about municipalities and regions in Sweden

Sweden has a population of nine million people living in an area of 450,000 square kilometres, making Sweden one of the most sparsely populated countries in Europe. The country is divided into 290 municipalities (local authorities) and 18 counties and two regions.

The major task of the county councils and regions is healthcare, accounting for almost 90 percent of their operations. Regions differ from county councils in having greater responsibility for regional development. The municipalities are responsible for matters relating to their residents and the immediate environment: primary and secondary education, childcare, social services, elderly care, spatial planning, rescue services, streets, waste collection, water and sewage, health and environmental protection. Involvement in recreational activities, culture, housing, industrial facilities and energy supplies is carried out on a voluntary basis, just like climate impact mitigation efforts. Municipalities are the "neighbourhood authorities" for people, companies and organisations and therefore have an important role to play in making Sweden sustainable.

There is a long and strong tradition of local self-government in Sweden. Municipalities, county councils and regions have a considerable degree of autonomy and have independent powers of taxation. About 70 percent of their revenues come from direct taxes on personal income. They carry out 2/3 of public consumption, and their share of total employment in Sweden is roughly 25 percent.

The examples provided in this report illustrate what local and regional authorities can do and already are doing in areas such as renewable energy, urban planning, transport, energy efficiency, public procurement, and dialogue and cooperation with the public and other partners. They include unique examples as well as common practices in Sweden. The strengths of Swedish local action include district heating, combined heat and power generation, waste recycling and green public procurement, as well as the added value of overall system-thinking on how technologies are applied through planning, dialogue with citizens and cooperation with enterprise. First, let us review some overall facts on energy and emissions in Sweden.

Facts and figures: Low and decreasing emissions from energy in Sweden

Sweden's emissions decreased by 9 percent from 1990 to 2007, for the most important greenhouse gases regulated in the Kyoto Protocol. During the same period, the economy grew by 48 percent. In 2007, emissions amounted to 7.1 tonnes of carbon dioxide equivalents per resident compared with slightly more than 10 tonnes for the EU-27 and about 15 tonnes for the OECD. However, studies indicate that emissions from Swedish consumption may be 25 percent higher than from production.

With a 44 percent renewable energy share of the final energy use in 2007, Sweden has the largest share of energy from renewable sources in the EU. This share has increased from 34 percent in 1990, and a national target of 50 percent for 2020 is set. The final energy use is 400 TWh (1455 PJ), about the same level as 1970. The total supplied energy is about 50 percent higher, including losses from production and distribution chiefly from nuclear power, and bunker oils for international shipping.

Electricity production and usage is among the highest in the world per capita, both in industry and households. This is due to many years of comparatively low electricity prices. About 90 percent of the electricity comes from equal shares of hydroelectric and nuclear power. In terms of **wind power**, Sweden is far behind countries like Germany and Spain, with 1.4 TWh installed energy in 2007. The government's target for 2020 is to increase this by up to 20 times (to 30 TWh).

The carbon tax that was introduced in 1991 now amounts to about EUR 0.10 per kilogram in the transport and housing sectors. Other important incentives include green electricity certificates to expand production, and various subsidies that shift over time for the conversion of energy systems and efficiency measures. **Grants for local investment programmes** (LIP and Klimp) are the biggest and most well documented. National emissions have been reduced by about 3 percent, or 2 million tonnes of CO₂ per year through 2,700 activities in 350 programmes in more than half of Sweden's municipalities. Other environmental objectives were also benefited. The national government contributed SEK 6 billion (about EUR 600 million) during 1997–2008, while municipalities and others invested four times that amount. Projects cover areas such as: waste, biogas, energy efficiency, energy conversion, sustainable cities, industry, nature conservation, decontamination of land, traffic, water, sewage and information.

Biofuel including waste and peat accounts for approximately 20 percent (120 TWh) of the supplied energy in Sweden. About one third of it is used for **district heating**, which meets half of the country's heating requirements for commercial and residential buildings. Only 20 percent of heating is provided from fossil fuels and electricity, 54 percent is from renewable sources, 17 percent from waste and waste gas, and 7 percent from industrial residual heat. Municipalities have led the expansion of district heating, and its shift away from oil and other fossil fuels, substantially contributing to reducing emissions in Sweden by nearly 20 percent of today's national emissions. The reduction is even larger taking into account the electricity production in combined heat and power (CHP or co-generation) and decreased emissions of methane from landfills. About 40 percent of district heating is used as a base for CHP, a share that is rising. CHP uses about 90 percent of the energy content of the fuel. District heating exists to various extents in almost all municipalities, and there is still a potential for expansion. About 60 percent is still owned by municipalities. According to the Ecoheatcool study, sponsored by Intelligent Energy for Europe, the 60 percent of Europe's energy needs that are heating, could theoretically be supplied from energy today considered to be losses: from power plants, waste incineration and surplus heat from industry. Another efficient form of supplying energy is district cooling, which began in 1992 and presently provides 0.7 TWh in about 30 networks in Sweden.

95 percent of household waste was recycled in 2007, a bit more than half through material recycling and the rest through energy production. The total amount of household waste has also been growing each year, equaling 514 kilograms per resident in 2007.

Production of biogas (biomethane) amounts to 1.2 TWh, half of it from sewage treatment. Biogas is mainly used for heating, but about one fifth is purified into vehicle fuel. The potential for biogas could be about ten times more, including the agricultural sector, and more than 50 times more including forestry residuals when commercialising new technology.

Profitable energy efficiency potential is about double the EU 9 percent target for 2016, according to the Swedish Energy Efficiency Commission. The public sector is also estimated to be able to save approximately 15–20 percent, primarily in buildings through profitable

measures for heating, ventilation and lighting. From experience gained in projects such as Energy Performance Contracting, around 20 percent can be saved through profitable, broad investments and system optimisation. Another important potential lies in influencing user behaviour.

Public transport accounts for approximately 15 percent of the distance travelled in Sweden, according to travel habit surveys, while cars are used for approximately 65 percent. Local and regional efforts can make a major difference here. The number of trips by public transport increased by more than 80 percent from 1999 to 2008 since Region Skåne assumed responsibility for regional rail traffic. In the less populated Bergslagen area of central Sweden, regional train travel has nearly tripled since 2001, when the four county councils and the area's municipalities assumed broader, coordinated responsibility.

Emissions from new cars have dropped rapidly in recent years. But Sweden still has the car fleet with the largest and most energy consuming vehicles in Europe. On average new cars emitted 173 g CO₂ per km for 2008, compared to the EU average of 158 g for 2007. With the introduction of a national definition for "green cars", one third of all new cars in 2008 met the criteria of alternative fuels or fuel efficiency. Procurement by regions and municipalities has led the way.

Public procurement accounts for about 25 percent of GDP in Sweden. Two thirds is through the national government and one third through local and regional authorities. According to a 2007 study, 78 percent of public sector procurement included environmental requirements, to a larger extent in county councils, followed by municipalities and national government agencies. Requirements were not well defined in 20 percent of the cases and not defined at all in 13 percent. The Swedish Environmental Management Council (MSR) develops and supplies requirements, tools and training on including environmental requirements in public procurement. The MSR is jointly owned by the national government, the Federation of Swedish Enterprise, and SALAR.

More facts and examples are available at:
www.swedishenergyagency.se ; www.swedishepa.se
www.svenskfjarrvarme.se ; www.avfallsverige.se
www.msr.se/en ; www.skl.se/klimat

“Municipally led expansion of district heating and its shift away from oil has reduced national GHG emissions by almost 20 % of current levels.”



Gästadsverket co-generation plant, Linköping. Photo: Åke E:son Lindman

Renewable energy production



Photos: Hydroelectric power - Björn Hårdstedt, Skogsbacka co-generation plant, Lycksele - Skellefteå Kraft, Vind power - Björn Hårdstedt

District heating offers something extra

Lycksele is a rural municipality in northern Sweden with a population of slightly more than 12,000. Cold air combined with calm conditions during the winter often puts a cap on the urban area. The inversion layer caused problems in air quality that were in part due to transports and extensive use of wood heating. A new co-generation plant led to many people opting not to use wood, even though the municipality is heavily forested.



Mayor Lilly Bäcklund

District heating has been produced in Lycksele since the beginning of the 1970s. At that time, the majority of customers were found in public housing, industry and the community's businesses. When Skellefteå Kraft began building the municipality's second power plant and assumed operation of Lycksele's power company,

active efforts were made to encourage single-family homeowners to connect to the network.

"When the second biofuel-fired co-generation plant was commissioned in 2000, many households took up on the offer to receive district heating. Moreover, we then closed off traffic in the city centre and widened the pedestrian zone, resulting in traffic now circumventing the city centre instead of running through it. Measurements now show that air pollution has decreased," says Mayor Lilly Bäcklund.

Today, the district heating network has around 1,300 subscribers, of which 900 are single-family homes. Both of the plants mainly burn biofuel from logging waste or pulpwood. Negligibly small amounts of fossil fuels are used at start-up or at peak loads. Grants for local investment programmes also facilitated the replacement of 114 out of 250 non-environmentally certified wood boilers with district heating.

"It is entirely voluntary for households to connect to district heating, but very few people heat their homes with wood today. There are still households that have instead opted for other alternative forms of heating such as pellets or electrical heat-pumps," Lilly explains.

District heating was the first step, wind power is the next on the way to renewable energy. The proposal on wind power planning has been posted at three locations in the municipality and sent for comment to approximately 50 different organisations, which means that the plan can be adopted in autumn 2009 at the earliest.

"We have to take the special needs of the reindeer industry into consideration at the same time that we gather opinions from other parties concerned and from the public," says Krister Fjällstedt, Environment and Climate Coordinator with the Municipality of Lycksele.

The municipality has therefore also commissioned the

development of a unique tool in the scope of the planning process - the social impact assessment. It is intended to function as an aid in a positive dialogue between the developer and representatives for the region's reindeer husbandry. The environmental impact assessment has been prepared and adapted to the comprehensive plan's objectives and what it allows for the appointed areas pursuant to the Planning and Building Act. In association with the review of future development, more detailed, site-specific studies and project impact assessments will be conducted pursuant to the Swedish Environmental Code.

Lycksele is also the first municipality in Sweden to use synthetic diesel (FT diesel) in its vehicle fleet. Its use is motivated by strong commitment to the environment and climate and a desire to support the development of



Spatial planning of wind power in Lycksele. Photo: Vitamedia

renewable fuels as well as a strive to minimise the emissions of greenhouse gases and substances harmful to the work environment from municipal vehicles. The vision is to become a municipality with something extra - a municipality free from fossil fuels that does not contribute to the emission of greenhouse gases and other air pollution.

1,000 vehicles on biogas

Linköping is one of Sweden's ten largest cities. Here, the diesel haze lay heavily over Trädgårdstorget square in the city centre at the end of the 1980s. A long-term biogas effort provided both healthier air, better resource utilisation and technical and economic development. Today, the climate benefit is clear.



Mayor Paul Lindvall

At the same time, the need to take care of the waste from the district's meat-packing industry and manure from local farmers was the solution to the problem of finding an environmentally friendly fuel. Waste from the food industry and sewage sludge is refined into vehicle gas in the municipality's biogas plant.

The first biogas bus rolled out on to the streets of Linköping 15 years ago. The biogas buses are quieter than the old diesel buses, so the noise levels have been lowered at the same time that the air in the city has become cleaner. Air pollution has been more than cut in half since measurements began at the end of the 1980s, and they continue to drop.

Today, there are more than 1,000 biogas vehicles in the city. These include all of the city buses as well as taxis, refuse lorries, private cars, company cars, leasing cars and even a train! This is one of the largest biogas fleets in the world. There have been a few hiccups along the way, but everything has generally continuously progressed forward.

"Biogas accounts for 6 percent of the total fuel consumption in the municipality today and it is constantly rising. Sales at biogas petrol stations reached an all-time high in 2008 - a total of 280 new customers were registered during the year," Helena Kock Åström, Environmental Strategist at the Municipality of Linköping, explains. "Biogas is an important piece of the puzzle in achieving the regional target of a 25-percent reduction of fossil fuels in the transport sector from 2000 to 2010."

Svensk Biogas AB, which is a subsidiary of the municipal company Tekniska Verken in Linköping, sells the production surplus of biogas to other municipalities in the region through its own refilling stations. In 2007, slightly more than 7 million Nm³ of biogas was sold, which corresponds to as many litres of petrol.

The long-term biogas effort and the local development of biogas technology have made strong contributions to the existence of the Environmental Technology Centre (MTC), operated by the municipalities of Linköping and Norrköping together with Linköping University. The two neighbouring municipalities invest in several different areas to achieve their vision of being a



Biogas plant Photo: Lasse Hejdenberg



Photo: Ylva Bergström, Östgötatrafiken

climate-smart region.

"Taking the environmental problems seriously is definitely rewarding. Sure there can be some investment costs at the beginning, but the benefits are so much larger – a good living environment, local business development and global responsibility. Visitors come from around the world to gain access to our know-how and experience, to potentially pursue similar efforts at home. We have spun off some of our know-how to the business community so that it can be used elsewhere, both in Sweden and the rest of the world. This is how we contribute to business opportunities here in Linköping and spread "green" thinking," says Mayor Paul Lindvall.

Optimised energy production benefits industry

The industrial city of Örnköldsvik lies on the Gulf of Bothnia in northern Sweden. Several companies cooperate here in a bio-refinery with renewable natural resources for an international market. Dissolving cellulose, ethanol and their derivatives are some of the products, besides the forestry industry's more traditional fine paper and paper pulp. In the cooperation with industry, the municipal power company plays a key role that benefits all parties.

“Increasing the value added in the forestry product-based industries and replacing the petroleum-based products will be a part of our future and are positive for our region,” says Mayor Elvy Söderström. “On the municipal and regional levels, we actively contribute to the development of the innovation system, the Bio-refinery of the Future.”

The new co-generation plant is a symbol for this cooperation. Of a total biofuel-based production of 1.1 TWh, half is steam for industry. One fourth is electricity and one fourth is district heating for industry, hospitals, municipal service and housing.

Municipally owned Örnköldsvik Energi plays a key role as a supplier of steam, cooling and heating to industry. Thanks to industrial needs for steam, the municipality achieves an even level of production of electricity in its co-generation throughout the year, and not only in the winter when housing and businesses need a great deal of

heating. The steam is used for processes such as those in the forestry and chemicals industries of Domsjö, Akzo Nobel and SEKAB.

“By us making large investments to maximise the energy supply in the industrial zone, companies can instead invest more money in their core business. Consequently, this benefits the municipality, the companies and the environment,” says Pelle Fridström, President of Örnköldsvik Energi.

Örnköldsvik Energi is one of the largest suppliers of district cooling in Sweden. District cooling is both environmentally friendly and energy efficient, and has low operating and maintenance costs. It is supplied in a separate pipeline network providing comfort and industrial cooling for commercial properties, the engineering industry in the central districts and to the Domsjö industrial zone. As of 2010, comfort cooling will also be supplied to 66 newly built flats. Cooling is achieved with the help of water pumped up directly from the sea.

“The answer my friend...”

Thanks to local politicians agreeing early on to invest in renewable energy and that support from the residents was achieved with the help of incentives and smart planning, the west-coast city of Falkenberg, with a current population of 40,000, is one of Sweden's foremost wind-power municipalities. The country's first commercial wind power plant was built here as early as 1983.

Today, Falkenberg's 35 wind power plants produce slightly more than 50 GWh of environmentally friendly electricity per year. This is enough for approximately 10,000 single-family homes and corresponds to one tenth of the municipality's energy needs. Five times as much hydroelectric power is already generated in Falkenberg.

After the planned expansion at sea and on land, wind power will provide 650 GWh and make the municipality a major “exporter” of electricity. The majority is planned to come from a park of 30 large wind power plants 8-14 kilometres off shore, commissioned in 2011 at the earliest. After initiating and preparing the project through its own energy company the municipality has sold its majority share to the former partner Favonius AB.

How is it that Falkenberg has come so far with wind power? Some advice to other municipalities from the planning architect Johan Risholm:

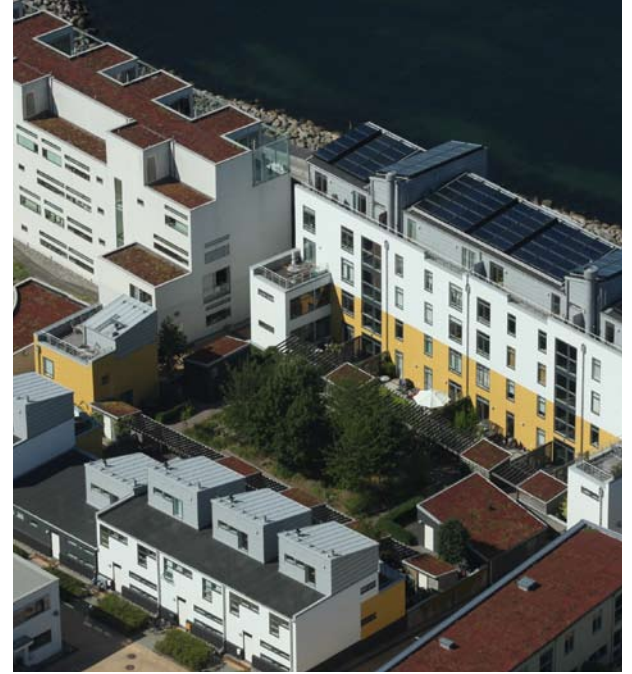
- Look for areas that are already affected, such as along motorways.

- Do not allow the construction of individual wind power plants, but rather groups of at least three – in attractive, harmonious formations – and maintain the distance from urban areas to minimise noise.
- Increase the public's interest by inviting the residents to buy shares. The Municipality of Falkenberg was active in creating the financial cooperative societies that quickly sold out. The households that are members have markedly lowered their electricity costs.



Photo: Johan Risholm

Planning and urban development for mitigation and adaption



Photos: Streetcar in the Municipality of Norrköping - Björn Härdstedt , Malmö Västra Hamnen: green roofs and solar collectors and bicycle bridge - Malmö City

Sustainable urban development

As early as the end of the 1990s, Malmö began to plan a climate-smart city district, Bo01 in Västra Hamnen. In Augustenborg, an ecological renovation of a residential area from the 1950s was carried out in a dialogue with the residents. The next generation of sustainable development is now being carried out in close cooperation with building contractors.



Mayor Ilmar Reepalu

“Transports and buildings account for the largest climatic impact. This means that we generally must address the climate issue at the local level, that we have to work towards a sustainable city,” says Mayor Ilmar Reepalu, and emphasizes that municipalities must function as pioneers in climate efforts.

Västra Hamnen is an entirely new city district in a port and industrial area at the sea. In the Bo01 area (the housing exhibition, City of Tomorrow, from 2001), there was a comprehensive solution for sustainability, from planning to implementation. In the Augustenborg area from the 1950s, it was a matter of ecological reorientation in a city district that had become pretty rundown and lost its status. The challenge was achieving change in close dialogue with the residents of the area. Both of the areas have many examples of renewable energy, traffic and more greenery.

The Bo01 part of Västra Hamnen is fully supplied by locally produced renewable energy. The majority of the heat is collected from the sea and from natural water reservoirs in the bedrock with heat pumps. The remaining heat is produced by solar collectors. The electricity is primarily generated by a large wind power plant and to a lesser extent by solar cells. Biogas is extracted from waste and waste water and after purification is returned to the district through the city's natural gas system. The CO₂ emissions from the new city district are consequently close to nil.

In Augustenborg, 450 square metres of solar collectors for hot water production have been connected to the district heating network. Solar cell plants produce electricity at the same time as they act as sun screens over windows. In a pilot project, the heat consumption is being measured for each individual flat. The gravel football field has become an ice rink in the winter with the help of a pipe system under the field and a refrigerating machine. The rest of the year, the entire field functions as a solar collector. Intensive efforts have been made on the ecocycle and 70 percent of household food waste goes to biogas production.

In the Bo01 area, you can live without having your own car with effective bus traffic that ties the district to the rest of the city, good bicycle paths and pedestrian

walkways. Investments have been made on renewable fuels and car pools. The residents in Augustenborg started their own car pool, which has now become a part of a regional car pool.

Greenery in the cities is good for many reasons: biological diversity, cooling, noise damping, and rainwater management. Of course, it looks nice too. In Augustenborg, an open surface water system with channels and ponds has reduced flooding. Many green roofs can be found in the area and in the next few years, new solutions for green façades will be tested. Greenery is also an important part of the attraction of Västra Hamnen with innovative surface water management, green roofs and parks.

Next generation of sustainable urban development

The Flagghusen quarter is the new generation of sustainable construction in Västra Hamnen, where the shift is being made from demonstration property to daily living. The task is to build sustainable housing at a reasonable cost. In a close dialogue between the city and building contractors, the parties have arrived at a joint undertaking. Some of the nine points are:

- Low energy consumption (max 120 kWh per m², including household electricity)
- Universal design – the buildings should be able to be used in the various phases of life
- Selective green measures to improve biological diversity
- Source-sorting of waste close to the property, with collectors in every courtyard.

The intent is for all of Västra Hamnen to continue to develop as a leading example of sustainable urban development, with alternative energy systems, urban wind power on buildings and reduced car use with car pools.

In Hyllie, a new city district is growing forth around the new City Tunnel Station, which will open 2010. Besides 7,000 homes, there are regional centres such as arena, shopping centres and exhibition areas. The ambition here is also sustainable urban development through a mixed city, energy efficient construction, urban biological diversity and renewable energy production from household waste, biogas, urban wind power and solar energy. Excellent public transport makes it possible to reduce car use. In both Hyllie and Västra Hamnen, there is place reserved in the street structure for the re-introduction of streetcars in Malmö.

Car restrictive social planning in the bicycle city

Car restrictive community planning. Commutometer. Walking school bus. One meets new concepts in the expansive university town of Lund in southern Sweden. Here, the environmental issues have been moved up to a strategic top level.

“Environmental thinking should be included in all operations. Such overall questions should be directly subordinate to the Municipal Executive Committee,” says Mayor Mats Helmfrid.



Mayor Mats Helmfrid

Local efforts are devoted to many different ways of reducing traffic flows, queues and emissions on the municipal roadways. This strategy has been compiled in a special plan for environmentally adapted transport systems. The first projects included a mobility office to distribute information, the Bicycle Municipality project and Walk and Cycle to School. In concrete terms, this involved new bicycle paths, improved school roads, “walking school buses” led by parents who took turns to walk the children instead of driving them, the cycle to work campaign, car pools and more. A 2004 survey showed that a clear majority of the residents supported the ideas and that many had changed their travel habits from driving to cycling or public transport.

During the years 1995–2005, car traffic on the municipal road system remained unchanged, even though the population in Lund grew by 6 percent. However, in the last three years traffic has increased by 5 percent, due to more commuting into the city. The municipality succeeded in slowing the increase in car traffic by improving conditions for pedestrians, cyclists and public transport.

“The municipality knocked on the doors of 25,000 households with the Smart Traveller concept. There is nothing wrong with the attitudes. The majority of people are aware that something must be done for the sake of the climate,” says Håkan Lockby, Traffic Planning Manager. “But people do not always practice what they preach.

We try to speak positively about what individuals can gain financially and in terms of health by using public transport, cycling and walking.”

The nifty Commutometer has been posted on the Internet. One completes a form with where one is travelling to and from, and which car one is driving. The meter works out what switching from driving to cycling or taking the bus or train would mean in terms of calorie consumption cycling, the time it would take, how much cheaper it would be, and the reduction in carbon dioxide emissions.

Lund is Sweden’s number one bicycle city, with a 27 percent increase in bicycle traffic since 1995. The target of a 15 percent increase was achieved in ten years by separat-

ing bicycle traffic, increasing lighting and making other physical improvements and working on behavioural change.

“Bicycling is a profile issue for Lund. We want to take care of bicyclists so that they will feel prioritised. In other cities in Europe, bicycling has decreased. We want to avoid the same trend here,” says Håkan Lockby.

From 1995 to 2008, public transport has increased by 32 percent in the city. The new Lund Link was an important piece of the puzzle with a partially car-free public transport route from Lund Central Station via the large university and business areas. The link was built for buses and adapted to be able to be converted to streetcar traffic.

“We want to be aggressive, build a city that withstands the day petrol costs EUR 2 per litre and climate changes force action,” says Håkan Lockby.

The thoroughfares on the national and county roads are more difficult to reach. The largest travel link from Malmö-Lund is the only one where car travel has increased more than public transport. Håkan Lockby sees it as desirable that both the Swedish Railway Administration and other national authorities are getting more involved to increase public transport capacity.

The plan for the environmentally adapted transport system was expanded in 2006 with greater regional cooperation and with social and economic dimensions. Håkan Lockby considers it to be important to secure long-term, broad political support.

“Public health and traffic safety are now also included. I think that this has provided us more arguments for sustainable community development.”



Photo: Sydsvenskan/Hussein El-Alawi

Planning for flooding

In the autumn of 2000, Arvika was hit by the country's largest flood in modern times. Thanks to a huge rescue effort, the worst threats were able to be averted. For the municipality, the disaster was an alarm clock and the start of comprehensive planning efforts.

During October and November in 2000, Värmland's watercourses received three times as much rain as normal. After a rainy summer, the ground was saturated. The water level in Arvika, a municipality with a great deal of forests, lakes and a population of just over 26,000, rose 1.9 metres over the nautical chart's normal level. A few weeks later, the fjord had risen by more than another metre and the water threatened homes, offices, nursing homes, business and industrial buildings as well as the technical infrastructure.

In spite of awareness of the city's vulnerable situation, the municipality was taken by surprise when the flood became a reality, but it was nonetheless able to take action. Under the guidance of Rolf Gustafsson, Technical Director, the municipality's technical administration was organised for the crisis along with thousands of people from other municipal administrations and companies, volunteers, the police, the military, the Swedish Rescue Services Agency, the Swedish Maritime Administration, other government agencies and organisations in an around-the-clock rescue effort from mid-November through January 2001.

With these experienced fresh in mind, a report was compiled with a detailed analysis of what happened, how problems were tackled and how to act if it happened again.

"We had long taken water into consideration in all planning. But this was not enough. Now we know that we live with a risk that we can only try to plan for in advance and adapt to. Therefore, we currently have an extensive plan for emergency preparedness," says Rolf Gustafsson.

In the municipality's comprehensive plan of 2008, the risk of flooding has been given considerable space.

"To-date, we have not needed to demolish or move any buildings, but we have denied building permits with a reference to our suitability assessment and new guidelines. While awaiting flood protection, we are also waiting to build in some areas," explains Rolf Gustafsson.

A clearer framework for the financing of flood protection, simpler rules, more rapid processing, better map material and better elevation, level and incline data are important items on the municipality's wish list to the national government.

"To be able to make reliable forecasts, we need data that is difficult, time-consuming and expensive for an individual municipality to prepare," says Rolf Gustafsson.



Arvika under water, Photo: Anders Norrby

To-date, the municipality has prepared material together with the Swedish Meteorological and Hydrological Institute and conducted its own studies and measurements within the EU projects Living With Flood Risk in a Changing Climate and Climate Proof Areas. Together with the municipalities of Eda and Säffle and the county administrative board, Arvika is participating in Project Byälven to evaluate the flood risk in the region and propose preventative measures. The municipality is also working with Karlstad University, energy companies, concerned authorities in Norway and a large number of national authorities such as the Swedish Rescue Services Agency, the Swedish Maritime Administration, the Geological Survey of Sweden (SGU) and the Swedish Geotechnical Institute (SGI).

To increase preparedness, Arvika has hired an environmental strategist and a safety coordinator, who both participate in the municipal planning process. The management strategy has been changed so that the Rescue Chief is responsible for both the preparedness plan and the operational management of the protection efforts. All municipal operations are now gathered in one large administration with three operations.

"Our organisation is based on close cooperation, good information and clear action plans. Hopefully, the cooperation will be more smooth and more effective in a small municipality such as ours, where we see each other pretty much every day," concludes Rolf Gustafsson.

Simpler systems increased bus travel

Equally clear lines as in the underground and buses on the water. Karlstad, a regional capital with a population of 84,000 in western Sweden, has increased bus travel the most in the country in recent years.

The CEO of Karlstadsbuss, Sören Bergerland, posed the interesting question: Why should riding the bus have to be so complicated? This is no longer the case. How and when the buses go have become much easier for the passengers to understand. The fact that bus travel has increased by 30 percent since 2005 and nearly 20 percent in the past year is also due to more rapid traffic and more frequent traffic – with fewer buses. The passengers have also never been as satisfied as now. But how do you get people to switch from driving to riding the bus?

The municipality invested SEK 14 million, approximately as much in percent, and expects to get half of it back in increased revenue. A part of this endeavour was to give all city districts a bus every ten minutes. Then people do not have to waste time on interpreting timetables. This past autumn, traffic went from 20 to ten minutes and the routes were straightened so the trips were faster.

A very clear route map was developed, inspired what it usually looks like for an underground or metro network. It applies to seven so-called basic routes that should be as easy as possible to understand.

“One can keep track of seven routes,” Sören Bergerland says.

To keep the more loyal bus passengers, the basic routes have been complemented with special routes. A twisting and turning route runs through the city centre for those who feel it is important to be close to the stops.

All basic routes operate 30-minute traffic in the evenings and weekends (formerly hourly traffic). All districts have also been given late-night bus service.

The bus stops have been equipped with electronic signs that show when the bus is coming in real-time. One can also easily get this information on a mobile phone.

The underground-like route map has also been posted at 461 places around town. It is posted in a large format at all bus stops with weather shelters. Extra clear information has been made for bus stops where a route change is possible.

Slightly more cosmetic finesses, investments in design and odd advertising, have also been used. Buses repainted with a sun on the front, revitalised bus stops with clearer names than before, a Zamboni done up like a bus in the ice rink where the home team of Färjestad plays hockey, campaigns and artistic adornment have also been used.

Public transport has been made into a more distinguished element of the urban environment. In a giant garage in the Orrholmen residential area from the 1960s, which is home to three bus stops and many passengers,



Karlstadsbuss road map, Photo: Vitamedia

there are wall murals, mosaics and a walk-of-fame with handprints of local celebrities like those in Cannes.

“We have to create an attractive product,” says Sören Bergerland.

Something that both he and Vice Mayor Håkan Holm emphasize is the placement of Karlstadsbuss in the municipal organisation. It is a department within the administration of the City Planning Committee.

This means that public transport issues are integrated into physical planning and are always included from the beginning when, for instance, new housing areas are planned and building permits are processed.

“It would not have gone as smoothly if the issues were not subject to the same committee,” says Håkan Holm, who chairs the City Planning Committee and is one of the initiators of the most recent success – Public transport on the water during the summer months.

“Like a vaparetto in Venice,” muses Sören Bergerland as he climbs aboard the boat at one of the 17 stops along the Klarälven river’s many branches through Karlstad. Interest has been far above expectations and many have stood in line in vain. 38,000 passengers in two months. A regular bus ticket is valid, SEK 19 (about EUR 2). People both commuted to work and went sightseeing.

Boat traffic is a new experience for Karlstadsbuss, which engaged two shipping companies. The municipality invested SEK 3 million and has its sights on expanding operations in the summer of 2009.

More flexible motorists

Mölnadal is a fast growing suburban municipality, neighbour of the metropolis Gothenburg, and with the European highway E6/E20 straight through the city. Traffic accounts for half of the carbon dioxide emissions and continues to increase. 40,000 people commute to and from the city every working day. The goal is to decrease car travel in cooperation with the largest companies.

The municipality wants to continue to grow at the same time that it must get control of and reduce the traffic flows. One step in this work is to reduce the number of commutes to and from work by car.

The RAM project is a collaboration between the municipality and some ten large companies in the area. It started in 2005 with a study of the travel habits of 2,300 employees where three main travel types were found:

- Comfort travellers – those who always travel to work by car and are not flexible in the choice (40%),
- WBP's – those who walk, bicycle or travel by public transport (25%),
- Fleximotorists – those who drive, but on occasion could consider travelling by public transport, walking, bicycling or carpool (35%).

The goal is for the flexible motorists to have increased by 50 percent by 2015. If every second motorist left the car at home one day a week, rush-hour traffic would decrease by 10 percent!

The companies in the collaboration meet four times per year to exchange experiences. They are offered consulting support to review their transports, which is a very much appreciated service that provides savings and creates goodwill. The five largest companies in the city have completed the programme and more are on the way. An inventory of plans and results is under way.

In 2009, a welcome package will be sent out to new companies with an offer of advice on business travel, work travel, vehicles and information and advice to the staff. Moreover, theme weeks, cycling challenges, appeals and try-out campaigns are arranged, all to increase interest and knowledge among both companies and the public about how to reduce one's climate impact. The first results measurement is planned for 2010.

"We cannot demand that everyone uses public transport, but we want to create systems so that they can one or two days a week," says Vice Mayor Hans Broberg.

Congestion tax benefits the environmental capital

*To address congestion and disruptions in traffic, a congestion tax was permanented in **Stockholm** in 2007, after a trial period and a positive referendum in 2006. Since 2005 traffic to and from the inner-city has decreased by 18-19 percent and queue times have been reduced by 30-50 percent. Greenhouse gas emissions have decreased along with traffic in the inner-city and by a couple of percent in the entire Stockholm region.*

In the region, one fifth of Sweden's population lives on two percent of its area. The city is divided by water with all through traffic guided to a few bridges. The population is growing, as is the pressure on the traffic infrastructure.

Before the congestion tax was introduced, it had many opponents. Consequently, a trial was carried out during 2006. Public transport was expanded at the same time and new park-and-ride parking was built. The results were very successful in terms of greater passability and reduced emissions. Fewer cars in the inner-city and a well-functioning system increased popular support.

A majority of Stockholm's residents now support the tax. Nearly 75 percent feel that congestion has decreased, more than 70 percent that the air has improved, 65 percent that traffic noise has decreased and more than half that traffic safety has increased.

The congestion tax is levied by the national government on cars registered in Sweden that drive into and

out of the inner-city between 6:30 a.m. - 6:30 p.m., except in week-ends and July. The cars are automatically registered at pay stations. Every passage costs SEK 10-20 depending on the time, or a maximum of SEK 60 per day. The tax is paid monthly through a payment notice to the vehicle owner.

"The congestion tax and the public transport efforts are important elements of the city's ambitious effort to reduce greenhouse gas emissions from today's 4 tonnes per resident to 3 tonnes by 2015," comments Ulla Hamilton, Vice Mayor, Environment and Traffic Division. "We are proud that Stockholm was appointed the European Green Capital for 2010."



Photo: Yanan Li, City of Stockholm

Energy efficient buildings in an energy efficient city

The fact that energy efficiency is a matter of the heart in the Municipality of Alingsås cannot be missed. The municipality's website has article after article about the work to make the municipality more environmentally friendly and energy efficient. Alingsås is a 400-year-old city with a compact city centre one hour east of Gothenburg. Here, broad efforts are pursued, ranging from public transport and urban planning to new construction and renovation.



Mayor Ingegerd Löfqvist

The municipal housing company, Alingsåshem, was the first in the country to rebuild one of the housing projects of the 1960s and 1970s using passive building technology. Brogården is a housing area with 300 flats that was built at the beginning of the 1970s. Mayor Ingegerd Löfqvist, believes that if renovations are to be done anyway, it is just as well to invest a little more to achieve energy-smart solutions. Heat exchange and sealed, well-insulated buildings are used instead of radiators. The small additional heating needed mainly for hot water is added with biofuel-fired district heating.

“On the long term, we will achieve very good economy for the tenants who live there. We will also achieve the municipality's goal of cutting energy consumption for

the heating of housing by at least half,” Ingegerd Löfqvist says.

The Municipality of Alingsås is trying to be better than current building standards. The President of Alingsåshem, Ing-Marie Odegren explains that both investments and long-term thinking are needed. But investments made on energy will be repaid within five to ten years. Today, the municipality is approximately 40 percent below the national building standard of 110 kWh per square metre for new construction.

Stadsskogen is a new residential area in Alingsås with 1,000 homes and schools built with passive building technology for low energy consumption. The area also has the country's first preschool built with this technology. The entire area is connected to the local energy company's district heating network, although the long distance to the existing network did not make it entirely commercially profitable. Estimates of alternative energy solutions also showed, however, that the district heating was the best alternative in consideration of the environment. The municipality therefore gave the energy company extended share capital of SEK 16 million to extend the network.

“It is also important from a community planning perspective to build new city districts in proximity to public transport routes. It is not only a matter of improving the energy efficiency of building heating, but also of broadening the holistic scope of our environmental approach,” says Ingegerd Löfqvist.

The municipality is also actively working to guide retailing to centres instead of allowing low-price department stores and retail chains to open shops on the outer edges of the city. This keeps the city alive at the same time that it reduces the drive for more car travel.



Energy efficient preschool with passive building technology, Stadsskogen Alingsås
Photo: Municipality of Alingsås

Energy efficient healthcare

The Dalarna County Council in western Sweden decided nearly ten years ago to actively work to reduce the environmental impact of its own operations. Today, it is the most energy efficient county council in the country. Dalarna has an area roughly the size of Belgium and has a population of approximately 275,000.

The property stock in the Dalarna County Council consists largely of hospitals and other healthcare buildings. It is a question of operations that are often under way around the clock with technically advanced and energy-intensive equipment.

Landstingsfastigheter i Dalarna, which manages and develops the county council's properties, works hard to reduce energy consumption. The total consumption in the properties was 180 kWh per square metre in 2008.

"We have cut energy consumption in half since 1982 and have already achieved the EU target of reducing consumption of heating and electricity by 20 percent by 2020," says a pleased Jan Sjöberg, Property Manager at Landstingsfastigheter.

Stig Koch, Energy Controller at Landstingsfastigheter, points out several factors that have allowed them to succeed in cutting their energy bill. A targeted and long-term energy management effort has had measurements and results follow-up as important components. In connection with renovations, investments have been made in new, energy efficient technology.

"Many of our environments require cooling. With the help of heat-pump operation, we can recycle the heat generated in the cooling process to heat up other parts of the building. We have also invested in frequency-controlled fans that allow us to better adjust the amount of heat in the premises to the need. Fans account for 30 percent of a property's electricity consumption, so there is a lot to gain," Stig Koch explains.

The county council's own energy efficiency targets are significantly tougher than those from the EU. By 2010, Landstingsfastigheter should have lowered its energy consumption to 170 kWh per square metre and by 2025, it should be down to 110 kWh – just a third of the consumption in 1982.

"I believe that we will manage it. Electricity is the toughest nut to crack. We have so much technical equipment in healthcare that is indispensable. It is a matter of looking at all of the possibilities. On the property side, for example, it is a question of replacing lighting with more energy efficient alternatives and finding controls so that they are not always on, but rather only when they are really needed," continues Stig Koch.

Of course, a lot of money can be saved by becoming more energy efficient. Another driving force of Landstingsfastigheter's work is to save the environment. To



The Micro-biology Laboratory at Falu hospital Photo: Marie Eriksson, Landstinget Dalarna

fully succeed, it is important to get all of the parties concerned on board.

"I am pleased that we succeeded in saving energy at the same time that we never neglect to create a good indoor environment for people who are on the premises. We have also worked with incentives for those who take care of the operation of the facilities and have worked to change the behaviour of those who use the properties. Among other efforts, we have worked with environmental contracts where the clinics and healthcare wards that actively work on the energy issue are given rent reductions," says Jan Sjöberg.

"We have cut energy consumption in half and already achieved the EU 2020 efficiency target."

Award-winning, environmentally friendly purchases

Last year, **Region Västra Götaland**, one of Sweden's three largest regions, won the Swedish Environmental Management Council's newly established prize, "Excellent Green Purchaser," for its strategic, pedagogic, comprehensive and thorough work on environmental adaptation of procurement and purchasing.

Being a good example is just as important as pushing development and making the right political decisions.

"When we talk about environmentally classed cars, for example, it is natural that I, as a politician, choose a municipal car that is biogas-driven," explains Roland Andersson, President of the Regional Executive Board.

"If we can affect the environment with the help of environmentally smart purchases for our organisation, it can contribute to large effects for us, for other county councils and municipalities and especially for enterprise," says Viveca Reimers, Environmental Strategist at the Environmental and Purchasing Organisation of Region Västra Götaland.

Approximately one third of Region Västra Götaland's budget is used for purchases of goods and services. A large part of the region's environmental impact consequently takes place in the choices and use of goods and services in operations. Some recent examples include the procurement of vehicles, furnishings and ecological food.

- In Västra Götaland, 80 percent of the 1,200 official and council cars are "green cars" in accordance with national requirements of energy efficiency and/or renewable fuels. Consequently, Västra Götaland tops the figures among regions and county councils. The greatest gain lies in the fact that a reduction of carbon dioxide emissions of 50 percent has been made possible on car travel.
- Prior to the latest procurement of furnishings, the region prepared a list to facilitate purchases of furniture and fabrics. The products on the "Green List" fulfil the criteria for several environmental labels and have made it possible for the suppliers to present their products to a large number of environmentally aware buyers.
- Thanks to training at several levels in the region's institutional kitchens, environmental requirements in procurement and cooperation between buyers and producers, 14 percent of the food for patients and employees is now ecologically produced and this figure is constantly rising. The most common ecological foods are coffee, milk and bananas.

Taking a social responsibility in procurement is also a matter of course. Neither politicians nor the public think that it is acceptable for suppliers to the public sector to neglect fundamental human rights or to exploit people or the environment to produce what we jointly consume.

The revelations in 2007 regarding substandard working conditions among manufacturers in Pakistan of



Roland Andersson, President of the Regional Executive Board

clothing and surgical instruments for Swedish health-care consequently incited a reaction by the three largest regions in Sweden: Region Skåne, Region Västra Götaland and the Stockholm County Council. Three

months later, the workgroup was finished with a proposal on a common code of conduct, rules and instructions on social responsibility in business dealings with suppliers. The code was adopted in 2008 and other regional and national authorities have also shown an interest.

The work has taken into account the international work underway on the new standard ISO 26000 – Guidance on Social Responsibility. In the process with the code, a continuous dialogue has also been conducted with the suppliers since good cooperation is the key to lasting improvement.



"Excellent Green Purchaser" award presented by Crown Princess Victoria.

Photo: Eric J Bleckert

Food takes public transport

*Irritation over the oligopoly of wholesalers and environmental requirements only covering the food and not the transport led to the introduction of a proprietary distribution model in the central Swedish industrial city of **Borlänge**. Now, locally grown carrots “carpool” with the large wholesalers’ goods to four municipalities schools, preschools and elderly homes – which saves both time, money and the environment.*

The Municipality of Borlänge’s procurement of food transports is a good example of sustainable work. By procuring transports separately, it was easier to place environmental requirements on lorries and fuel – for example, that the lorries should be environmentally classed under the latest EU rules and that the fuel they run on should be of the highest possible environmental classification.

Food logistics are procured together with the neighbouring municipalities of Gagnef, Säter and Smedjebacken. Now this noteworthy distribution model has been used for seven years. Well-functioning coordination between the four municipalities has further amplified the positive effects.

“The ambition was to find functional, comprehensive solutions, not just patch and fix. The politicians in charge showed courage and dared to invest in the complete solution,” says Åke Persson, Coordinator of Sustainable Development in the Municipality of Borlänge.

Positive effects of the distribution model include that:

- The procured transport centre for joint distribution saves time, money and the environment.
- Local and small producers are benefited by shared transports, which increases competition and places downward pressure on prices.
- Shorter distances and fewer stops result in less exhaust emissions.
- Children are given a safer traffic environment when fewer lorries travel to and from the schools.



Åke Persson

Food from the various suppliers is led to a joint receiving centre where they are repacked and loaded together for onward transport to slightly more than 200 schools, preschools and elderly homes in the region. Now, a haulier drives all of the goods out instead of seven different suppliers each delivering goods with their own lorries. The transporter is now required to reduce its carbon dioxide emissions

by another five percent.

Goods valued at approximately EUR 4 million pass

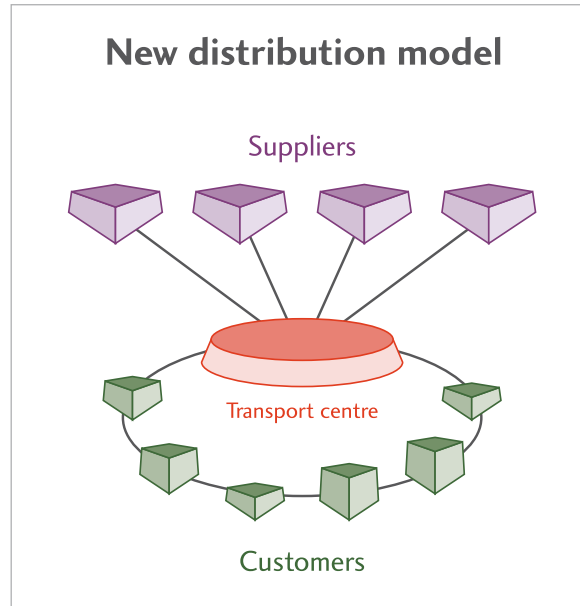


Illustration: Tomas Blijdenstein

through the centre annually. Half of all deliveries go to the Municipality of Borlänge. The rest are equally divided between the neighbouring municipalities. Borlänge buys a great deal of ecological food, but still orders the majority of its goods from large wholesalers. When the distance of the food to the school kitchen is shorter and cheaper, small, local producers can also be involved and compete.

Financially, it is a zero-sum game. The gains the municipalities make on lower food prices roughly match what they pay the haulier for the transports, but a better environment, better working environment and higher traffic safety are achieved.

Interest in the distribution model has peaked among several different actors in the country and many municipalities contact Borlänge and request information. Together with a common municipal development company, Borlänge is trying to actively spread its work to the other municipalities in Dalarna.

“There are several very exciting opportunities to develop our solution. Our ambition is to make it easier for small and medium-sized suppliers and to pave the way for direct deliveries from the food industry, and for this to work, good IT support is needed. We simply want to build a type of public transport system for food,” concludes Åke Persson.

Civic dialogue with a thousand measures

North of Sweden's largest lake, Lake Vänern, lies the Municipality of **Karlstad** with a population of just over 84,000. In the project *MiljöVarDag*, or *Daily Environment*, the municipality has succeeded in getting 100 households to live more environmentally friendly. Together, the residents have implemented more than 1,000 environmental improvement measures in their daily lives.



The Piscator family and energy expert Mikael Söderström conducting an energy review of the house. Photo: Åsa Forsberg, Municipality of Karlstad

The *MiljöVarDag* project is one example of civic dialogue, where the municipality and the residents of Karlstad have worked together for a better environment. Together with coaches from the municipality, just over one hundred families have received support and training in areas such as energy, transport, waste and consumption.

P-O Haster, Project Manager of *MiljöVarDag*, explains that the project began as early as 2004-2005 when eleven households undertook environmental improvement measures in their daily lives.

"The results were fantastic and we immediately felt that we wanted to continue with the project on a larger scale. In 2007, we were contacted by Venice with a request for us to join a pilot project where European cities would involve a total of 2,000 families and of course we said yes," P-O continues. Besides Karlstad, eight other cities in six countries have participated in the EU project, Echo Action (Energy Conscious Households in Action).

The objective has been for eight out of ten families to lower their energy consumption and their emissions of fossil carbon dioxide by 9 percent and for two out of ten families to reduce these emissions by 20 percent. In Karlstad, some families have also tried ecological food and better source-sorting of rubbish.

"The families have achieved considerable success," says P-O Haster proudly. "Car travel decreased by more than 5 percent; many began cycling or walking to work

instead. Training in eco-driving reduced fuel consumption by 10 percent and engine heaters reduced it by another few percent. Electricity consumption in the home decreased by 7 percent and the unsorted household rubbish decreased by nearly 60 percent. Moreover, 25 families made major investments in heating solutions for their homes. On average, the families implemented ten environmental improvement measures and reduced their fossil carbon dioxide emissions by more than 1.5 tonnes per family."

The Piscator family is one of the households that participated in the project, a family with young children living in a single-family home from the 1970s.

"We received help with an energy review of our home. We installed an air heat pump and two compost units, so now we compost everything. Even though we have children in nappies, we now use the smallest rubbish bin and 14-day collection," says Regina Piscator. The participating families now act as environmental ambassadors. To spread this inspiration further to all the residents of Karlstad, the municipality has initiated a campaign where residents are encouraged to challenge the households from the project by environmentally adjusting their daily lives.

For the municipality, elements of civic dialogues such as this one are important to develop operations. They provide valuable feedback on how the municipal systems work.

"We operate in many different ways. We have gone out and met people for discussions, we have conferences on the Internet and sometimes, we have used a selection of individuals to ask different questions. This gives the residents more chances to express their opinions than the usual approach through political parties," says Mayor Lena Melesjö Windahl. "The residents are also offered energy advice, transport advice and consumer guidance through the 'Rådrummet' or Counsel Room, the municipality's centre for environmental issues that is located in easily accessible premises on the main square in the centre of the city."

For the Piscator family, the idea of an environmentally friendly everyday is here to stay. There is a lot more to do, such as installing solar heating.

"But it will have to go at the speed that we can afford. This is a part of our lives now and is something we want to teach our children," concludes Regina Piscator.

Climate cooperation with the business community

Municipalities and regions cooperate in many ways with the business community in efforts to reduce climatic impact, including environmental requirements in procurement, municipal environmental supervision and energy advice. One successful example of training for small companies is the **Lidköping Municipality Energy Gain**, winner of the EU ManagEnergy Local Energy Action Award 2009. Regional and local development efforts include joint efforts and projects concerning business opportunities and technical systems, such as the **BioFuel Region** co-operation in two northern counties. **Borlänge Energi**, **Tekniska Verken in Linköping** and **Umeå Energi** are municipal companies active internationally together with private firms to offer expertise and system know-how concerning energy, waste and water.

Fossil-fuel-free region 2030 and energy and the environment as growth factors are overall goals for the Kalmar region in south-eastern Sweden. In its strategy, the region is investing in wind power, biofuel and biogas, energy efficiency improvement, transports and vehicles and knowledge refinement. In 2008, the Kalmar County Climate Commission, gathering representatives from enterprise, the public sector and the academic world, posed 17 challenges to various actors and work on these challenges is in full swing.

Växjö's local Climate Commission in 2008 proposed a large number of concrete measures and commitments for various actors to convert to a fossil-free energy and transport system and contribute to growth.

"The involvement of the university and the business community provided several practical solutions in the work on a fossil-free Växjö. Together, we can also export our expertise concerning the environment and climate protection, benefiting both regional growth and the world that is shouting for solutions to the environmental problems," emphasizes Mayor Bo Frank.

The Stockholm Climate Pact is an initiative in which the City of Stockholm cooperates with companies in the Stockholm region around climate efforts. At the beginning of 2009, 40 companies had registered. The companies meet to exchange experiences and annually present their targets, results and investments.

"This cooperation strengthens the climate efforts both in the city administration and among companies," emphasizes Vice Mayor Ulla Hamilton. "Active climate efforts provide competitive advantages and reduced costs for energy and transports."

Business Region Göteborg (BRG) is a publicly owned company with the overriding objective of contributing to sustainable economic growth, employment and diversified enterprise in the Gothenburg region. BRG works with business development support to small and medium-sized companies, establishment support and cluster and industry development. Three major

projects focus on business-driven environmental development: Biogas Väst supports the development of production, distribution and use of biogas as a vehicle fuel. Ecoex helps companies in environmental and sustainable energy technology to reach international markets. Cleantech InWest guides foreign direct investment to the region's environmental technology clusters, including areas such as bioenergy, IT and vehicles, sustainable buildings and wind power.

Municipalities, regions and national government in cooperation

There are several formations of local and regional governments working to reduce climate impact, such as the **Eco-Municipalities**, the **Nordic and Baltic Aalborg Commitments Network**, and various forms of regional environmental and sustainability work.

The state county administrative boards have cooperated with municipalities and other stakeholders to address the national environmental objectives and formulate energy and climate strategies.

The Climate Municipalities (Klimatkommunerna) is an association with some 20 municipalities and one county council. It has worked actively to reduce greenhouse gas emissions since 2003 by increasing the motivation and opportunities of municipalities to carry out concrete measures, by exchanging experience and distributing information. Concrete support is offered in work on local climate strategies. The association also promotes national climate efforts by calling attention to important opportunities and obstacles.

Sustainable Municipality is a programme for which the Swedish Energy Agency is responsible with the aim of supporting municipalities in their sustainability efforts, using energy as a springboard. Just over 60 municipalities will participate from 2008 to 2011, after a previous round with five municipalities. The thematic areas on which cooperation centres include urban planning, energy efficient buildings, biogas, procurement, business development and information. The cooperation is a model for how the EU Energy Performance Directive can be implemented in Sweden. The Swedish Energy Agency also supports the country's municipal energy and climate consultants and the regional energy offices.

Direct state grants have been given to the local and regional level, foremost for local environment and climate investment programmes and energy conversion and efficiency measures in public buildings. Municipalities have responded with great interest and thousands of measures, even though there has been criticism of varying cost efficiency and unnecessarily complex administration (although not considered as complex as many EU programmes). Examples are provided by the Swedish Environmental Protection Agency. Focus on evaluation and exchange of knowledge makes this a **gold mine of experiences!**

Local Action for Success

This report presents several examples of the extensive climate efforts under way in Swedish municipalities and regions. The local and regional levels play decisive roles in implementing international climate efforts. We have a great deal to learn from each other, and many solutions already exist.

Sweden's municipalities, county councils and regions are prepared to assume responsibility for a broad range of initiatives aimed at reducing climate impact, securing energy supplies and adapting to climate change.

At the same time, it is crucial that the national government and the European Union support municipalities and regions in their efforts and assume their part of the responsibility for the infrastructure, knowledge base, regulatory structures and economic policy instruments.

More information is available at www.skl.se/klimat
Municipalities and regions at www.theirname.se

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