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PACT OF ISLANDS

ISLAND SUSTAINABLE ENERGY ACTION PLAN

ISLAND OF ÖLAND

Fields of wild orchids. *Photo: Municipality of Borgholm*

Date of approval

2012-02-06

Executive summary

Political decisions concerning energy and climate issues in the municipalities of Öland, Borgholm and Mörbylånga, has long been characterized by project approach. While this has worked well there has been no long-term strategy in the field. There was first in connection with the greenhouse effect's massive impact that showed the need of a common climate strategy.
All municipalities of Öland joined the Pact of Islands in 2010, which is a commitment much like Covenant of Mayors but specialized on islands. This membership includes various projects with various commitments. The current project is called the Isle Pact, which aims to develop local energy action plans to meet or exceed the EU's sustainability 20/20/20 2020. The project is led by the Outer Hebrides in Scotland and is co-funded by the European Commission and is expected to eventually result in reduced global climate change.

EU sustainability means that by 2020 the EU should:

- **Reduce carbon dioxide emissions by 20 % compared to 1990 levels**
- **Energy mix will consist of 20 % renewable energy**
- **Total energy consumption will decrease by 20% by 2020**

The membership of Pact of Islands shows that to Öland and its municipalities climate issues are of utmost importance and priority. One of the commitments of membership is to produce an Island Sustainable Energy Action Plan, which now has been done. This document is the first version and will be supplemented and revised until the autumn of 2012 when the Isle Pact project will be completed.

An ISEAP gives a clearer overall picture of how, where and to what extent the Öland population and activities affects the climate in the form of carbon dioxide emissions to the atmosphere. A survey of our energy use, energy generation and carbon emissions has resulted in indications and understanding of how we are doing in relation to its objectives. Without an existing situation analysis with defined indicators and measurable goals is something so complex as to effectively reduce the carbon footprint of an entire island next to impossible to implement.

For a sustainable future and continuous improvements,

Kenth Ingvarsson

Chairman, Öland's Municipal Association

Lisbeth Lennartsson

Vice Chairman, Öland's Municipal Association

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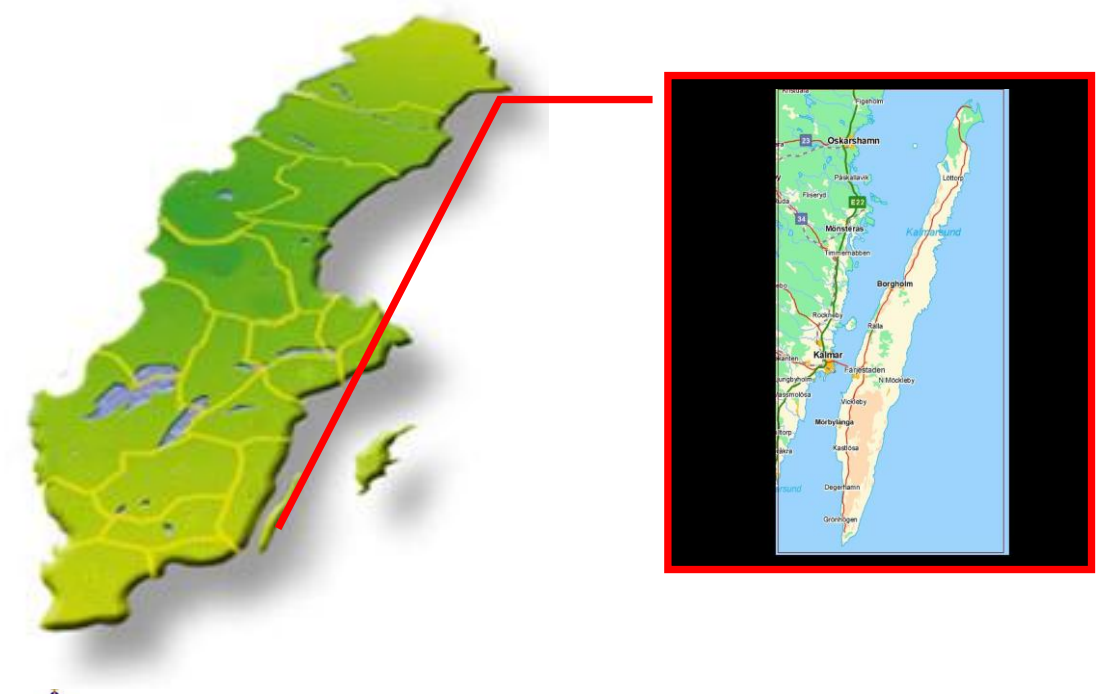
1. CONTEXT

1.1. Geography and territory



Sweden
Scandinavia,
Europe

Öland
Kalmar County
Borgholm & Mörbylånga
Municipality

Öland is located in the Baltic Sea in south eastern Sweden and the surface is the smallest landscape (1 350,1 km) but also the second largest island in the country. The island belongs to Kalmar County and consists of two municipalities; Mörbylånga in the south and in the north Borgholm. Since 1972, Öland is anchored to the mainland by the 6072 meter long Öland bridge, which is the only commercial means of transportation to and from the country.

Limestone quarry. *Photo: Municipality of Borgholm*

The bedrock consists mostly of limestone, which has given rise to the rich flora found. The landscape has great cultural and natural values of national and international interest, of which one of them is the many old windmills that are scattered around the island. In the southeast part of Öland bird life is studied all year round by ornithologists from various parts of Europe. The island can also be proud of the fact that southern Öland is on UNESCO's World Heritage List.

Öland reached 24 697 inhabitants the 31st of December 2010, of whom 55 % are 45 years or older. The population density makes a cut of 18,3 inhabitants per square kilometre which makes 10.6% percent of the county's total population. In total there are 12 083 homes on the island, of which 2008 of them are apartment buildings.

Öland's geology

1) *Böda sand area*
Composed mainly of gravel and sand dunes.

2) *Öland's Northern Alvar area*
Limestone pavement which patches are covered with a thin layer of boulder clay or sandy soil.

3) *Öland's Northern drumlin area*
Moraine and other deposits that formed strings in the northwest-southeast direction, which gave rise to a lobed coastline and a slightly hilly terrain.

4) *Western coast plateau*
A narrow strip of muddy boulder that has a string of glacial river material in forest beach bar.

5) *Algutsrum*
Have a deeper soil layers where both till and other soil types present.

6) *Southern Alvaret*
Covered by an extremely thin moraine soil cover and patches are rocks totally bare.

7) *Eastern Landborg area*
Characterized by the sea walls and meadows.

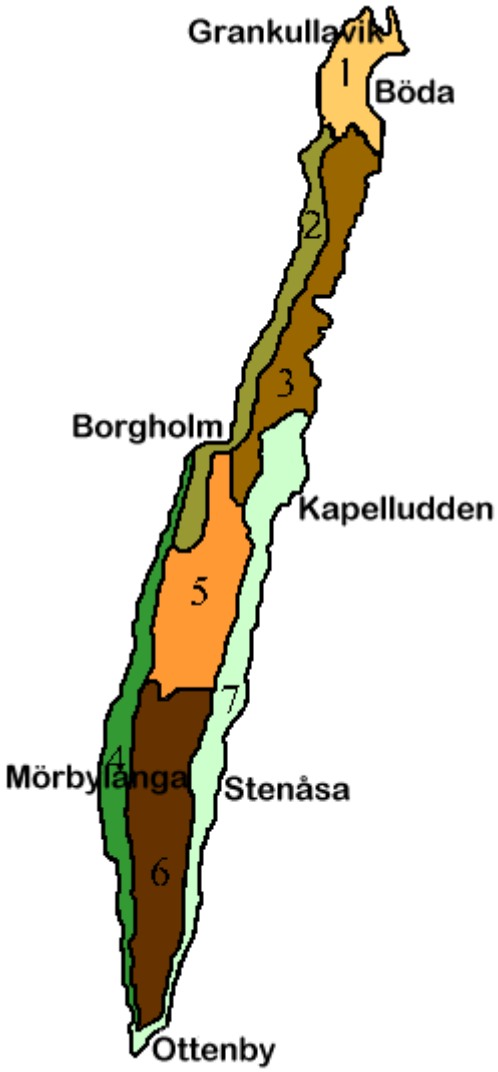


Fig.1.
Öland's geology[1]

1.2. Demography

Regarding the future population we have looked at the development since 1990 finding only small differences. While the Island is connected to the mainland by bridge the number of part-time inhabitants will probably increase as many summer house owners tender to live there an increasing number of months per year and in many cases all year round when retiring from work.

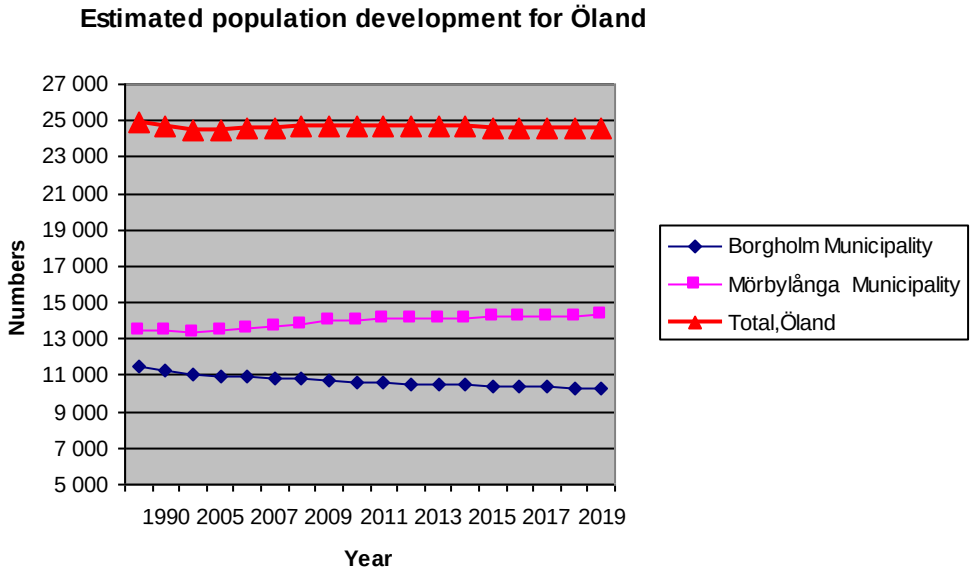


Fig.2. Öland's estimated population growth.

Öland belongs to the County of Kalmar and the island's surface represents 12% of the population (Fig. 9) and 10% of the county's total population (Fig. 8).

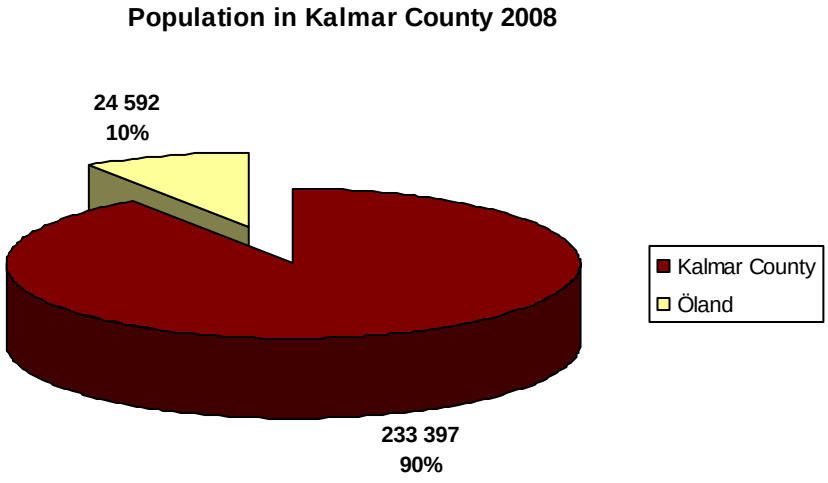


Fig.3. Öland's percentage share of the whole Kalmar County's population 2008.

1.3. Economy

The budget for municipal operations in Sweden for the coming calendar year is decided by the City Council, a so-called budget year. Within the budget, has the revenues (money received by the municipality) to be greater than the costs. Exceptions may be made if there are exceptional reasons.

The municipal budget shall include a plan for the business and the economy during the financial year. The tax rate and the funds for activities required and the plan must show how the activities to be funded and how the financial position is expected to be at year-end. Similarly, there is always a chance to receive regional, national and international project funding for qualified climate and environmental actions.

Öland's municipalities are working with an organization-wide energy efficiency including transport, real estate and behavioural issues. The work has no defined investment budget in a form other than human resources. Those consist of two full-time part-funded climate strategists by the Energy Agency. However, opportunities for new investment in climate change are given proposed actions which are proven economic benefits.

In the real estate side is a systematic climate adaptation and energy efficiency work with its own budget. Mörbylånga municipality expects to add a sum of about 1 million euro on energy conservation measures by 2020 in selected properties. Investments are expected to generate total energy savings of about 20%, which represents a decrease of 16 054,7 MWh and 5 256,4 tons of CO^2. Borgholm municipality has no precise budget within this sector at the moment.

Investment in municipal transport is continuous in its existing business in the form of withdrawal of life vehicles to new environmental classification.

1.4. Political and administrative structures

Öland municipalities have an important role to play in the energy and climate change initiatives through its responsibility for land-use planning, energy planning, supervision and operation of technical facilities. Municipalities have also good opportunities to influence developments through their responsibilities for information, education and counseling.

Planning plays an important role if we are to achieve energy and climate goals and reduce climate change. General and detailed plans are an important function in terms of energy such as current location of new development and how it is placed in the terrain, the possibilities for public transport which is created and the heating system that can be used. Transport represents a large proportion of greenhouse emissions. Cost and availability play a critical role in the choice of fuels and transportation. Local authorities have little ability to influence legislation, fuel prices and taxes, some of the factors that govern our use of fuel and therefore our carbon emissions.

Municipalities can, however, in their various roles and close contact with citizens and businesses work towards more environmentally friendly transport, energy efficiency

measures in the municipalities and to develop effective policy instruments such as procurement and political support for booting of biogas production.

By being an intermediary of knowledge and information, municipalities may communicate their contribution as citizens and businesses can apply for other public authorities. One such example in the energy field is a grant for conversion from direct electric heating to district heating, rock-sea or ground source heat pumps or biomass. In addition, municipalities may use the environmental administration of the activities for reducing the carbon footprint. This can be done by checking the environmental code enforcement, under review and to require low greenhouse gas emissions and through active enforcement measures aimed at reducing emissions.

The municipality as an organization contributes to a relatively large part of the municipality's total greenhouse gas emissions. By seeing their energy consumption, business travel, transportation, and in the context of procurement set climate requirements, the municipality can reduce its own carbon footprint significantly.

Finally, the municipality plays an important role in information dissemination and public education. Here is the Energy Adviser, an important resource, both to the island's businesses and private individuals.

The open plain of South Öland. World heritage. Photo: Municipality of Mörbylånga

2. OVERALL STRATEGY

2.1. Current framework and vision for the future

2.1.1. Worldwide

The Swedish climate work is conducted at several levels. At the global level there is the Kyoto Protocol is an international agreement reached in late 1997 in Kyoto, Japan. The agreement, which was executed in 2005, aims to annual global emissions of greenhouse gases should be reduced by at least 5 % from the year 1990 for the period 2008-2012. A decision would be taken on a new international climate agreement in Copenhagen in autumn 2009 but unfortunately, the parties could not agree on the issue.

In January 2008 the European Commission made a proposal, "energy and climate package", with the following objectives:

- 20 % lower greenhouses gas emissions by 2020
- 20 % increased energy effiency
- 20% share of renewable energy

This case includes the share of bio fuels to be 10 % of transport energy use.

2.1.2. Sweden

At the national level, the government of Sweden, spring 2009, presented the bill, "An integrated climate and energy policy". The bill provides targets for climate and energy policy in 2020:

- 40 % reduction in climate emissions.
- 50 % renewable energy, as the least.
- 20 % increased energy effiency.
- At least 10% renewable energy in transport sector.

The 40 % target for climate compared to 1990 and refers to the non-trading sector, i.e. those sectors not covered by EU's emission trading scheme. The emission target includes such as transport, housing, waste facilities, agriculture, forestry, aquaculture and industry segments. For the activities covered by the EU scheme of emissions trading is determined reduction of emissions jointly at EU level under the trading system's rules.

2.1.3. Regional

The aim of Kalmar County is to be a pioneer in work with reduced greenhouse emissions while achieving a sustainable growth. The county will use energy and the environment as a regional growth. In 2030, Kalmar County is planning to be a low-carbon region. This means that Kalmar will stop using oil-based fuels (oil, petrol, diesel) and produce

themselves as much, or more, energy with bio fuels, PV, wind energy and hydropower instead. Already, the county is well on its way towards the target. Today, 65 % of the county's energy comes from renewable sources, i.e. bio fuel from forest and soil, wind energy, solar heating and hydropower.

This means that the county is an international benchmark.

2.1.4. Kalmar county-wide targets

Energy and environment as growth – more jobs and exports.

With this goal meant that the development of the industries will be better than the national average for the same industries, as well as to the amount of regionally produced energy will increase. The development is measured as the number of persons employed, turnover and exports.

Fossil fuel free in year 2030

No net emissions of fossil carbon dioxide from Kalmar.

Vind power

Wind power will be a significant part in the work of a fossil fuel free region. The region will also play an important role in the national efforts for wind energy and take a central role in the national network for wind power. The expansion of wind power will be facilitated, including by creating flat-rate conditions for wind power in accordance with Parliament's planning goals.

Decouple economic growth from increased use of fossil energy

With this goal meant continuously lower emissions of fossil carbon dioxide per GRP (gross regional product), are reported as tonnes of fossil carbon dioxide per million in GRP.

Energy efficiency

Energy efficiency will increase continuously measured as well as kWh / GRP as kWh per passenger kilometre and kWh / freight kilometres.

2.1.5. Regional council's four climate targets

For the year 2010:

Less than 4,4 tonnes fossil carbon dioxide/person.

This corresponds to existing regional environmental goals (milestones) of 15% reduction in greenhouse gas emissions from 1990 to 2010.

20% less carbon dioxide from transport compared with 1995.

All public transport will be renewable for a minimum of 40%.

In 2010 at least 40 % of the county's community-paid trips carried out by vehicles and / or renewable fuels. The society funded travel is meant for government, their own travel and transport procured by government (public transport, transportation, school bus, boat, etc.).

All the public cars are environmentally friendly cars.

In 2010, all cars purchased or leased by the public sector shall be green, according to the national definition that exists for government procurement.

For the year 2020:

Less carbon dioxide.

Emissions of fossil carbon dioxide will be reduced by at least 50% from 1990 to 2020.

Energy effiency in buildings.

Energy use per unit area in heated homes and offices should be reduced by 20% by 2020 and 50% by 2050 relative to 1995 (= national and regional environmental objectives / targets).

Carbon neutral heating and electricity production.

In 2020, should there be no use of fossil fuels for heating. The county's production of renewable electricity is at least as large as the consumption of it.

All fuel for public transport will be renewable.

An implementation is done in 2020 which means that all public transport are made by vehicles and/or operate in renewable fuels. The public travel is meant for government, their own travel and transport procured by government (public transport, transportation, school transportation, etc.). The public sector has also great potential to influence and reduce their own flight travels. However, at regional level, is there a very little opportunity to influence the aviations technical development. Those flight travels that have been made and which emits greenhouse gases should be avoided by the public sector.

2.1.6. Öland's overall targets and vision for the energy and climate work

Below is an extract from the parts relating to topics of energy, communications and land development in the document *A vision of Öland in 2015 (1999).*

Targets, energy

- *The proportion of locally produced renewable energy will increase.*
- *The reliance on fossil fuels will reduce.*

Strategy

We will…

• …stimulate energy solutions where local renewable resources are utilized. The expansion of offshore wind power and location upon agricultural land, which is not in areas related to the national interest for the landscape, shall be eligible for detailed investigations. In the first instance, wind turbines are to be located together in groups.
• …work to change the natural law limiting the ban on large wind power groups over 10 MW in view of the technologies developed today and are expected to become a reality tomorrow. Already produced major amounts of energy on fewer works (note: limit of 10MW each group was abolished 2009-08-01).
•… work for the Öland Produced biomasss should be used in the common district heating in urban areas.
• …stimulate the cultivation of energy crops.
•…see solar energy as a natural part of the island's energy supply.

For the sections relating to climate impact of transport mentioned in the section following ***Communications****:*

Overall targets

• Roads, shipping and telecommunications should be developed so that residents and businesses have good communications.

• Shipments must be well coordinated. Vehicles must be accessible for disabled persons and also be energy-efficient and operated with the fuels that are less environmentally and health hazardous. We will in future encourage opportunities for cycling, carpooling and use of public transport. We will develop and promote video meetings and increase trade in locally manufactured goods.

Targets, motor traffic

• As far as possible, coordinate our municipal transportation.

Targets, walking & cycling

• Pedestrian & cycle road network will be improved - for public health, tourism and as substitution of car traffic.

• Work to improve the public road network and secure that public transport is maintained at a healthy level.

• Together with Regional Transport Company plan the future public transport to get better resources and in building more commuter parking lots.

Targets, commuting & public transport

• All of the regional work area Kalmar /Öland be put to use, and make long distance commuting easier

• The transport system will be designed to achieve maximum accessibility.

*The section of land development has not referred anything about energy or climate change on housing or other buildings. The final document have an impact assessment for each section and the heading **Energy** states:*

Comment/conclusion
Energy provides, in principle, always an environmental impact. Generally, a large part in energy production is locally / regionally. Production sites should be located so that disruption in energy production is minimized. Offshore wind power is therefore an interesting alternative.

Comment/conclusion
It is important that transport is to be seen in a regional / national perspective where all of Öland is well integrated, especially with the more densely populated Kalmar region for more effective communications with rest of Sweden and international connections. Färjestaden, for example, should be integrated into the local network of Kalmar. The expansion of communications facilities should not affect the natural and cultural values but these values must not obstruct the expansion.

2.2. Objectives and targets

Mörbylånga municipality energy & climate targets

A decision was taken that all Mörbylånga municipality shall be self-sufficient with renewable energy by 2025. The target means that the municipality should stop bringing up oil-based fuels (oil, petrol, and diesel) and produce themselves as much or more renewable energy such as bio fuels, solar and wind power. The municipality's goal is tougher than the county's target for the county in 2030 will be a fossil-fuel free region. To achieve the municipality's commitment to 2025, the municipality will endeavour to work with energy issues and continually make strategic decisions in the right direction.

Energy- & climate targets:

- Mörbylånga municipality shall be self-sufficient with renewable energy by 2025.
- Mörbylånga municipality will have a safe and secure energy which is fossil fuel free by 2025.
- Mörbylånga municipal buildings and facilities have an average energy efficiency ratio of 25% in 2025 compared to 2008.
- Mörbylånga municipality will increase residents' and operators' awareness and knowledge about energy and climate issues in order to choose the society and the environment most sustainable energy source and to work and contribute to growth in a sustainable manner.
- Mörbylånga municipality will work towards a clear environmental profiling and targeted work for a sustainable society in collaboration with industry, other municipalities and stakeholders in the region.

Borgholm municipality energy- & climate change targets

Activity targets:

- Establish a policy for travel to the municipality in which environmental and climate change demands are indicative.
- Establish an energy efficiency strategy for how to operate municipal buildings.
- Establish a strategy for purchasing / leasing of vehicles for the municipality which meet the environmental requirements of public procurement SFS 2009:1.
- Fossil fuels are not used in local business properties.
- Most of the municipality buildings which are not connected to district heating should use solar heating for hot water.
- All housing and construction in Borgholm municipality is characterized by energy efficiency and environmental awareness. Passive houses and other low-energy alternative buildings are welcome for new construction.

Outcome targets:

- Building new wind turbines or upgrading of 50 MW installed capacity during the period 2010-2014.
- At least two biogas plants that breeders primarily manure or sewage sludge to the vehicle gas / heat or electricity there in 2014.
- There are at least two filling stations for vehicle available to the public year 2014.
- Of the total amount of private and commercial cars in Borgholm's municipality are 50 % eco-friendly cars by 2014.
- Of the vehicles in Borgholm Municipality / Borgholm Energi AB's own activities have 20% of the vehicles biogas or electricity as fuel, the other 80% ethanol or diesel particulate filter.

- Newly constructed wetlands are another 250 Ha around the municipality in 2014.

Climate change strategy linked to objectives in other policy documents

In 2000 decided Öland's community councils to adopt Borgholm and Mörbylånga municipalities common set of targets and strategies for Öland's common public interest in the document *A Vision of Öland - 2015*, which itself has been the basis for the two outline plans.

Climate change strategy is therefore also a strong connection to the municipal separate outline plans of 2002 (Borgholm) and 2007 (Mörbylånga) where the development of renewable energy is discussed. These master plans serve as guiding documents for planning in the municipality for years to come.

Values and objectives of existing energy plan based on the basis of common EU energy policy, the Swedish national environmental quality targets, Kalmar county regional environmental objectives and the Swedish Energy Agency's regulations and guidelines on state aid for energy efficiency in local governments.

Port of Borgholm *Photo: Municipality of Borgholm*

3. ENERGY BALANCE AND EMISSION INVENTORY

3.1. Final energy demand

Energy use Öland	1990		2008	
	MWh	%	MWh	%
Farming, fishing, forest	107 356,00	**11%**	109 056,00	**10%**
Industry and construction	336 995,00	**33%**	462 996,00	**42%**
Public service	43 467,00	**4%**	26 523,00	**2%**
Transports	221 999,00	**22%**	225 491,00	**20%**
Other services	36 042,00	**4%**	71 515,00	**6%**
Households	275 158,00	**27%**	215 923,00	**19%**
Total final use	**1 021 017**		**1 111 504**	
Total primary energy demand	**1 045 461**		**1 145 723**	
Energy efficiency	**97,70%**		**97,00%**	

Chart 1. Summary of Öland's energy use expressed in percentage and MWh during the years of 1990 and 2008.

Öland's population	1990	2008
Borgholm municipality	11 484	10 855
Mörbylånga municipality	13 447	13 737
Total, Öland	**24 931**	**24 592**

Chart 2. Öland's population, year 1990 and 2008.

As the chart below shows, is it the industrial, household and transport sector who takes the lead when it comes to using most energy, both during the base year and 2008.

The industrial sector had the majority of the energy demand during the base year (33 %) and still has 2008 (42 %). The trend has changed within the household sector, from second most energy demanding in 1990 to third 2008 – something that rather could be explained by a combined effect of the ever increasing energy prices and increased environmental awareness than a declining population.

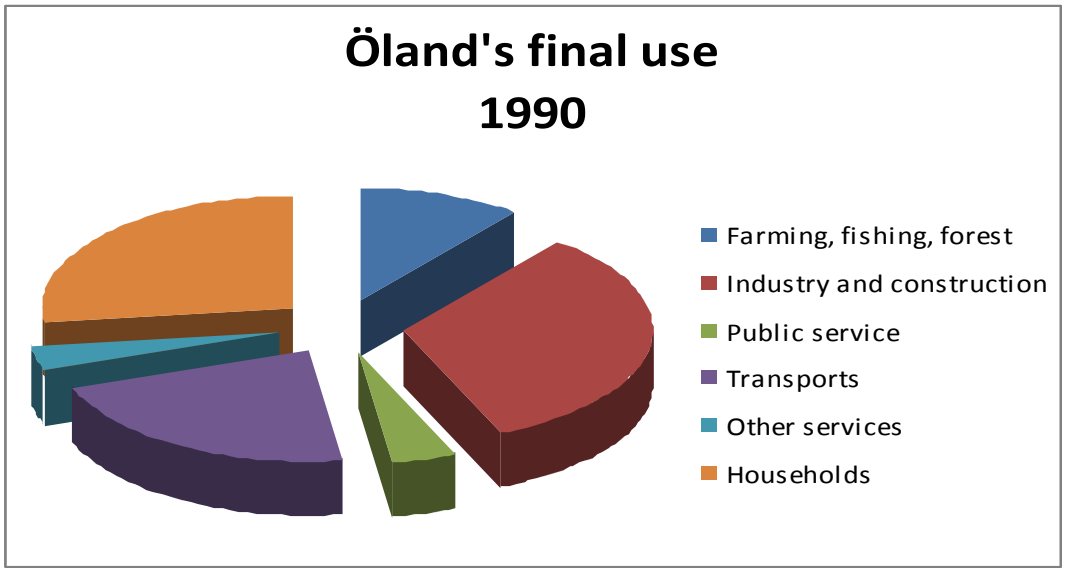


Fig.4. Öland's final energy use during base year, distributed on the different sectors.

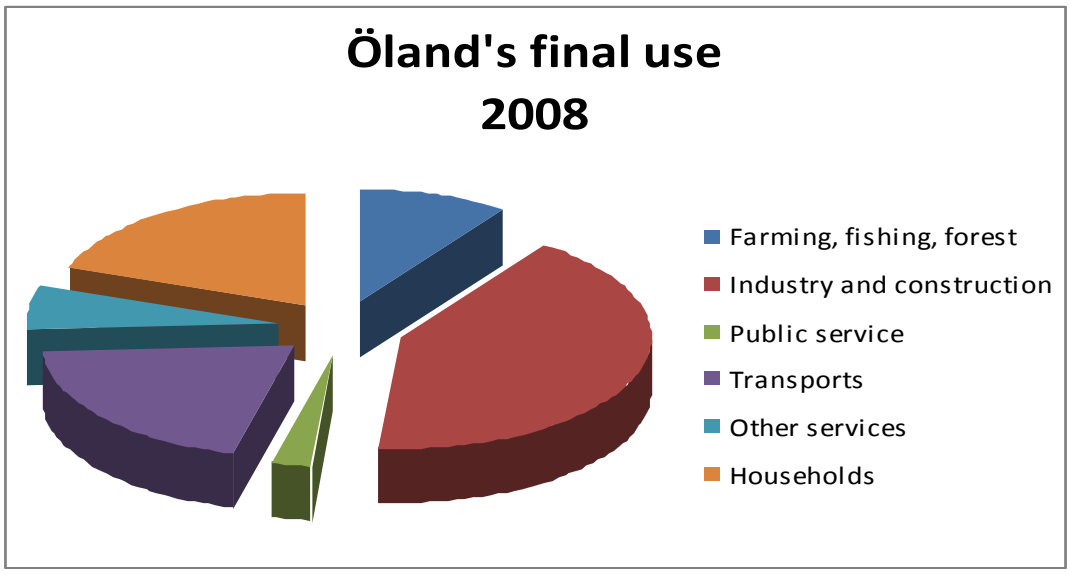


Fig.5. Öland's final energy use during the year of 2008, distributed on the different sectors.

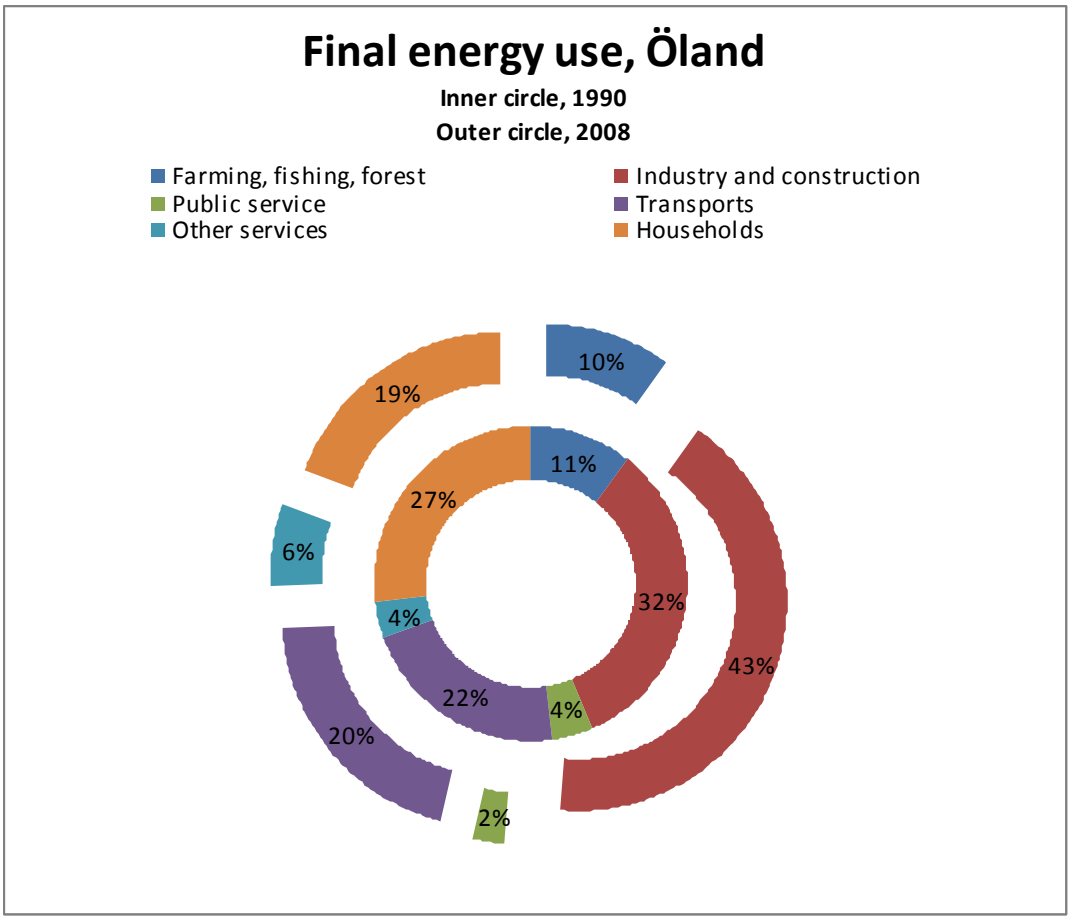


Fig.6. A comparison between Öland's final energy use during base year and 2008, distributed on the different sectors.

As can be seen, the industry is taking a bigger share of the energy amount, while all sectors, besides from other services, which made a small growth since 1990.

The main reason could be the increased production rate on Öland, uppermost regarding Cementa, even though they are working towards a higher energy efficiency per produced unit.

The business as usual-scenario has been drawn from 2008 until 2020, based on numbers from the statistic seen yearly average increase, and is an important tool to show where Öland is heading if no improving actions are taken.

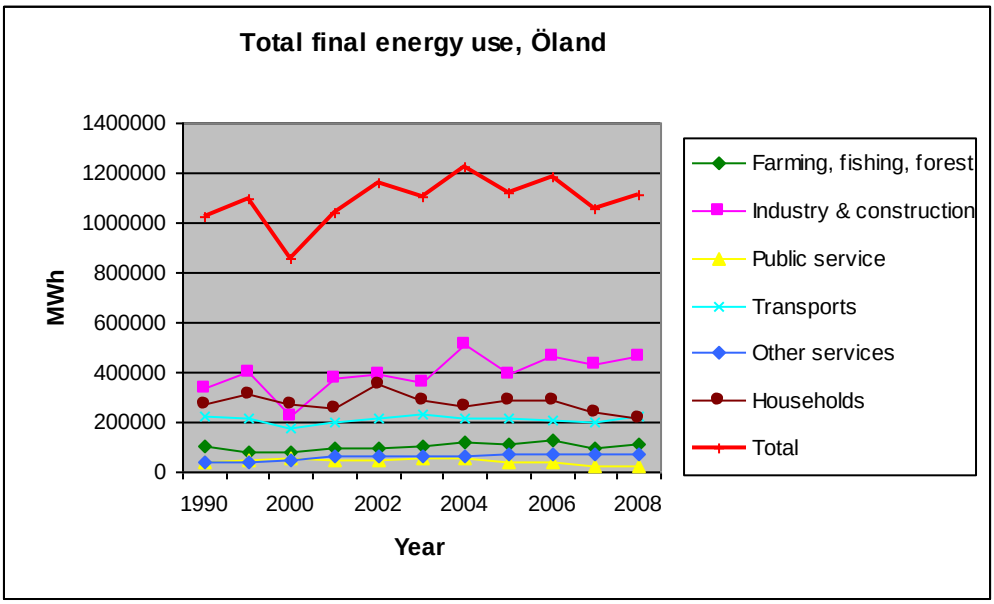


Fig.7. A report of Öland's final energy use between base year and 2008, both shown as a total and a distribution ratio between the different sectors.

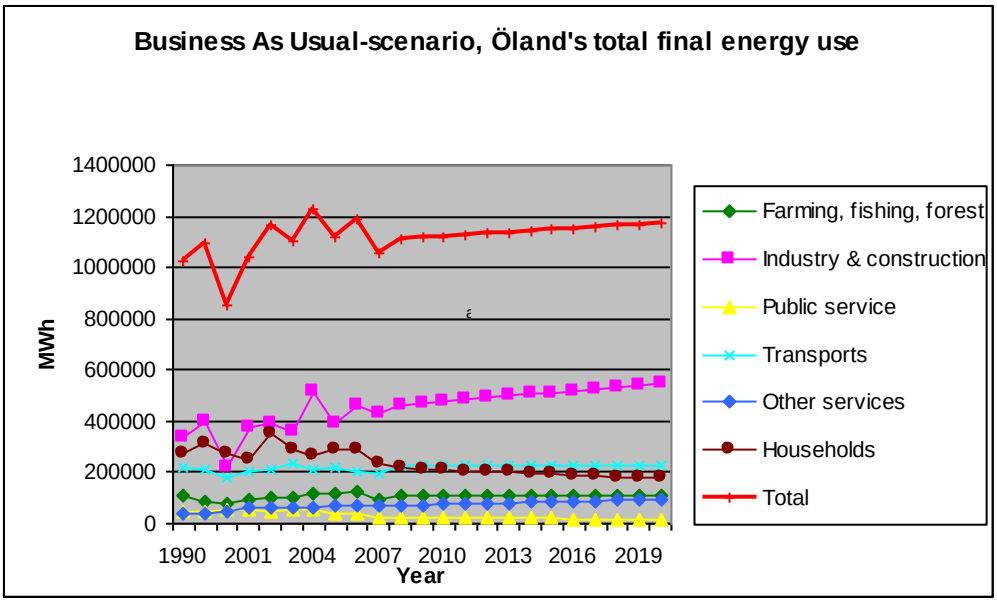


Fig.8. A comparison between Öland's final energy use between base year, 1990, and 2008, shown as a total and distributed on the different sectors.

It's noticed that there's a large difference between the business as usual scenario and the 20-20-20 EU-target. Öland used 9 % more final energy year 2008 than the base line year 1990, which means a 21 % difference compared to the EU target, meaning a total difference in 213 009 MWh.

If nothing is done to improve the energy efficiency until 2020, Öland will fail with an energy use rate of 35 % (355 015 MWh) compared to the goal. The EU target is set to the energy use at 816 814 MWh in 2020, but if there is no actions taken until then, is there a big risk that it could reach an amount of 1 171 829 MWh instead.

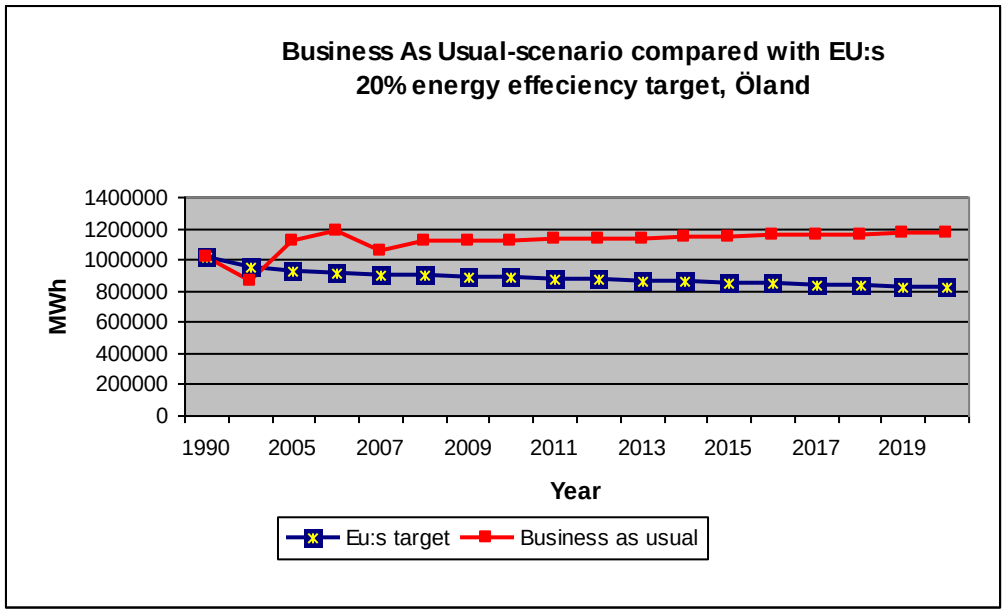


Fig.9. Showing the total and each sectors share final energy demand on Öland between the years 1990 – 2008.

Öland's final energy demand	1990 MWh	Increase % MWh	2008 MWh	Increase % MWh	2020 MWh	Increase % MWh
Business as Usual	1 021 017	x	1 111 504	+9% +90 487	1 171 829	+15% +150 812
Fullfilling EU's 20-20-20-target	1 021 017	x	898 495	-12% -122 522	816 814	-20% -201 203

Fig.3. The energy demand development on Öland, showing the base year (1990), current status (2008) and target year (2020).

3.2. Primary energy demand

It's blowing an average wind of 6.66 to 8.82 m / sec at a height of 71 meters above the ground on Öland which makes the landscape of one of Sweden's windiest. In pace with the increased interest in wind power in the country and the progress of technology development in the area prompted the island's municipalities continuously on wind locations from both landowners and energy companies. However, one can not only take into account the interest in the need for renewable energy, but other interests as the preservation of natural and cultural environments must also be met.

Wind power as energy sources go hand in hand with Öland's goal of becoming self-sufficient in energy by 2020. Therefore, a wind power plan is drawn to explore the possibilities surrounding the expansion of wind power on Öland.

The investigation showed that with the current management and a network capacity of further 90 MW installed (the equivalent of 45 wind turbines á 2 MW) could mean that the island can become self-sufficient in electricity. These works should be distributed over the grid in the northern, central and southern parts of 30 MW per site. Would more establishments be present, a new power cable of 50 kV to the mainland has to be build.

Windfarm at Utgrunden. *Photo: Municipality of Borgholm*

The first modern wind turbine was built in the early twentieth century. 2008 had Öland a total of 68 wind turbines with a combined generating capacity of 48 MW and an estimated annual production of 133 GWh. The majority of wind turbines located in the municipality of Mörbylånga (36 pcs.) But the effect and annual production is more than twice as large in Borgholm's municipality (25 pcs) when they have more powerful turbines.

Öland's energy mix	1990		2008	
	MWh	Share	MWh	Share
Nordic energy mix	1 021 017	100%	977 704	88%
Renewable energy	0	0%	133 800	12%
Distribution of renewable energy	**1990**		**2008**	
	MWh	Share	MWh	Share
Mörbylånga municipality	0	0%	32 100	24%
Borgholm municipality	0	0%	66 700	50%
Seabased	0	0	35 000	26%

Fig.4. The current status on Öland's renewable energy mix.

Öland municipalities have both recently (2010 and 2011) invested in separate 100% municipally owned wind turbines that are supposed to produce and supply the majority of the City's energy needs. Mörbylånga Municipality works are located, assembly, on the mainland, while Borgholm is built in Rönnerum, locally on the island.

The energy demand (based on the Business as usual-scenario calculations) for 2020 shows that Öland will have an energy mix consisting of 16 % renewable wind energy, if no more windfarms will be installed.

Contrawise - if the calculated possible windfarms will be installed, is the amount definitely higher – 63 % of the needed energy on Öland.

Windfarm at Egby. *Photo: Municipality of Borgholm*

Future energy mix

2010			2020		
Energy support	**MWh**	**Share**	**Energy support**	**MWh**	**Share**
Nordic energy mix	932 758	83%	**Nordic energy mix**	433 029	37%
Existing windfarms	188 800	17%	**Existing windfarms**	188 800	16%
Possible new windfarms	0	0%	**Possible new windfarms**	550 000	47%

Distribution of future renewable energy

2010			2020		
Existing	**MWh**	**Share**	**Possible, non-existing**	**MWh**	**Share**
Mörbylånga municipality	43 100	23%	**Mörbylånga municipality**	40 000	7%
Borgholm municipality	110 700	59%	**Borgholm municipality**	240 000	44%
Seabased	35 000	19%	**Seabased**	270 000	49%

Fig.5. The current (2010) and possible future (2020) energy mix on Öland based on existing wind farms, wind farm permit applications and calculated energy demand.

3.3. Emission of carbon dioxide

Emissions statistics was made based on figures taken from reference years 1990 and 2008 statistics from National Bureau of statistics (SCB), Swedish environmental emissions data (SMED), Sweden's geological survey (SGU), the environmental protection agency (Naturvårdsverket) and local chimney sweep. The years were selected because 1990 is the year the EU is using as a reference to 20-20-20-goals and the 2008 is a year of above-mentioned bodies have had time to compile their statistics of the genre.

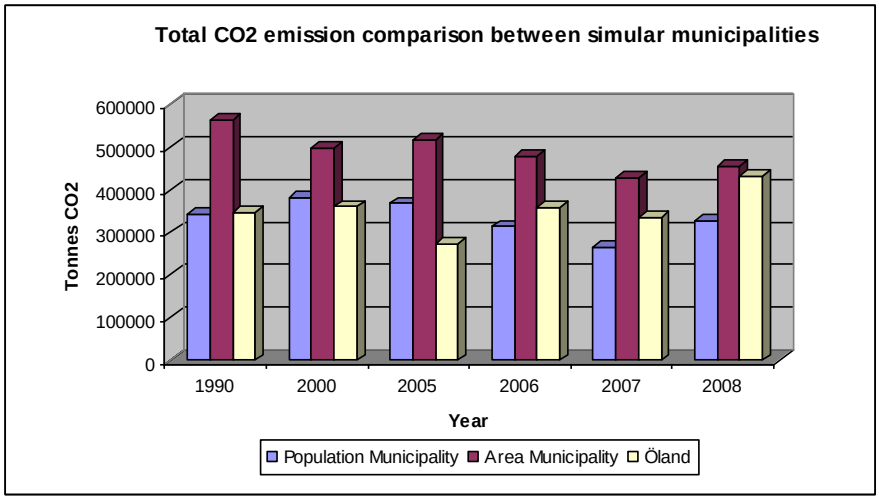


Fig.10. Total carbon dioxide emissions, all sectors. Comparison between Öland and theSwedish municipalities corresponding to the same surface area (Örebro municipality) or numbers of population (Höganäs municipality).

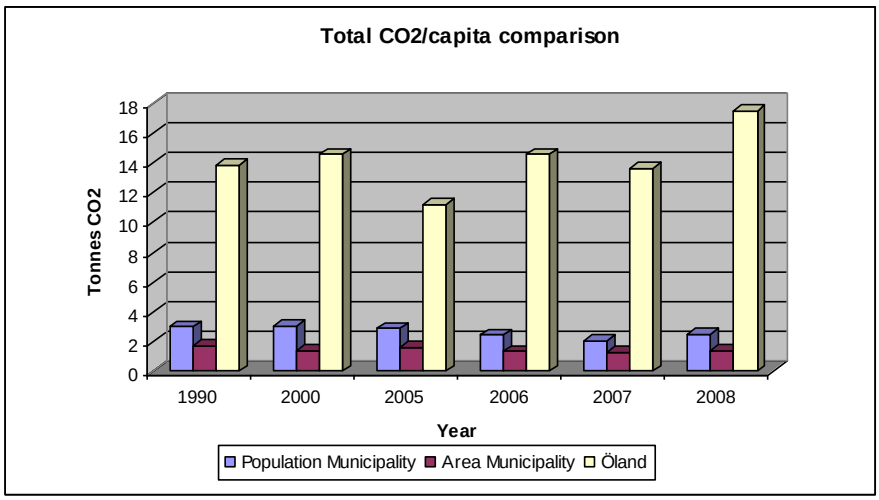


Fig.11. Total carbon dioxide emissions/ capita, all sectors. Comparison between Öland and theSwedish municipalities corresponding to the same surface area (Örebro municipality) or numbers of population (Höganäs municipality).

From a carbon footprint perspective, Öland's three major climate-sensitive sectors are industry (the cement industry), energy and transport. Compared with municipalities with similar surface area and population, has always Öland (between the years of 1990 and 2008) had a higher carbon dioxide emission number per capita in all those three sectors.

(Fig. 10-12). Öland's carbon dioxide emissions/ capita for year 2008 is 17,5 tonnes (Fig. 4), which is more than three times more than the Swedish average - which corresponds to 5 tons for the same year. If you compare it with the municipalities of the same area (Örebro) or population (Höganäs), has Öland over nine times more carbon dioxide emissions levels!

This huge difference is due to a major and decisive factor: Cementa AB, one of Sweden's three largest cement factories. This factory is located in the southern part of Öland, in Mörbylånga Municipality, namely in Degerhamn.

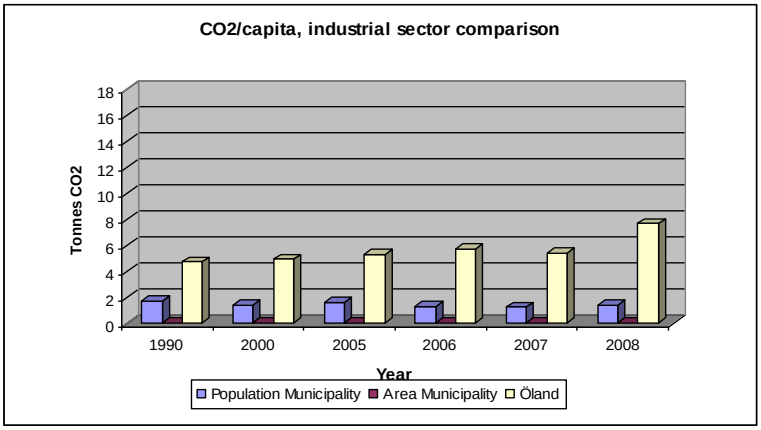


Fig.12. Total carbon dioxide emissions/ capita, the industrial sector. Comparison between Öland and the Swedish municipalities corresponding to the same surface area (Örebro municipality) or numbers of population (Höganäs municipality).

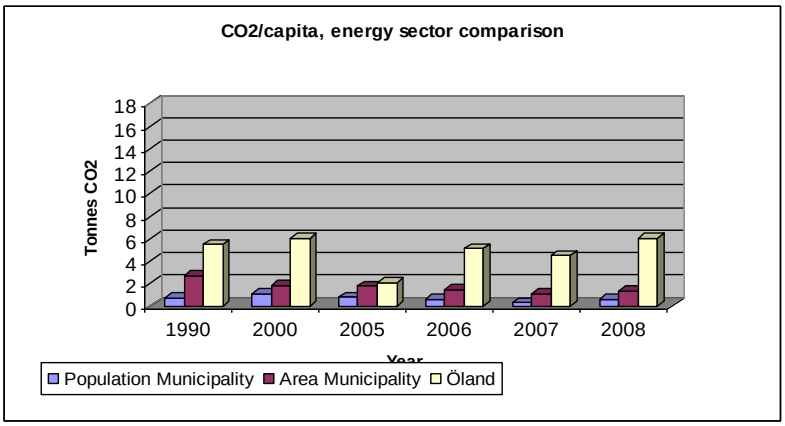


Fig.13. Total carbon dioxide emissions/ capita, the energy supply sector. Comparison between Öland and the Swedish municipalities corresponding to the same surface area (Örebro municipality) or numbers of population (Höganäs municipality).

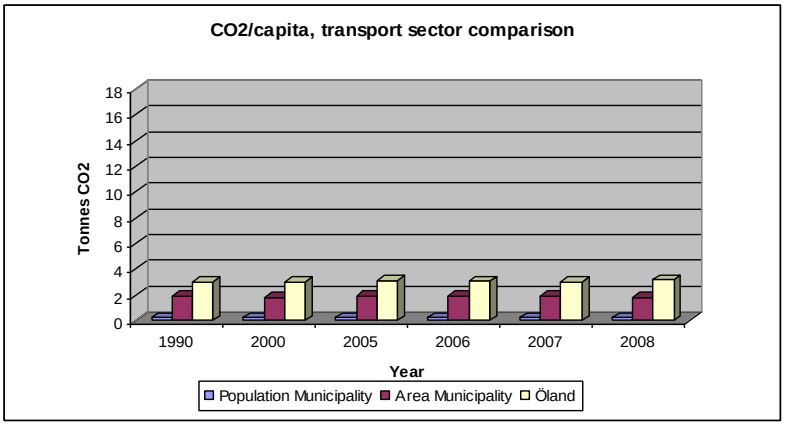


Fig.14. Total carbon dioxide emissions/ capita, the transport sector. Comparison between Öland and the Swedish municipalities corresponding to the same surface area (Örebro municipality) or numbers of population (Höganäs municipality).

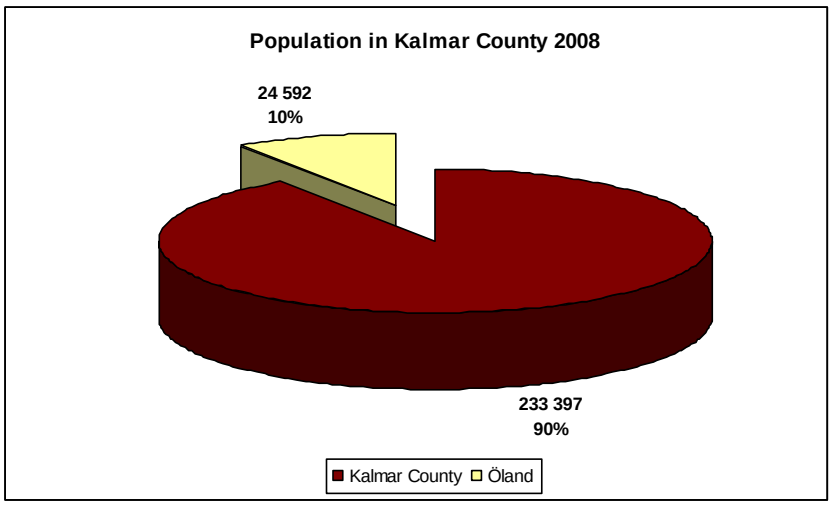


Fig.15. Öland's percentage share of the whole Kalmar County's population 2008.

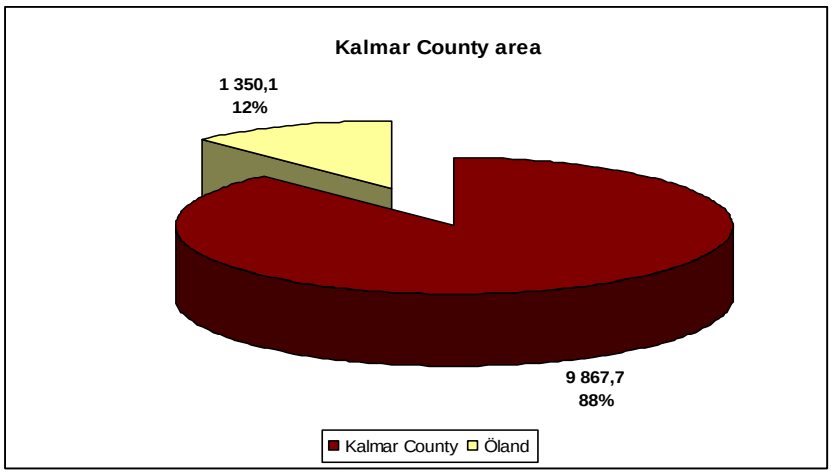


Fig.16. Öland's percentage share of the whole Kalmar County's surface area.

Öland belongs to the County of Kalmar and the island's surface represents 12% of the population (Fig. 9) and 10% of the county's total population Fig. 8).

Of the county's total carbon dioxide emissions, Öland's share has increased from remarkable 25 % to 34 % between the year of 1990 and 2008 (Chart 1).

Of the county's total carbon dioxide emissions from its industrial sector from the same time aspect, covers Öland's mineral industry (Cementa AB) between 98 - 100%.

However, these high figures are hardly surprising when Cementa AB's factories (the remaining plants are located in Skövde & Slite) account for about 4.4% of Sweden's total carbon emissions. From a global perspective the cement industry covers around 5% of the world's total (human) carbon dioxide emissions.

Öland's total share of Kalmar County's carbon dioxide						
	1990	2000	2005	2006	2007	2008
Energy supply	20%	22%	13%	26%	27%	37%
Industrial process	98%	98%	98%	98%	100%	99%
Transport	15%	14%	13%	14%	13%	14%
Machinery	17%	15%	17%	18%	16%	17%
Solvent use	10%	9%	10%	10%	6%	6%
Total	***25%***	***25%***	***23%***	***28%***	***28%***	***34%***

Chart 6. Öland's percentage share of the whole Kalmar County's carbon dioxide emissions during the years of 1990 and 2008.

Leading regional politicians at Kalmar castle. *Photo: Municipality of Mörbylånga*

Geographic maps (Pic. 2, 3) from the Environmental Protection Agency below shows Kalmar county with Öland's municipalities and their total carbon emissions in 1990 and 2008 respectively.

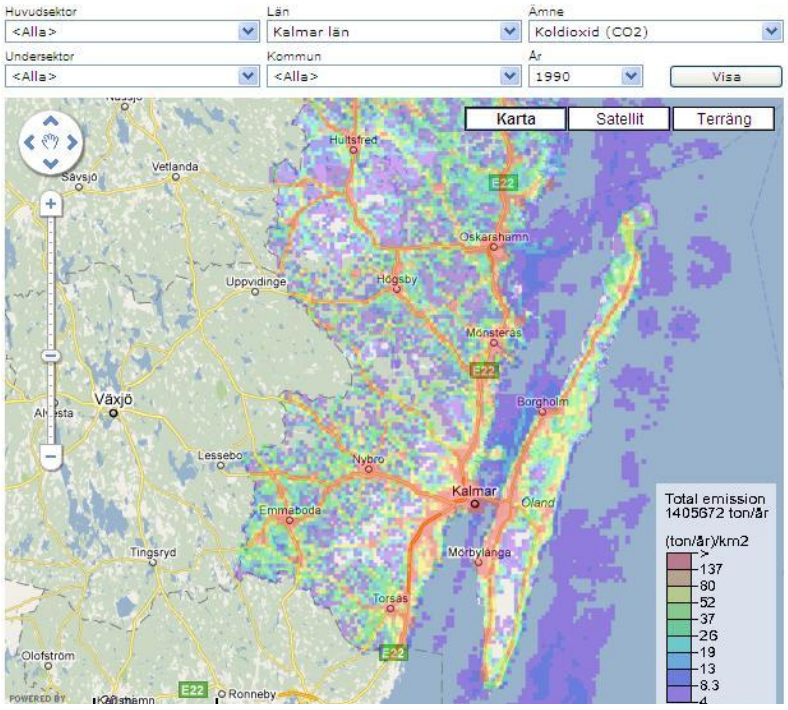


Fig.17.
Kalmar county's carbon dioxide emissions during 1990, tonnes/year & km^2

By comparing the maps can be concluded that the main issues are around the towns of Borgholm, Färjestaden and Mörbylånga, which in itself is not particularly surprising since these sites also has the largest population and hence most activity (such as traffic). Thereafter comes smaller populations like Grönhögen, Degerhamn, Runsten, Böda and Löttorp. The reason for these regions point emissions can be explained by activities that are located there.

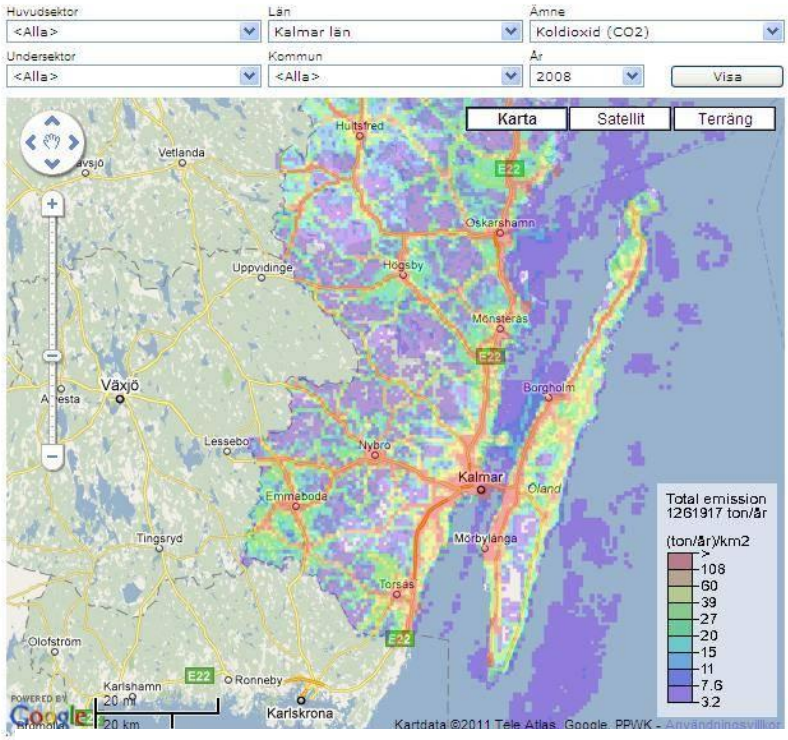


Fig.18.
Kalmar county's carbon dioxide emissions during 2008, tonnes/year & km^2

Common to Grönhögen, Löttorp and Byxelkrok is that all have limestone processing industries. Degerhamn has a very energy-intensive cement industry, Cementa AB, which accounts for just over half of Öland's total carbon dioxide emissions.

Entity responsible for elaboration: The Öland municipal association

The carbon inventory has identified the following three main emission categories in Öland:

•Industrial Processes, 43.8%.

Of which the vast majority of emissions come from the mineral industry, almost exclusively from the very energy-intensive cement production in the Cementa AB, Degerhamn.

• Energy, 34.8%.

Electric heating plants account for the bulk of emissions, followed by self-heating and boiler houses.

• Transportation, 17.9%.

Passenger transport accounts for more than half of total emissions in this category.

To reduce carbon dioxide emissions from these sectors focuses municipalities for actions which initially involves energy efficiency in public sector activities with a focus on transportation, changing behaviors in business and property management. To reach out with the knowledge and inspiration for the island's residents and businesses, the officials from each municipality and Öland Business Office will attend and arrange various energy activities such as Energy Day and Bankable Project.

Through hard work and commitment, together we can make gradual progress from year to year to achieve, and in some cases surpass, the EU's energy policy objectives. If we are going to achieve these lofty goals, or if we are over our heads, remains to be seen in the near future. To reach the ambitious goals is of highest priority, and means that we contribute to a better climate development. If the targets fail to be met within the time frame, it is of great importance that we choose not to see it as a failure but rather a detour from achieving its goals at a later stage. Whatever the results may be, work for continuous improvement should never stop - we cannot afford that.

3.4. Industry

Öland is characterized mainly for its agriculture, farmland and tourism. The major industrial operation on the island has a major impact on Ölands total carbon emissions, namely Cementa AB.

Cementa

Cementa is one of the largest Swedish cement production facilities The Company is owned by the German based Heidelberg Cement Group since 1999. Cementa has three sites across Sweden; the largest on Slite (on the island Gotland), Skövde and the smallest in Degerhamn (Öland). The reason for the placement of Degerhamn is explained by the proximity of raw material excavation of limestone and the infrastructural advantageous port mode.

The Cementa factory at Degerhamn. *Photo by courtesy of the Heidelberg group.*

Cement industry in the world

Producing cement involves the need to heat the limestone crusher at a temperature of 1450 degrees Celsius, which requires large energy expenditure. It is therefore hardly surprising that the cement industry is the whim of climate-changing activities that it is in respect carbon. The industry is estimated to account for 5% of total global emissions - which is more than the entire aviation sector.

Cementa largest factory in Slite is at the forefront in its field in terms of environmental performance. The factory is one of the most modern and energy efficient cement plants in Europe and is held up as an example of Swedish Nature Conservation Agency with regard to industries that reduce their environmental impact.

Cement industry in Sweden

Sweden is a country that uses a minimum of cement per capita, because it's more common to build houses made of wood. There will not be any new established cement industries within the northern Europe where it is seen as an overly expensive investment. A plant in the same range as Slite, in Gotland, is estimated to cost as much as around four or five hundred billion euros. Instead, the emphasis is on developing the existing industries. In 2007 the estimated production from cement three Swedish mills account for 90% of the total amount of cement used in Sweden.

Cementas activity stands approximately for about 4,4 % of Sweden's total carbon dioxide emissions, which is less than the total transports in Sweden, but larger than any other single Swedish company contributes.

Production

Cement Manufacturing Tradition in Öland extends far back in time, until 1886 when Öland Cement Company Limited was formed and then starts its production in Degerhamn two years later. In the factory, four different grades of specialty cements, known micro cement. This special production is best suited as a sealant of rock at the tunnelling and large custom orders to include expansion of the E4 highway to Uppsala, the Hallandsås Tunnel, the City Tunnel in Malmö and the Botnia Railway Line.

In the early 1980's was Cementa in a situation that was about to end in closure, but the company managed to rise, production has increased sharply since the somewhat weak economy in the early 2000's. The good production figures resulted in an initial investment of 40 million in 2006 from Heidelberg Group, the money that was invested in the quality and energy efficiency work. The money was more than welcome when the Degerhamn plant was old and needed a renovation. Some of the measures undertaken were to ensure the safety of operations, phasing out an oil furnace and to adapt better after the then new environmental legislation.

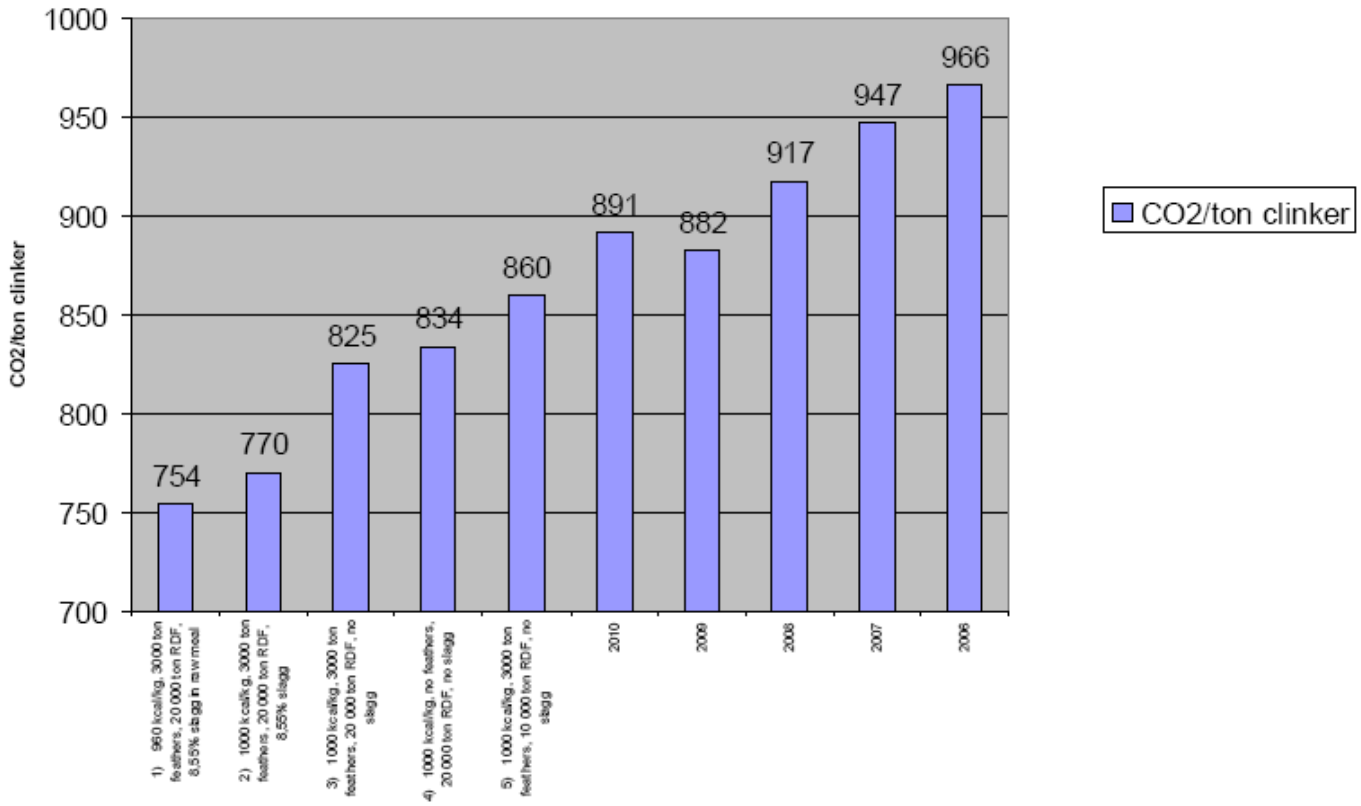


Fig.19.
Cementa's CO2 emission caused by their clinker production since 2006

Ellen Svensson of Mörbylånga, municipality, The Cementa plant manager at Degerhamn Tomas Lind (centre) and Anders Lyberg(right), energy efficiency engineer at Heidelberg Group North.

Öland limestone quarry is classified as a mineral deposit with a national interest and the asset is expected to be secured to 200 years.

Production (ton)		Fuel use (ton)		Raw material use (ton)	
Cement	308 244	I EO1	109 632	Limestone	433 305
Clinker	276 882	Choal	35 228	Bauxite	2 372
CKD (cement waste)	2 172	KEO	5 350	Alox	2 358
		SPA	2 160	Sand	46 495
		Feather/Waste	500	Merox	10 687
				Gypsum	12 156
				Ferro	1 613

Chart 7. Cementa's total production and fuel and raw material use in the year 2010.

Environmental efforts

Between the years 1993 and 2000, Cementa invested in environmental initiatives that cost the company 20 million euros. Foremost the money was invested in various technical solutions to reduce dust, nitrogen oxide and sulphur oxide emissions but also to get a functioning environmental management system in operation. Cementa in Degerhamn is a company that has a major commitment in both the local business community and environmental issues. The company has long had an open dialogue with the media, the local construction and the municipality and is at the forefront with its many past and planned research projects. One of the role models is Cementa factory in Slite that has come a long way.

Cementa's cement production requires high energy input for its energy-intensive production, and the plant in Degerhamn is no exception. In fact, their special production requires a higher concentration of the intermediate product clinker which gives higher carbon emissions per tonne of cement than both the factories in Slite and Skövde.

Degerhamn main fuel (77.5%) are finely ground coal originating from Russia, but the fires also solvents, KEO (converted fuel oil) and fuel oil - fuels the company gradually trying to phase out with renewable fuels. One of the attempts made to reduce their carbon-based fuel burning is the burning of plastic waste, which led to an agreement with the Kalmar regions scavenger (KSRR) and an investment facility for a burning trial run for household waste.

Cementa AB's fuel use	Quantity (ton)	Energy (Gcal)	Share of energy (%)	Energy consumption (ton/h)	Energy content (kcal/kg)
Coal	36 000	217 762	77,5	5,7	6 049,0
Solvent	2 000	12 215	0	0,3	6 107,7
Fuel oil	70	736	0,1	0,01	10 517,6
KEO	4 000	40 137	19,2	0,6	10 034,3
Feathers/household waste	10 000	45 839	3,2	1,6	4 583,9
Total	*52 070*	*316 690*	*100*	*average 1,642*	*average 7 458,50*

Chart 8. Cementa's total energy demand in the year of 2010.

Cementa in Degerhamn started collaboration with the chicken company Guldfågeln AB in 2010. The partnership means that the cement will begin to burn gold bird offal, feathers. This collaboration means that the cement reduces its coal and hence its dependence on fossil fuels while Guldfågeln reduce their waste by 22 000 miles of truck transportation. An investment of 0,6 million euros is made of a spring plant where the springs are dried using waste heat from the lime kilns. Dried feathers have the same energy content as wood chips, which mean that a pound of feathers is equivalent to two thirds of the energy contained in one kilogram of carbon. They estimate the climate benefit of the action to be about 3 000 tonnes decreased fossil carbon emissions per year.

KSRR's federal council decided in August 2011 that Cementa in Degerhamn may burn their pre-sorted combustible waste. The decision means that the waste no longer need to transport around 55 000 tonnes of waste to Norrköping for combustion and that Cementa instead will be able to phase out its coal burning further. The new waste incineration does not contribute any ash or dust emissions since combustion is of very high combustion rate - higher than the current in Norrköping. Overall, we expect cement to reduce its fossil carbon dioxide emissions by 15 000 tons annually, equivalent to 3 000 Swedes' average annual emissions.

Cementa plans to install an own new wind farm consisting of six works in one of Öland designated and approved wind areas, in the south of Degerhamn. The wind turbines capacity is not determined, but at present is 2,6 MW most current. The company is exploring ways to directly connect the turbines to the plant. Turbines would generate electricity up to 40 GWh, which would cover the plant's annual energy needs.

Cementa in the future

Although Cementa in Degerhamn have not experienced such high production rates for that many years in a row previously, and that demand for cement is increasing, reason, leadership, however, that orders are one thing, while implementation is another. The underlying reason for this argument is that the large projects they distribute their cement is mostly publicly funded, which means that political decisions can be delayed depending on how they judge the economic situation.

The need for cement is extensive and cements producers not only deliver to the Swedish market longer, but also to the foreign market since the mid-2000s, a market that paves the way for future production increases, facility developments and new challenges. The likelihood of increased production is high, which also would mean an increase in total emissions of CO2, although an increased environmental performance may mean a reduction on the ratio t CO2/producerad tons of cement.

The burning of Guldfågeln AB's feathers will be fully operational in time for January 2012 and the waste combustion begins in the second half of 2013 when the plant is expected to be fully completed. The discussion is now about infrastructure for the transport of waste and in the current situation, the emphasis is on the train between waste collection plants in Kalmar to boat over to Degerhamn.

A permit application for a wind farm will be submitted in mid-October and the plants are expected to be operational sometime in 2013 if everything goes according to the plan. If the application is granted may be cemented in Degerhamn become Scandinavia's first wind-powered cement plant.

4. ACTIONS

4.1. Fulfilling the targets, a 2020 countdown - a 62% reduction of CO^2 !

Each municipality's energy- and climate strategy provides a number of actions which is to take place inside the municipality. In order to reach the 2020-target of no more than 350.000 tons of CO2 the actions taken by official authorities only makes a small contribution.

Close to 70.000 tons of CO2 has to be reduced by 2020 in total compared to 1990 where the municipality actions stand for less than 3% of the target (2,1 ton CO2). That's why it is so important to take actions together with the inhabitants of the Island. Due to the fact that the island has a well developed wind energy master plan we will reach a 62% reduction of CO2 by 2020 compared to 1990.

1. **Renewable energy production.**
   The dominant part is the development of new wind power farms on the Island. By 2010 there are 85 MW of wind power in operation producing nearly 150 GWh per year. These figures are likely to be more than doubled to 2020 according to the developed wind power plan for the Island pointing out 17 areas suitable for wind power without major impact on the Islands delicate nature and other interests. The total of 380 GWh wind power will instead of imported electricity reduce CO2 emissions by 175.000 tons since 1990.

   According to undergoing investigation is likely that the Island have a Biogas fuel station before 2020, but as being newly introduced, it is unlikely to have any significant effect on the CO2 emissions.

2. **Conversion of fossil fuel to renewable fuel at industries.**
   The by far most important action will be the decision by the Cementa factory to start burning waste from the nearby municipalities instead of coal. The contract has been signed and will be in operation during 2012 or 2013. This action reduces CO2 emissions by 15.000 tons per year. They will also receive feathers from a nearby poultry factory which, when operational, will reduce CO2 emissions by another 3.000 tons.

3. **Use of renewable fuel in transport.**
   Although the Island most certainly has at least one biogas fuel station in 2020 is it not likely to also have electricity production from biogas. So the exact reductions of CO2 from transports are difficult to foresee. We know that there will be a small

amount of electric vehicles and biogas fuelled cars but there numbers are in small scale. Yet the auto industry will produce more efficient cars as the price of fossil fuel will increase and environmental and economic advantages are important to the buyer. Together with the normal updating of the transport fleet and improved efficiency of the vehicles it is likely that CO2 will be reduced by 15% in 2020 or 8.000 tons compared to 1990.

4. **More efficient use of electricity.**
Due to the EcoDesign-directive electricity use in households will decrease with at least 20% when fully implemented. As consequence electricity use should drop some 55.000 MWh or 6.600 tons CO2 by 2020. But you have to keep in mind that the households are increasing their electric use with more and more domestic gadgets so it probably that the final figure could be up to 50% less than expected. The local energy advisors have a key role to create public awareness.

   Of the 6.600 tons of CO2 a mayor part will be electric heating efficiency.
The Island have some 12.000 summer houses which mostly are electric heated in the winter to 5-10° C to avoid frost damages. There are, and are increasing in great numbers, houses that are converted into air-to-air heat pumps. For a normal size summerhouse that would be a reduction of CO2 by 420kg CO2/year each and with 75% of the houses converting we reach a possible reduction of 3.800 tons CO2.

   Several projects are starting and will start coming years regarding energy efficiency in industries, the goal is set to 20% improvement with no mayor investments necessary.
Energy experts say it is an easy goal to reach. So without counting with the cement factory the energy used by industry on the island was 205.000 MWh in 1990 and a reduction by 20% in energy use would sum up 5.000 tons less of CO2.

How to reach the 2020 goals of CO2 reduction

1. R**enewable energy production**	**175 000 tons CO2**
2. Conversion of fossil fuel to renewable fuel in industries.	**18 000 tons CO2**
3. Use of renewable fuel and increased efficiency in transport.	**8 000 tons CO2**
4. More efficient use of electricity.	**11 600 tons CO2**
5. Municipality owned actions	**2 100 tons CO2**
	214 700 tons CO2

To reach the Island 2020 target many actions are to be taken and require that the municipality is ahead of the game leading the way and stimulates renewable energy processes. The 2020-goal compared to 1990 is clearly achievable and a 50% reduction compared to 2008.
Even now, 2011, the northern municipality of Borgholm is self-sufficient of renewable electricity for public activity by 100% through its investment in wind power.

The southern municipality of Mörbylånga is already today self-sufficient with renewable electricity by 75%.

4.2. Actions to increase energy efficiency

Action no.1	Review the climate impact of municipal transport
Description of action	Examine and calculate annual CO_2 emissions of their vehicles Improve policy for the purchase and use of vehicles
Owner of the issue	Energy and Climate Strategists
Cost	Within the energy contract, existing budget within the assisted living route optimization
Reduction of CO_2/energy	Reduce at least 10 % by 2014 with 64 tons and 40% by 2020 with 250 tons less of CO2
Work plan	Transport strategy with action plan adopted by the city council by 2011-04.
Other environmental benefits	Reduced other emissions and promoting use of renewable fuel

Action no.2	Increase energy efficiency municipal buildings
Description of action	Energy analysis of municipality owned properties Report profitable efficiency measures
Owner of the issue	Each municipality's property manager
Cost	Within the energy agreement
Reduction of CO_2/energy	Reduced energy by 20% by 2020 or 5.000 MWh or 1.400 tons of CO2
Work plan	Efficiency Strategy with action plan adopted by the City Council no later than 2011-02
Other environmental benefits	Fossil fuel free heating in properties by 2014

Action no.3	Substitute use of fossil heating systems in municipal buildings and dwellings
Description of action	Identify buildings with oil-based heating, plan and implement a phase out of the identified heating systems
Owner of the issue	Each municipality's property manager
Cost	Within the real estate operations budget
Reduction of CO_2/energy	Reduced fossil oil by 1.000 MWh or 300 tons CO2
Work plan	2020-01-01
Other environmental benefits	No use of fossil fuels

Action no.4	Organise Energy Days
Description of action	Organise an Energy Day for the public / business
Owner of the issue	Öland's Climate & Energy strategists in collaboration with the Energy Agency Southeast
Cost	Allocated budget for the Covenant of Mayors
Reduction of CO_2/energy	Better results than the EU 20-20-20 targets by 2020.
Work plan	Spring 2011
Other environmental benefits	Increased knowledge in society

Action no.5	Project sustainable tourism
Description of action	Investigate the energy and emissions effect from tourism and convert into a more sustainable branch.
Owner of the issue	The City Council and the Island tourism agency, Öland's Energy and Climate Strategists, Tourist organizations, Agenda 21 Group. Swedish national progress agency.
Cost	Tourist agency, Regional development office, Municipalities.
Reduction of CO_2/energy	Strategic plan for sustainable tourism on Öland.
Work plan	Gathering of facts completed by may 2012. Action plan developed by end of 2012. In operation by latest June 2013.
Other environmental benefits	Network of green business, more energy effective tourist resorts.

Beaches at Böda Sand. *Photo: Municipality of Borgholm*

4.3. Actions to improve primary energy demand

Action no.1	**Introduce a fossil free fuel vehicle fleet in the local business**
Description of action	Review and adapt procurement criteria for SFS 2009:1(The Swedish ordinance on environmental and road safety requirements for public agency cars and car transport)
Owner of the issue	Energy and climate change strategist with the procurement coordinator
Cost	Within existing operations budget.
Reduction of CO_2/energy	Reduce at least 50% by 2020 compared to 2008.
Work plan	New procurement of passenger cars will be completed by 2012.
Other environmental benefits	Reduction of various issues such as particulates, nitrogen oxides and reactive hydrocarbons, depending on the chosen replacement fuel.

Action no.2	**Establish a travel policy for the municipality in which environmental and climatic conditions are indicative**
Description of action	Review and write new / revising the existing policy
Owner of the issue	Energy and climate change strategist with the procurement coordinator
Cost	Within existing operations
Reduction of CO_2/energy	Reduce at least 50% by 2020 compared to 2008. 6 tons of CO2.
Work plan	Revision / new policy will be made and implemented in 2012.
Other environmental benefits	Reduction of various issues such as particulates, nitrogen oxides and reactive hydrocarbons, depending on the chosen replacement fuel.

Action no.3	**Join the Covenant of Mayors, EU**
Description of action	Establish energy efficiency plan and report profitable actions
Owner of the issue	The City Council
Cost	In the energy and climate strategy, allocated budget.
Reduction of CO_2/energy	Better results than the EU 20-20-20 targets by 2020.
Work plan	2011-02-28
Other environmental benefits	Lower costs, reduced environmental load

Action no.4	**Participate in project Isle PACT in Europe**
Description of action	Establish energy efficiency plan and report profitable actions
Owner of the issue	The City Council
Cost	Within the EU-project budget. Gotland is the manager of B7.
Reduction of CO_2/energy	Better results than the EU 20-20-20 targets by 2020. Special consideration to island conditions
Work plan	Application for fall 2010 and full participation by 2012.
Other environmental benefits	Lower costs, reduced environmental load

Action no.5	**Implement a Bankable Project**
Description of action	Team up with a so-called Hot Spot on the Island
Owner of the issue	Business contacts and Öland Climate & Energy strategists
Cost	Existing budget in Pact of Islands / investment cost from the company
Reduction of CO_2/energy	Reducing carbon emissions. Energy optimization
Work plan	Start 2011-05-31
Other environmental benefits	Business sector involvement and greater commitment to climate change

Action no.6	**Do a follow-up of Öland Municipal Vision 2015**
Description of action	Analyzing the results versus ambition. Initiate new call for a Vision 2030.
Owner of the issue	The City Council, Öland's Energy and Climate Strategists, Environmental & Construction section, Agenda 21 Group, BEAB.
Cost	Within the Environmental & Construction section and others
Reduction of CO_2/energy	Strategic plan for sustainable development in Öland
Work plan	Analysis of Vision 2015 is completed by 2012. New calls begin in 2013. Completion in 2015.
Other environmental benefits	

5. ORGANIZATIONAL AND FINANCIAL MECHANISMS

5.1. Coordination and organisational structures

Öland's municipalities has two different but at the same time quite similar organisational structures. The common structure is the ruling City councils, which consists of elected politicians, and the head of the municipal organisation.

Common is also that the staff who is working strategic within environmental, climate and energy business is gathered under the environment department.

5.2. Staff capacity

The staff working directly with these kinds of climate change issues is mainly only two – the environmental and climate strategist in Mörbylånga and the energy and climate strategist in Borgholm. Those strategists work as project leaders with the aim to achieve EU's 20-20-20 goals and have their own working groups within transport and facility area. Both municipalities have their own qualified staff but also the opportunity to hire external consultants where and when needed.

5.3. Involvement of stakeholders

It is not permitted to involve any stakeholders within the Swedish public sector because of its impartiality.

5.4. Budget

The set budget is a total of two fulltime positions and an existing budget to improve and minimize the energy use within the municipals buildings.

5.5. Financing sources and instruments

The Swedish Energy Agency contributes with a funding that covers these two above mentioned fulltime positions. Mörbylånga municipality provides their energy efficiency programme with existing money within the business.

5.6. Monitoring and follow-up

Öland internal environmental performance is monitored annually and presented in an environmental statement highlighting the municipality's efforts during the year. The report is based on environmental and planning administration business and climate strategy. The

current monitoring system is based primarily on the form is filled in by the respective administrations and companies. This will include data from a utility company, municipal property managers and information relating to transport within the municipality's own operations. The annual report should provide a basis for formulating new targets and measures.

In addition, a number of indicators developed for the municipality as an organization and the municipality as a geographical area to describe how Öland move in relation to the objectives. Follow-up by the municipality as a geographical area is such using data from Statistics Sweden (SCB), Swedish Environmental Emissions Data (SMED), Environmental Protection agency (Naturvårdsverket) and the Working Party officials.

In future work, it is important to Öland that its ISEAP is a living document with realistic practice measures that has a plan that follows the annual budget. This creates a constant climate change work in progress that leaves room for development and improvement. Some measures in the action plan are implemented and new measures developed. The massive work that has developed with this strategy and the emission inventory is proposed to continue its local cross-border cooperation between with the municipal officials for the best result. Its target is to follow, obtain, encourage and develop climate change initiatives in the municipalities with a holistic approach.

The representatives of the respective activities designates to the group responsible for addressing climate change issues in their respective organizations. The local councils are the ones who have the overall responsible for monitoring each municipality’s current status analyse.

To reach Öland’s overall targets will it be necessary to do follow-ups on this energy and climate strategy on a regular basis. By using developed baselines data, ratios and computational models, can it help the ISEAP to facilitate the implementation over time. A lot is happening also in the energy and climate area which means that the strategies and priorities may need to be revised.

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Photos

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PACT OF ISLANDS

Elaboration:

ÖLANDS KOMMUNALFÖRBUND

Local Authorities:

BORGHOLMS KOMMUN

Mörbylånga kommun

Financial support:

EUROPEAN COMMISSION

Directorate-General for Energy

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