EL-EFF REGION

WP 3: Regional action plan

Västra Götaland, Sweden

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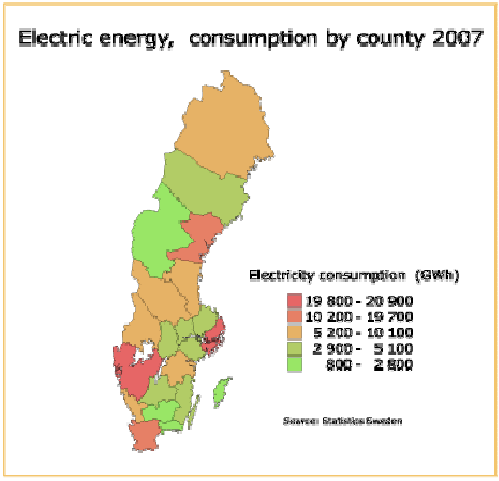
Background

Västra Götaland is the third largest region in Sweden with 1.5 million people representing 17 % of the Swedish population. Västra Götaland consists of 49 municipalities where Gothenburg is the largest city and the major centre of growth in the region. Here are sparsely-populated areas, big cities, landscape of forest- and coast united with large flat countries. Västra Götaland is the most prominent industrial region and is also the fifth biggest producer of provisions and is containing half of the fishing industry in the country. The industry is mainly focused on export, has lots of international contacts and is in close cooperation with universities. The region has also the largest harbour in Scandinavia, a strong shipping industry and the second biggest airport which contributes to make the region to a real hub for transports. Västra Götaland is one of the most visited tourist areas in Scandinavia with a rich cultural heritage and a strong environmental awareness.

Energy and electricity use

In 2007 the energy use in Västra Götaland was 67 TWh of which 32% or 20,2 TWh was electricity. This gives a per capita use of 13 500 kWh electricity which is considered very high in an European context. The main reason is the high use in industry but also relatively high use in other sectors.

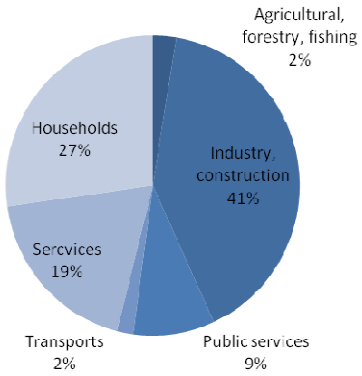
The figure on the right clearly shows that Västra Götaland is one of Sweden's counties with the highest electricity use. This is of course a result of number of inhabitants but also the building structure and industries



The figure below shows the use in different sectors.

The industry is the major electricity consumer in Västra Götaland and is consequently an important actor when aiming to decrease the electricity use. There is a big saving potential especially when focusing on the support processes such as ventilation, lightning, compressed air etc. After a long period of low electricity prices, the industry is now facing higher prices. This has enhanced the incentives for energy conservation as well as fuel switches.

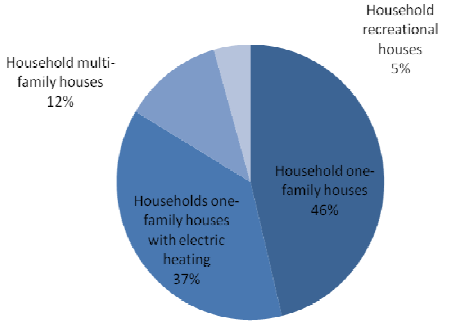
Electricity use in Västra Götaland 2007



The electricity use in households are around 3 700 kWh per person or 5,6 TWh in total. A large part of this is used in houses which have electric heating systems (37%). I addition to this many of the other one-family houses is heated through different heat pump solutions. This implies that electricity could be saved by fuel switches or further development of district heating grids as well as heat conservation measures in houses.

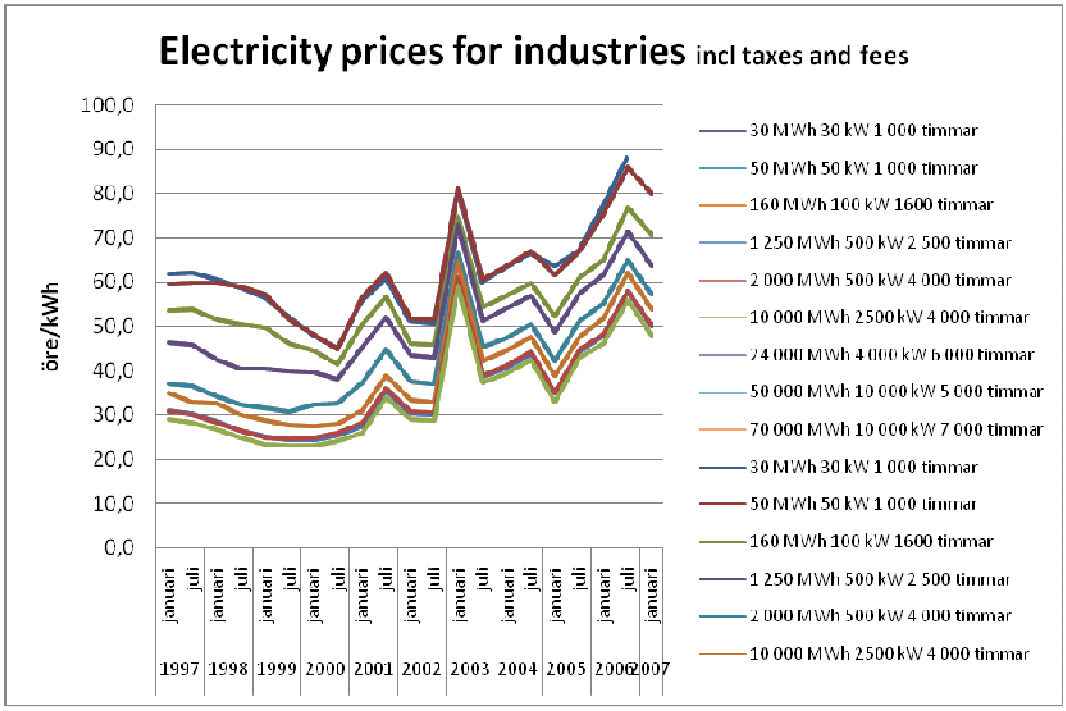
The other part of the electricity use in households is for lighting, ventilation, appliances etc.

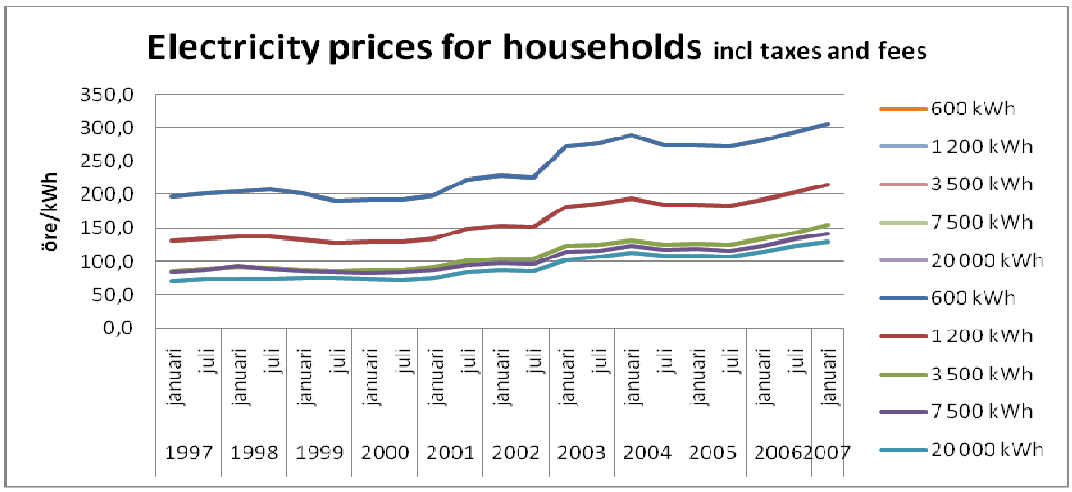
Electricity use in one family houses in Västra Götaland 2007



Electricity prices

The tables below shows how the electrify prices has been progressing from 2001 to 2007.





As you can see the electrity has increased with almost 50% during this years for most of the user categories. This is mainly driven by increased electricity prices on the market but also higher taxes and fees. The table below illustrates how the end users costs for the electricity is constructed (households in 2006).

2006	**Euro/kWh**	**Year**
Typical electricity price household including all taxes	0,136	2006
This price consists of:		
Energy costs	0,0285	
Grid charges	0,0430	
Charges/levies for green electricity certificates	0,0028	
Electricity tax (not for industries, only 0.0005 €/kWh)	0,0281	
VAT (not for industries, services etc)	0,0341	

Developments

The electricity use in the industry develops mainly as the industrial growth du e to the fact that most part of the use is for processes and the operation of the industries. Only minor parts are for heating.

There is a large potential for energy savings in the industry and the interest for this has been enhanced due to the increased electricity prices and the last years awakening of the climate agenda.

The electricity use in the household sector is relatively stable although a lot of fuel switches has been carried out during the last years. This implies a under laying growth in electricity use for appliances etc.

The big challenge for decreasing electricity consumption in households is to increase the human knowledge level about energy and the connection between electricity use and their everyday behaviour. People in Sweden in general have a bad knowledge of how their behaviour gives impact on energy use and costs.

The number of appliances and new use of electricity increases for every year. Stand-by functions in a great number of appliances is also a growing problem. The electrical use must be on a very high efficient level to prevent the electrical consumption to increase.

The total energy use per m^2 will probably decrease in the region because of more efficient heating sources. A consequence of more efficient buildings will be lower cost, less impact of the environment and a safer and secure energy supply.

Targets and strategies

There are no quantified targets set for energy efficiency in the region of Västra Götaland and the measures proposed are mainly supporting and promoting the development of renewable energy and energy efficiency. However, a lot of initiatives are taken in both their own organisation (hospitals etc) and at municipalities and commercial actors. The development is not lacking behind due to the missing of a dedicated regional strategy but the actions are not fully coordinated in between themselves.

During 2006 the regional administration initiated a strategy work in the field of energy beginning with a study of the potential, barriers and possibilities for the region to become a "low carbon society". The study was carried out by ECON Analyse AS and KanEnergi Sweden AB on behalf of the Environmental Board of the regional administration.

The study report, finalised in February 2007, serve as a base for the development of a regional energy strategy with an action plan. During 2007 a stakeholder climate dialogue was initiated under the name "Smart Energy" with six different focus groups. During, and as a result of, the dialogue a suggestion on regional strategy will be formed. The strategy shall incorporate how all together can speed up the phase out of fossil fuels from the regional economy. The suggestion on strategy will then be sent out to relevant actors for comments and during 2008 be adopted by the Regional Council and others.

The market

The electrical market in Sweden is dominated by three big energy companies, Vattenfall, Eon and Fortum. These three are dominating the electrical production, trading and distribution.

The supplier buys the electricity on Nord pool, the Nordic power exchange, or directly through own contracts. The customer signs a contract with the supplier. The end customer can choose between "fixed" electricity price with different bounding times or "running" contracts. According to regulations today, the end customer has right to change electricity supplier or negotiate for a new contract.

The El-Eff Region Project

Electricity consumption is rising, in some areas with alarming speed. There is a strong risk that the increase in electricity consumption will over compensate the growth in electricity production from renewable energy sources. A considerable lack of awareness about these increases exists, not only among the general public but also in SMEs, in public administrations and in political decision makers on regional and local levels.

As the increases in electricity consumption are not limited to one specific area - they happen in domestic and non-domestic areas, in buildings as well as in industry.

The El-Eff Regions project will boost efficiency in electricity use in 8 European regions. It will analyse and tackle areas with specific growth rates by developing regional plans and implementing targeted promotion and dissemination activities.

The project duration is 28 months (01.01.2007 - 30.04.2009) and consists of 11 partners, representing 8 regions and two organizations.

The reasons for growth in electricity use are various and complex: changing life styles and work patterns leading to a proliferation of equipment and appliances, resulting also in a sharp increase in stand-by losses; increase of cooling in warmer, but also in colder climates; switch to electricity from other energy sources; increase in electricity-intensive processes in industry etc.

Target groups

The use of electricity in different sectors of the society is related to a very wide spectra of stakeholders. However some are more important than other based on strategic issues in the work with decreasing the use or even just limiting the increase in electricity use. Below is a list of key stakeholders which is important to involve in this work.

- Electricity producers
- Electricity suppliers
- Grid owners and operators
- National, regional and local authorities and agencies
- Municipalities
- NGO’s for consumers
- Energy advisors
- Regional energy agency
- Consultants
- Large building/real estate owners
- Large industries
- Industrial networks and support organisations
- Manufacturers of technology/products
- Media
- Retailers of household appliances

Some "key"-stakeholder in the region:

Municipality owned utilities (Göteborg Energi AB etc)

Göteborg Energi AB is the fourth largest energy company in Sweden and western Sweden's leading energy company. They are owned by the municipality of Gothenburg. They provide their customers with energy services, broadband, district heating, cooling, natural gas and the electricity supply network.

Göteborg Energi AB and a range of other, but significantly smaller, municipality owned local utilities plays a big role in the production, distribution and use of electricity. The utilities are often a good business for the municipality but can also be used as an important tool for implementing the local energy plans and climate strategies. The utilities has, in most cases, the capabilities and resources needed for implementing and supporting their costumers in their work with increased energy efficiency. Due to the political steering of the utilities the economic objectives can be set a side for other issues such as socio-economic impacts of energy efficiency and increased use of renewable energy.

Hållbarutveckling Väst

Hållbar utveckling Väst - the Energy Agency of West Sweden coordinates the local energy advisors in the county of Västra Götaland. They also run projects on local, regional, national and sometimes European level to promote sustainable energy usage. The objective is to further energy efficiency and the use of renewable energy in Västra Götaland.

Municipal Energy advisors

The municipal energy advisors are for small companies, organisations and also for the public use. The purpose is to supply impartial and locally adapted information and guidance about energy related questions.

Industrial networks and support organisations

The industries in west Sweden is, as described in the background, by far the largest electricity using sector with 41% share. Thus improving energy efficiency in general and electricity efficiency and fuel switches in specific is most important. Several studies shows that the potential is considerable and there I s lot of profitable energy savings that could be implemented within the industries. However, due to lack of information (tools) and knowledge this is seldom realised. The industrial network and supporting organisations such as Industrial Development centres, technology Parks etc has a key role in pooling available resources and knowhow and to attract the interest of the industries.

Media (papers, TV, radio etc)

Our survey carried out in the beginning of the project clearly shows that media is one of the main information sources for the households before purchasing appliances for the home. Media plays a key role of highlighting the electricity use of different appliances, stand by losses etc.

Retailers of household appliances

The sales personnel at the retailers and warehouses for electric appliances is in most cases also advisors in the purchasing process. Our survey shows that most households rely on the information provided within the stores at the actual purchasing moment. It is important that the sales personnel has the proper knowledge and tools in terms of electricity efficiency and performance. It is also important that the customers are guided thorough different kinds of labelling systems such as the existing EU-labelling for white goods. This kind of labelling systems should also be implemented for TVs, satellite set up boxes etc.

Within this project a campaign with the leading warehouse chain was implemented with very good results and a lot of interest and response from the sales staff.

Benefits & main barriers

By electricity efficiency the emissions are stopped at the source instead of using end pipe solutions or changing of fuel. Concerns for the environment and climate change are enough reason for electricity efficiency, but there are other benefits to gain as well. Many times investments in energy efficiency is more cost efficient then investments in new energy production. The arguments for energy efficiency below are discussed in the report "Energy efficiency" by the Swedish Society for Nature Conservation.

The energy supply system is not always reliable and it happens that the power goes off. The system could be much more secure if the total use of electricity was reduced and if the peak load could be evened out.

The spot price for electricity can be very high at peak load. For the industry, energy efficiency and load control and management is of major importance to influence the price for electricity and hence the total cost for the energy use of the industry.

The market for environmental businesses is growing every year. It includes factory products, services to adjust buildings, processes and energy systems. The region of Västra Götaland has the possibility to make use of the opportunities this market brings.

One of the main barriers for energy efficiency is that the energy policy has been concentrating on the supply side of the energy system when replacing nuclear power and decreasing the dependency of oil. Also the governmental climate support programs, LIP and KLIMP, have been focused on energy supply. This is of course also in the interest of the large energy producers. The producers of efficient energy technology on the other hand are smaller and not so well organized why they don't have the possibility to influence the policy as much as the large companies.

Another barrier for energy efficiency is that the money distributed by the government to climate support programs has decreased over the years from 0, 1 billion Euros to 15 million Euros.

Listed below are the barriers identified during the interviews and roundtable meeting with different stakeholders in the region.

Main barriers to be overcome for private households:

- The cost of electricity is a small share of total expenditures for households, if the house does not have electricity heating.
- Electricity cost is included in the rent for some households,. This is however a small group.
- Many houses use electricity for heating, lacking the infrastructure for water distributed heat.
- There is a lack of feedback to households on electricity use. The electricity consumption is only measured once a year and the bills are based on preliminary assumptions of the electricity use. It can also be difficult for the households to understand their electricity use since the bills are considered to be complicated by some of the stakeholders. However, due to a new law, there will be monthly monitoring of the electricity use in households after mid 2009.
- The use of products in stand-by increases fast.
- There is a lack of information on electricity use of products in the stores.
- Difficult to make people understand the cost effectiveness in investing in more electricity effective products.

Main barriers to be overcome for public sector:

Main barriers for the electricity efficiency in the own organization, mainly the electricity use in the buildings, are mostly the same as for other actors with similar activities, see industry and business sector.

Main barriers to be overcome for industry and business:

- The electricity cost is only a small share of the total costs for most companies and is therefore not prioritized.
- Many industries have a very short planning horizon, resulting in that measures with a relatively short pay-off time are not realized.
- Low incentives to produce electricity effective equipment.
- Low incentives to produce electricity effective buildings.
- Lack of recent statistics of energy use in buildings.
- The comfort cooling increases.
- The heat pumps increase the maximum effect demand.
- There is an apprehension that the measures of the coming energy declarations for buildings are not going to be realized.
- There is sometimes a lack of interest to adopt new technologies, especially in the construction field.
- Lack of knowledge in the management of buildings.
- Lack of awareness of energy issues in the construction process.

Area of activities & suggested measures

A regional strategy for improved energy efficiency in general and electricity efficiency in specific should cover all sectors in the society. However, the actions should mainly be focusing on the role of the regional administration and authorities as well as municipalities.

In general, a region or a municipality has four different roles and functions to work within to support the development of the energy system and use. These are:

1. Authority
2. Owner/project developer/investor
3. Influencer/advisor/communicator/educator
4. Purchaser

The main function for a region (and/or municipality) is of course the role as an authority. This role gives the possibilities to set up the rules and requirements, plans and policies to support a efficient use of electricity

The region (and/or municipality) is also a large owner of buildings and operations which can be utilised for projects and investments in new technologies or systems as well as efficient use through good management and an organisation with high level on relevant knowledge. It is important for a region or a municipality to take lead and to be the lighthouse example. Especially if utilising the role of authority and setting requirements on other actors.

The region and municipalities has a large impact on the daily life conditions for every inhabitant. Directly through their operation such as hospitals, schools and other public services or indirectly through other actions such as campaigns etc. In many cases they are also advisors through local energy advisors or through other actions or projects. This fact can be utilised to increase the awareness of electricity use through information an communication as well as highlighting theses issues in the schools.

The region or municipalities are large purchaser of goods and services. By setting high requirements on electricity efficiency they can stimulate the market development of new and/or better technologies and energy smarter services. Examples can be office equipments, computers, lighting etc

Actions on electricity efficiency in buildings

There is today a range of well proven and available technologies and methods or alike that would, in practice, considerably decrease the use of electricity in buildings and equipments.

Today's most energy efficient buildings use considerably less energy than conventional buildings. This can be realized through use of energy efficient appliances, fans, ventilation systems, air conditioning systems, circulation pumps as well as lighting. However quite a substantial part of the electricity use and potential savings are related to the users of the buildings and equipment not integrated in the building. An example is all office appliances, TV set, satellite set top boxes, play modules etc.

There is also a trend that the purchase and use of these kind of equipment is rising year from year.

There for it is important to both initiate measures aiming at the actual electricity use of integrated or standard equipment in the buildings and the user dependent equipments and use patterns.

This implies both to public operations and services, private services as well as for the households.

The region and/or municipalities should emphasize there actions on information and communication to rise the awareness. The local energy advisors and regional energy agency plays a vital role in this work.

Cooperation should be established with real estate owners and housing companies. Together, and also with local/regional energy companies, a range of campaign activities competitions or alike can be implemented.

Network for landlords and housing companies where exchange of experience and knowhow as well as new technologies and ideas can be discussed is important.

As a large building owner the region and the municipalities should also invest in new technologies and have an efficient operation and management in relation to energy use which could be a lighthouse example.

A range of measures are briefly described below. See also page 64-73 in the Swedish NEEAP – "Ett energieffektivare Sverige".

Actions on electricity efficiency in industry

Studies and experiences show that considerable electricity savings can be reached in industry. There is a range of profitable electricity efficiency measures or fuel switch measures in most industry branches although the potential is differs between the branches and the individual industries.

Electricity efficiency in industry depends on a wide range of different factors of which economy is one. In today's competitive markets there is seldom room for allocating resources to work with other issues than the companies' core business and operations. This implies that a lot of profitable measures are not implemented due to lack of resources and also knowhow and proper tools. There is a lack of knowledge, information and tools on measures, technologies and energy management.

The strategy for the region as well as for the municipalities should be to coordintae the actors and to initiate exchange of experiences and knowhow amongst the industries and other involved actors such as consultants and equipment suppliers.

The region can, together with the Swedish Energy Agency and others, develop supporting actions such as trainings, tools and methods and also support for energy audits and consulting services.

A range of measures are briefly described below. See also page 78-81 in the Swedish NEEAP – "Ett energieffektivare Sverige".

Overview of regional measures

	Target Groups						
	Households		Business			Public sector	
Measures	Multi-family houses	Single family houses	Commercial service	Real estate owners and landlords	Industry	County	Municipality
Information and media campaigns	X	X	X		X		
Best practise case studies	X	X		X	X		X
Training		X			X		
Promotion of labelling/voluntary agreements	X	X					
Procurement requirements						X	X
Initiation av benchmarking programmes					X		
Energy education in schools						X	X
Exchange of experiences on different level			X	X	X	X	X
Measures for efficient offices			X	X	X	X	X
Support to individual projects and actors	X	X	X	X	X	X	X

Within the El-Eff Regions project a range of measures to decrease the use of electricity has been identified. These measures are described in other reports within the project.

On the next pages a list of prioritised measures at a regional level is presented.

No	Measure	Direct target group	Implemented by	Funding body	Estimated costs (€)	Description of the measure	Targeted / expected impact
1	Information campaigns with energy advisers	households	Regional energy agency (REA) + Municipal energy advisors (MEA)	National and/or Regional Government	100 000 €	Supporting energy advisers and utilizing their local platform for information activities. Information campaign on stand-by: internet tool, media cooperation, brochure, direct mailing, competition	2 % of the households participate, 200 kWh/a per household saved
2	Best practice, case studies	households	REA/MEA	National and/or Regional Government	100 000	Highlighting good examples in the household sector that can be integrated in an information campain.	100 000 hoseholds reached
3	Media campaigns	households	Regional administration and REA	National and/or Regional Government	100 000	Series of articles in local newspapers, cooperation with TV, Internet sites etc.	No of articles, TV/radio occurance. Increased awareness
4	Promote Labeling	households	Swedish energy agency, REA, retailers	National and/or Regional Government	50 000	Promote labeling in co-operation with distributors of electrical appliance or other products that can have energy labels (houses etc.).	Share of "most efficient" products sold should be >50%
5	Public procurements for electricity efficiency	Public sector	WESTMA (public procurement organisation)	National and/or Regional Government	50 000	Public procurement can be used to increase the demand for electricity efficient equipment, buildings and services.	New products with increased energy performance on market
6	Support case studies	Public sector, Industry and commercial	Regional administration and REA	National and/or Regional Government	50 000	Support case studies of good examples and spread information about them to other actors .	No of case studies compiled and no of persons/organisations reached
7	Statistics for electricity use in buildings.	Public sector, Industry and commercial	Real estate and building owners	National and/or Regional Government	100 000	Collection and presentation of up-to-date statistics for the electricity use in buildings. To be done in cooperation between the electricity suppliers and public bodies.	Better knowledge and tools for estimation of electricity use

8	Regional administration coordinator/ initiator for cooperation and exchange of experience	Public sector, Industry and commercial	Regional administration in cooperation with other stakeholders	National and/or Regional Government	100 000	The region can work as an important platform for experience exchange on different levels (example the ongoing programme for energy efficient buildings).	Improved coordination and cost efficiency of policy and implementation measures
9	Energy mapping and education for the industry	Industry & Commercial	Consultants etc.	National and/or Regional Government	100 000	Energy mapping/auditing and education for the industry (maintenance staff-lower level and administrators-higher level).	10% less energy used in participating organisations
10	Active use of procurement requirements	Industry & Commercial	Industry branch organisations and network	National and/or Regional Government	50 000	Procurement requirements used more actively to stimulate the development of electricity efficient products. Real estate companies are mentioned as a group where procurement could be used more actively.	Higher market share (>50%) of energy effecient products
11	Landlords feedback on electricity use	Households and commercial	Real estate branch organisations, utilities	National and/or Regional Government	100 000	Landlords have an important role to increase feedback on electricity use. Experiments are running where a "smart box" has been placed in the apartment showing the real time electricity use.	10% less energy use in participating househoplds
12	Information campaigns	Industry & Commercial	Utilities, REA, MEA	National and/or Regional Government	100 000	Information campaigns can be carried out in cooperation with electricity producers or suppliers as well as the municipal energy advisors.	No of organisations reached
13	Best practice case studies	Industry & Commercial	Branch organisations	National and/or Regional Government	50 000	Best practice case studies can increase the transformation of the market to more efficient use of electricity.	1000 organisation reached
14	Support and information	Industry & Commercial	bransch organisations, REA, MEA	National and/or Regional Government	50 000	Measures for efficient offices can be realized through support and information dedicated to companies, the real estate owners and landlords.	10% or organisations given support and information implement energy measures
15	Training with energy advisors	households	REA/MEA	National and/or Regional Government	50 000	Training in collaboration with energy advisers. For interested home owners or dedicated groups.	500 kWh saved by participating household

Targets

In accordance to "National program for energy efficiency and energy smart building construction" the target for energy efficiency in buildings should be 20 percent to 2020 and 50 percent to 2050 in relation to 1995.

The target stated in the National Energy Efficiency Action Plan (NEEAP) for Sweden (Ett energieffektivare Sverige) is 9% to 2016 in relation to the base years 2001-2005.

The overall objective of the climate initiative "Smart Energi" is that the region of Västra Götaland shall be almost free from fossil fuel by 2030. A climate strategy which is the result of the climate dialogue held by "Smart Energi" during the year was presented in 2008. Energy efficiency was an important part of the strategy.

Based on these national and regional targets within the energy area we suggest that a specific target for electricity use and following routines for monitoring and evaluation is implemented.

As Västra Götaland is a quite large electricity user, both in terms of per capita as well as share of all energy use it is important that a dedicated target is set on the electricity use. As such a large share of the electricity use is in the industry it is also recommended that have two or more indicators to monitor.

We suggest the following targets and indicators.

Area	**Target**	**Indicator**
Share of electricity in total energy use in Västra Götaland	<30 % to 2016 (32% in 2007)	Share ($GWh_{el.}/GWh_{total}$)
Electricity use per capita	< 12 500 to 2016 (~13 500 in 2007)	kWh/inhabitant
Electricity use in households per capita	< 2,9 to 2016 (~3,11 in 2006)	MWh/inhabitant
Share of electricity use in households with electric heating in relation to total use in households	< 25 % to 2016 (37% in 2007)	Share ($GWh_{el.}/GWh_{total}$

Implementation & monitoring

It is important that the regional administration, through is environmental board and secretariat as well as the board and secretariat for growth and development know intensify the discussion and analysis of the following and others issues to develop a action plan.

Issues that should be addressed are:

- How do we present the findings and outputs of the El-Eff Regions project and how can this be included in the Smart Energi agenda?
- Which areas should be prioritized in the short and long term?
- Which areas can the regional administration and/or municipality influence directly and which areas has to be reached through cooperation or directly by other actors (such as state, industrial organizations etc.)?
- In which way can the regional administration cooperate and coordinate with the municipalities, the association of municipalities and other public bodies?
- Is there an synergies with other strategic development areas such as tourism, economic growth, business development, job creation, spatial planning etc?
- Who/m are responsible, and for what?
- Which are the interested parties and how should these be involved in the best way?
- Which actions and activities can be implemented?
- In which time frame should they be carried out?
- Which resources can we, and other public bodies, allocate to this work?

Monitoring

The monitoring of the indictors suggested for the targets is used through the national statistics. This statistics are public an updated annually. The numbers can be downloaded or read on www.scb.se or www.regionfakta.com

The monitoring of the awareness level and as well as the importance and impacts of the actions implemented by the region and municipalities is far more complicated to carry out and to assure the quality of the monitoring results.

The impacts of individual actions should be monitored in relation to the completion of the action and carried out in close cooperation with the implementers as well as the persons and target groups involved.

We suggest that these indicators such as energy awareness, attitudes towards electricity or alike is integrated in the overall monitoring made by the regional administration for economic growth, health, life quality etc.