

EL-EFF REGION

WP 3: Regional action plan prepared by: ESV

Regional action plan for Upper Austria

1 Background

| | |
|---------------------------|--|
| Capital: | Linz |
| Population: | 1.38 mio |
| Area: | 12.000 km ² |
| Gross inland consumption: | 305 PJ; > 30 % renewables |
| Economic activities: | industry, service sector, tourism, 25% of the Austrian industrial exports |



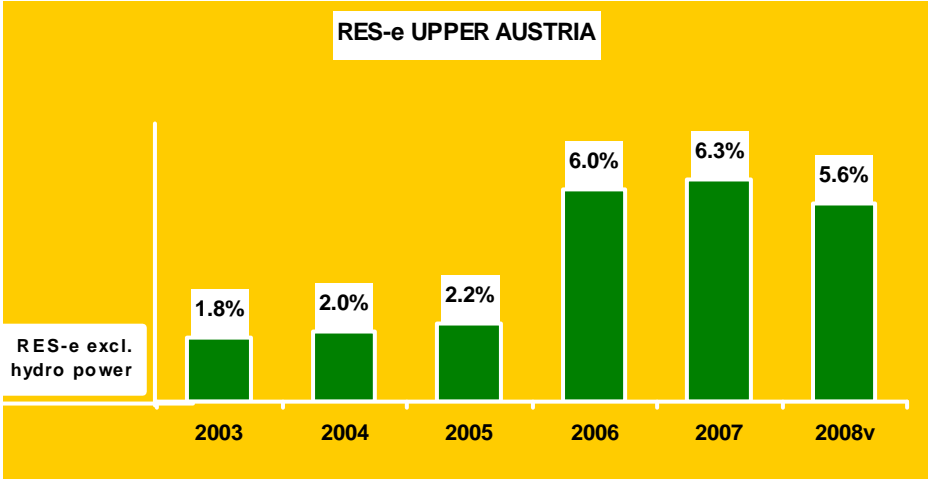
Upper Austria has about 1.4 mio inhabitants and is a highly industrialised region (with more than 25 % of the industrial exports of Austria) located in the Northern part of Austria bordering Bavaria and Czech Republic. Important heavy industry is located in the central part of the region, yet Upper Austria is characterised also by small-scale farming. Upper Austria offers a variety of different landscapes: rolling hills, high mountains, lakes and large forest areas.

The region of Upper Austria has set itself ambitious energy efficiency targets. In 2004, Upper Austria passed an energy efficiency strategy with the aim to increase energy efficiency by 1% respectively 1.5% in the public sector until 2010. The Energy Efficiency Strategy is also part of the overall energy strategy and action plan "Energy 2010" which includes clear targets and as well as a comprehensive action plan to achieve them. The first implementation phase (1994-1999) was very successful and for example led to an increase in the share of renewable energy sources from 25 to 30% and to a reduction of energy consumption in housing of 30%.

In 2007, a process was started to define the energy future of Upper Austria beyond 2010. Four scenarios until 2030 were developed which outline possible developments of energy consumption, trends and potentials.

On 10 October 2007 the regional government decided to adopt the "turning point scenario" as official policy objectives. The targets include – among others - to cover 100% electricity from renewable energy sources up to the year 2030 and reduce electricity consumption by 0.5% annually.

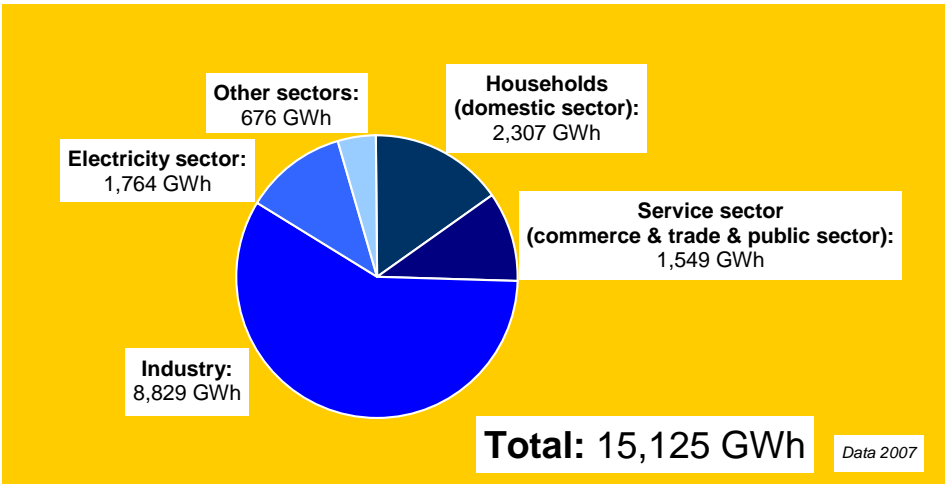
The EL-EFF Regions project was very well timed and was able to support the Energy Future 2030 process. Within the EL-EFF project, events were organized to involve stakeholders in this process and the list of measures developed in WP 3 provided valuable input to the list of measures under decision in the Energy Future 2030 process.



| | | | | | | |
|----------------------------|--------------|--------------|--------------|------------|--------------|--------------|
| total hydro power | 69.9% | 75.5% | 74.6% | 72% | 67% | 66.0% |
| of which small hydro power | 5.5% | 5.6% | 6.5% | 7% | 7% | 6.9% |
| total RES-e | 71.7% | 77.5% | 76.8% | 78% | 73.3% | 71.6% |

Source: Energy Commissioner Upper Austria

The following table gives an overview of the electricity consumption in the region:



Since October 2001 when the electricity market liberalization became effective (except for a small reduction in 2002), the electricity price has been continuously increasing. Presently, it is about 120% of the value in October 2001. Although there is a significant price difference between different electricity retailers, so far only a small percentage of households changed their supplier.

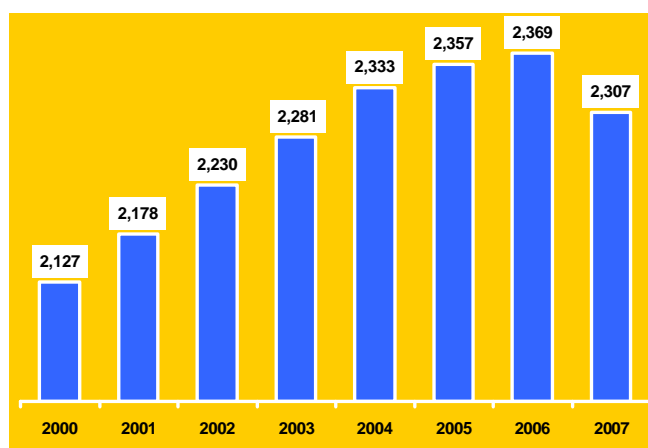
| Typical electricity prices | Price per kWh in Euro |
|---|-----------------------|
| households (incl. taxes), 2007 | 0.16 – 0.19 |
| service sector (only energy price, incl. taxes), 2006 | 0.0465 – 0.0464 |
| industry (only energy price, incl. taxes), 2006 | 0.0441 – 0.0433 |

www.e-control.at

Electricity consumption in households

In Upper Austria, there are about 543,034 households, the average annual electricity consumption per household is about 3,000 kWh. In 2005, electricity consumption in households was 2,490 GWh, representing 19.4% of the total Upper Austrian electricity consumption. This figure includes the electricity used for electric heating, which is about 300 GWh and for hot water provision (about 400 GWh). The electricity consumption in households for electric appliances (excluding hot water provision and electrical heating) amounts to about 1,600 GWh, or 12% of the total electricity consumption.

There was a continuous increase of electricity consumption in this sector (GWh):



Source: Energy Commissioner Upper Austria

Experts assume that the increase of about 8.5% since 2000 is mainly due to the increased number of households, additional appliances and due to the increase in the number of heat pumps. In the last years, many new one family homes were equipped with heat pumps (24,000 installations), mainly because people considered it as a convenient and environmentally friendly heating system and also due to attractive electricity tariffs offered by the electricity suppliers.

Additionally, the number of electric appliances per household is continuously increasing as well as their frequency or time of use. Especially the fields of "home office" and electronic entertainment have been growing continuously over the last years. For example, the "home office" sector has already a share of about 12% of the total household electricity consumption.

However, awareness concerning electricity consumption and savings potentials is quite high. According to a survey carried out by ESV in the last years, attention is being paid to the electricity consumption (64%), followed by the price (52%) and the brands (33%) when buying new electric household appliances.

Electricity consumption in the public sector

Statistics in Upper Austria only show electricity consumption in the “public and private service sector” as one figure, therefore it is difficult to analyse the public and tertiary sector individually.

However, electricity consumption in this field increased sharply in the last years. From 2000 to 2005, there was an increase in electricity consumption of 80% (public and private service sector).

For the public buildings owned by the regional administration, energy accounting is in place since 1994, allowing benchmarking and monitoring. The overall energy benchmark for electricity consumption in all public buildings (owned by the regional administration), increased from 30 to 34 kWh/m²a (in 2005).

Electricity consumption in the service/tertiary sector/SMEs

Electricity consumption in this field increased sharply in the last years. From 2000 to 2005, there was an increase in electricity consumption of 80% (public and private service sector). It is estimated that the vast majority of this increase was in the service/tertiary sector (offices, shops, etc.). The annual increase in economic activities (increasing GDP) results in a continuous increase in new services.

Electricity consumption in industry

Upper Austria is a highly industrialised region with a strong industry, especially energy intensive metal, chemical and pulp and paper industries. This explains why the electricity consumption in industry amounts to 7,717.9 GWh (2005) which is 60% of the total Upper Austrian electricity consumption.

Typical for the sector is the high relevance of “individual measures” in one industry company. If for example a new paper production machinery is installed in one of the 3 major pulp and paper industry companies, this means a significant increase in the overall Upper Austrian energy consumption.

Although in the last years, industries benefitted from lower electricity prices, presently a trend to own electricity production in big companies can be noticed. Recently some major businesses built new CHP plants, some of them fired by biomass. A number of best practice industry buildings were implemented recently which serve as model for other businesses.

Target groups

The main stakeholders in the electricity field in Upper Austria are:

- Electricity consumers (private households, public bodies and institutions, companies)
- Energy retailers
- Grid owners and operators
- Regional authorities (administrative authorities, the electricity authority)
- National electricity regulator
- Technology producers
- Civil engineers & consultants
- Regional energy agency ESV & the OEC (network of green energy businesses)
- Large industries (metal, chemical and paper industries)
- Media
- Consumer organisations, farmers association and small hydro power association
- Retailers of household appliances

A survey carried out within the EL-EFF regions project of representatives of different stakeholder groups produced interesting results regarding the views and the current knowledge level of different stakeholders. There are many similar views but also opposite ideas.

When asked about the future development of electricity consumption, the majority of the interviewed persons believe in an increasing demand in the coming years. 4 out of 20 persons said that demand will stabilize and/or decrease. Private households are seen as the field with the biggest growth rates and consequently the field with the biggest saving potentials (lighting, stand-by losses, energy efficiency, etc.).

When asked about the own field of activity, the answers show that most of the interviewed persons are already very aware of the topic and actively searching for saving potentials. Suggestions for legal, financial and awareness raising measures are far reaching and partly very detailed.

Benefits & main barriers

The main benefits of electricity efficiency are:

- reduction of costs for importing electricity
- CO₂ reduction and climate benefits
- technology leadership due to more efficient production methods / companies
- lower electricity costs

Main barriers

The main barriers for achieving the electricity efficiency target and for implementing the proposed measures:

- in many cases, electricity efficiency can be achieved by implementing a number of rather "small" saving measures which makes it difficult to communicate and implement measures
- very often the benefits can not be traced directly enough which can discourage actors
- when discussing possible measures, it seems that it is often easier to put the focus on the discussion of new (green) electricity plans rather than on saving measures
- lack of best practice examples

Economic implications of selected electricity efficiency measures:

Presently a study is being carried out by the University of Linz to assess the economic implications of electricity efficiency measures. The following example was recently published:

Example: Measure "Electricity efficient circulation pumps"

Increased use of electricity efficient circulation pumps until 2030; by 2030 only electricity efficient circulation pumps are in use in the private sector.

Target group: Households

| Period | investment costs | electricity savings | investment per electricity saved |
|-------------|------------------|---------------------|----------------------------------|
| 2009 - 2030 | 45 mio € | 3,105 TJ | 5.2 Cent/kWh |

This example shows that the costs for saving one kilowatthour electricity is only 5.2 Cent which very much below the costs for households for buying electricity. Moreover, besides electricity saving, there are a number of positive effects on regional economy:

| Economic effects | 2009 | 2010 | 2015 | 2020 |
|--------------------------------|-------------|-------------|-------------|-------------|
| Cross regional product (mio €) | 0.8 | 1.4 | 5.4 | 13.0 |
| Employment | 9 | 11 | 27 | 64 |
| Private consumption (mio €) | 0.3 | 0.1 | 0.2 | 2.4 |
| Investment (mio €) | 1.1 | 1.2 | 1.5 | 2.5 |
| Electricity consumption (TJ) | -11.8 | -23.8 | -84.0 | -144.6 |

Example: Measures "Electricity efficient technologies for motors" & "Increasing efficiency for the use of compressed air"

Use of technical and economic electricity efficiency potentials in 5 different (industry) sectors

Target group: Industry

| Period | investment costs (minus financial support given) | electricity savings | investment per electricity saved |
|--------------------|---|----------------------------|---|
| 2009 - 2030 | 283.2 mio € | 54,606 TJ | 1.9 Cent/kWh |

For these two measures, the costs for saving one kilowatt electricity were calculated with only 1.9 Cent, taking into account public support for these electricity efficiency measures, the costs for one kilowatt electricity saved would amount to 2.5 Cent. Again, among others, the following benefits for the regional economy are outlined:

| Economic effects | 2009 | 2010 | 2015 | 2020 |
|--------------------------------|-------------|-------------|-------------|-------------|
| Cross regional product (mio €) | 36.8 | 58.9 | 157.0 | 224.9 |
| Employment | 64 | 148 | 272 | 337 |
| Private consumption (mio €) | 6.2 | 8.7 | 32.6 | 45.4 |
| Investment (mio €) | 25.5 | 25.4 | 21.9 | 10.0 |
| Electricity consumption (TJ) | -185 | -437 | -1724 | -2913 |

University of Linz, "Energie-Institut"

Area of activities & suggested measures

In the last years, a number of measures have been carried out to increase energy efficiency and the use of renewable energy sources - ranging from awareness raising & information measures, energy advice & training to legal measures & financial support. An action plan can build upon these measures which will be enlarged for the Energy Future 2030 strategy.

The following list outlines possible electricity efficiency measures including enlargement of ongoing and new measures:

| No | Measure | Type of measure | Direct target group | Involved actors, e.g. | Description of the measure | Target / impact / criteria |
|----|---|------------------------|--------------------------------------|--------------------------------|---|---|
| 1 | Electricity efficiency competition | information | Households, companies, public bodies | ESV | annual competition for best practice in electricity efficiency in the categories "households", "companies", "public" including promotion folder, media cooperation and award ceremony | number of submissions |
| 2 | Online tools | information | Households | ESV | online-database providing information about efficient household appliances, including online tool to check the electricity consumption of household circulation pumps, etc. | number of visitors of the website |
| 3 | Campaign "Good and efficient lighting" | information | Households, service sector, SMEs | ESV, regional bodies, advisers | promotional campaign supporting efficient lighting technologies and including initiative to exchange lamps | number of brochures / folders disseminated, number of lamps exchanged |
| 4 | Campaign "Minus 10%" | information | Households | ESV, regional bodies | within the promotional campaign "Minus 10%" (started in Oct. 08 as part of the EL-EFF regions project), a number of awareness raising activities for electricity efficiency in households are presently implemented | participation in "Minus 10%" competition |
| 5 | Campaign "Efficient fridges and freezers for low-income households" | information, financial | Households | ESV, regional bodies | campaign for exchanging inefficient fridges and freezers for low-income households (including information and financial support) | number of appliances exchanged |
| 6 | Campaign on energy efficient | information, financial | Households | ESV, regional bodies | information events (including training seminars), folders, website, financial support | number of exchanged pumps |

| | | | | | | |
|----|---|------------------------|--------------------------------------|----------------------------------|--|--|
| | circulation pumps | | | | for exchange of old pumps | |
| 7 | Electricity efficiency criteria | financial | Households | Regional bodies & administration | electricity efficiency criteria as part of financial support programmes | e.g. max. electricity consumption per person, per household |
| 8 | Phasing out electric heating | legislative, financial | Households | Regional bodies | exclusion of electric heating for new homes within the frame of the sustainable buildings programme and priority for renewable heating according to construction legislation | |
| 9 | Energy efficiency criteria for heat pumps | financial | Households | Regional bodies | requirement of energy efficiency criteria (coefficient of performance) for heat pumps in order to receive financial support | minimum requirement class "A" |
| 10 | Electricity efficiency advice sessions | information | Households, companies, public bodies | ESV | including electricity efficiency in every energy advice session which is carried out for different target groups by ESV | electricity efficiency is a topic in about 10,000 advice sessions per year |
| 11 | Electricity efficient technologies for motors / engines | information | Public bodies, companies, households | ESV | campaign to increase market penetration of efficient technologies for motors (e.g. motors, fans, pumps...) | 10% savings/a |
| 12 | Campaign on energy performance contracting | information, financial | Companies, public bodies | ESV, regional bodies | support and increased market penetration of energy performance contracting | increase in number of contracting projects annually by 10% |
| 13 | Stand-by campaign | information | Households, public bodies, companies | ESV | campaign on saving electricity in households, municipalities and companies with a focus on reduction of stand-by consumption | |
| 14 | Best practice examples & pilot | information | Households, public | ESV | best practice examples in public sector (incl. schools) and companies documented; pilot | 10 best practice examples for public |

| | | | | | | |
|----|---|-----------------------------|----------------------|---|---|--|
| | projects | | bodies, companies | | projects implemented | sector and companies; 20% less electricity consumption in the pilot cases |
| 15 | Campaign "Electricity efficiency for schools" | information | Schools | ESV | awareness raising activities for schools including training material for teachers, support for "school projects", school competition, funding for electricity efficiency measures in school buildings | |
| 16 | Local energy strategies | information, financial | Public bodies | Regional bodies, municipalities, ESV | enlargement of the support programme for municipalities ("E-GEM") which encourages them to carry out local energy strategies including targets and an action plan for electricity efficiency | number of implementing municipalities and targets set by them |
| 17 | Public procurement for electricity efficient appliances | information, legislative | Public bodies | ESV, regional bodies | continuation and enlargement of activities in the field of public procurement (information packages) and purchase of appliances by any public body limited to the most efficient ones | 20 % of the electricity consumption of new appliances |
| 18 | Electricity efficiency criteria for public buildings | legislative, financial | Public bodies | Public authorities | in case of new construction and major renovation of public buildings, together with the existing energy performance indicators, an electricity efficiency performance indicator has to be met to be eligible for public funding | 10 % of the average electricity consumption of new and renovated public buildings |
| 19 | Obligatory annual reduction targets; accounting & monitoring | legislative | Public bodies | Public authorities | annual targets for reducing electricity consumption in public buildings and obligatory electricity accounting to monitor progress | 1 % reduction of the electricity consumption of public buildings per year |
| 20 | Efficiency criteria for | legislative | Public | Regional | increasing efficiency of existing systems, | COPs of new and |

| | | | | | | |
|----|--|-------------|------------------------------------|---|--|--|
| | air conditioning | | bodies, companies | bodies | minimum COPs for new systems, reducing the number of systems by new construction and renovation | existing systems |
| 21 | Smart metering | information | electricity retailers | Households, companies | advanced electric meters with communication functions | 3% of the households have smart metering |
| 22 | Energy efficiency criteria for electricity production | legislative | Electricity producers | Regional & national bodies | obligatory electricity efficiency criteria for new and existing plants to increase efficiency | |
| 23 | campaign for increasing efficiency for the use of compressed air | information | Companies | Energy advisers, ESV | minimum COP for new installations and support for old installations | |
| 24 | Campaign "load management" | information | Companies | Energy advisers, ESV | advice and audits for load management and for reactive current compensation | number of advice sessions |
| 25 | Sector strategies | information | Companies | ESV, energy advisers, Chamber of commerce | electricity sector strategies for the main business sectors which are based on energy audits in representative companies of each sector and including electricity efficiency measures and best practice case studies | number of sector strategies |
| 26 | Increased R&D activities | information | Companies | ESV, regional bodies | supporting R&D projects in the field of electricity efficiency; continuation and enlargement of existing R&D programme | 10 projects annually |
| 27 | Efficient cooling campaign | information | Services sector, SMEs | ESV | Information and awareness raising activities (training courses, conference, publication) | |
| 28 | Training seminars for energy officers | information | Industry, tertiary & public sector | ESV | Training seminars for staff responsible for "electricity" in industry, tertiary & public sector are developed and regularly carried out | |
| 29 | Energy efficiency | information | Industry, | Regional | Development of electricity efficiency standards | 3 % of the electricity |

| | | | | | | |
|--|--|--|--------------------------|-------------|---|---|
| | standards for energy technologies in buildings | | tertiary & public sector | bodies, ESV | for energy technologies in public & company buildings (“Haustechnik”) and link to public funding. | consumption in public & company buildings (new and renovated buildings) |
|--|--|--|--------------------------|-------------|---|---|

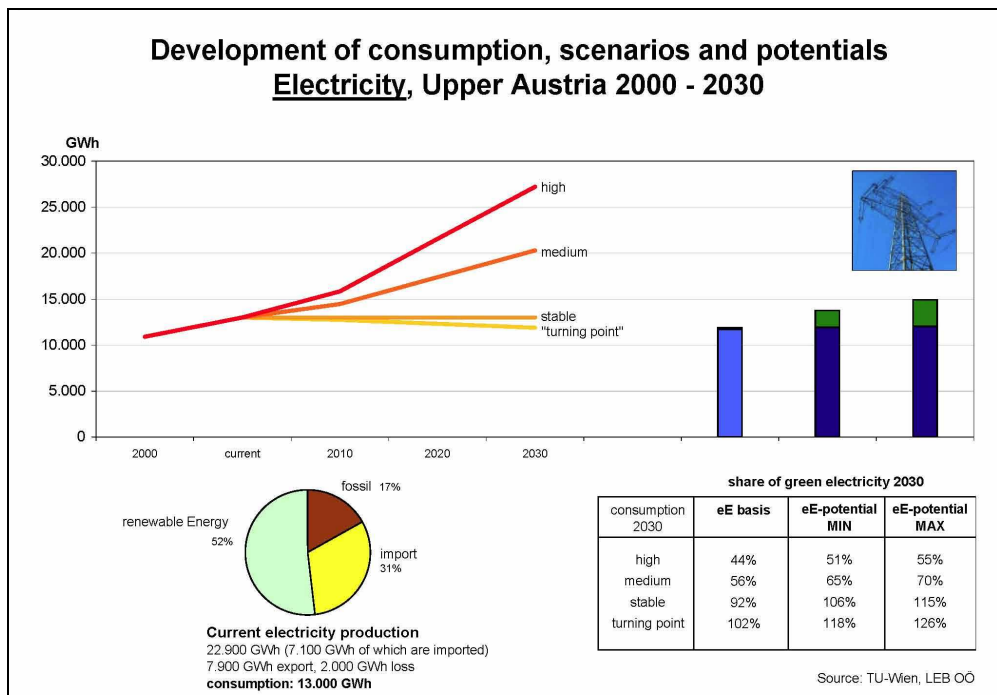
Targets

For future development, as part of the strategy process "Energy future 2030", 4 scenarios were developed which outline development of consumption, trends and potentials and which show that the share of RES-e can vary from 44% up to 126%. This depends on the development of the electricity consumption by 2030 (high – 3% increase, medium – 2% increase, stable - +/- 0%, turning point scenario - -0.5%) and on the utilisation of RES-e potentials.

Based on the 4 scenarios, the following targets were adopted:

- 100 % electricity from renewable energy sources
- no fossil fuels for heating
- 39 % less heat demand
- 41 % less fossil transport fuels
- minus 65 % CO₂

However, a high share of RES-e (turning point scenario) is only possible if Upper Austria succeeds in increasing electricity efficiency. The target is therefore to reduce electricity consumption by 0.5% per year. Electricity efficiency will therefore have a high political priority over the next years, also making use of the results of the EL-EFF project.



The Austrian wide target laid down in the Austrian National Energy Efficiency Action Plan is to save 9% of the average total energy consumption (by 2016), that is 80.4 PJ (22.4 TWh). For the Austrian National Energy Efficiency Action Plan, 378 measures were developed, which were taken into account when developing the measures for this Regional Action Plan.

Implementation & monitoring

Annual reporting and monitoring is undertaken by the Energy Commissioner, which will also include the electricity efficiency target.