



# EL-EFF Regions

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## Boosting Efficiency In The Electricity Use In 8 European Regions

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 project will take a cross-sectoral approach and focus on increasing the efficiency of electricity in 8 European regions: Oberösterreich (A), Ile-de-France (F), Pomerania (PL), South Bohemia (CZ), Västra Götaland (S), Madrid (E), Navarra (E), Saxony (D). It will analyse and tackle areas with specific growth rates by developing regional action plans and implementing targeted promotion and dissemination activities.

The web site <http://www.efficient-electricity.info> presents an updated picture of the efficiency in the electricity use at a regional level. Even if the context varies from a region to the other, you will notice the strong will and involvement of regional organisations and institutions in electricity efficiency.

The project, which is coordinated by O.Ö. Energiesparverband, is supported by the programme 'Intelligent Energy - Europe' of the European Commission.

## Campaign On Efficient Lighting In Upper Austria



Energy efficiency (EE) and renewable energy sources (RES) are since many years cornerstones of the Upper Austrian energy policy. In 1993, the first Upper Austrian energy strategy and action plan was passed leading to an increase of renewable energy sources from 25 to 30 %. For the present decade, the energy strategy also sets a number of very concrete goals: to double solar and biomass.

Upper Austria has also passed an energy efficiency strategy with the aim to increase energy efficiency by 1%, by 1.5% in the public sector respectively. O.Ö. Energiesparverband (ESV), the energy agency of Upper Austria, is mainly responsible for the implementation of the energy strategy and action plan.

One recent field of activity to increase energy efficiency and tackle raising electricity consumption in the last years is lighting. ESV therefore developed an information campaign for energy efficient lighting which will be officially launched on 23rd April.

Light is inevitable in our live – but energy consumption is often underestimated. It is often unknown that lighting can cause for example up to 50% of the electricity consumption in offices and that appropriate lighting to a high degree influences work quality. Although many energy efficient lamps and lighting systems are available, reality often seems to be different.

With easy measures, such as the change from lamps with electromagnetic ballast to fluorescent lamps with electronic ballast, energy savings of around 30% can be realised. With the use of motion detectors und light management systems the savings can even be doubled – depending on the kind of rooms and frequency of use. Additionally to the energy efficiency enhancement, an improvement in the lighting quality can be achieved by using modern lamps.

Also in the catering and hotel industry lighting plays a prominent role, it contributes to the wellbeing of guests and additionally represents a notable expense factor. Around 30% of electricity use in this industry is caused by lighting and therefore it is worth thinking about energy efficient solutions benefiting from less electricity consumption, longer life-time of lamps and less maintenance costs.

Additionally in private households lighting is an important cost factor as the annual electricity costs for room lighting of a family of four are around 75 Euro, which means around 10% of an average electricity bill.

In preparation of the lighting-campaign, ESV organised a round-table on "energy efficient lighting in tertiary sector buildings" in January 2007. At the round-table, important players, like ESCOs, energy advisers, planners and representatives of lighting companies, were invited to discuss how efficiency in lighting can be boosted and how to develop strategies on that.

For the first time at the Energiesparmesse, an annual exhibition and trade show dedicated to renewable energy sources and energy efficiency in March 07 in Upper Austria, ESV presented energy efficient street lighting systems.

Among others, next steps of the lighting campaign will include the following activities:

- a brochure on energy efficient lighting (32 pages), which will provide general information on lighting, a special focus on lamps, lighting systems, light management, use of daylight, street lighting, lighting, for the industry and also a few best practice examples,
- campaigns targeted at private households and hotels,
- conference on "efficient & innovative lighting" on 24th April,
- a new training course (June 07).

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## The Local "Energy Gain" Training Programme



The "Energy Gain" is a local training programme for companies to get a better knowledge and understanding of their energy use and to improve their energy efficiency through a range of measures (both technical and organisational). The training programme is arranged by the Municipality of Lidköping in cooperation with local business and trade organisations with financial support from the Government. The training is carried out by the association MiljöPunkten (the Environmental Point) where KanEnergi is one of the founding member companies and also involved in the trainings.

The target groups are mainly manufacturing industry, workshops, farms, property managers and/or owners and trade companies.

The training programmes are branch specific and a group of 10 similar companies is undergoing the programme at the same time. The companies are during the training program mapping their energy use and developing their own energy action plan with measures on energy efficiency and renewable energy. In total 10 training groups of companies are planned which implies round 100 companies participating from 2006-2008.

The training programme consist of six sessions all dedicated to specific areas such as environmental issues, the building envelope, ventilation and cooling, heating, industrial processes, operation and steering and behavioural and management issues.

The training sessions are sometimes held at facilities of the participating companies or other specific facilities to include practical site visits and knowledge of each company's specific business and production area. Each company also has the opportunity to have a visit by an energy expert for advice on specific energy measures.

At the end of the training programme each participating company present their energy situation and an action plan of measures to be implemented or further analysed.

The companies get a folder with all documentation used. In addition a dedicated website has been set up on the Municipality website. Here the participants can find a range of described examples on measures in different categories, check-lists, guidelines, reports and other publications, links as well as the documentation for download.

So far almost 50 companies have carried out the training programme with excellent testimonials. Two groups of industries, two with farmers and one for property managers and/or owners has been carried out. This spring a new industry group will start the training programme.

All participating companies have identified a range of profitable measures that will effect in lower heating and electricity consumption and/or costs. In addition, many of the company's states that the actual exchange of experiences and know-how amongst the participants has been an added value as, in many cases, the energy responsible persons are alone with this task in their own organisation.

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## Climate Protection With Handicapped Persons In Social Services



In every public or private building with a number of different users of the building you can find a saving potential of energy, water and waste of at minimum 5% up to 20% only by change of the user's behaviour and low-budget investments. The Gertec GmbH initiated together with the Lautenbacher Gemeinschaft, Hohenfrieder Werkstätten and the Sozialtherapeutische Gemeinschaft Weckelweiler a project in social services for handicapped persons which is co-financed by the Deutsche Bundesstiftung Umwelt (DBU). The goal of the project is to achieve 10 percent current saving of energy and water consumption in the participating institutions in two years and to implement a more conscious handling of energy and water in the village communities in their every day life.

To reach this ambitious goal different constituents are offered and will be carried out: e.g. seminars for attendants and janitors, three-day "energy saving weeks", public relations as well as the institutions of the project accompanying hotline. By their enthusiasm ability humans in need of care will be sensitized to this topic and will be accompanied by about 650 attendants.

The very positive experiences of the first two "energy saving weeks" shows, that – because of the different type of handicaps - it is very important to give individual personal advices how to treat with energy and water and no general rules.

In the same way it is absolutely necessary to demonstrate theoretical basic principles in a practical way: To show how to aerate a room a fog machine was used to see in reality what are the effects by tilting a window, open it complete or open two opposite windows. Also the "power" of electricity gets tangible by using an ergometer when the handicapped persons tried to "produce" 300 Watt by their own energy. And to turn a thermostatic valve is much easier to raise the temperature in a room than to spark a fire by stones, tinder, straw and wood.

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## Electricity Efficiency Project To Reduce Energy Consumption In A Polish Hospital



A successful electricity efficiency project was implemented in the regional hospital in Elbląg in Pomerania. The hospital was opened to the public almost 20 years ago and treats patients from the eastern part of Pomerania. It offers a complete range of health care services in 20 departments and 10 out-patient clinics, employing the staff of 1000 people.

The hospital is housed in a vast complex of buildings of the total usable floor area of over 30 000 m<sup>2</sup>.

The comprehensive retrofitting programme was implemented by the hospital in 2005 with the aim of reducing the operating costs of the facility and bringing positive environmental effects.

In the course of the program implementation the following measures, among others, were taken (with respect to electricity efficiency);

- central heating boilers were modernised (the electric efficiency of circulating pumps increased when the power consumption of each of them dropped from 11,5 kW to 4 kW after fitting them with inverters. These actions resulted in the reduction of the power demand by 120 kW and to 140 000 kWh/year from 260 000 kWh/year;
- 8 000 pieces of 40W bulbs were replaced with 36W bulbs , resulting in the reduction of electricity demand by 32 kW;
- open-air lamps were modernised , which led to their higher efficiency and the reduction of electricity demand by 14kW;
- batteries of the capacitor were installed in order to improve the power factor, which made it possible for the investment to be paid back in under one year;
- electricity meters were installed in many of hospital units, which enables the management to estimate the yearly budget more accurately and motivates the staff to save the electricity, for example by switching off lamps when light is not needed and electricity receivers that are not being in use,
- strict operational and maintenance procedures as well as more severe standard requirements enforcing regular checks and measurements prevent failures of the equipment and excess electricity consumption.

Due to these measures, the rate of overall electricity consumption growth has been stable despite the fact that number of necessary equipment and apparatus the hospital has to install, in order to stay up-to-date with modern medical technologies, has increased significantly (for example the electricity demand has grown: by 40kW for the hospital computer network, by 60 kW for magnetic resonance apparatus, by 60 kW for angiography equipment, etc.).

The level of the electricity consumption and electricity demand over the past years is presented below:



Electricity	2006	2005	2004	2003	2002	2001	2000
Consumption [ MWh/year]	2886	2761,6	2745,8	2791,3	2696,5	2547,2	2218,8
Peak load (demand) [ kW]	668	667	651	640	663	647	588
Yearly average load (demand)	608	592	589	591	580	543	498

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## Electricity Demand Side Management In Paris City Hall



In the frame of a campaign to reduce electric consumption, Paris city hall realised in 2002 an audit of its energy consumption in partnership with ARENE, ADEME and EDF. A technical study was carried out to determine the consumption breakdown of the diverse equipments and highlight the energy savings potential. An action plan was then realised to turn this potential into reality.

The goal of the study was a reduction of 15% to 20% of the electric consumption corresponding to 60,000 euros per year.

The electric consumption of the building was approximately 5,000 MWh per year for a bill around 325,000 euros. Electric consumption measurements were done onsite; in total the consumption of 226 equipments was measured. Measurements on temperatures, luminance, and other

observations were realised to assess users comfort and electricity use efficiency.

This analysis highlighted the following points:

- A seasonal trend of the consumption: a decrease in the summer, especially in August (75% of the annual consumption) and a peak in the winter (125% of the average consumption);
- Consumptions vary greatly during the day with a power call of approximately 350kW during the night, week ends and bank holidays (representing 45% of the consumption!);
- The main electric use is lightning with 44% of the overall consumption. Air conditioning and heating systems are responsible for 24% and office and IT equipments for 7%.

The study highlighted potential savings based on 3 topics: technological, technical and behavioural reaching 1,000 to 2,000 MWh/year. (half of them due to a better management of equipments during the night, meaning around 20% to 40% of annual spending) :

- 0 to 20% for thermal use,
- 40% to 60% for lightings,
- 50% to 60% for equipments and IT,
- 5% to 10% for others and external.

20 actions were set up to reach the potential. They can be classified in 4 groups:

- Information and communication actions on lightings, IT...
- Premises management with the implementation of measurement devices to follow the consumption evolution. Building services equipments were also stopped during the night and incandescent lights bulbs were replaced by efficient ones.
- Procurement policy: no more halogen, replacing CRT (Cathodic Ray Tube) by flat screens...
- Deeper studies for an optimal following of the city hall consumption evolution.

Therefore it is a high potential that has been discovered. Most measures have a payback time lower than 3 years but need a high level of involvement and commitment of all stakeholders.

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## Monitoring Electricity Efficiency In Private Households In South Bohemia

Let us introduce you one of interesting projects of Energy Centre Ceske Budejovice (ECCB). One of our long-term activities in the field of electricity efficiency is wattmeter renting. The wattmeter is a special device for measuring electricity consumption of home electric appliances up to 2.650 W and indicating consumed kWh of the electricity and the price (in CZK) of this electricity amount (according to the electricity tariff of the household).

16 new wattmeters EKM 265 were bought with the financial support of JČE (now E.ON Czech republic) and Energie AG Oberösterreich in 1998. ECCB rents them free for two weeks for 200 CZK retainer that is returned to the customer at the end of rent. When the clients come to rent the device, they obtain the directions of use with benchmarking values of low and high electricity consumption for different electric appliances. We emphasize the importance of using energy efficient appliances and try to increase the customer awareness about the energy labels (first of all A, A+, A++). We also ask the clients to fill in an anonymous questionnaire about values measured in their households. These questionnaires are used for our internal purposes.




From June 1998 till March 2007, 369 persons hired questionnaire the wattmeter and we got interesting information about electricity consumption in their households. (the high consumption of appliances in the stand-by mode surprised many people). Evaluating the data in 2000, we paid attention especially to the electricity consumption of three particular appliances, i.e. washing machines, refrigerators and TV sets. The average annual electricity consumption (calculated from the values in the anonymous questionnaires) of following appliances was: washing machines - 204 kWh, refrigerators - 448 kWh and TV sets 127 kWh. Although we do not have calculated the exact statistics of next years, it is nevertheless evident (from the anonymous forms information of years 2001-2007), that the electricity consumption has not been significantly reduced since 2000 until now. The next data evaluation will be done this year.

ECČB continues to monitor the situation of electricity efficiency in South Bohemia and the Czech Republic and will implement various projects to motivate people to behave in the field of energy efficiency with greater responsibility.

ECCB was established in 1998, it is a centre of energy advice that focuses mainly on the region of South Bohemia. Our main focus is the support of energy and electricity efficiency, utilization of renewable energy sources and increasing the interest of general public in those problems. We offer a broad palette of our services to different target groups e.g. free energy advice service, energy studies, audits and concepts, thermovision measuring, organisation of seminars and excursions, awareness campaigns, cooperation with media, implementation of projects, wattmeter renting etc.

ECČB is very pleased to be a partner of the European Commission Project Boosting efficiency in the electricity use in 8 European regions and it will do its best for the successful implementation of the project and its idea of boosting electricity efficiency in South Bohemia.

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## Update Of Electronic Appliances Plan 2006 In Navarra



The Government of Navarra and the Institute for the Diversification and Saving of Energy (IDEA), have signed a Collaboration agreement to put in practice several interventions in order to foster the saving and the energetic efficiency. Within these measures we can find the Update of electronic appliances Plan in 2006.

The objective of the plan is to reduce the consume of electricity consumption in the homes, by means of the replacement of fridges, freezers, fridge combi deliveries, washing machines and dishwasher for equipments with an energetic label of A level or higher.

In order to achieve this objective, the replacement of old appliances for this kind of electronic appliances of the A level - whose energetic consumption is less- , was granted by the Government of Navarra.

There were 140 commercial establishments who joined this initiative and the total number of electronic appliances granted came to 8260.

### Granted Electronic Appliances

	A	A+	A++	Total
Fridge/ Combi	2,833	75	10	2,918
Dishwasher	1,256	-	-	1,256
Washing Machine	3,860	-	-	3,860
Freezer	168	44	14	226
<b>Total</b>	<b>8,117</b>	<b>119</b>	<b>24</b>	<b>8,260</b>

The total awarded amount has been 619.500 euros and the final estimated saving of energy was 2.288 MWh/year.

For the execution of the Plan a programme in Internet has been created that have been used for the development of this measure (it was accessible from the website of the Government of Navarra, [www.navarra.es](http://www.navarra.es)). By means of this programme several objectives were achieved: universalize the information and publish the measure; to automate the joining process of the shops, and the application of the discount that they did to their clients; immediate knowledge of the number of granted electronic appliances (in order not to apply a discount that it won't be paid by the Government of Navarra in case of run out of the budget). Moreover an important promotion campaign was done in order to disseminate this measure to the common citizen, who doesn't know or is not used to the normal ways to reach the public aids (the Official Bulletin of Navarra for instance).

Moreover, and as a part of the campaign, several elements were designed for the diffusion of this action in the shops that joined the initiative (brochures and their supports and stickers to be put in the shop window announcing that the shop has joined the campaign).

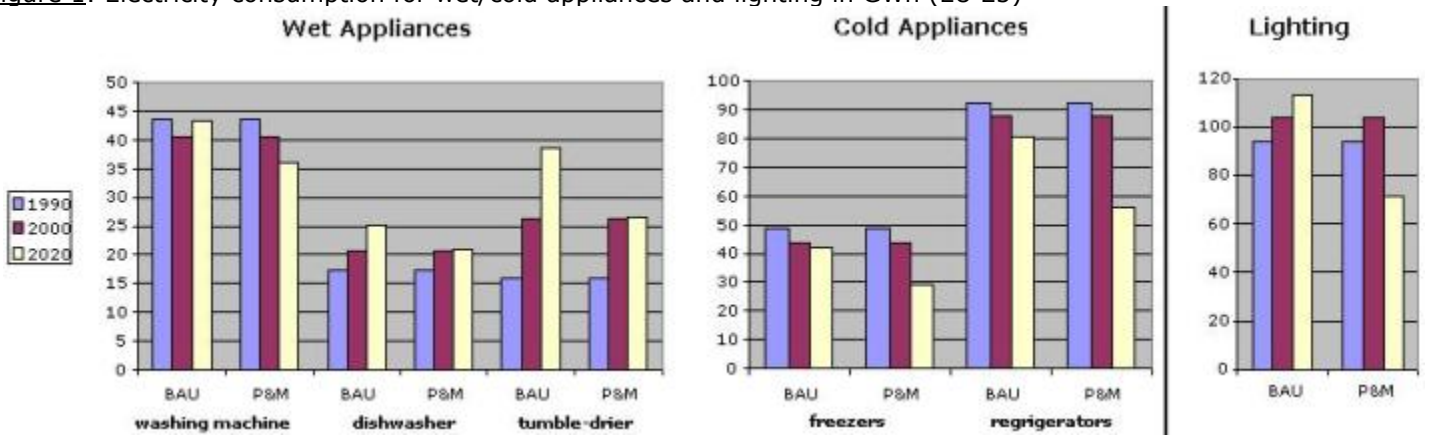


## Potentials For Demand Side Energy Efficiency In The EU

Demand side energy efficiency potentials are large and cost-effective: more than 30-40% of all energy use could be saved with a net benefit to society within the next 30 years. However, they are more difficult to describe than e.g. potentials for renewable energies. The potentials are incorporated in a set of hundreds of different technologies for numerous energy uses in different sectors and sub-sectors. Their economy and implementation depends on re-investment cycles and investment decisions of a large number of decision makers with very individual levels of information and preferences, as they depend on behavioural changes of end-users in all sectors of the economy. The scenario study conducted by the Wuppertal Institute on the behalf of the WWF, however, addresses potentials for demand side energy efficiency in the residential sector <sup>(1)</sup>. Within the scenario analysis, **the so-called policies and measures (P&M) scenario for the EU-25** sketches an ambitious strategy in the EU in order to achieve substantial reductions in energy-use and of greenhouse gas emissions until 2020. This strategy assumes that about 80% of the currently available economic energy savings potentials can be realised by this strategy.

Currently, electricity consumption covers about 33% of total energy consumption in the residential sector. Figure 1 shows that in the business-as-usual scenario (BAU) energy consumption especially of wet appliances and lighting will increase if no additional policies and measures are taken. In the more ambitious **P&M-scenario**, on the other hand, significant reductions can be achieved, resulting in savings of about 23 Million t oil equivalents or 962 PJ.

**Figure 1:** Electricity consumption for wet/cold appliances and lighting in GWh (EU 25)



Source: own calculations based on CECEd 2001, Environmental Change Institute et al. 1998, Environmental Change Institute et al. 2000.

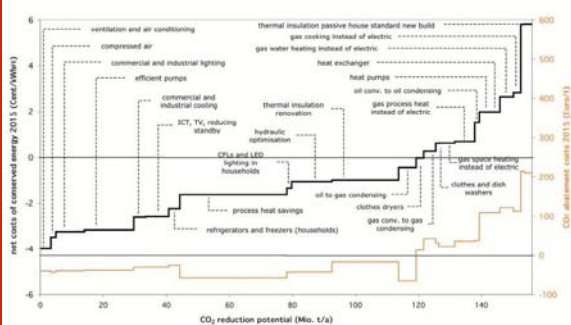
A research project by Wuppertal Institute on behalf of E.ON AG (Thomas et al. 2006) has provided a holistic overview of technical options for energy end-use efficiency, and has quantified the techno-economic potential for energy end-use efficiency in Germany and assessed the transferability of these results to other European countries <sup>(2)</sup>. Around 70 energy efficiency technologies and measures able to provide major energy efficiency improvements for 18 fields of end uses were selected for the analysis. The analysis was made for 2010 and 2015 and considers the interactions between individual measures, such as thermal insulation and the replacement of a heating system.

In the figure below, the curves of **net costs of conserved energy** (bold line) and of **net costs of CO2 reduction** (thin line) represent, from a macroeconomic view, the measures in an ascending order relative to the average net costs of conserved energy in Euro per kWh of conserved or substituted energy (electricity or heating fuel). Net costs of conserved energy are the (average values for) additional costs of each individual technology (derived from the analysis of an average case) less the long-run avoided system costs for the supply of electricity and heating fuels.

All measures with net costs of saved or substituted energy below zero are **cost-effective from the perspective of society**. Measures with net costs above zero, in turn, cause additional costs even after deduction of the avoided energy system costs (the result is quite similar from the perspective of the customer's perspective).

Thus, it will be cost-effective from the perspective of society to apply the examined efficiency technologies and measures for **saving more than 120 million tons of CO2 per year until 2015** in Germany alone, in the residential,

net costs of conserved energy and CO<sub>2</sub> abatement costs (total resource cost perspective)



**Figure 2 (enlarge the picture):** CO2 reduction potentials in Germany until 2015, aggregated across all sectors; average net costs of conserved energy (bold line) and CO2 abatement costs (thin line) compared to the costs of measures that would have been installed in a baseline scenario, and net of avoided long-run marginal system costs of energy supply (hence net costs), from the total resource cost perspective. Source: Thomas et al. 2006


Differences in energy saving potentials and benefits and costs of

conserved energy between countries mainly result from different consumption structures, i. e. differences of consumption shares for certain end-uses or sectors, from different shares of energy sources used, different availability of energy-efficient technology, and differences in energy and technology prices. On the other hand, the level of energy efficiency that already exists or has been achieved can be different.

Within Europe, the differences of consumption structures originate from climatic, cultural and economic conditions. An example is the obvious north-south slope for lighting, the higher share of old, energy-wasting refrigerators and washing machines in Eastern Europe, whereas the use of freezers often represents the different habits of eating. Dishwashers and tumble-driers, however, are nearly exclusively used in Western Europe, but the number of such devices in Eastern Europe will rapidly increase in the following years. Especially in Southern Europe the use of air conditioners is increasing, but in Central Europe, too, mobile air conditioners are becoming more and more popular. With regard to the remaining electricity end-uses such as information and communication technologies, there are no substantial differences within the European countries. But the use of manifold small devices is increasing. Without taking countermeasures, this increase will result in a higher standby consumption.

The policy measures to achieve significant reductions in all member states in electricity consumption are first of all setting dynamically increasing **minimum standards for power consumption of electric appliances**. These standards should apply to on-mode as well as to standby use. They should be combined with an extension of **energy labelling** to all appliances (especially consumer electronics and home office equipment), and with a revision of labelling every 3 years to guarantee that only the most efficient appliances are A-rated. Furthermore, the purchase of energy-efficient appliances should be stimulated by **rebate schemes** to accelerate the market penetration of the most efficient appliances, meaning that buyers get a discount on prices for energy efficient appliances. An according scheme was running very successful in the Netherlands until 2003, causing A-rated appliances to become dominant in the market and making the market share of the most efficient A+ and A++ appliances the highest in the EU ([www.energiepremie.nl](http://www.energiepremie.nl)). Another strategy is the **switch from electric heating** to other, more energy-efficient heating systems and the avoidance of air-conditioning.

As a conclusion, increasing energy efficiency contributes to achieving several energy and social policy objectives as environmental and climate protection, welfare (lower energy bills and imports), competitiveness in the economy, employment and security of supply

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- (1) Lechtenböhmer, S.; et al., 2005: Target 2020: Policies and measures to reduce Greenhouse gas emissions in the EU, Report on behalf of WWF European Policy Office, Wuppertal Institute, Wuppertal
- (2) Thomas, S.; Barthel, C.; Bunse, M.; Irrek, W., 2006: Options and potentials for energy end-use efficiency and energy services, Summary, Final report on behalf of E.ON AG, Wuppertal Institut, Wuppertal

## Intelligent Energy Europe "Intelligent Energy - Europe" Programme

"Intelligent Energy - Europe" (IEE) is the Community's support programme for non-technological actions in the field of energy, precisely in the field of energy efficiency and renewable energy sources.

From 2003-2006, IEE has supported the European Union's policies in the field of energy as laid down in the Green Paper on Security of Energy Supply, the White Paper on Transport and other related Community legislation. Its aim was to support sustainable development in the energy context, making a balanced contribution to achieving the general objectives of security of energy supply, competitiveness, and environmental protection. The programme was structured in four fields : *SAVE*: for the improvement of energy efficiency and rational use of energy, in particular in the building and industry sectors - *ALTENER*: for the promotion of new and renewable energy sources for centralised and decentralised production of electricity and heat and their integration into the local environment and the energy systems - *STEER*: for initiatives relating to all energy aspects of transport - *COOPENER*: for initiatives relating to the promotion of renewable energy sources and energy efficiency in the developing countries.

2007 will be the starting point of the IEE II programme as part of the Competitiveness and Innovation Framework Programme. €730 million will be available to fund projects for the promotion of energy efficiency and renewable energy. The new programme will build on the strengths of IEE I whilst giving greater emphasis to addressing the needs of small and medium-size enterprises, as well as improved competitiveness and innovation. The programme will cover three main areas - energy efficiency, renewable energy sources and transport - and within these areas many of the themes from previous years have been repeated, including buildings, industry, consumer products, renewable electricity, heating and cooling and biofuels.

 [http://europa.eu.int/comm/energy/intelligent/index\\_en.html](http://europa.eu.int/comm/energy/intelligent/index_en.html)

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