



# Saving energy

Directorate-General  
for Energy



- TIME TO STEP UP OUR EFFORTS



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# A challenge for our times

Without energy, our society cannot survive or thrive. Yet the European Union today faces a series of tough energy challenges, due to a growing dependence on energy imports, dwindling supplies of fossil fuels and concerns about their impact on climate change. It also continues to waste a fifth of its energy through sheer inefficiency.

Energy efficiency is a proven and cost-effective solution. By saving energy, we can save money and the EU can enhance the security of its energy supply, reduce carbon emissions and move more swiftly towards its goal of a 20% reduction in primary energy use by 2020. Further benefits include the creation of new business opportunities and a more innovative and competitive economy, through the development of energy-efficient technologies, products and services.

In the EU we have made good progress driving greater energy efficiency into every sector — with new policies, measures and action. Energy labels can today be found on many items ranging from fridges to buildings. Concerted local action is also paying off with ambitious initiatives such as the Covenant of Mayors, with the bonus of enhanced international cooperation.

Yet the EU has less than a decade to meet its 2020 energy savings' target and must do more to save energy, especially in energy-intensive sectors such as construction, manufacturing and transport. New impetus towards that goal comes with the energy efficiency plan 2011. The plan aims to boost energy efforts across the board, with a view to achieving the EU's 2020 energy-saving target and generating longer-term efficiencies.



# Energy: society's **lifeblood**

Secure, affordable and sustainable energy for all — these are the EU's common energy policy goals. But meeting them gets tougher every year, as Europe battles to reduce greenhouse gases, cut oil and gas imports, and tackle rising energy prices. And to judge from current slow progress, the EU won't achieve one of its key climate and energy goals: a 20% reduction in energy consumption by 2020 through energy efficiency measures.

So step up 'Energy 2020', an ambitious energy strategy for the coming decade and part of better EU legislation, policy and tools in this area. The new strategy will accelerate EU decisions

and measures to save more energy, increase the use of renewable energies, and build smarter and more diverse energy networks.

The strategy is designed to secure a sustainable EU energy supply and support economic growth. It will focus on a range of different areas, from the regulation of energy markets to technical innovation and external relations, as well as education and incentives for people to save energy.



## Energy 2020's five priorities

- achieving an energy-efficient Europe;
- building a truly pan-European integrated energy market;
- empowering consumers and achieving the highest level of safety and security;
- extending Europe's leadership in energy technology and innovation;
- strengthening the external dimension of the EU energy market.

## Did you know?

- The EU uses one fifth of the world's energy.
- Cities and urban areas consume up to 80% of energy.
- The EU must spend EUR 1 000 billion on energy investments over the next 10 years.
- By 2020, one third of EU electricity will come from renewable energies.



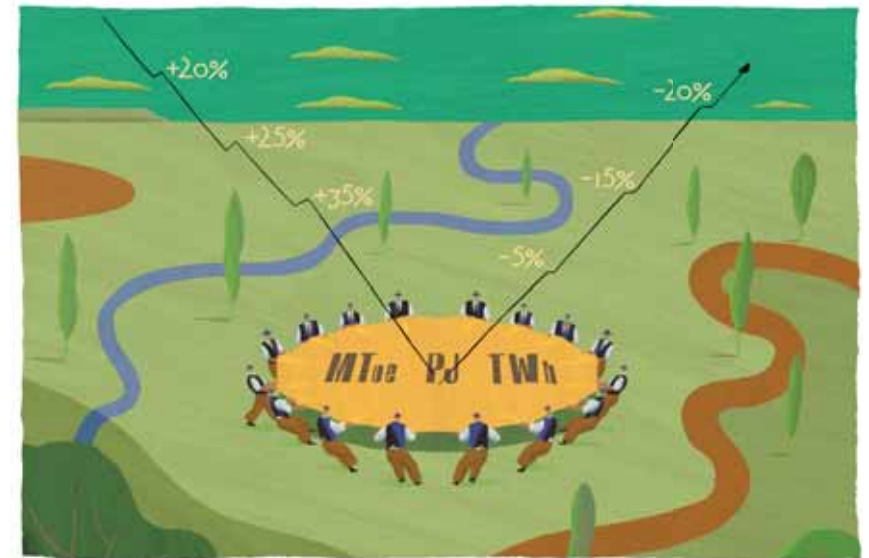
# A **boost** from the energy efficiency plan

Energy efficiency is high on the EU's list of priorities, because it contributes to many of the Union's economic, social and environmental goals. The energy efficiency plan 2011 helps keep them on track by proposing energy efficiency measures across the whole economy.

The plan provides guidance for all Europe's energy efficiency efforts. It injects new impetus into EU efforts to achieve the target of 20% energy saving by 2020, while looking further down the line to the EU's climate and energy goals for 2050. The plan sets out areas for future measures — chiefly in the public sector, industry, utilities, among consumers, and in financing and transport.

Public authorities will be encouraged to take energy efficiency into account in all their purchases, while companies will be asked to benchmark their energy use or have regular energy audits. Utilities must help customers to reduce their energy use. Consumers will have smart meters and receive clearer bills, so they can better manage their energy consumption. Innovative financing tools will promote the uptake of energy efficiency across Europe, and specific proposals for saving energy in transport will be published in a comprehensive White Paper. All these measures are designed to drive energy efficiency and related investments into our cities, homes, businesses and appliances, as well as into industry and transport.

If we can reach the 20% target by 2020, everyone will enjoy the benefit of substantial cost savings. Europe could, for example, then reduce its annual energy bill by some EUR 200 billion, which is the equivalent of not using around 370 million tonnes of oil. Per household, this means EUR 1 000 saved every year.



## In a nutshell: Energy efficiency plan 2011

- gives new impetus to energy efficiency throughout Europe;
- sets the energy efficiency policy framework and identifies key action areas, for example industry, consumers and transport;
- paves the way for building up lasting political and social commitments towards further improvements in energy efficiency;
- is helped by the EU's cohesion policy, which allocates EUR 9 billion to energy investments.



# Always check the **label**

Our homes devour energy around the clock, with appliances to keep us warm, cook and preserve food, heat our water, provide lighting and for use in many other work and leisure applications. So it comes as no surprise that energy-using products account for most of the energy consumed in households and for a third of the EU's energy consumption.

But there has been a consumer revolution in recent years, thanks in part to initiatives such as the EU labelling scheme to show us just how much energy our appliances consume. A recent survey indicated that as many as 85% of consumers now consider energy consumption a more important criterion than price, when they purchase white goods.

Buy a large 'A' class energy-efficient TV and you could save EUR 35 annually in electricity costs, compared with an energy-hungry 'D' class TV. Invest in a modern washing machine in the top energy efficiency class and you will find your electricity costs reduced by a third, when compared with a similar model from 1995.

The EU's energy label is widely trusted by consumers as a measure of energy efficiency and performance. Minimum efficiency standards today cover 10 product groups with 15 more to come, and a recent change to EU law has led to the creation of new energy classes that go as far as A+++ for goods like fridges and will provide stronger incentives to manufacturers to continuously enhance the efficiency of their products. In time, goods in the lowest classes (F, G) will be squeezed out of the market, driving manufacturers to produce products that are increasingly energy efficient.

Energy labels will also be introduced for tyres. They will also soon be in place for buildings EU-wide, with energy efficiency certificates for each property.

## Consumer benefits of energy-efficient products

Possible savings over the product's lifetime for the most cost-efficient appliance compared with the market average

Product	in kWh	in euro
Fridges/freezers	2 900	435
Tumble driers	1 560	240
Water heaters (electric)	13 000	1 950
Lighting (compact fluorescent light (CFLs) everywhere)	2 000	300
Standby (all appliances in a home)	750	110
Boilers	63 700	4 100



# Expanding energy efficiency across the board

Major energy savings can be made in the energy services and end-use consumption sector. Guided by EU legislation, Member States are adopting a number of measures in this area, such as concluding voluntary agreements with the industry, setting energy savings' obligations on energy utilities, and boosting the energy services' market.

Public authorities are also leading by example in energy efficiency efforts. This is important, since EU public procurement accounts for up to 17% of the gross domestic product.

Some authorities already take into account the energy efficiency and environmental impact when purchasing goods, services and works. But further energy savings are possible. Buying only what is most energy efficient may initially seem more expensive, but in the long term it leads to a significant reduction in energy costs for public buildings such as schools and hospitals. Two pieces of EU law, covering the energy services and energy performance of buildings, already make public authorities energy efficiency pace setters.

Energy services' companies (ESCOs) can play a major role in achieving energy savings throughout the energy chain. ESCOs deliver energy services and/or other energy efficiency improvement measures to energy consumers and are paid on the basis of the achieved energy efficiency improvements. But Europe's energy services' market needs a helping hand to develop.

A revision of the energy services directive will aim at achieving further energy savings in all sectors (energy supply and end-use) and will include new measures to reinvigorate the energy services' market. Also expected is wider use of energy auditing and smart metering for buildings, small business and industry, as well as measures to improve the quality and frequency of information provided by energy bills. The goal is to make it easier for consumers to make energy-efficient choices.



## Coming soon: energy performance contracting

- a contract to implement energy efficiency measures;
- an efficient way to improve a building's energy performance;
- utility bill savings will pay for energy-saving measures;
- successfully used in some countries, it will be promoted across the EU.



# From new builds to refits

Buildings consume some 40% of Europe's energy needs and account for 36% of EU CO<sub>2</sub> emissions. Hence the race to improve their 'energy performance' by raising energy efficiency and bringing down emissions — both of which help us move towards reaching the EU's 20-20-20 goals by 2020, and create new jobs in this sector.

Much can be done to enhance the energy efficiency of Europe's buildings, where some 28% of energy can be saved. EU legislation in force since 2002 focuses on maximising the energy performance of both new and existing buildings. Revised in 2010, it now requires even tougher action in Member States so as to achieve energy saving.

All new buildings are required to use nearly zero energy by the end of 2020. Those occupied and owned by public authorities must meet this requirement two years earlier. New building standards will be conducive to achieving this. But before those deadlines, new buildings must already comply with minimum energy performance requirements. To this end, a common comparative framework will be set up which takes into account the different climatic conditions in the Member States.

Moreover, energy efficiency must be improved in all existing buildings when they are undergoing major renovation, for example by adding insulation and better monitoring of energy use. Special 'system' requirements must also apply to technical equipment such as heating, hot water and air-conditioning systems. Also, energy certificates must soon be displayed in almost all buildings regularly used by the public. This should increase the awareness of the owners and occupiers of these buildings as to their energy performance.

## New energy performance of buildings directive: 2020 horizon

- 5–6% saving of EU's total energy consumption;
- 4–5% saving of EU's total CO<sub>2</sub> emissions;
- up to 450 000 potential new jobs.

## Enhancing buildings' energy efficiency

The 'Intelligent energy — Europe' (IEE) programme supports many energy efficiency projects in buildings. They include 'Build up', a European web portal that shares best practices and available tools, and CEPH ('Certified European passive house designer'), which developed a European training course for passive-house architects, engineers and designers.







# Energy savings in the **pipeline**

Europe has a dense energy production and distribution network, but must do more to enhance this sector's efficiency. Up to a third of all the energy used in the EU gets lost during transformation, and losses in the transmission and distribution of electricity are typically around 10%.

New equipment and infrastructure are being built to cope with a growing energy demand. Yet there are concerns that energy efficiency is not always given the priority it needs in the modernisation process. One solution is for the industry to make greater use of best available techniques (BATs).

European tools and legislation — such as the emissions trading scheme, the renewable energy directive and the industrial emissions directive — are also expected to boost energy efficiency. They will for instance encourage energy producers to choose more efficient gas and renewable energies.

Stemming the significant losses incurred during thermal electricity generation, currently around 60%, is a European priority. This lost energy can be injected back as heat into district heating systems or industrial plants. The EU would like to ensure such heat is always reused where possible in combined heat and power (CHP) or 'cogeneration' systems.

Cogeneration offers energy savings and can lower CO<sub>2</sub> emissions, but only accounts for 11% of the EU's total electricity generation. So there are plans to give CHP priority access to distribution grids and encourage high-efficiency CHP.



## **Mega market for mini power stations?**

Hot water and electricity can be generated with the latest micro-cogeneration systems, ideally running on gas or liquefied petroleum gas. Already used in homes and small commercial sites EU-wide, this emerging technology typically offers 35% energy savings over traditional electricity from national grids.



# A moving target

Transport takes almost one fifth of the EU's energy and is the fastest growing sector in terms of energy use. But although European freight and passenger transport are set to grow by a further 50% and 35% respectively by 2020, energy-efficient vehicles and alternative or avoided transport can deliver major cost savings, cut greenhouse gas emissions and reduce Europe's fossil fuel imports.

Thanks to sustainable mobility campaigns, many drivers are leaving their cars at home and opting to walk, cycle or use public transport. Others have concluded that trains are more energy efficient and often quicker than a plane for short journeys. More generally, Europe must make better use of all its transport modes — road, rail, air and waterborne.

Recent EU legislation calls on public authorities to do all they can to accelerate the market introduction of clean and energy-efficient road vehicles. Assisting authorities and private users is the Clean Vehicle Portal, with its detailed database of consumption and emission data over a vehicle's lifetime.

Innovation can play a major role in reducing energy consumption. Intelligent transport systems (ITS) for example call on information and communication technologies to smooth and speed up transport and services by road, rail, air and water.

The maritime and aviation sectors also benefit from efficiency initiatives. The Marco Polo programme helps shift road freight onto more environmentally friendly modes such as short-sea shipping, rail and inland waterways. Under SESAR, better air traffic management can reduce a flight's environmental impact by 10%, thus increasing the safety, efficiency and capacity of planes.

## Did you know?

- An electric car's lifetime energy costs can be EUR 5 000 less than a diesel car.
- From 2012, all new tyres in the EU will carry an energy efficiency label.
- Showroom passenger cars must carry labels for their CO<sub>2</sub> emissions and fuel consumption.



# Spending **to save**

Financial barriers to energy efficiency measures must come down as quickly as possible, whether they apply to the private or public sectors. With an eye on its 2020 energy and climate goals, the EU is boosting investment in and mobilising the market for energy efficiency through new financial programmes and instruments, innovative partnerships and better use of existing funds.

At national level, legal obstacles are being removed to energy service companies (ESCOs), useful partners for organisations keen to implement solutions improving their energy efficiency. Public–private partnerships (PPPs) for energy efficiency technologies are also more popular, since they attract substantial fresh funding from diverse sources — especially important in today's tough economy.

Private financing for energy efficiency schemes can also be supported through EU funds, notably in the EU's newest Member States. In every European region, the Structural Funds are increasingly backing sustainable energy and energy efficiency projects, while the 'Intelligent energy — Europe' (IEE) programme supports EU-wide energy efficiency projects such as the 'Sustainable energy Europe' campaign.



## **ELENA**

The European Local Energy Assistance Facility (ELENA) offers grants to cities and regions, covering technical assistance costs for developing large-scale sustainable energy investments — such as smart grids, buildings' refurbishment, and clean and efficient urban public transport. One Barcelona-based project for example will save some 280 GWh of energy a year and reduce annual CO<sub>2</sub> emissions by up to 200 000 tonnes.

## **European Economic Recovery Fund**

This is a new EU fund using money from the European 'Energy programme for recovery' to support energy efficiency and renewable energy projects.

# Think globally, **act locally**

Energy efficiency starts at home, but is also a top international concern. The EU uses its trade and foreign policy relations to develop closer international cooperation. The aim is to promote energy efficiency worldwide, 'export' the successful EU approach and learn from what other relevant countries are doing to save energy.



Set up at the EU's initiative, the International Partnership for Energy Efficiency Cooperation (IPEEC) is an international forum providing global leadership on the issue. Members include the G8 countries, Brazil, China and India. The goal is to exchange information, disseminate best practices and develop new ideas. Priority work areas include sustainable buildings, energy management and the measurement of energy savings.

Local action takes many forms: the EU's regional policy supports projects driving energy efficiency, tools like ELENA finance energy projects in cities and regions, and of course the push to reduce energy waste starts with each and every one of us.

Led by the European Commission, the Covenant of Mayors is a prime example of how local action can successfully contribute to the EU's climate and energy goals and foster international action to the same end. By early 2011, the permanent network included local and regional authorities in over 2 180 cities in 42 countries.

Each signatory to the Covenant pledges to exceed in its territory the EU target of curbing CO<sub>2</sub> emissions by 20% by 2020 with the help of self-drafted sustainable energy actions plans. They receive essential technical and financial backing for this from supporting structures, made up of associations of local authorities, regions, provinces and national energy agencies.

Thanks to the Covenant, local action on energy efficiency and distributed renewable energy sources is fostering strong international partnerships. This has resulted in EU climate and energy policy being extended to the south Mediterranean, the Baltic and beyond, and an agreement with US cities. It has even piqued the interest of Latin America and China.



# Ready for 2020, eyes on 2050: our energy-efficient future

If Europe is to unlock its vast potential to save energy, it must better manage consumption and eliminate energy wastage as a matter of urgency. The programmes, tools and support to achieve this are falling into place and continue to develop. But achieving the EU's energy efficiency targets calls for an unflinching political commitment and above all action from everyone at national, regional and local levels.

The European Commission's energy efficiency plan 2011 aims to get Europe back on track towards meeting its goal of 20% energy savings by the end of this decade. For although the current financial crisis has reduced overall energy consumption, it is also hampering the rollout of energy efficiency measures.

Under the latest plan, Europe's annual energy bill could be reduced by as much as EUR 200 billion — generated through energy efficiency efforts across the whole economy. It should also lead to new jobs and foster a positive environment for leading technologies, innovation and competitiveness.

Special emphasis will be paid to energy efficiency in the public sector, which is being called on to set a good example to others, as well as industry, transport and consumers. Member States will also have a guiding framework for stepping up their national efforts to make energy savings wherever possible.

Looking further to the future, Europe would like to see a fully sustainable energy system and is working on an energy roadmap for 2050. By focusing all efforts on maximising energy savings over the next decade, it will go a long way towards laying the foundations for reaching that ambitious goal.





# Further information

## **Directorate-General for Energy**

[http://ec.europa.eu/energy/index\\_en.htm](http://ec.europa.eu/energy/index_en.htm)

## **Energy Star label for office equipment**

<http://www.eu-energystar.org>

## **Clean Vehicle Portal**

<http://www.cleanvehicle.eu>

## **EU climate and energy package**

[http://ec.europa.eu/environment/climat/climate\\_action.htm](http://ec.europa.eu/environment/climat/climate_action.htm)

## **Covenant of Mayors**

<http://www.eumayors.eu>

## **European Local Energy Assistance (ELENA)**

[http://www.eib.org/products/technical\\_assistance/elena/index.htm](http://www.eib.org/products/technical_assistance/elena/index.htm)

## **Intelligent energy — Europe (IEE)**

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

## **International Partnership for Energy Efficiency Cooperation (IPEEC)**

<http://www.ipeec.org>

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Europe can no longer afford to waste its precious energy. Not only does this cost us money, it damages the environment and contributes to climate change. Yet small adjustments to the way we live, work and travel would enable Europe to trim its annual bill for energy consumption by one fifth by 2020. They would also help get the EU back on track towards meeting its climate and energy goals in the medium and long term. Europe's energy efficiency drive is supported by the energy efficiency plan, with guidance on ways the EU, Member States, businesses and consumers can maximise their energy saving potential. This brochure highlights some of the energy challenges facing Europe and the solutions proposed in the plan.