

ENERGY EFFICIENCY

Reconciling Economic Growth
and Climate Protection

December 2007



WHO ARE WE?

BUSINESSEUROPE's members are 39 central industrial and employers' federations from 33 countries, working together to achieve growth and competitiveness in Europe.

BUSINESSEUROPE, the Confederation of European Business, represents more than 20 million small, medium and large companies.

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ENCOURAGE ENERGY EFFICIENCY IN EUROPE AND IN THE WORLD!

Companies are taking up the climate change challenge

European companies are taking action to deliver their share in combating global climate change. They want policy-makers to deliver their share by finding global solutions which also include the rapidly industrialising countries with growing greenhouse gas emissions. In this regard, energy efficiency is key as it reconciles economic growth, supply security and climate protection.

Cost-effective ways to reduce energy consumption are widely available

There is immense potential in Europe and in the world to increase energy efficiency, through behavioural changes or through cost-effective technologies, many of which are already available or being developed. In particular, the residential sector has considerable untapped possibilities.

European companies are good at energy efficiency*

World-class solutions to reduce energy consumption cost-effectively often come from European industry, which itself has already substantially improved its own energy productivity in the past, making Europe, after Japan, the most energy-efficient region in the world.

A conducive climate for innovation is needed

Our global energy challenge is above all an innovation and implementation challenge. Implementation of the better regulation agenda is key to ensure that a strong industrial base is kept within Europe in order to ensure the development of climate-friendly technologies and solutions. An innovation strategy putting regulation in its centre and ignoring the cost-effectiveness of policy measures would lead to discouragement of innovation and relocation of production, to the detriment of growth as well as the environment.

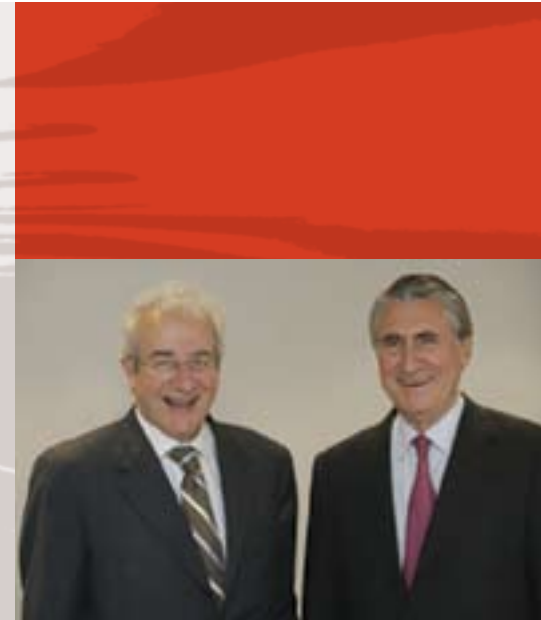
* This publication compiles a number of examples of how companies in Europe are making or enabling better use of energy (pages 10 and 11).

European policymakers must come up with a supportive policy for further energy efficiency improvement

Despite the Commission Green Paper and action plan on energy efficiency and despite the target of increasing the EU's energy efficiency by 20% by 2020, energy efficiency still does not get the political attention it deserves. Policy-makers can help promote cost-effective energy-efficiency solutions throughout society in Europe and in the world.

An EU external policy should stimulate voluntary technology transfer

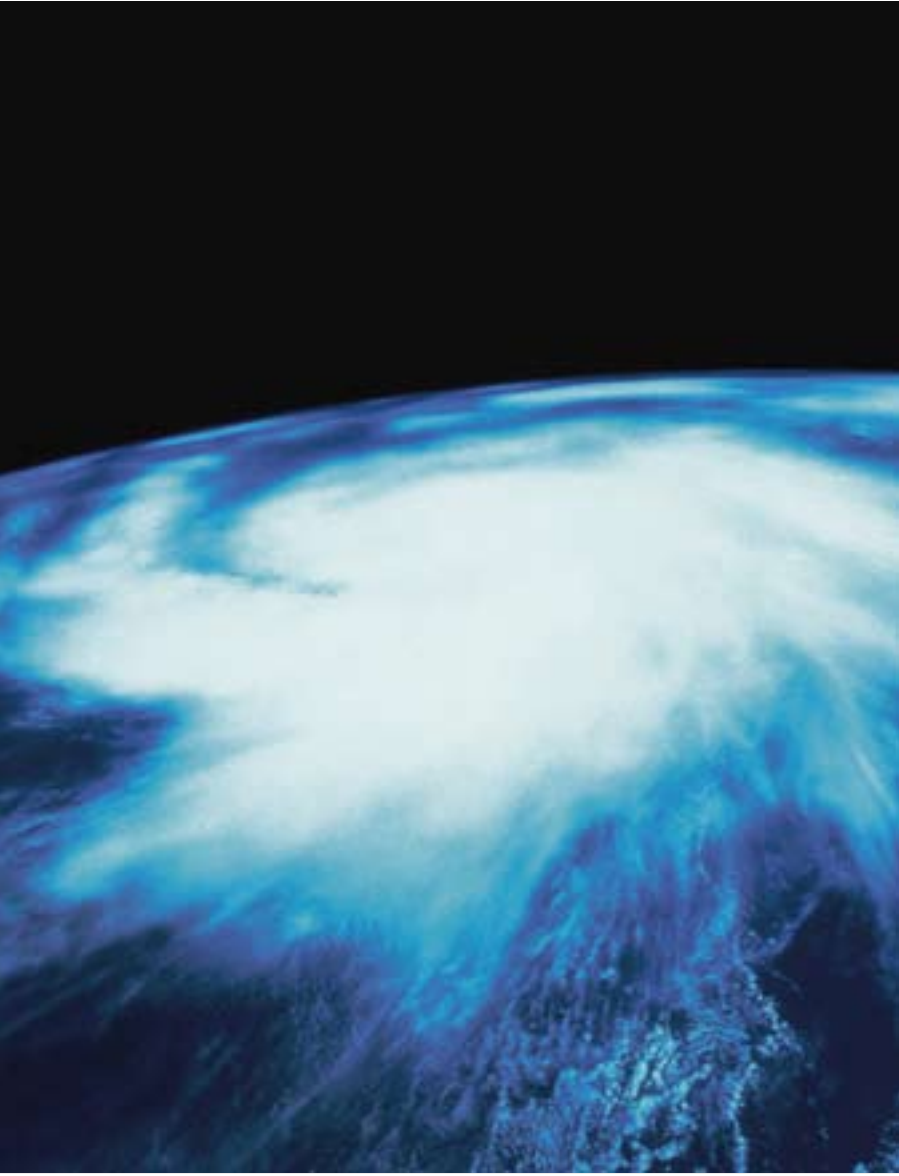
As more than 70% of the world's energy-saving potential is in developing countries, a constant and substantial transfer of technology must be encouraged. In view of the upcoming international negotiations on combating climate change, BUSINESSEUROPE urges European policy-makers to put the dissemination of energy-efficient solutions at the top of the agenda.




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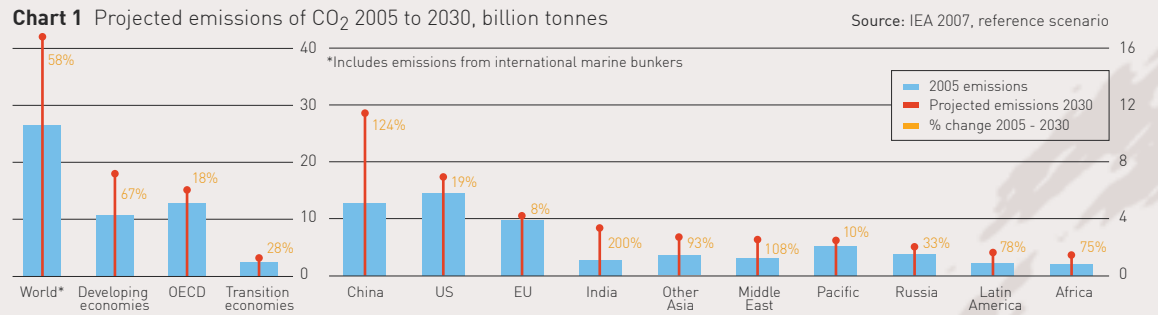




THE GLOBAL ENERGY AND CLIMATE CHALLENGE

Global warming is one of the biggest challenges of our time. In order to have a realistic chance of controlling greenhouse gas emissions it is necessary first and foremost to answer the question: how can unprecedented global growth, primarily in emerging economies, be reconciled with climate protection? World energy demand is projected to grow by more than 50% by 2030*. This additional demand corresponds to twice the energy consumption of today's United States. But only a minor share of the growth will come from the "developed" world. As prosperity and urbanisation in industrialising countries is rapidly increasing, billions of people will start demanding more and better housing, cars, refrigerators, air

travel, etc. Oil and gas prices have soared since the beginning of the millennium. The global race for cheap and secure energy sources has started, which are not necessarily the most environment-friendly ones: coal use is expected to expand by more than 70% between 2005 and 2030. As a consequence, emissions are increasing. On the current projection world CO₂ emissions will have increased by more than 50% in 2030. Already this year China is overtaking the USA as the country with the highest absolute CO₂ emissions. Although the US, Japan and Europe still have by far higher per-capita emissions, their relative share in global greenhouse gas emissions is steadily decreasing.



* Projections on this page are from the International Energy Agency.

THE POTENTIAL OF ENERGY EFFICIENCY

In theory, there are three ways to reduce greenhouse gas emissions: reducing economic growth, changing the energy mix to low-carbon sources, and increasing energy efficiency. Reducing growth would cause the global economy to stagnate and cannot be considered an option. Making the world energy mix less carbon-intensive is an important factor, with the potential of clean coal, nuclear and renewable energy sources to be tapped. However, apart from nuclear, many of the technologies are not yet widely available at market conditions. In contrast, a multitude of technologies and behavioural strategies to increase energy efficiency are cost-effective and ready for use. The only sustainable way forward is more intelligent and efficient production and use of energy.

Energy efficiency reduces greenhouse gas emissions and saves costs

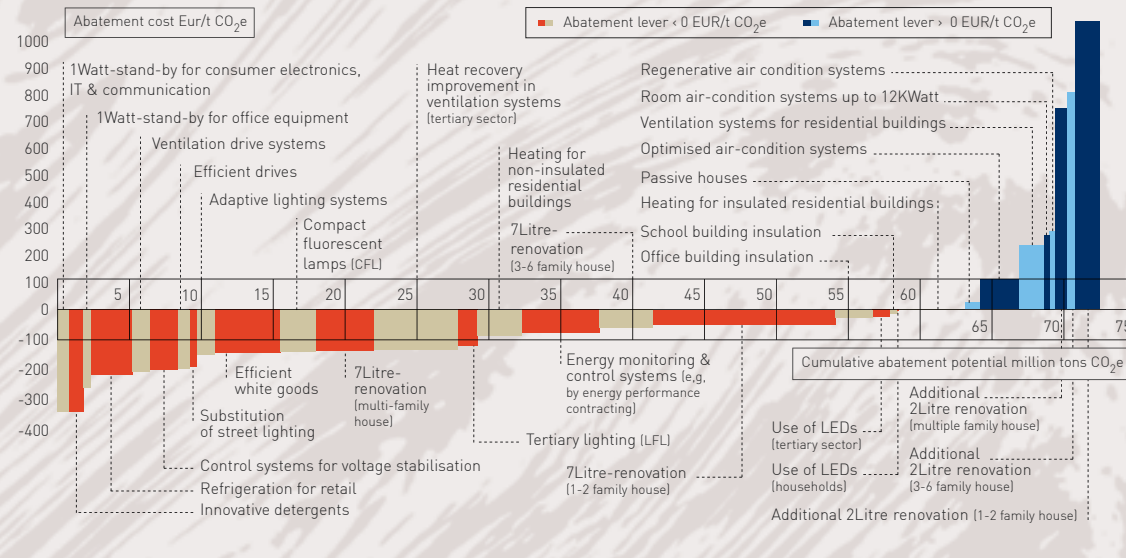
Of all possible measures to abate greenhouse gas emissions, those that use energy more efficiently bear the lowest “cost”. A recent McKinsey study, conducted for the German economy, finds

considerable untapped potential in cost-effective energy efficiency measures, especially for the residential sector - almost 60 million tonnes of CO₂ by 2020. The graph on this page compares

a number of CO₂ reduction measures for the residential sector in terms of cost and reduction potential. The measures indicated in red are cost-effective.

Chart 2 Residential sector: abatement costs and potential for Germany by 2020

Source: McKinsey & Company, Inc. on behalf of “BDI Initiativ – Wirtschaft für Klimaschutz” 2007: www.wirtschaft fuer klimaschutz.eu



More than one third of Europe's energy supply is lost ...

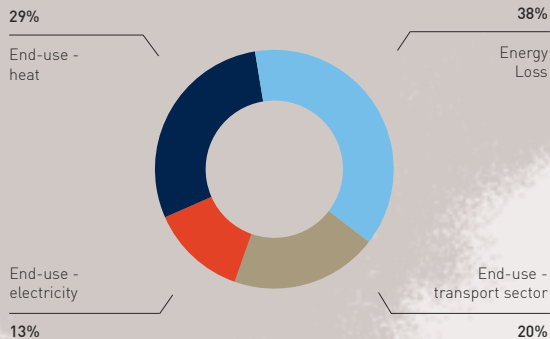
European countries have a total primary energy supply of 81.1 Exajoule, but total end-use amounts to only 50.2 Exajoule. More than one third of our energy is lost as wasted heat, for example during industrial processes, or when electricity is generated, transmitted or used.

Chart 3

Energy Supply to Europe* in 2003

Source: ECOHEATCOOL 2005

* EU27 plus Croatia, Iceland, Norway, Switzerland and Turkey



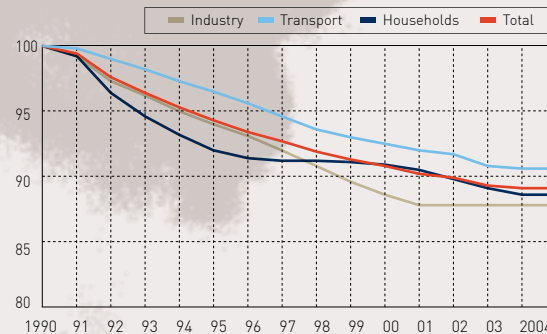
... although improvements have been made

In EU15, energy efficiency of energy end-users (industry, households, transport) improved by 11% between 1990 and 2004. However, improvements in several sectors have stagnated in recent years, which suggests that the “easy” measures have already been taken.

Chart 4 ODEX* energy efficiency index for EU-15 final energy users (1990=100)

Source: ODYSSEE energy efficiency project 2007

* ODEX is a weighted average of 26 sectors (7 transport, 9 household, 9 industry, 1 services)



The actual energy efficiency of many industry sectors is even higher when not only the production phase but the whole life cycle of their products is taken into account: materials like aluminium, steel or plastic can be recycled extensively saving enormous amounts of energy and emissions.

If all the world used energy as productively as in Europe, a major step towards solving the energy and climate problems would be taken

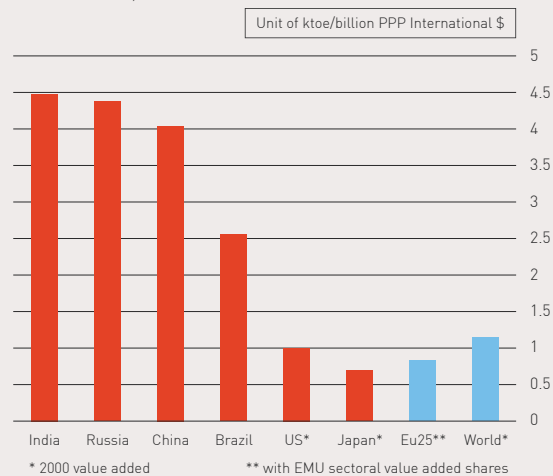
Although much remains to be done in Europe, compared with other world regions it is very energy-efficient. If all countries in the world had Europe's energy productivity rate, then the world's energy consumption would be instantly reduced by more than a quarter. Energy productivity in the industry sector is several times higher in the EU than in the big emerging economies.

McKinsey projections* for 2020 show that energy efficiency technologies which are already available can save more than 20% of energy demand compared with a business-as-usual scenario. More than 70% of these energy savings will have to be made in industrialising economies.

Chart 5

Energy consumption per unit of value added - industrial sector

Source: BUSINESSEUROPE calculations based on World Bank 2007, IEA 2005



This means that a substantial transfer of technology from industrialised to industrialising countries is necessary. The EU's external policy must make this a priority and stimulate voluntary technology transfer to outside Europe.

* "Curbing global energy demand", McKinsey Global Institute May 2007





POLICY RECOMMENDATIONS

Smart promotion of energy efficiency aims at curbing emissions relative to production, and at fostering innovation and competitiveness without resorting to disproportionate and costly regulation or to a unilateral and unreasonable increase in the carbon price. In view of implementing the EU goals on energy and climate change as decided by the European Council in March 2007 and in view of the international negotiations on mitigating climate change, BUSINESSEUROPE puts forward the following policy recommendations:

- 1 Introduce benchmarking in EU emission trading.** The cost imposed by the EU Emission Trading Scheme is a serious threat to competitiveness, especially for energy-intensive industries. This could be alleviated by introducing the possibility of allocating emission rights according to criteria such as technology benchmarks rather than auctioning. Thereby companies that are increasing their emission efficiency will be rewarded and encouraged to innovate further rather than pressed to relocate their emissions outside the EU.
- 2 Improve the Clean Development Mechanism.** This mechanism, set up under the Kyoto Protocol, enables the export of clean technology

to industrialising countries so that abatement of greenhouse gases can be carried out at the lowest cost. Its functioning must be improved and ensured on a long-term basis. Furthermore, no restrictions should be set on how many credits from CDM projects companies are allowed to buy in order to comply with their obligations under the EU Emission Trading Scheme.

- 3 Foster international sectoral approaches.** The EU should support efforts to develop international sectoral approaches for controlling industry emissions. These approaches could facilitate the emergence of a truly global response to the climate problem that will reconcile economic growth with the curbing of emissions.
- 4 Liberalise trade multilaterally without discrimination.** Facilitating trade in environmental goods and services worldwide will contribute to energy efficiency. However, as there is no agreed definition of an environmental good, an ambitious reduction of trade barriers in the WTO Doha negotiations and in bilateral trade negotiations is the best way forward. Positive discrimination for environmental goods would most likely create administrative obstacles while contributing

very little to the environment. While generally favourable to voluntary technology transfer, BUSINESSEUROPE urges the EU to ensure that intellectual property rights and WTO local content rules are fully enforced to protect investments.

5 Foster R&D and innovation. The EU's Strategic Energy Technologies (SET) Plan can make an important contribution to achieving Europe's energy goals if it adequately involves industry as an indispensable part of the solution. Further measures to create European lead markets in the energy field must be explored. Keeping the industrial base in Europe will ensure continued green innovation at world-class level.

6 Implement the energy efficiency action plan. With its paper on energy efficiency "Doing more with less" and ensuing action plan, the European Commission has shown the way. However, many of the cost-effective measures in the action plan, for instance those related to buildings and cogeneration, are not advancing fast enough. A new sense of urgency is needed to fully tap the cost-effective energy efficiency potential in Europe and in the world.

7 Seize untapped potential in heating and cooling. For example by fully implementing the directive on Combined Heat and Power (CHP) and promoting local initiatives to use "waste" energy for heating, cooling or power generation.

8 Spread information and know-how. Encourage information and education programmes at all levels. A special focus should be put on SMEs and the new Member States. European industry is willing to help overcome asymmetry of information by sharing experiences and best practices with companies in the new Member States.

9 Develop appropriate energy performance standards and labelling. Policy-makers should collaborate extensively with the concerned businesses and industries regarding the ongoing studies undertaken by the Commission and avoid bureaucratic and overlapping regulations. Europe should also cooperate more closely with trading partners like the US on energy efficiency standards and an open process towards negotiating standards on eco-labels at a global level.

10 Promote energy performance contracting. Current EU directives and initiatives like the Energy Performance of Buildings Directive, promote energy efficiency, but only cover parts of a sustainability process, which is vital for achieving energy efficiency. Promotion of proven, successful processes like energy performance contracting that cover the whole process from identifying to implementing measures will bring the market up to speed much faster.

11 Maintain a flexible IPPC system based on best available techniques. Under the current environmental permit system for industrial installations set up by the EU Directive on Integrated Pollution Prevention and Control (IPPC), best available techniques for each industrial sector are defined and disseminated throughout Europe. It is important that the current revision of the IPPC Directive retains the flexibility of this system.

12 Complete the internal energy market. In a competitive internal energy market, electricity producers will be increasingly challenged to increase the energy efficiency of their installations.





HOW COMPANIES IN EUROPE ARE INCREASING ENERGY EFFICIENCY – EXAMPLES

- 1 District heating and cooling.** In some places, using waste heat from industrial or electricity generating processes for heating and cooling can be a huge opportunity for energy savings. For example, the Shell oil refineries in Gothenburg (Sweden) and Frederica (Denmark) are among the world's most energy-efficient refineries, because of good public-private cooperation enabling district heating. Doubling the use of district heating from currently 6% to 12% in Europe would help reduce CO₂ emissions by 9.3%.
- 2 Combined heat and power production (CHP).** The new co-generation unit which is being built at the ExxonMobil Antwerp (Belgium) refinery has the ability to integrate heat with the refinery production process. It will generate an amount of electricity equivalent to the requirements of 300,000 European households thus decreasing CO₂ emissions by 200,000 tonnes a year.

The Spanish pulp and paper sector has installed nearly 60 CHP plants since 1990, transforming the sector from a large electricity consumer into an integrated energy business operation that produces electricity efficiently.
- 3 Efficient electricity generation from coal.** The efficiency of electricity generation can be highly increased with the newest technology. The Danish plant "Nordjyllandsværket" has the highest electrical efficiency from a coal-fired installation to date. Coal is used 20% more efficiently than at older coal-fired plants, corresponding to 20% less CO₂ emissions. The plant can achieve 47% thermal efficiency. Further, advanced clean coal technologies are used at the plant, significantly reducing emissions of SO₂ and NO_x.
- 4 Using municipal waste for energy.** The cement kiln at Buzzi Unicem's Cuneo plant (Italy) substitutes 20% of its energy needs for clinker production with high-quality solid recovered fuel (developed by Pirelli Ambiente) from local municipal solid waste. Thus more than 70,000 tonnes of CO₂ are saved per year and the total amount of solid waste locally generated by the population is fully recovered. This is but one example of co-processing: the average substitution rate of traditional fuels at cement plants in Europe is around 20%.
- 5 Low rolling resistance tyres.** 20% of the energy used to move a car is consumed by tyres. Tyre rubber compounds transform energy into heat when the tyres are in motion. Michelin has been working

for more than 80 years to reduce this so-called tyre rolling resistance, and the introduction of silica in 1993 was a major breakthrough. Low rolling resistance tyres now represent about 50% of passenger car tyres sold in Europe on the replacement market. However their market uptake is slower than expected, because many consumers are not aware of environmental impacts when purchasing tyres.

6 Eco-Driving. Several manufacturers and driving schools offer "eco-driving" training. It leads to a consumption reduction of up to 25% for individual drivers after training, with significant effects of up to 10% in the long run. The European Climate Change Programme has calculated that the reduction potential of CO₂ emissions from eco-driving would be at least 50 million tonnes in Europe by 2010.

7 Energy performance contracting. Service providers in Europe (e.g. [www.shell.com/global-solutions/CO₂management](http://www.shell.com/global-solutions/CO2management)) develop energy saving potential in an industrial plant or in a building with targeted modernisation and optimisation measures. The ensuing cost savings pay back the investment cost and service fees during the term of the contract.

8 Efficient industrial motors. Motor-driven systems consume about 65% of industrial electricity in the EU. Huge energy savings can be achieved by combining motors with variable-speed drives, which regulate the speed of a motor to the needs of the process it is running. In many applications, energy use can be cut by 87% just by adjusting the motor speed. Despite the scale of the potential savings, less than 10% of motors worldwide are combined with a variable speed drive.

9 Reaching carbon-neutrality of concrete. The building sector represents around 40% of all CO₂ emissions in the EU. The European cement sector is engaged in a long-term policy of reaching carbon neutrality of concrete as a building material. Intelligent combinations of heating, ventilation, solar shading and building structure can reduce energy use for cooling by up to 50%. Concrete buildings as heavyweight structures provide a stable indoor climate: by utilising concrete's thermal mass, energy consumption can be reduced by tempering the need for heating and cooling in a building.

10 Use of advanced insulating glass units. The manufacturing of one square metre of low-emissivity (low-E) double glazing generates 25 kg of CO₂. On the other hand, replacing one m² of single glazing by low-E double glazing saves 91 kg of CO₂ per year. Thus the CO₂ that is emitted during the manufacturing is recovered after less than four months of using this product.

11 Prevention of flaring. A "Clean Development Mechanism" project conducted by an ENI subsidiary ensures that the residual gas produced in the oil fields in Nigeria (that was previously wasted by flaring it) is used to produce electricity in a power plant, which accounts for 12% of the overall generation capacity of Nigeria.

12 Switch to more efficient lighting. Lighting consumes 14% of all electricity within the EU. Approximately, two thirds of all lighting currently installed in the EU is based on older, less energy efficient technology, developed before 1980. Philips has developed the Green Switch programme, which accelerates the changeover through greener lighting technologies through education and information campaigns and liaising with policymakers. More information: www.asimpleswitch.com



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