

## Energy Efficiency in the EU: An Introduction

### Summary

Energy efficiency could help reduce fuel poverty, reduce energy insecurity, achieve climate change and air pollution goals, stimulate SMEs and create jobs. In particular, energy efficiency action could help contribute to both the Member States' GHG target (see effort sharing agreement decision 406/2009/EC), releasing credits for trading on the EU ETS in relevant sectors and renewable energy target (dir. 2009/28/EC). Indeed, at an informal meeting on 23 July 2009, energy ministers agreed that energy efficiency measures are the most cost-effective way of reaching the 20-20-20 targets.

In the coming months important dossiers will be discussed. For example, the next energy efficiency Action Plan is expected in March 2010. Importantly, this will outline the legislative action to be proposed in the coming years. Moreover, implementing regulations for the recast eco-design, energy labelling and buildings directives will be voted upon in the coming months. The European Parliament will crucially have more power in this process due to the revised comitology procedure with scrutiny.

### Background

The European Council conclusions of 8 - 9 March 2007 (7224/1/07) emphasised the need to increase energy efficiency in the Community to achieve the objective of saving 20% of the Community's primary energy consumption compared to projections for 2020 and called for a thorough and rapid implementation of the energy efficiency Action Plan.

An evaluation undertaken by the Commission (COM (2008)772) of EU energy efficiency policy revealed:

- Poor implementation of energy efficiency legislation at Member State level: Member State implementation of EU legislation at the national level has been slow, financing fragmented and practical measures insufficient
- Lack of consumer awareness: there is a need for behavioural change and to facilitate this information (e.g. informative billing), labelling and smart metering (e.g. ESD requires Member State to ensure the use of metering)
- Insufficient market uptake: financing is scattered or there is no administrative structures to allow uptake. EE upfront costs can be substantial (even though pay back time is shorter than the life span of an intervention) and require access to financing.

'Negawatt-hours' are seen as the single largest energy use in the EU. The Communication set out that between 1997-2006 the *annual* savings achieved were equal to one third of all crude oil imports to the EU in 2006 and there is still much more that can be done.

EU policies and measures in place (including those in the pipeline) have been deemed insufficient to deliver the desired 20% reduction by 2020 in EU annual primary energy consumption. The Communication estimates that current measures would only deliver a 13% reduction (see Annexes).

The energy savings potential in the EU is large: 19% in industry; 20% in transport; 30% in households and services. The European Commission is therefore looking into tabling additional policies (see section on next steps).

Energy efficiency covers all sectors and has extensive synergies with internal energy market regulation, the 2008 Climate and Energy package and transport policy agendas. Thus in all of these areas there will be a reference or provision to energy efficiency. Specifically, the EU agenda on energy efficiency policy is developed around so called 'five pillars':

1. the general policy framework and the actions taken under the Action Plan for Energy Efficiency (EEAP);
2. the National Energy Efficiency Action Plans based on the framework Directive on end-use efficiency and energy services;
3. the legal framework for the most important consumption sector - buildings – and energy consuming products;
4. flanking policy instruments such as targeted financing, provision of information and networks like the Covenant of Mayors and Sustainable Energy Europe; and
5. international collaboration on energy efficiency.

In the following section we summarise some of the main policies and some insights into their past and more recent development.

### **The Energy efficiency action plan (EEAP) (COM(2006)545)**

Targeting buildings, transport and manufacturing, the plan foresees a series of new Directives from 2007 to 2012. The action plan contains over 70 initiatives. The implementation of the action plan is ongoing. One third of the actions were completed in November 2008 (latest review, COM (2008)772). Measures included in the EEAP are considered to achieve energy savings of about 13% by 2020 if properly implemented by Member States. However, the extent to which the predicted benefits materialise will depend on what measures the Commission ultimately takes forward (so far only a third of the actions envisaged) and the effectiveness of implementation in Member States. Tax harmonisation plans for example are a particularly contentious area, moreover resistance from key industries, such as the German carmaking lobby or energy related product manufacturers, and changing consumer behaviour will also be potential barriers to success. The action plan foresees the measures tabled in the energy efficiency package (see below).

### **Ecodesign directive (Directive 2005/32, amended by Directive 2009/129 recast)**

The energy efficiency action plan highlighted the enormous energy savings opportunities in the products sector. The European Parliament, in its resolution of 31 January 2008 on the action plan, called for strengthening of the provisions of Directive 2005/32/EC. Also the Sustainable Consumption and Production (SCP) action plan

(COM(2008)397) recommends the revision of the ecodesign directive and the extension of its scope.

The recent recast of the ecodesign directive (2009/125/EC), adopted on 21 October 2009, expands the scope of the directive from covering only energy-using products (EuP) to all energy related products, defined as 'any product having an impact on energy consumption during use' (e.g. windows, construction products, insulation materials, detergents and water-using products).

The ecodesign directive is meant to harmonize both the environmental and trade aspects of energy related products.

- a) 'Ecodesign' aims at improving the environmental performance of products throughout their lifecycle (raw material selection and use; manufacturing; packaging, transport and distribution; installation and maintenance; use; and end-of-life) by systematically integrating environmental requirements at the earliest stage of product design. The framework Directive is in principle applicable to any energy related product in the domestic, tertiary and industrial sectors, except for vehicles, which are excluded. It is flexible enough to ensure future adaptations to all products. The Directive narrows this down to uses that represent an important volume of sales (i.e. more than 200,000 units a year in the EC) in the EU market and a 'significant environmental impact'. Another criterion is the potential for improvement in terms of the environmental impact of product groups, which should not entail 'excessive costs' and could take into account both existing legislation and pro-active initiatives from industry.
- b) The internal market aspect is intended to avoid market fragmentation through dissimilar national environmental requirements. It ensures that ecodesign requirements for all significant energy related products can be harmonised at Community level. The directive provides for the establishment of standards to which energy-related products will have to conform in order to be able to benefit from free movement within the Community. These standards will have to be defined by the Commission in the framework of the comitology procedure, following an impact assessment.

The directive suffered from having two not entirely harmonious aims: reducing energy use from products, and harmonising standards across Europe. The latter is primarily a single market issue that can as easily be reached by relaxing standards as by toughening them. Originally, the European Parliament demanded that the directive at least partially rest on an environment legal base to avoid weakening standards, which was rejected by the Council. The directive also allows voluntary agreements and self-regulation to be given priority over regulation if they are more efficient. Importantly, it is the Commission who, without consultation, will assess and sign voluntary agreements with the industry. These are an area of increasing expansion.

By introducing the comitology procedure there is the prospect of quicker tightening of standards based on technical criteria, rather than political deal-making. The application of the 'regulatory procedure with scrutiny' for the adoption of implementing measures under the Directive was agreed in July 2007 (Directive 2008/28/EC).

The ecodesign directive is a framework directive. It does not introduce directly binding requirements, but it defines a process, conditions and criteria for setting requirements regarding environmentally relevant product characteristics to be met for products to be placed on the market. Standards for products will take into consideration the life cycle of the products from their manufacture onwards with consideration given to energy consumption, waste generation, water consumption and extension of lifetime.

An indicative list of additional product groups was identified by a recent Commission Communication (COM(2008)660) outlining the work plan for the implementation of the Directive. So far, nine ecodesign regulations have been put in place (including: standby; simple set-top boxes; lamps and ballasts (leading to the phase out of incandescent light bulbs); external power supplies, industrial motors, circulators, televisions, refrigerators and freezers) which are expected to save about 315 TWh electricity per year by 2020 if fully implemented. This is more than the annual electricity consumption of Italy.

During informal negotiations with the Council, the EP failed to achieve that the scope of the directive was immediately enlarged to *all products* (except for vehicles). This would have made it easier to use of the directive to cover all products with an impact on resource use. Instead, due to the opposition of some Member States, it was included that the Commission would assess the *appropriateness* of extending the scope of the directive to non energy related products in 2012 and, as appropriate, come up with proposals for a further amendment of the directive. However the EP succeeded in obtaining the review of the methodology for the identification and coverage of significant environmental parameters, including resource efficiency and considering the whole life cycle of products not later than 2012.

### **The Energy Efficiency Package (COM(2008)772)**

In November 2008, the Commission proposed an Energy Efficiency Package consisting of the following elements:

- a proposal for a recast of the Energy Performance of Buildings Directive;
- a proposal for a revision of the Energy Labelling Directive;
- a proposal for a new Directive containing a labelling scheme for tyres;
- a Commission decision establishing guidelines clarifying the calculation of the amount of electricity from cogeneration;
- a communication on cogeneration.

The key single elements are summarised in the following sections.

### ***Buildings Directive (directive 2002/91/EC – recast proposal COM (2008) 780)***

Energy efficiency in buildings is one of the priorities of the European energy efficiency policy. It contributes to 40% of final energy consumption, while the cost-effective CO<sub>2</sub> savings potential is estimated to be equal to 30%. Hence, it is considered to be a crucial sector for CO<sub>2</sub> emissions reduction, if, after the Copenhagen negotiations, a 30% reduction target will be sought.

The energy performance of buildings directive (EPBD) provides a holistic approach for energy efficiency in the buildings sector. It covers building envelopes, energy use for

space and water uses and lighting for residential and non residential buildings. Although transposition at Member State level has been slow, the directive has succeeded in bringing energy efficiency back on top of the political agenda.

On 18 November 2009 (2008/0223 (COD)) a final political agreement between the Council, the EP and the Commission on the proposed directive recast was reached. Negotiations revolved around the following main issues: a) targets relating to low-energy buildings and their definition; b) financing of energy efficiency measures; c) the calculation method to draw up energy performance requirements for buildings.

The final agreement includes the following main provisions:

- Starting from 2021, new buildings will be at nearly zero energy consumption under the new EPBD. New construction accounts for just a very small percentage of all buildings (1% per year). The starting date is later than hoped for in the EEAP (which was 2015).
- Starting from 2013, all buildings (not only buildings above 1000 square meters as in the previous directive) and building elements undergoing major renovation will need to observe minimum energy performance requirements. The methodology for such calculation will be drafted by the Commission by 30 June 2011 through the comitology procedure.
- The initial proposal of restricting the public incentives only for the construction or major renovation of buildings (or parts thereof, including building components), the results of which comply at least with minimum energy performance requirements, was diluted into a simple recommendation. Also, no additional financing was foreseen either from the EU or from national budgets to speed up renovations.

Difficulties remain in terms of take up of funding for the renovation of buildings, especially for residential buildings and especially in new Member States, due to administrative rules and ownership structures.

The text will be adopted by the Council in December 2009 and will be finally adopted by the EP in the first quarter of 2010

#### ***Labelling Directive (directive 92/75/EEC - recast proposal COM(2008)778)***

The energy labelling directive (ELD) was originally conceived to harmonise energy efficiency labelling in the EU and avoid trade barriers. The directive requires retailers to display a comparative label showing the energy consumption of products. It is a framework directive, thus implementing measures and product categories are decided via the regulatory procedure with scrutiny (comitology). In 2009, Parliament attempted to block the Commission's proposed label format when voting on new energy labelling format for televisions and fridges. It used its 'veto' powers for the first time in this context. If the Parliament **refuses to endorse the measures via the 'regulatory procedure with scrutiny,' the Commission has to come up with new proposals.**

A number of studies confirm that the directive has significantly contributed to market transformation towards more efficient appliances. An example of this is that in 2007 most of the models sold belong to the 'A' class. Thus the recently proposed recast

(COM(2008)778) enlarges the scope of the directive to deliver further benefits. Similarly to the Ecodesign Directive, the proposed recast of the directive extends the scope to cover energy using products and energy related products, including construction products and windows (previously it covered only so called 'white goods' i.e. household appliances).

A compromise deal was agreed on the proposed recast on 16 November between the MEPs of the ITRE Committee, the Council and the Commission. The new directive is expected to be finally approved in early 2010. The Parliament failed to block attempts to create a 'beyond A class' scale: three additional classes (A+, A++, and A+++) for the most efficient class were approved. Member States were divided on the issue, some backing positions similar to the EP, others, led by Italy, were in favour of the final approach. However, a requirement for regular reviews was achieved. The European Parliament tried, unfortunately in vain, to introduce an obligation to buy only the most efficient products in public procurement procedures. It succeeded instead in delivering an obligation to display the energy efficiency class where energy-related information or the price is indicated in advertisements.

The outcome was received with disappointment by environmental NGOs, who were backing the EP position.

#### **Other EU policies and measures on energy efficiency**

There are a number of Directives in place in various sectors promoting energy efficiency targets and standards:

- The **energy end-use efficiency and energy services directive** (2006/32/EC) requires Member States to adopt a national indicative energy savings target of 9 % within 9 years (by 2016) and aims at creating the conditions for the development and promotion of a market for energy services and other measures aimed at improving end-use energy efficiency. Methods to evaluate the measures implemented to achieve the 9% energy savings target set out in the directive were recently completed by the Commission in collaboration with Member States under the EMEES project<sup>i</sup>. **A revision of the directive is expected in 2010.**
- The **directive on the promotion of cogeneration** (2004/8/EC) provides harmonisation of definitions of efficient CHP, establishes a framework for a scheme for a guarantee of origin of CHP electricity, and sets the general target of having electricity production from cogeneration increased to 18%. A recent decision includes guidelines on definitions and a methodology for calculation of high efficiency cogeneration. **More actions on CHP are to be included in the new EEAP.**
- **Energy use in transport** is currently addressed by the Regulation on Emission performance standards for new passenger cars, the proposed Directive on labelling of tyres, the proposal on greening car taxation and the 'Green Cars' initiative. The Commission is also working on a proposal on light commercial vehicles and a revision of CO<sub>2</sub>/cars labelling. **A revision of the EEAP will consider if additional measures need to be undertaken. A white paper on transport will also be published in 2010.**

- **Internal gas and electricity market package** highlights the role of national regulating authorities in ensuring the necessary investments are undertaken to reduce transmission losses and the roll out of smart meters in Member States.
- **Energy taxation:** A proposal for a revised EU energy taxation Directive has been put on hold following an internal consultation by the Commission as they wish to further clarify some elements of the text. Key elements within the draft include the proposed introduction of an explicit distinction between CO<sub>2</sub> and non CO<sub>2</sub>-related energy taxation; the extension of the scope of the Directive to ETS sectors for non-CO<sub>2</sub> elements; and tax exemptions to stimulate low carbon technologies and biofuels. **The adoption of the proposal was postponed until the new Commission takes office.**
- **Financing** is a crucial element for energy efficiency measures, which can often entail substantive up front costs. European funding, though the EIB and EBRD, is available, but often technical capacity and administrative barriers prevent take up of funds. The **budget review** foresees a review and expansion of funding for energy efficiency. Recently, the **structural funds** regulation review (as part of the economic recovery plan) included energy efficiency in social housing among the measures that are eligible for funding (up to 4% of total ERDF allocations) in all Member States;
- **International cooperation** through dialogues and exchange of best practices is also a priority for the EU, in particular with neighbourhood countries, Russia, Brazil and China, Africa and G8 countries. However, harmonisation at the global level is complicated by the different systems in place particularly in the US, Japan and Europe.
- **Role of information:** information and education on energy efficiency is *crucial* for the uptake of energy efficiency measures. One contribution to this issue, was given by IEEP's climate team which recently completed an online library for the EU Executive Agency for Competitiveness and Innovation (EACI) on tools and guidebooks on the following four themes:
  - energy efficiency in industry (energy management and benchmarking in industry);
  - local energy management (facilitating the dissemination of energy efficiency and renewable energy applications at the regional, local and municipal levels);
  - renewable energy applications (sizing and feasibility of applications); and
  - 5energy aspects of transport (mobility management and alternative modes of transport).

The online library includes tools and guidebooks which are available free, ready to download and use. <sup>ii</sup>

### **Next steps – opportunities for action**

A **revised energy efficiency action plan**, based on the review of progress since the 2006 plan, was expected in November 2009. This has, however, been delayed and is now expected in mid-2010. The main alleged reasons for this was a divergence of views among Member States and the Commission on the possibility of and nature of a binding efficiency target and impact on carbon prices. Moreover, it was felt any decision should not pre-empt the Copenhagen negotiations.

The action plan is intended to outline the new legislation to be proposed in the EU on energy efficiency to achieve the 20% primary energy consumption target. Options

suggested include: a national mandatory energy efficiency target; a binding obligation for Member States to establish white certificate systems; and a strong focus on energy efficiency in buildings (e.g. including the refurbishing of 15 million homes by 2020 under the European Building Initiative). The role of cogeneration is also anticipated to be boosted. One other important point is the set up of targeted finance schemes (e.g. targeting 20% bottom performing buildings).

A binding energy savings target is said to be opposed by some in the European Commission, who are concerned that this might lower the carbon price drop and 'derail' the ETS. Its scope (whether to focus only on buildings or transport, or to all sectors) would still need to be defined by the EC in a further impact assessment. Moreover, a harmonised methodology for measuring progress towards achieving a binding target on primary energy consumption is currently missing.

Once published, the European Parliament will produce a non legislative opinion on the action plan. This will give the EP the chance to voice its positions and concerns on the legislative plan.

**A revision of the Energy end-use efficiency and services directive (2006/32/EC) (ESD)**, which could include, among others, a provision for public incentives to be only provided to measures that guarantee a measurable energy saving, is expected in 2010.

**Important implementing measures of the ecodesign directive are expected.** After two years of preparation, in March/April 2010 the EC is expected to vote in regulatory committee (under the comitology procedure) on mandatory standards for heating and cooling appliances, under the ecodesign directive. These measures are estimated to be equal to around half of the energy saving potential and CO2 emissions abatement potential of the directive. The Parliament will be called to contribute to this under the 'comitology' procedure in July 2010. Early engagement in this process is key – given the technical nature of documentation it is recommended to start reviewing this now to ensure an effective response when consulted.

A review of the **ecodesign Directive** is foreseen in 2012 and will consider the extension of its remit to non energy related products. The SCP action plan also foresees an **ecodesign labelling Directive** to complement the ecodesign Directive.

A long awaited **white paper on energy efficiency in transport** is expected in 2010, outlining measures for the period 2010-2020.

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## ANNEXES

### Expected annual primary energy saving potential by 2020 for EU27 for some specific Energy Efficiency measures (full implementation)

Measures		Yearly primary energy savings by 2020 compared to 'business as usual' scenario in Mtoe	Yearly primary energy savings by 2020 compared to 'business as usual' scenario in %	Reference document <sup>37</sup>
1	energy services Dir 2006/32/EC	Max 193	Max 9.8%	COM(2008)11(as of 2016)
2	eco-design Dir 2005/32/EC (appliances) and labelling framework Dir 92/75/EC	96	4.9%	EuP preparatory studies <a href="http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm#consultation_forum">http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm#consultation_forum</a>
	energy star agreement with USA	2	0.1%	
3	buildings Dir 2002/91/EC	130	6.6%	SEC(2006)1174
4	cogeneration Dir 2004/8/EC	23	1.2%	COM(2002)415
5	fuel efficiency in road vehicles - CO2&cars –public procurement	36	1.9%	COM(2007)856 & SEC(2007)1723 COM(2007)817
6	urban transport - integrated approach	20	1.1%	Policy assessment of the CIVITAS initiative
<b>TOTAL NET (taking into account the interplay of measures and the witnessed implementation speed)</b>		<b>256</b>	<b>13%</b>	
<b>OBJECTIVE EU27 in 2020</b>		<b>394</b>	<b>20%</b>	
Note: PRIMES model 'business as usual' baseline projections (update 2007) in 2020: EU27 TOTAL primary energy consumption = 1968 Mtoe.				

Source: COM (2008)772

### Barriers and drivers

The table below gives an overview of the main drivers and barriers of energy efficiency improvements.

**Energy saving potentials by final energy consuming sector and key drivers, actors and barriers for energy efficiency improvements**

Sector	Share in final energy cons. (2006)	Saving potential by 2020 <sup>38</sup>	Key drivers for energy efficiency	Key barriers	Key actors
All sectors	100%	21%	<ul style="list-style-type: none"> <li>• Energy policies</li> <li>• Market forces/ energy prices</li> <li>• Financing and taxation</li> <li>• Awareness</li> <li>• Technological development</li> </ul>	<ul style="list-style-type: none"> <li>• Incomplete implementation of energy efficiency legislation</li> <li>• Lack of awareness</li> <li>• Market failures</li> </ul>	<ul style="list-style-type: none"> <li>• Everybody</li> </ul>
Households and commercial buildings	41%	30%	<ul style="list-style-type: none"> <li>• EU and national/regional legal requirements</li> <li>• Technological developments</li> <li>• Financial and fiscal incentives</li> <li>• Energy services Companies</li> <li>• Information instruments (e.g. labelling, certificates, metering, campaigns)</li> <li>• Behaviour trends</li> </ul>	<ul style="list-style-type: none"> <li>• High up-front costs</li> <li>• Owner-tenant dilemma</li> <li>• Lack of awareness on the benefits</li> <li>• Overestimation of the investment needs</li> <li>• No access to attractive financing options</li> <li>• Energy efficiency not recognized as business opportunity</li> </ul>	<ul style="list-style-type: none"> <li>• Property owners and tenants</li> <li>• Construction business</li> <li>• Financial institutions</li> <li>• Consumer associations</li> <li>• National/local authorities</li> <li>• EU institutions</li> </ul>
Transport	31%	20%	<ul style="list-style-type: none"> <li>• EU and national/regional legal requirements</li> <li>• Consumer awareness</li> <li>• Information campaigns</li> <li>• Labelling</li> <li>• High energy prices</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of information</li> <li>• Limited commitment from transport industry</li> <li>• Insufficient infrastructure (e.g. poor urban planning, limited public transport)</li> <li>• Behaviour patterns</li> </ul>	<ul style="list-style-type: none"> <li>• Transport companies</li> <li>• Associations</li> <li>• Citizens</li> <li>• National/local authorities</li> <li>• European institutions</li> </ul>
Industry	28%	19%	<ul style="list-style-type: none"> <li>• High energy and carbon prices</li> <li>• Voluntary and mandatory agreements</li> <li>• Improved energy efficiency of production processes</li> </ul>	<ul style="list-style-type: none"> <li>• High up-front costs</li> <li>• Limited commitment</li> <li>• Low awareness of the benefits</li> <li>• Overestimation of the investment needs</li> <li>• Lack of financing</li> <li>• Low share of energy in production costs</li> </ul>	<ul style="list-style-type: none"> <li>• Companies</li> <li>• Industry associations</li> <li>• National/local authorities</li> <li>• European institutions</li> </ul>

Source: COM (2008)772

<sup>i</sup> EMEES [http://www.evaluate-energy-savings.eu/emees/en/the\\_project/project\\_description.php](http://www.evaluate-energy-savings.eu/emees/en/the_project/project_description.php)

<sup>ii</sup> The IEe- Library is available here: <http://www.iee-library.eu/index.php>