Overview of energy efficiency measures of European Industry
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Abstract
Energy intensity improvements in industry have been significant over the past two decades. Further improvement potential can be tapped if targeted policy action is taken. However, the household, tertiary and transport sectors have even higher energy savings potentials. Energy savings policies improve industrial competitiveness and provide for economic benefits to society.
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LIST OF ABBREVIATIONS

ETS  Emission Trading Scheme
EU   European Union
HPI  High Policy Intensity
LPI  Low Policy Intensity
Mtoe Million tons oil equivalent
SME  Small and Medium-sized Enterprise
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EXECUTIVE SUMMARY

Background and aim

In view of the revision of the EU Energy Efficiency Action Plan foreseen in 2011, the Committee on Industry, Research and Energy (ITRE) of the European Parliament requested this briefing paper on the "Overview of Energy Efficiency measures of European industry". It is the aim to provide background information and advice for the Members of the ITRE Committee on energy efficiency achievements and future trends in the European industry.

Achieved energy efficiency improvements in industry

Energy efficiency in the industrial sector was improved by 30% in the EU 27 for the period 1990-2007, representing an average 2.1% annual improvement. The main contributions have been achieved by the chemical and machinery branches. In the three most energy intensive sectors paper, chemical and steel, the production has constantly increased, while the specific unit energy consumption of each sector has decreased.

The performance in energy efficiency improvements varies significantly among Member States. Between 1998 and 2006, a group of 10 countries (mostly new Member States) have achieved larger energy efficiency improvements than the EU-27 average, while a group of three countries have not improved their energy efficiency at all (Italy, Malta, and Spain).

Drivers of energy efficiency improvements

Overall increasing energy prices are the major driver for energy efficiency in industry. However, the level of impact of price increase depends on the level and expected durability of higher price levels.

A good economic climate has a tendency to have a positive impact on efficiency due to improved investment cycles. A downward economic climate reduces the overall energy consumption without efficiency improvements.

Structural changes include changes within an industry, notably through technology innovation, or within an economy, notably by decreasing or relocating energy intensive activities. In most European countries, structural changes have reduced energy intensity; on average 30% of the reduction of energy intensity is due to structural changes.

A total of around 260 industry-targeted policy measures have been implemented or considered by the Member States, Norway and Croatia since 1975, of which 180 measures are being applied. Most of the on-going measures are relatively recent: nearly 70% have been implemented since 2000 and more than 40% since 2005.

Future trends and energy efficiency potentials

Industry has a limited future potential for energy savings compared to households, transport and the tertiary sector. Based on the European Commission funded ODYSSEE MURE project future final energy savings potentials of the European industry of 5.9% to 6.6% by 2020 compared to the baseline scenario are estimated. In addition to energy savings, switching to low carbon fuels, renewable energies and carbon capture are options to reduce greenhouse gas emissions from industry.
Roughly speaking the energy savings potential in industry is equally distributed between the three categories of electricity consumption by process specific energy consumption, space heating and crosscutting technologies including lighting, electric motors, pumps, ventilation, cold supply and compressed air.

The EU Emission Trading System (ETS) represents roughly 50% of the energy consumption in terms of total industrial final energy consumption. So far knownledge of the impacts of the ETS on energy efficiency is very limited.

The energy savings potential of European industry by 2020 does not reveal any clear groupings of countries, neither by size nor by geography or accession date to the EU. Individual national industry structure and the past development play the dominant roles.

**Industry sectors**

58% of industrial energy consumption are represented by the four industry sectors iron & steel (19%), chemical industry (18%), paper (11%) and food, drink & tobacco (10%). The former three are energy intensive sectors which are covered by the ETS to a large extent.

**Paper** production is a very efficient process in Europe already today. The economic energy savings potential will range from 6% to 9% by 2020. Increasing paper recycling rates should allow for a further decrease of energy consumption in paper production.

**Steel** production is an efficient process in Europe. The economic energy savings potential will range from 6% to 7% by 2020, achieving the full technical potential then. Increasing iron recycling rates should allow for further energy savings in steel production.

**Chemicals** production in Europe has a notable economic energy savings potential of 17% by 2020, which will be close to the technical potential.

**Food** production in Europe also has a notable economic energy savings potential of 11-13% by 2020. Reducing food waste over the full value chain including the final consumer estimated at around 30% could reduce food demand significantly, and could thus reduce energy consumption, hunger, water consumption and greenhouse gas emissions.

**Obstacles**

Many barriers and market failures exist that impede the realisation of these savings potentials without targeted policies. A major barrier is the relatively low importance attributed to energy consumption in non-energy intensive industries. Other barriers include insufficient investments in research and development, high expected returns on investment and short payback times, confidentiality concerns related to independent energy audits, the investor-user dilemma, the investment barrier, information deficits etc.

Small and medium-sized enterprises (SMEs) have particular characteristics which require special attention: limited access to information, a low energy share of their expenditures, and, due to their size, searching for funding for energy-savings measures would cost too much transaction expenses. **SMEs thus need specific measure packages.**

**Costs of energy savings**

Energy savings can be achieved by investments in more efficient appliances, in certain installations and in entire manufacturing plants, with the associated investment costs covering a wide range. The financing costs over the economic lifetime of investments in industry are assumed to be between 8% and 30%. **Net economic benefits** for energy savings in industry taking account of initial investment, financing costs and energy savings range from 25 EUR/GJ, or 7.2 ¢/kWh, down to zero.
The energy prices assumed in the calculation of the energy savings potentials are based on a projected oil price of US-$ 62.8 per barrel of oil equivalent (boe) in 2030. Given current oil prices and increasing global resource constraints significantly higher actual energy prices can be expected. Consequently, chances are high that the economics of energy savings will further improve and will significantly enhance savings potentials.
POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

Role
Policy departments are research units that provide specialised advice to committees, inter-parliamentary delegations and other parliamentary bodies.

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- Economic and Monetary Affairs
- Employment and Social Affairs
- Environment, Public Health and Food Safety
- Industry, Research and Energy
- Internal Market and Consumer Protection

Documents