

BRIEF ON ENERGY EFFICIENCY

Introduction

The mission of Roadmap 2050 is to provide a practical, independent and objective analysis of pathways to achieve a low-carbon economy in Europe, in line with the energy security, environmental and economic goals of the European Union.

The Roadmap 2050 project findings can be summarized as follows: The decarbonisation of the European power sector is practical, technologically and economically feasible and a pre-requisite for meeting the EU goal of at least 80% lower greenhouse gas emissions by 2050.

Roadmap 2050 examines the costs and benefits of the following decarbonisation pathways for the European power sector:

- 40% renewables, with the remaining 60% supplied evenly between non-renewable low-carbon technologies: CCS and nuclear
- 60% renewables, with the remaining 40% supplied evenly between non-renewable low-carbon technologies: CCS and nuclear
- 80% renewables, with the remaining 20% supplied evenly between non-renewable low-carbon technologies: CCS and nuclear

The study has also assessed the technical and economic feasibility of a scenario with 100% renewable electricity, requiring no nuclear power and limiting CCS application to heavy industry.

Energy Efficiency -- the foundation for success on all pathways

The analysis shows that, in every scenario, delivering cost-effective end-use energy efficiency at a large scale is critical to Europe's ability to build and operate the low-carbon electric power system. In order to deliver on its full potential, energy efficiency needs to be recognised, financed, and delivered on the basis that it is a power system resource

With proper support, energy efficiency resources would allow Europe's utilities to cost-effectively retire or avoid building more than 440 medium-size coal plants (500 MW each) by 2050. The Roadmap 2050 analysis shows that, by avoiding more expensive generation and transmission needs, energy efficiency measures can also reduce the cost of the transition to a decarbonised power sector by up to 30%.

Energy Efficiency improvements need to more than double annually to keep the increase in power demand manageable

With greater electrification of transport and of heating in buildings and industry, electrical energy requirements are estimated to increase by 80% in 2050 against 2005 levels. Reaching energy efficiency levels beyond those assumed in the reference case can cut this level of load growth in half and is assumed to do so in Roadmap 2050. Energy efficiency across the economy, including more efficient electric vehicles, a buildings retrofit programme and other measures, can off-set the demand created by the move away from fossil-fuels towards electricity in other sectors.

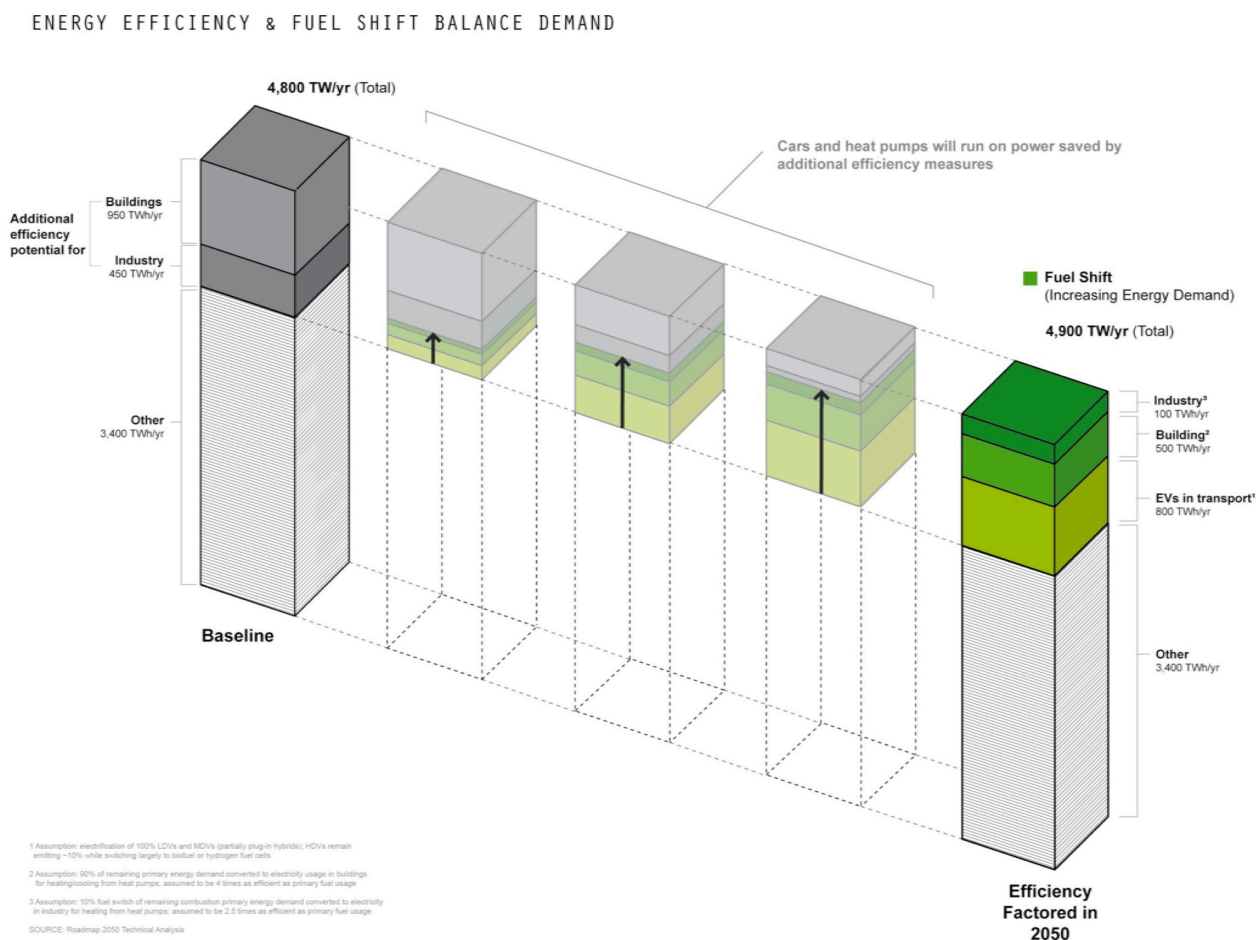
To achieve this, Europe needs to step up the intensity and savings rates of today's energy efficiency programs and policies. A recent study by Ecofys and Fraunhofer concludes that the impact of energy savings policies will need to nearly triple from the current levels achieved by the EU energy efficiency package in order to achieve the EU's 20% by 2020 energy savings target. Failure to do so would leave unrealized €70bn per year in savings to European energy consumers, net of investment costs.¹

This results in an overall reduction of energy intensity for the economy, and if ambitious energy efficiency measures are put in place now, energy bills in Europe can start to fall as early as 2015.

Energy efficiency is the lowest cost means of reducing carbon emissions. In addition, end-use efficiency:

- Is widely distributed, with savings opportunities in every Member State and economic sector;
- Avoids the need to build a large fraction of otherwise-required power generation, transmission and delivery infrastructure;
- Directly reduces energy costs to families and businesses across the economy;
- Improves power system reliability and security of supply; and
- Has the potential to create wide-scale business opportunities and significant numbers of new, local jobs

Large-scale energy efficiency must, therefore, remain one of the highest priorities for policy makers.



1. The Feasibility of Binding Energy Savings Targets in the EU" by Ecofys and Fraunhofer (Part 1: facts and figures, April 1, 2010 unpublished report), co-funded by European Climate Foundation and Regulatory Assistance Project. Full final report (Parts 1 and 2) scheduled to be published in early May 2010

Delivering Energy Efficiency – What's Required?

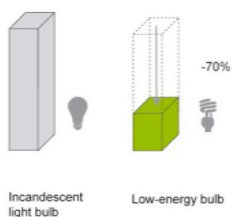
Obviously, there are challenges to face and obstacles to overcome, especially in making sure that the requisite level of investment in cost-effective energy efficiency actually happens.

A broad range of approaches will need to be deployed and these must be flexibly designed to take advantage of varying local circumstances. Member States and local regional governments must take ownership of designing and delivering the necessary package of solutions, operating within a broad framework of standards, regulations, and market policies established at EU level.

The good news is that there are many opportunities for success and many good examples to draw upon. For example, Member States can establish an aggressive mandatory annual target to retrofit buildings with deep efficiency improvements. They can use the review of market arrangements to ensure that energy efficiency investments can compete on a level playing field with generation investments, for example, in the valuation of power system capacity. They can adopt more stringent building codes; create savings mandates; provide technical assistance to industries; and create new business models for utilities and other energy suppliers that reward success in helping customers to save energy. There are many program options to choose from, and no single solution will be enough. Roadmap 2050 sets out many of the available models in Volume 2: the Policy Report

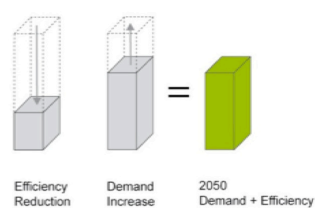
ADDED EFFICIENCY BENEFITS

REDUCE ENERGY CONSUMPTION



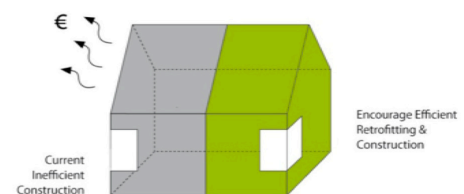
THE OVERALL ABILITY OF THE EU TO DECARBONISE IS DEPENDENT ON ACHIEVING AGGRESSIVE ENERGY EFFICIENCY SAVINGS.

OFFSET INCREASING ENERGY DEMAND



WITHOUT ENERGY EFFICIENCY SAVINGS, ENERGY DEMAND WILL INCREASE AND IT WILL BE HARDER AND MORE EXPENSIVE TO MEET THAT DEMAND.

INCREASE ENERGY EFFICIENCY SAVINGS³



ENERGY EFFICIENCY SAVINGS SHOULD BE PURSUED URGENTLY. THEY CAN BE MADE NOW, AND THE MAJORITY ARE CHEAPER THAN BUILDING NEW. THIS IS HAS A SPECIFIC IMPACT ON CO₂ EMISSIONS IF IT IS UNABATED FOSSIL GENERATION THAT IS BEING BUILT TO MEET DEMAND THAT COULD HAVE BEEN MET BY ENERGY SAVINGS.

1) Compact fluorescent lamps (CFLs) use about 70% less electricity to produce the same light as a normal bulb, cutting greenhouse gas by over 50%. SOURCE: www.bbc.co.uk/bloom
 2) SOURCE: Roadmap 2050 Technical Analysis
 3) Buildings are responsible for 40% of energy consumption and 36% of EU CO₂ emissions. Energy performance of buildings is key to achieve the EU Climate & Energy objectives. SOURCE: www.ec.europa.eu/energy/efficiency

Conclusion

Important solutions to the energy efficiency challenge lie in market design, clear regulations, and stable public funding. Most importantly, governments need to adopt an effective efficiency policy framework in their approach to energy planning.

Large-scale ramp up of cost-effective energy efficiency requires a strategic and concerted effort by policymakers to recognize explicitly that energy efficiency represents a low-cost and zero carbon power system resource and is vital to any and all decarbonisation scenarios.

Glossary

CCS	Carbon Capture and Storage
MW	Megawatt
Bn	Billion

The Roadmap 2050 project is an initiative of the European Climate Foundation (ECF) and has been developed by a consortium of experts funded by the ECF. In addition, a wide range of companies, consultancy firms, research centres and NGOs have further supported the preparation of this report. The ECF is the sole author of the Roadmap 2050 report, is solely responsible for its content and will act as a guardian of the content.

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