



## **"Saving energy—just do it!"**

### **ECEEE Summer Study Session 2007**

### **An overview of noteworthy results**

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**Personal recollection of some eceee 2007 summer study presentations by  
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panel 2.**

Sharing knowledge and experience pertaining to energy-saving practices in different countries can teach us a great deal for our energy management policies. The European Council for an Energy Efficient Economy (ECEEE) is a group of more than 45 European agencies and organisations and ??? individuals focusing on energy efficiency issues. Founded in 1993 by a few European agencies, including ADEME, ECEEE aims to promote and disseminate knowledge and information on energy efficiency practices and energy management policies, with particular emphasis on the European Commission. As part of this work the organisation holds a Summer Study session every two years.

In 2007 the Summer Study session (June 4-9) brought together over 350 participants on the theme "Saving energy—just do it!" ( [http://www.eceee.org/summer\\_study](http://www.eceee.org/summer_study)). Over 220 papers (including some 50 posters) were presented in nine thematic panel sessions. At this event the participants had a chance to discuss European directives in preparation or recently implemented, and new economic tools such as white certificates, debating practices, successes and failures in rational energy use in different countries.

Some of the reflections and analyses discussed at the Summer Study session are presented briefly here. These debates seek to better understand the factors that determine how people use energy, whether in their professional activities or in personal decisions concerning their homes and travel.

#### **Energy efficiency investment by companies: a complex decision-making process for investments that are still often considered to be non-strategic**

Several contributions looked at the motivations of companies and businesses that invest in energy efficiency. It is now well known that investment decisions are only partially motivated by the economic profitability of projects. Understanding why companies invest, and also why they do not invest, in money-saving energy efficiency projects remains an open question.

C. Cooremans examines this topic, relying on recent management-science research on decision-making processes.<sup>1</sup> This analysis underscores the importance of strategic and cultural factors in the decision-making process. Often organisations do not see energy efficiency investments as strategic, which explains that in the end the investments are not made. Some of the energy managers interviewed state that they often have the feeling that energy efficiency is not considered to be a priority in their organisations, and that organisational barriers frequently block adoption of effective technologies. Indeed, 75% of the companies surveyed are characterised by energy management that is weak: without a dedicated energy-management person or team, there are no indicators to monitor consumption. Very different practices exist in a single activity sector, showing that good energy management stems more from a company culture than from commercial imperatives.

F. Coito and D. Allen investigated why industrial cement companies in California have not adopted certain profitable practices that would enable them to improve their energy efficiency (optimised use and maintenance of existing productive apparatus, process integration, or more effective equipment).<sup>2</sup> With this objective they conducted a series of interviews with the production managers of several cement companies. Some of their findings are particularly illuminating. In this industry, energy is the most important variable in production cost; it is of prime importance if the company wants to lower its production costs. The interviews show, however, that implementation of measures to reduce production costs is not seen as a key factor for the company's success. Despite the fact that energy is recognised as important, few human resources are dedicated to this component. Maintenance work is above all intended to ensure that the machinery continues to work so as to maximise production. The priority given to continuous production also explains why site managers have reservations about new equipment that they are not familiar with. With respect to investments to be made, the expected payback times are often particularly short, on the order of one year to eighteen months in the least efficient production units. Lastly, there is the feeling that small-scale energy efficiency projects are not worth the effort.

Together these elements demonstrate that efforts must be reinforced to publicise exemplary projects in industry, and to pursue reflection on positioning energy and environment-related jobs, in particular shared part-time positions for small and medium-sized businesses.

### **Energy efficiency and renewable energy investment by households: economic profitability is not the only lever of decision-making**

H. Herring *et al.* sought to identify why English consumers decided to adopt—or not to adopt—appliances or materials that would improve the energy efficiency of their homes (insulation, condensation boilers, heating control devices, low-energy lamps, renewable energy resources, i.e. solar thermal, photovoltaic, mini-wind energy or wood-fired boilers).<sup>3</sup> The researchers studied close to 400 responses submitted by individuals who had adopted or seriously considered adopting at least one of these technologies since mid-2002.

As for companies, the decision-making process for households is complex: it cannot be reduced to a simple economic calculation, and the lack of information only partially explains why consumers do not adopt new technologies.

Consumers who have taken up a low- or no-carbon technology (energy efficiency or renewable energy) state that they acted to make savings (in energy and monetary terms)

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<sup>1</sup> Catherine Cooremans, 2007, Strategic fit of energy efficiency (Strategic and cultural dimensions of energy-efficiency investments), ECEEE summer study proceedings, paper 1, 177.

<sup>2</sup> Fred Coito and Daisy Allen, 2007, Why industrial customers don't implement cost-effective energy efficiency opportunities: A closer look at California's cement industry, ECEEE summer study proceedings, paper 7, 303.

<sup>3</sup> Horace Herring, Sally Caird and Robin Roy, 2007, Can consumers save energy? Results from surveys of consumer adoption and use of low and zero carbon technologies, ECEEE summer study proceedings, paper 9, 146.

and/or because they are concerned about the environment. Investment costs that are too high are often given as the reason why a technology is ultimately not adopted. This said, other factors, which are in some cases more important, explain adoption or non-adoption; they vary from one technology to the next.

The useful life span of low-energy lamps, on the order of 8 years, is often cited to explain why this type of device is chosen. One-third of low-energy lamp users say they have become more concerned with saving energy after their purchase, while 10% say they leave the low-energy lamps on longer than in the past. This leads us to think that the rebound effect is fairly limited. People who rejected this type of lamp did so for aesthetic reasons, mentioning low luminosity, or because their lamp fixtures were not designed to accept this type of light bulb.

For insulation, the reason most often given is the desire for a warmer house. Having a house that is cooler in summer is also mentioned, but by only 10% of households that have installed insulation. Among households that ultimately did not insulate their homes, lack of space or a preference for environment-friendly materials that did not qualify for subsidies were often mentioned as obstacles. In France the standing observatory on energy improvements in buildings (OPEN) set up with support from ADEME provides further information. This information shows, for example, that home purchases are a prime opportunity for undertaking energy improvements because they are part of the dynamics of overall renovation work.

Condensing boilers and heating control devices are also chosen in order to have a warmer home. One factor often mentioned to explain non-adoption of condensing boilers is their reputation of poor reliability and short life span.

For renewable energy, showing oneself to be "green" by using solar or wind power plays a role in the decision to adopt these resources. The main reasons given to explain the decision not to adopt these technologies are uncertainty about equipment performance, the reliability of solar and wind power, problems in obtaining the necessary permits, and compatibility with existing plumbing and electrical systems.

Lastly, an analysis of the data show that most consumers who installed renewable energy systems had previously adopted at least two of the energy efficiency measures listed.

### **Energy performance certificates for housing: ensuring the intelligibility of the certificate and the quality of expertise**

L. Shorrock and S. Coward asked a panel of individuals in the United Kingdom about their reading and comprehension of the energy performance certificate they had received at the time of their recent home purchase.<sup>4</sup> The results were particularly positive. Most of the participants found that the A to G scale used to evaluate the energy and environmental impacts of the home was easy or very easy to read and understand. No respondents found them very hard to understand. Likewise, most of the respondents found that the suggested measures for improving the energy performance of the home were easy or very easy to understand. In most cases the certificate was considered to be an interesting document, easy to understand and useful.

D. Maes and G. Vekemans looked at the still embryonic sector of experts in home energy performance and audits in Belgium.<sup>5</sup> Their study refers to the period 2005-2006, before audits were mandatory for housing sales. The authors studied the fees charged by experts for an energy audit. They note significant disparities, from 250 to 2 000 euros for an audit at the beginning of the period. After a few months, prices stabilised at between 400 to 600 euros per audit, which is still a high cost. From the experts' point of view this is a reasonable price,

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<sup>4</sup> Lee Shorrock and Sara Coward, 2007, Energy performance certificates for homes—the consumer perspective, ECEEE summer study proceedings, paper 5, 004.

<sup>5</sup> Dries Maes and Guy Vekemans, 2007, New challenges for energy certification of dwellings—we keep on learning, ECEEE summer study proceedings, paper 5, 171.

because the audit usually takes one day. For home owners, few were ready to pay more than 200 euros. Most thought that 100 euros was an acceptable price. Government authorities want to identify simplified procedures to limit audits to a maximum of four hours, and hold prices down to 100-150 euros.

The study also reviewed the quality of audits conducted, via spot inspections of several homes that had already been audited in Flanders. The authors first describe how experts are trained and accredited. In spite of these procedures, several major problems came up during these inspections: in some cases the technical results did not at all accurately reflect the actual situation. However all the households involved were satisfied with the results. The appreciated the evaluation report and felt that the service they received was in keeping with the price they paid. Belgian authorities are also studying ways to ensure that the audits are of high quality.

### **Efficient household electrical appliances: a drop in retail prices correlated to a rise in production volume**

M. Ellis *et al.* analyse the evolution of energy performance and price trends for different electrical appliances (refrigerators, freezers, combined freezer-refrigerators, washing machines, clothes dryers and air conditioners) in the United States, Australia, Japan and Europe.<sup>6</sup> The authors observe over a period of about 15 years both improved energy efficiency and lower prices for the appliances studied, in all the countries surveyed, although to different degrees. In the United States, for example, average energy consumption of refrigerators and freezers fell by 60% between 1980 and 2001; at the same time the retail price of the appliances fell by 40% in real terms.

To understand the origin of the lower prices observed, the authors conducted interviews with a number of industrialists. Three determining factors were identified:

- higher production volume,
- lower costs for innovative products and components used in appliance design.

Greater demand for efficient appliances played a central role in lowering production costs, and therefore retail prices.

The authors also examine the effects induced by the introduction and progressive enforcement of minimum energy performance standards on average energy consumption and retail prices of appliances. Minimum standards were introduced for the first time in 1990 for refrigerators and freezers in the United States, and then reinforced in 1993 and 2001. The authors note a substantial drop, on the order of 20%, in average energy consumption for these appliances following the reinforcement of minimum standards in 1993 and 2001. The findings are less clear-cut for Japan and the United Kingdom. With regard to prices, the authors find that higher retail prices sometimes followed introduction of minimum performance standards, but that these increases were generally temporary, and the overall trend is one of falling prices.

Lastly, the authors find that efficient technologies became available at prices that were generally lower than those anticipated by prospective engineering studies, which led to an over-estimation of the cost of energy efficiency policies. They therefore recommend that this phenomenon be taken into account in future price projections. These findings are confirmed by the conclusions of a recent study of energy policies worldwide conducted by the French Environment and Energy Management Agency for the World Energy Council.

### **The greenhouse gas emissions of personal transport: the impact of activity and income levels**

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<sup>6</sup> Mark Ellis, Nigle Jollands, Lloyd Harrington and Alan Meier, 2007, Do energy efficient appliances cost more?, ECEEE summer study proceedings, paper 6, 025.

C. Brand has developed a database compiling all land and air travel over one year by a sample of residents in Oxfordshire (UK), and their characteristics (socio-economic profile, geographical location, etc.).<sup>7</sup> The greenhouse gas emissions (CO<sub>2</sub> and other gases) of the people in the sample (456 randomly selected individuals) were then evaluated.

Individual emissions linked to air travel (70.2%) dominate total emissions, while emissions due to public transport represent a low fraction (about 3%) of overall emissions.

The distribution of emissions across the population sample is highly unequal: the top 10% of emitters are responsible for 43% of total emissions, whereas the bottom 10% of emitters account for only 0.1% of emissions! The top 10% of emitters are generally 30 to 50 years old, work full-time and earn over 30 000 GB pounds per year. They travel by air five times more than the sample average, and drive 5.582 km per day, 2.4 more kilometres daily than the national average. The 10% of the sample that emit the least are generally women, children or elderly people (over 75 years old), not employed and non-drivers with low income. Lastly, residents of urban areas are responsible for more emissions than those living in rural areas, due to a higher propensity to air travel.

This study shows how significant GHG emissions from air travel can be for some individuals. Nevertheless, this observation must not mask the crucial problem raised by land-based transport emissions; furthermore, people who travel by air constitute a small fraction of the total population in Britain, as in France. But this article clearly shows that this group must be urged to use other modes of travel... or travel less!

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<sup>7</sup> Christian Brand, 2007, Personal air and car travel—just don't do it!, ECEEE summer study proceedings, paper 9, 228.