External costs and their integration in energy costs

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NEWS
• A Workshop on this subject has been held in Brussels on 9 December 2005 with various scientists and DG representatives. See WWW.EXTERNE.INFO
• A new ExternE Methodology 2005 update
• A new ExternE Results 2005 update To be published soon

EXTERNAL COSTS
• Externalities are changes of welfare generated by a given activity without being reflected in the market prices
• Energy externalities (like transport, industrial or agricultural externalities) are often negative and considered as a cost which is external because it is not paid by those who have generated it
• A clear example of externality is the air pollution which increases hospital admissions for respiratory illness (pain and suffering, costs of healthcare, lost productivity)

EXTERNAL COSTS
• If “internalised”, external costs can help to move towards a more sustainable energy (or transport, industrial or agricultural) system
• If not internalised and taking into consideration public goods (like air or soil or water quality) there is a sort of distortion of the market favouring non sustainable technologies
• Alternative technology options can become competitive through the internalisation of external costs

EUROPEAN RESEARCH EFFORT
• Energy externalities: a terminology entered in the European “jargon” and applicable to various policies: environment, energy, transport, taxation and state aid.
• A new way of thinking: taking care of social and environmental damages (“polluter pays” principle)
• Major advances in both research on energy externalities quantification and on policy implementation these last 15 years

http://www.inforse.org/europe/seminar06_BXL.htm
EUROPEAN RESEARCH EFFORT

- Influence of SD and of public/social actions on the internalisation of energy externalities
- From the beginning of the 90's: close to 15 M€ dedicated to research on energy externalities
- Scientific support to European policies
- EU reference at the world-level
- Multidisciplinary research consortium
- Genuine European methodology and approach

EUROPEAN RESEARCH EFFORT

- Verband der Elektrizitätswerke Österreichs (AT)
- IEK, Universität Stuttgart (DE)
- Risoe National Laboratory (DK)
- Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas – CIEMAT (ES)
- National Technical University of Athens - NTUA (EL)
- École des Mines de Paris - ADEME (FR)
- EKONO Energy Ltd. (FIN)
- Technical Research Centre of Finland – VTT (FIN)
- Fondazione Eni Enrico Mattei (IT)
- Instituto di Economia delle Fonti di Energia – IEFE (IT)
- Energy Conversion Centre, University College Dublin (IRL)
- Vrije Universiteit Amsterdam – IVM (NL)
- ENCO Environmental Consultants (NO)
- Centro de Estudos em Energia da Energia, dos Transportes e do Ambiente (PT)
- Stockholm Environmental Institute (SE)
- AEA Technology plc (UK)

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EU POLICIES ENERGY

- Green paper: Towards a European strategy for the security of energy supply - COM(2000)769
  "Fiscal instrument (...) should lead to the internalisation of damage caused to the environment"

  "The Community needs a real Community-wide debate on the different energy sources, including costs and contributions to climate change"

- Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market - OJ L 283
  "Need to internalise external costs of electricity generation"

EU POLICIES TRANSPORT

  "Towards modal rebalance and greater internalisation of external costs"

  "Charging for infrastructure use (...) is intended to provide positive economic incentives for transport operations through a structure which more effectively integrates external costs and infrastructure costs in transport prices"

EU POLICIES STATE AID

- Community guidelines on state aid for environmental protection - OJ C 37 (2001)
  "The principle of prices to reflect cost states that the prices of goods or services should incorporate the external costs"

  "Member States may grant operating aid to new plants that will be calculated on the basis of the external costs avoided (...) The amount of the aid thus granted to the renewable energy producer must not exceed 5 eurocents/kWh"

EXTERNAL COSTS RESULTS (comparison among technologies)

Air pollution external costs of electricity systems (based on average EU power plant and rest of energy chain)

DAMAGES OF AIR POLLUTANTS IN THE EU (€/tonne) - CAFE

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>NOx</th>
<th>SO₂</th>
<th>PM₂.₅</th>
<th>VOC</th>
<th>NH₃</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,200 - 11,000</td>
<td>5,400 - 16,000</td>
<td>25,000 - 72,000</td>
<td>920 - 2,700</td>
<td>10,000 - 30,000</td>
</tr>
</tbody>
</table>

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FP6 (2002-2006)
SUSTAINABLE ENERGY SYSTEMS

Medium and long term energy research actions
- Fuel cells, including their applications
- New technologies for energy carriers, particularly H₂
- New and advanced concepts in renewable energy technologies
- Capture and sequestration of CO₂
- Socio-economic tools and concepts for energy strategy
- Policy-orientated research

FP7 (2007-2013)
COOPERATION - ENERGY

- Hydrogen and fuel cells
- Energy savings and energy efficiency
- Renewable electricity generation
- CO₂ capture and storage technologies for zero emission power generation
- Renewable fuel production
- Clean coal technologies
- Renewables for heating and cooling
- Smart energy networks
- Knowledge for energy policy making

CURRENT EUROPEAN RESEARCH TOPICS

- To define a methodology for ecosystem damages
- Effects from multi-media (air/water/soil) impact pathways
- Externalities from major accidents (cf. oil tankers)
- To evaluate fuel cycles in all Europe
- To pursue a stakeholder dialogue
- To assess new and emerging new technologies
- To address energy security of supply issues
- To evaluate long-term internalisation strategies

QUESTIONS

- What should be included in the “external costs” definition (security of supply, depreciation of infrastructure publicly funded, acidification, nuclear proliferation…)?
- Are there sufficient bottom-up studies (to cope with time and site variability) for each technology?
- Generalisation and transferability?
- How to pass the costs on to the users in a socially and politically acceptable way?
- Taxation or subsidy?
- How to use the money recovered from the internalisation of external costs?

QUESTIONS

- Political context and externalities (cf. nuclear and renewables)?
- National, EU or global « internalisation » (cf. competitiveness)?
- External costs vs. Subsidies (energy or social ones)?
- Communicate the uncertainties?
- Preference of the population with respect to different types of risks?
- Potential of technological progress?

CONCLUSIONS

- Are we ready to accept a reduction of the average life expectancy of the European population of around 5 months due to air pollution?
- Health impacts of air pollution from electricity and transport sectors are around 80 billions €, i.e. approximately equivalent to the EU budget (100 billions €)
- Internalising external cost of coal electricity would significantly increase its cost

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CONCLUSIONS

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- Alternative technology options can become competitive through the internalisation of external costs

INFORMATION AND SOURCES

- http://www.externe.info/
- Contacts: European Commission and EU RTD projects coordinators (IER, ARMINES, ISIS, University of Bath)