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Press release¹

New research reveals the real costs of electricity in Europe

Key words: energy costs, environment, health, socio-economy

A major EU funded research study undertaken over the past 10 years has proven that the cost of producing electricity from coal or oil would double and the cost of electricity production from gas would increase by 30% if external costs such as damage to the environment and to health were taken into account. It is estimated that these costs amount up to 1-2 % of the EU's Gross Domestic Product (GDP), not including the cost of global warming. They have to be covered by society at large, since they are not included in the bills which electricity consumers pay. The EXTERNE project, which was undertaken by researchers from all EU Member States and the United States of America, was designed to quantify these socio-environmental costs of electricity production. It is the first research project ever to put plausible financial figures against damages resulting from different forms of electricity production (fossil, nuclear and renewable) for the entire EU.

Commenting on these results Research Commissioner Philippe Busquin urged energy producers to come up with environmentally friendly options that will help to reduce external costs. Currently, the generation of electricity costs about EUR 0.04 (4 cents) per kWh. Figures confirm that external costs are higher in urban areas than in rural ones. Electricity is just one example since the EXTERNE methodology could be applied to other energy-related sectors like transport. In fact, preliminary work has shown that aggregated costs of road transport, the dominating source of damage, add another 1-2% of GDP to the bill.

The report also says that nuclear power involves relatively low external costs due to its low influence on global warming and its low probability of accidents in the EU power plants. Wind and hydro energy present the lowest external costs. The methodology used to calculate the external cost is called impact pathway methodology. This methodology sets out by measuring emissions (including applying uniform measuring methods to allow comparison), then the dispersion of pollutants in the environment and the subsequent increase in ambient concentrations is monitored. After that, impact on issues such as crop yield or health is evaluated. The methodology finishes with an assessment of the resulting cost.

¹ For more information on the European Commission's Research DG, including previous press releases, visit our Web site at <http://europa.eu.int/comm/research/>

How to factor in external cost

The report proposes two ways of taking account of the cost for environmental and health damage. One possibility would be by **taxing** the damaging fuels and technologies resulting in a substantial increase of energy prices. For example, if the external cost of producing electricity from coal were to be factored into electricity bills, between 2 and 8 cents per kWh would have to be added to the current price (this is true for the majority of the EU Member States). Another solution would be to encourage or subsidise **cleaner technologies** that allow avoiding socio-environmental costs.

Since taxation on an EU level is very difficult to achieve the Commission has opted to encourage the second solution. In February 2001, it published the Community guidelines on **state aid for environmental protection**, which explicitly foresee that "Member States may grant operating aid to new plants producing renewable energy that will be calculated on the basis of the external costs avoided." At any rate, the amount of the aid thus granted to the renewable energy producer must not exceed 5 cents per kWh.

Future actions

Building on the results of the EXTERNE project, the Commission has recently launched a follow-up research project called NEWEXT (New elements for the assessment of external costs from energy technologies) which will study additional elements for the evaluation of external costs, such as:

- monetary valuation of mortality risk;
- evaluation of acidification and eutrophication (enrichment of the environment in nutrients resulting in undesirable effects such as alga growth) on the ecosystem and biodiversity;
- effects arising from the fact that several parts of the environment (air/water/soil) may be damaged;
- effects of major accidents in non-nuclear fuel chains (such as oil spills).

Background on the EXTERNE study

The study is in fact the result of 20 research projects conducted in the past 10 years. Researchers from all EU Members States have taken part but the main organisations were the University of Stuttgart (Germany) the Association for Research and Development of Industrial Methods and Processes (ARMINES, Sophia Antipolis, France) the Foundation Eni - Enrico Mattei (FEEM, Venice, Italy), the Flemish Institut for Technological Research (VITO, Mol, Belgium), the Risoe National Laboratory (Roskilde, Denmark), AEA Technology (Didcot, United Kingdom) and the Centre for Energy, Environment and Technological Research (CIEMAT, Madrid, Spain). The Commission contributed EUR 10 million.

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Figures

External costs (for electricity production in the EU (in cent/kWh**, PV = photovoltaics))

Country	Coal & lignite	Peat	Oil	Gas	Nuclear	Biomass	Hydro	PV	Wind
AUT				1-3		2-3	0.1		
BE	4-15			1-2	0.5				
DE	3-6		5-8	1-2	0.2	3		0.6	0.05
DK	4-7			2-3		1			0.1
ES	5-8			1-2		3-5*			0.2
FI	2-4	2-5				1			
FR	7-10		8-11	2-4	0.3	1	1		
GR	5-8		3-5	1		0-0.8	1		0.25
IE	6-8	3-4							
IT			3-6	2-3			0.3		
NL	3-4			1-2	0.7	0.5			
NO				1-2		0.2	0.2		0-0.25
PT	4-7			1-2		1-2	0.03		
SE	2-4					0.3	0-0.7		
UK	4-7		3-5	1-2	0.25	1			0.15

* : biomass co-fired with lignites
 ** : sub-total of quantifiable externalities
 (such as global warming, public health, occupational health, material damage)