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Electricity : The Price of the Environment

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France's electrical utilities encompass three levels:

1. electricity generation: support for all types of power (co-generation, renewable energy) and generation in zones with no interconnection (Corsica, overseas departments, Mayotte);
2. electricity supply: revenue losses and excess costs resulting from the implementation of the "commodities" pricing system and the "instability" scheme;
3. electricity distribution: the Electricity Equalisation Fund and Electrification Cost Amortisation Fund institute damages and grants between distributors.

The aforementioned costs amounted to EUR 1461.5 million in 2003, 56% of which was devoted to funding for cogeneration, 27% for zones with no interconnection, 8% for small hydraulic power funding, 8% for other power sources (wind, sun, etc.) and 1% for distributors.

France is not alone in this respect, with all of Europe's countries having chosen to provide financial support to renewable energy sources, so as to achieve the objectives of the "Renewable Energy" Directive. The following chart offers a comparative view of the various schemes implemented, based on IFIEC (*International Federation of Industrial Energy Consumers*) data.

It shows that the cost of utilities is on the way toward marked increases in the years to come. France's Energy Regulation Commission (CRE) has put together a number of growth scenarios to predict total increase in utilities costs, using a variety of macro-economic assumptions. The average scenario yields unit costs ranging from EUR 4.3/Mwh to EUR 6.2/Mwh in 2006, for an absolute value of EUR 1.7 to EUR 2.5 billion (highest assumption).

The Cost and Effectiveness of Europe's Electrical Utilities

The following section aims to compare the effectiveness of the financing systems set up to support renewable energies. It intentionally leaves out any analysis of social schemes[1] to focus exclusively on the most costly component of public utilities: financial support for renewable energies. To determine the cost-effectiveness of the policies set up, the cost of the measures is compared with the carbon dioxide "savings" derived from the development of renewable energy sources. In other words, it is a matter of calculating the cost required to "prevent" a given quantity of CO_2[2].

How should the results be interpreted? The first salient fact is the relative effectiveness of Spain's policy, despite its high costs, in that the total emissions prevented are more than satisfactory, thanks in particular to a large amount of wind-energy facilities. France, meanwhile, has a less efficient system, for two main reasons: particularly attractive buy-back costs and major support for cogeneration, which prevents far fewer emissions than wind, sun or small hydraulic works. Germany is between the two: its wind-energy facilities, for instance, enabled it to prevent over 10 million tonnes of CO_2,, at a relatively high public net cost of EUR 2 billion. However, this figure needs to be looked against the background of German coal

[1] This parameter was excluded for two reasons: the differing social prices from country to country and the fact that the said costs are, in many countries, still under the responsibility of monopoly incumbent players and thus result from cross-subsidies, intrinsically opaque and difficult to quantify.

[2] The rationale is that a policy to support renewable energies will make it possible replace a standard generation method (with a set amount of CO_2 output) with a renewable generation method yielding lower CO_2 quantities.

subsidies (EUR 4 billion), covered by the State budget. What separates Spain from Germany is the level of wind-energy usage (1500h/yr in Germany and 2500h/yr in Spain).

If care is not taken, utilities will require public expenditure in excess of the gains derived from the open market. This situation is not a problem in itself, but does require public debate about the nation's ability to take on costs that are "bearable" for its economy. Attention will thus have to be given to ensuring that certain – ill-informed – consumers do not assume that liberalisation means higher prices. This will require, in particular, quantifying the cost of each utilities component and, subsequently, studying the impact thereof on high-intensity[3].

The Impact of Utilities Costs on Industrial Competitiveness

In the face of growing utilities costs, the French government chose to institute a CSPE [contribution to electrical utilities] ceiling for all high-intensity consumers. Any kilowatt-hours consumed per site above 150 GWh are now exempt from the tax. The CRE believes that the new ceiling, EUR 500 000, will lead to an increase of EUR 0.55/MWh in CSPE for all consumers. The chart below shows the percentage of total electricity cost (excluding tax) in 2003 accounted for by the CSPE, by type of consumer.

Even though the ceiling mechanism provides a vital benefit for industrial consumers, it leaves "small" industrial consumers hanging.

In Germany, a recent IFIEC study (July 2003) called government's attention to the risks that utilities costs place on competition. When compared, the cost of producing one tonne of aluminium (sector partly open to international competition) in Germany and across the world, on average, shows excess costs of 4.8% in the former, part of which is due to markedly higher electricity prices.

Faced with such pressure on their industries, many States have set up exemption schemes. In The Netherlands, the excess costs ascribed to industrial consumers are kept to a maximum of EUR 62 096 euros per year. In Sweden, the quota for green power supply is zero for industrial clients. In Finland, the cost of renewable energy support policies is covered by the State budget.

The German federal government approved, on 9 April 2003, measures designed to safeguard the competitiveness of industrial consumers by modifying its April 2000 EEG Law. In order to qualify for the exemption, companies must meet the following conditions: have their competitiveness threatened by the increase in electricity costs, consume over 100 GWh and have at least 20% added value in their electricity supply costs. If all of the aforementioned conditions are met, the company may benefit from a reduced-rate tax of EUR 0.5/MWh, rather than EUR 4/MWh, applying to other consumers. Nonetheless, the measure is relevant to only 10 to 15 companies.

In the United Kingdom, companies covered by the Integrated Pollution Prevention and Control (IPPC) Directive may sign a Climate Change Levy agreement with the government, fostering energy efficiency and thus becoming eligible for an 80% reduction in tax rate. Moreover, total income from the tax is theoretically paid back to the companies, in two ways:

- through reduced employer payroll taxes in 2001-2002 (0.3% reduction in employer contribution to National Insurance scheme);
- through government grants in favour of energy-efficiency measures: £50M (EUR 82 million) are expected to be devoted to this each year. There also exists an investment aid programme for the first year of certain energy savings projects, for a total of around £70 M (EUR 114 million) in 2001-2002.

[3] High-intensity users (« *électro-intensifs* », in French) are consumers, usually industrial, whose power consumption accounts for a significant share of its production costs (10 to 20%).

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A Supplementary Solution: The Emissions Permit Market

As we have already seen, a substantial share of the excess costs from utilities is covered by the massive funding set aside for production support policies. Consequently, debate needs to ensue as to whether more effective and less costly economic tools might be implemented[4].

The purchase price definition system does not call for planning or supervision of the generation capacity that will ultimately be produced, nor later, of the costs to the public government and the consequences on the market. As the CRE re-stated recently, "if the price set is too low, the production channel in question will not develop; if it is too high, it will develop above and beyond the targeted objectives, creating excess costs for the local authorities".

Other mechanisms to finance new energies are also possible: the calls for tenders or green certificate markets, currently being set up in several European countries, are two such examples. For any given energy policy, the use of a system based on calls for tenders offers the advantage of keeping control over production capacity volume delivered and the opportunity to influence the geographic coverage of the various projects. A green certificates market[5] could make it possible for each operator (generator or consumer) to achieve a minimum renewable electricity quota, at a lower cost.

Whatever the case, the price for the end user is not expected to drop significantly. It is believed that the CO_2 issue is will lead to an increase in prices, which the market liberalisation will offset only partially.

The CO_2 issue will make it even more difficult to make the connection between liberalisation and price decreases.

The fight against climate change is one of the European Union's leading commitments. Moreover, pursuant to the Kyoto Protocol, it has undertaken to reduce its greenhouse gas emissions by 8%. In order to do this, the protocol calls, in particular, for a market-based flexibility mechanism, through emissions rights trading. This is expected to help companies set up investment strategies to reduce their emissions, without any negative impact on their economic growth.

The 13 October 2003 European Directive, which established the greenhouse gas emissions allowance trading system within the Community states, in particular, that each Member State must appoint one or more national authorities, with power to manage the permits market. The market players here obviously include electricity generators (more specifically facilities with combustion power greater than 20 MW), but also encompass refineries, the steel industry, glass production, cement production and the paper industry. 95% free of charge initially, the allowance rights will gradually be shifted to a by-payment system. CO_2 emissions exceeding the allowance levels will be subject to taxes of EUR 40 per CO_2 equivalent tonne (2005-2007), then EUR 100 (2007-2012). When they are not used, the allowances are negotiable.

Even though the allowance trading market is an economically efficient system, the cost of CO_2 efficiency is rather high: the shift from a coal-based electricity generation system to one based on natural gas carries substantial technological and training-related costs.

For example, mutually-agreed trading currently values each tonne of CO_2 at EUR 12, compared to EUR 6, in early 2003. In comparison, the same product costs EUR 1 on the United States Chicago Climate Exchange. This difference is probably due to the lower constraints that prevail in the United States.

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[4] For more specific infomration, readers may refer to the International Benchmarking memo put out by Christian Egenhofer and Patrick ten Brink in August 2003 on *Environmental Policy Instruments*.

[5] A green certificate is proof that the electricity put into a network by a producer indeed comes from renewable sources.

Keeping those figures in mind, wholesale electricity prices should increase by around 15 to 30%, in the future. In addition, the consequences of the legislation will also need to be taken into account as regards the competitiveness of industries whose countries have ratified the Kyoto Mechanism (and the European system), compared to that of countries that have not done so.