

The European Electricity Market Enters the New Millennium

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EUROPEAN ENERGY AND THE EUROPEAN UNION

European countries emerged from World War II tattered and politically isolated. Much of the energy systems and infrastructure established during this post war period continued to dictate energy policy well into the early 1990s. The European Union, EU, (previously known as the European Community) was established after the war and included Belgium, France, Germany, Italy, Luxembourg, and the Netherlands. The EU has since expanded to 15 members with the admission of the United Kingdom, Ireland, and Denmark in 1973; Greece in 1981, Spain and Portugal in 1986, and Austria, Finland, and Sweden in 1995.

Currently, many of the remaining European and former Soviet block countries are in alliance and/or cooperation with the EU objectives and policies. Much recent progress has been seen on the cooperation and unification of European nations as is evident in the widespread acceptance and implementation of the common European currency, the Euro, in 1999.

From an energy perspective the EU is highly dependent on non-Union countries for much of its energy supplies. Statistically, almost half of its primary (all energy sources including fuel oils, coal, gasoline, natural gas, electricity, etc.) energy is imported. The ultimate consumption of energy is equally divided between the three primary sectors of industry,

transportation, and household commercial sectors.

Western Europe is projected to see a higher than average 2-percent annual growth (above projections from most industrialized nations including even the U.S. and Japan) in electricity consumption from 2000 to 2020 mainly due to the current measures aimed at unifying the region both financially and economically. While most of this increase is expected to be met by new gas-fired generation, the largest share of the EU's current energy requirement is met by oil and solid fuels (coal and lignite), followed by nuclear energy, natural gas, and finally renewable sources (hydroelectric, wind, biomass, etc.).

For more than two decades, Western Europe has been reducing its dependence on coal and oil as electricity generation fuels. In 1970, coal and oil-fired generation supplied over 60% of the total, and by 2020, coal and oil-fired generation are expected to reduce to less than 30% of the total. It is important to recognize that generation fuel sources vary considerably by country as indicated in Table A.

Table A. Gross Electric Generation Capacity, gW, Jan. 1, 1999

Region/ Country	Thermal	Hydro	Nuclear	Geothermal/ Other	Total
France	28	23	62	0	113
Germany	82	4	23	2	110
Sweden	7	16	10	0	33
United Kingdom	56	1	13	0	70
Total W. Europe	334	141	125	4	604
United States	564	98	101	14	778

(Ref - US DOE - EIA -3/99)

One of the major activities of the EU concerns the energy policy of its member nations. In summary, the energy policy of the EU is to create a single, integrated European energy market with three primary objectives:

1. The EU aims to increase competition in European energy markets, through such measures as the creation of an open and competitive European electricity market.

2. The EU's energy policy is to enhance energy supply security by attempting to diversify its supply sources, both in terms of energy as well as in terms of its external supply sources.
3. Finally, the EU is responsible for environmental protection, including adoption of policies to enhance energy efficiency in all areas, switching from relatively "dirty" fuel sources (especially coal) to "cleaner" ones, and reducing greenhouse gas emissions.

LIBERALIZATION OF THE EUROPEAN ELECTRICITY MARKET

Since the mid 1980s many European countries had individually implemented a process to open their electricity markets to a "free market," or liberalized status. Many countries had made considerable progress by the early 1990s in initializing this process including the United Kingdom, Germany and the Nordic countries. However, the impact of neighboring utility operations presented considerable obstacles and there was a definite need for the intervention of an organized, multi-country approach to this issue.

Probably the single most important action to date affecting the opening of the European electricity market was the EU sponsored Directive 96/92/EC concerning common rules of the internal market in electricity. This Directive was adopted by the Council of Ministers on December 19, 1996 and subsequently entered into force two months later on February 19, 1997. The Directive establishes common rules for the generation, transmission and distribution of electricity.

From February 19, 1999, most big electricity consumers across the European Union have the right to choose a power supplier other than their local monopoly. The liberalization that had been sweeping through Europe over the past few years was formalized in this EU law. Eventually, the choice could be extended to every consumer in all of Europe.

Under the EU Directive, member States were to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 1999. However, Belgium and Ireland were given a reprieve of an additional one-year and Greece an additional two years to adopt the Directive. Although obligated under the directive, as of late 1999 France and Italy had not passed the enabling legislation necessary for the initial limited opening required in February 1999. In early 2000,

France and Italy had enacted supportive legislation, but exact details as to the extent of the legislation and its direct compliance with the EU Directive are unclear and appear to provide for only a “minimum level” of participation.

The Directive provides for a gradual market opening in three steps whereby each Member State is compelled to liberalize their market to at least the minimum opening requirement. The Member States are allowed to go for a larger opening than the Directive’s required minimum, including a complete liberalization, if desired. The minimum market (calculated as the share of the total consumption, consumed by final consumers) opening requirements as specified under the Directive’s 3-step plan include:

Step 1: On February 19, 1999, consumers with an annual consumption exceeding 40 GWh (roughly a 5 to 7 mW site) were allowed to choose their electricity supplier. This implies that about 25% of each national market was opened for competition in Step 1.

Step 2: On February 19, 2000, the threshold was reduced to a level of 20 GWh. This increased the minimum market by approximately another 26%.

Step 3: On February 19, 2003, the threshold will be further reduced to 9 GWh, which equals a market opening of approximately an additional 33%.

Member States themselves are allowed to define the eligible customers to participate in each phase of the market openings. However, very large final consumers of over 100 GWh and distributors responsible for the bulk of electricity sales must be included in the definition of eligible customers. In 2006, signatory countries will be required to open up at least one-third of their electricity markets to new suppliers.

Western Europe has already seen some moves toward the introduction of consumer choice in the retail electricity market. The Nordic nations implemented fully competitive markets at the wholesale level in 1996, and today at the retail level, households in Finland, Norway, and Sweden are allowed to choose their electricity suppliers.

The recently privatized electricity industry in the United Kingdom allows for full competition. Since the summer of 1999, virtually all house-

holds in England and Wales were allowed to have the option of choosing a preferred electricity supplier. A recent article describes the UK consumer's approach to electricity purchase as being similar for their "grocery shopping at the local supermarkets."

The open market in electricity will ultimately lead to convergence between the high price regimes of Austria, Germany and Italy and the low prices of Denmark, Finland and France. The main beneficiaries will be the consumers, who should see prices tumble. In those countries already liberalized at the retail level, prices have come down considerably and continue to show indications of further reductions.

For example, a recent price reduction in the U.K. resulting from the reduction in transmission, distribution, and supply price controls (a process being implemented over a 5 year period for transmission and distribution and 2 years for supply) for consumers taking power from one of the former monopoly electric suppliers, will result in an approximate 6% reduction in costs beginning in April 2000. Current estimates indicate that U.K. prices to industrial customers have fallen over 30% in real terms since the 1990 "market opening," with similar reductions in residential prices.

By making prices transparent, a single market for electricity should considerably drive down costs and boost efficiency. Competition in generation will spur innovation and investment in cleaner, more efficient power plants. A major European industry group, the Electricity Association, indicates that a fully competitive single market across the EU is achievable by 2005.

"GROWING PAINS" OF THE FREE MARKET

While Sweden and Finland offered full competition at the end of 1999 and are seen as having the most open markets in Europe, the rest of Europe seems to have a slightly less cooperative outlook. France, which operates close to a "single utility" country, has been least prepared to participate and will likely stick to the minimum requirements. Legislation to dismantle the monopoly of the state-owned utility *Electricité de France*, EdF, the national supplier and Europe's biggest electricity firm, is slow. The government feels that EdF is highly successful as it is and consumers enjoy some of the lowest prices in Europe (see Table B) due to the abundant power supplies of relatively inexpensive nuclear and

hydro-based power production. The French declared that EdF would likely retain control of the electric transmission grid.

Laws alone do not guarantee genuine liberalization. Some countries have refused to wrench transmission grids from the control of generators. However, the Directive does require enforced separation of commonly owned transmission and supply operations, with separate management, using separate accounts to ensure transparency and fairness of treatment.

Germany is allowing its many municipally controlled distributors to adopt a "single buyer status," making it difficult for competitors to break into local markets. In Italy, individual companies have been preparing for liberalization but all the required supportive government legislation may not be in place. Belgium's Electrabel, which controls nearly 90% of the country's market, will defend its strong position after Liberalization, as will EdF and most large monopoly operations.

Table B. Selected Energy Prices 1997

Country	Electricity for Industry \$/kWh - US	Electricity for Households \$/kWh - US
France	0.0487	0.1093
Germany	0.0860	0.1803
Sweden	0.0342	0.1026
United Kingdom	0.0691	0.1223
United States	0.0407	0.0831

(Ref DOE - IEA)

Although the definition of competitive access is still being debated, the anticipated onset of competition has led to some transnational acquisitions by European electricity companies eager to engage in cross-border trade. This too has brought its share of problems and inequities. A prominent case in point concerned the British, German, and Dutch ministers who complained in 1999 to the EU that EdF has been competing in their markets while the French market remains closed to their companies. Electricity markets in the United Kingdom (UK) and Germany are fully privatized, and complaints from those countries have prompted the EU's antitrust body to look into the issue.

In late 1999 formal legal proceedings were initiated against France by other EU members. The UK was especially concerned in the wake of EdF's 1998 purchase of the British regional power distribution company London Electricity and the 1999 purchase of the South Western Electricity supply business. The UK has objected to the sales, referencing EdF's total control of an English Channel submersible interconnection, which is jointly owned by EdF and the UK's National Grid Company. Because the French market remained closed, the interconnection could only be used for EdF sales in the UK but not British sales in France.

The UK had persisted in its complaints for the eight months since the opening of the French market became mandatory, and in the fall of 1999 threatened to ban electricity imports from France. At the time, it was estimated that France controlled about 7% of the British power market. In early 2000, France finally implemented the initial phase of the EU directive although there was general disappointment that the government appears to require only the basic minimums to comply with the Directive.

Considerable new power plant construction activity has been announced throughout Europe in the past 3 years prompted by the uniform liberalization made possible by the EU Directive. By late 1999 it was estimated that well over 200 gW of new plant capacity was under active development throughout Europe. The EU market is anticipated to have a significant amount of new electric generation capacity installed over the next decade. Liberalization is rapidly growing in the wholesale markets in anticipation of the full opening of retail markets over the next few years.

Over the past year almost \$15 billion of internal and cross-border acquisitions (amounting to about 30 gW of capacity) have taken place and have resulted in drastic changes to the competitive environment of the UK, Spain, Germany and the Netherlands. Additional integration and consolidation is anticipated in the near term with a focus on lowering power generation costs and addressing business infrastructure issues. This activity is speculated to result in 4 to 6 regional electricity markets operating independently from national and political boundaries.

Between its high anticipated growth in electrical consumption and the impact of the liberalized market operations, Europe will be a "hot bed" for new electrical generation construction and expansion of grid and infrastructure systems for many years to come.

ABOUT THE AUTHORS

Louis J. Braquet, P.E., CCP, LB Services, L.D.C., is an independent energy consultant whose work entails knowledge of the energy industry's customer/utility/regulatory environments. His background includes project experience with industrial and commercial power generation, electric technology application, and business development opportunities. He has been involved in over 60 large power systems projects, some exceeding 200 MW and \$150 million construction value.

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