

EUROPE

Picture of a Stalled Competitive Model

Several hurdles remain to further liberalization and full competition in the electricity sector.

Two major trends can be observed in Europe's electricity sector. First, the increasing importance of private-sector participation in a sector that was traditionally viewed as belonging to the state. In the 15 years since the UK started to privatize its electricity sector, there has been a complete about-face on this issue, with almost all European countries privatizing certain elements of their electricity sector, whether through the introduction of private independent power producers (IPPs), or the opening of state-owned companies to private investment, or the outright sale of energy assets. France, which has politically struggled with its ambition to open EdF's capital to private investors and has delayed this step in recent years due to fierce union opposition, is a notable exception. However, other countries, such as Greece and Italy, have succeeded in selling portions of their state-owned utilities (PPC and Enel, respectively) without undue public opposition. The Accession countries (which include the 10 countries that recently joined the EU as well as those that hope to do so in the next few years), with only a few exceptions, also are selling assets.

The second major trend in Europe is that of the massive amount of merger and acquisition (M&A) activity across the continent. In the mid to late 1990s, major national European utilities started to buy assets and companies in other Western European countries, with the objective of becoming powerful regionwide actors. The winners of this phase were the German actors RWE, E.On, French EdF, Italian Enel, Spanish Endesa and Iberdrola, Finnish Fortum, and Swedish Vattenfall. The second phase of M&A activity has been the attempt by these companies to position themselves in Eastern Europe in anticipation of EU Accession.

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At the same time, several hurdles remain to further liberalization and full competition in the European electricity sector. First, the wave of M&A activity has resulted in an oligopoly of large European utilities on the European continent, which ultimately could stymie the development of full competition. Second, the continued persistence of regional markets, such as the Scandinavian area, the Iberian Peninsula, and South-eastern Europe also prohibits the flourishing of full competition across the entire continent. Finally, concerns about the

level of actual competition in these markets continue, due to difficulties that new entrants have in accessing and keeping customers in a profitable manner. These are all issues that the EU will continue to address as it refines its policies and attempts to drive forward the integration process.

Europe’s Resource Mix: A Mixed Bag

In general, the structure and composition of the generation sector differs among most European countries, whereas the

market design for wholesale trading, transmission, and distribution is becoming more similar across the region. The following four sections delineate our cross-European comparison: generation, wholesale markets, transmission and distribution, and retail supply. Several characteristics define the structure and status of the generation segment in a given country or region: the amount of installed capacity related to current peak demand and expected peak demand in coming years; the composition of fuel drivers and ongoing economic availability of that fuel; the age and state of plant; and, given Europe's ambitious Kyoto targets, the availability of renewable resources and policies for encouraging their use.

Sufficient generation capacity is a crucial part of energy security. In general, a reserve margin of 15 percent of operational installed capacity above expected peak demand is required to ensure a reasonable level of reliability. By this measure, markets that are currently in an overcapacity situation in Europe include Austria, France, Germany, Lithuania, and Slovakia. All of these countries have reserve margins well above 15 percent and are significant exporters. Countries currently suffering a lack of sufficient capacity include Greece, Hungary, Ireland, Italy, and Spain.

Supply-demand balances change with time. Supply must be adequate to meet demand over time. Thus load forecasts are crucial in determining sufficient levels of generation capacity. There are pockets of very low growth in Europe where anticipated load growth through 2010 is not expected to exceed 1 percent per annum. Countries in this category include Denmark, England and Wales, Germany, and Sweden.

At the other end of the spectrum is a group of high load-growth countries, where growth rates are expected to be consistently 4 percent or higher per year through 2010. These countries include Bulgaria, the

Czech Republic, Greece, Italy, Lithuania, the Netherlands, Portugal, Slovenia, and Spain. These countries thus will have to not only replace the assets that need to be retired in the next 10 years, but will need to add significant new plant to meet increased load. Likewise, the supply context is likely to change as certain countries retire all of their nuclear capacity (Germany and Belgium), and Eastern Europe shuts down its more polluting plants and replaces the nuclear plants that the EU has stated are not safe.

Europe's fuel sources are diverse, with many energy rich countries—Germany, Poland, and Greece (coal), Scandinavia, Latvia, and Austria (hydro), the UK, the Netherlands, and Romania (natural gas), Estonia (oil shale), and Russia and Norway (gas and oil). The presence of natural resources can sometimes further complicate electricity reforms due to state ownership of natural resources, high levels of employment provided by natural resource industries, and union support for these industries. Hydroelectric resources also can complicate electricity policy. Hydro capacity usually decreases in the

FIGURE 2 **TIMELINE OF EU ELECTRICITY DIRECTIVE COMMITMENTS**

EU Directive	Implementation Year	Action
1996/92/EC	1999	All consumers over 40 GWh free to choose supplier
1996/92/EC	1999	Unbundling of vertically integrated utilities (at minimum separation of accounts)
1996/92/EC	1999	Third-party access to network guaranteed by designated, impartial TSO
1996/92/EC	2000	All consumers over 20 GWh free to choose supplier
1996/92/EC	2003	All consumers over 9 GWh free to choose supplier
2003/54/EC	2004	Supplier choice for all non-residential customers
2003/54/EC	2004	Separation of TSO into independent entity
2003/54/EC	2004	Establishment of national regulator
2003/54/EC	2007	Supplier choice for all customers
2003/54/EC	2007	Separation of DSO into independent entity.

Note: Implementation years apply only to original EU 15, although Accession countries are expected to have implemented all Directives by 2007.

FIGURE 3 **CLASSIFICATION OF EUROPEAN ELECTRICITY MODELS**

		Supply Arrangements	
		Single Buyer	Competitive
Market Structure	Fragmented	Bulgaria Hungary Italy N. Ireland Poland Portugal Ukraine	Austria, Belgium, Czech Republic, Denmark, England & Wales, Finland, France, Germany, Netherlands, Norway, Romania, Russia, Scotland, Slovakia, Spain, Sweden, Switzerland
	Vertically Integrated	Not present in Europe	Estonia, Greece, Ireland, Latvia, Lithuania, Slovenia

summer when rivers and lakes are somewhat drier. In addition, having a disproportionate percentage of hydroelectric generating capacity can leave the country exposed to price spikes during periods of poor hydrology conditions, which occurred in Scandinavia in the summer of 2003.

At the same time, other countries that have practically no natural energy resources, such as France, Belgium, and Lithuania became original proponents of nuclear power in the 1970s and 1980s. But nuclear power has become a divisive issue in Europe, with several countries politically opposed to its continued use, such as Germany, Belgium, and Italy, while other countries, such as France and Finland, are committed to its continued use as a reliable and environmentally safe energy source.

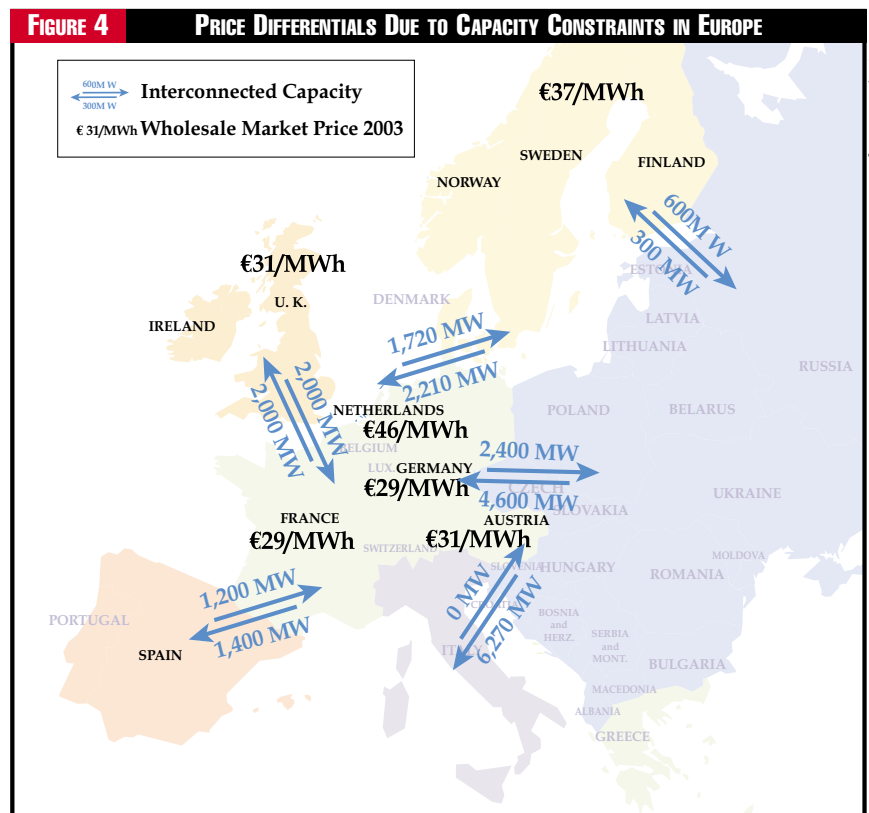
The nuclear question is particularly provocative in Eastern Europe, where some of the power plants built during the Soviet era are in dubious condition, yet few alternate supply sources exist. The EU is particularly concerned about the older Soviet reactors and has explicitly stated that Lithuania's Ignalina, Bulgaria's Kozloduy, and Slovakia's Bohunice V1 should be closed. In addition, the EU wants reactors in Bulgaria, the Czech Republic, Hungary, and Slovakia to be upgraded, and the reactors in Romania and Slovenia to be closely monitored. Yet, given that these countries need alternate sources of supply and technical assistance before the plants can be closed or upgraded, timely compliance with these nuclear safety regulations will be challenging.¹

The encouragement to use renewable energy sources—long a goal of the EU—was translated into law in 2001 through Directive 2001/77/EC, which targeted increased production of electricity from renewable energy (from 14 percent to 22 percent in 2010). The EU endorses three main types of support mechanisms for renewable energy sources (RES). The first is a fixed feed in tariff for all renewable energy and a guarantee that all electricity generated by RES will be dispatched. Such an approach is used in Austria, France, Switzerland, and Ukraine. The second approach requires suppliers or customers to buy a certain amount of RES generated electricity, which can be in the form of a "green certificate."² If the

required quota of renewable energy is not achieved, the supplier is fined. Italy, the Netherlands, and the UK use this approach. The third option is a direct subsidy from the government to cover a portion of either capital or operating costs. While the Accession countries are not as advanced in implementing RES policies (and are not subject to the same strict Kyoto Protocol targets as Western Europe), certain countries, such as the Czech Republic, Estonia, and Latvia, have started to implement active RES policies.

Wholesale Markets: Organized Exchanges Dominate

With wholesale market design under a deregulated framework, generators can sell their output into a wholesale market or to a specific customer, be that a power marketer (who then re-sells it to others), a retailer (who re-sells the output to end-users), or a direct customer (who then uses the electricity). Bilateral trading, also referred to as over-the-counter (OTC) trading, is the most common way for these sales to occur. In addition, many deregulated markets have established centralized exchanges to provide a transparent framework for energy sales and to create a benchmark price index for the region. While organized exchanges are usually more visible to the public, the volume traded on exchanges is normally a fraction of bilateral trading activity.

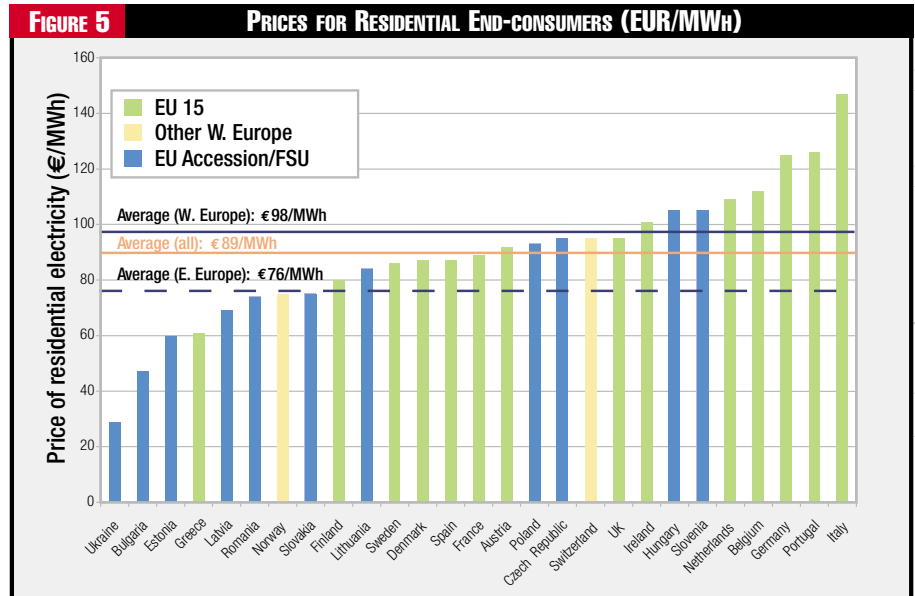


In Europe, OTC markets and organized exchanges are often used together to create a hybrid wholesale market. Western Europe has numerous organized exchanges. Nord Pool, the Nordic power exchange, is the oldest, the largest, and the most liquid exchange in the region, and it sets prices for all four Nordic countries (Denmark, Finland, Norway, and Sweden). In recent years, exchanges have developed in Germany (EEX), France (Powernext), Austria (EXAA), and the Netherlands (APX), leading to increased information about wholesale price indications in the region.

Most of these exchanges operate in a similar manner, with an auction system for price formation where the intersection of demand bids and supply bids for each hour sets the market clearing price for all winning bids. Some exchanges, such as Nordpool and Powernext, also offer clearing services to ensure the financial security of transactions. The exchanges have close ties to the grid operators to ensure physical delivery where needed. The products offered by the exchanges vary as the exchange matures. Thus, Nordpool has the largest variety of products and services, including standard day-ahead and futures contracts, as well as balancing products. EEX and Powernext both offer blocks of hours and futures contracts in addition to standard day-ahead hourly contracts.

The UK differs from its continental European neighbors in that it does not have an organized exchange and all trading activity is bilateral. In 2001, the UK regulator, Ofgem, replaced the UK Power Pool, which had existed for 10 years, with the New Electricity Trading Arrangements (NETA), a decentralized set of arrangements with a sophisticated structure for balancing generation, consumption, and imbalances. In addition, National Grid (NGC), the UK's transmission system owner and operator, manages an optional balancing mechanism (BM) to manage real-time imbalances and transmission constraints. Regardless of whether participants are active in the BM, there is a compulsory imbalance settlement process for all market participants.

In addition, there are markets that do not currently provide realistic pricing indications, such as OMEL in Spain and many of the nascent exchanges emerging in Accession countries, such



as Czech Republic, Poland, and Slovenia. Spain's OMEL is a mandatory pool for all plants that are more than 50 MW and are not contracted through bilateral contracts. However, OMEL contains an implicit price cap due to the mechanism for recovering stranded costs, which gives an unfair advantage to incumbent Spanish generators. Moreover, Spain continues to have regulated tariffs, which are very competitive with market rates, resulting in most eligible consumers purchasing at regulated tariffs instead of acquiring via the pool. Pool prices are therefore not representative of real competitive market dynamics in Spain.³ The exchanges in Eastern Europe are new institutions, are highly illiquid, and still reflect the lack of significant competition in the generation sector in most of these countries.

European Price Convergence: The Ins and Outs

Due to insufficient interconnection capacity in Europe, regional differences in wholesale power prices remain. However, prices in western continental Europe, which includes Austria, France, and Germany, are converging. The average baseload price in 2003 in the three countries ranged from €29.23/MWh to €30.63/MWh. The convergence in prices among these markets is due to the large amount of available interconnection capacity that allows arbitrage among the different exchanges, thereby leading to highly correlated prices.

Nordpool's prices, while providing clear indications for the four Scandinavian countries, are driven largely by hydrological conditions. Unfortunately, 2003 was a year of poor hydrological conditions, and the average price of almost €37/MWh made prices substantially more expensive than in the continental European region. Under normal conditions, prices in Scandinavia are lower than in continental Europe.

Likewise, prices in the Netherlands still are affected by relatively tighter supply-demand fundamentals and the country's constrained import ability, and thus differ substantially from its Nordic and continental neighbors. As would be expected, the Netherlands' average baseload price in 2003 was substantially higher than seen on the other exchanges at €46.47/MWh.

In addition, there are markets for products other than just energy. For example, there is a market for generation capacity in Belgium, France, and Ireland. These Virtual Power Plant Auctions (VPPs) were first mandated in France by the European Commission in exchange for the acceptance of Electricité de France's (EdF) acquisition of Energie Baden Württemberg (EnBW) in 2001. A purchaser of a VPP contract obtains a right, but not an obligation, to the output of virtual capacity, which entitles the contract holder to issue dispatch instructions and receive electricity output on the following day for delivery on the high-voltage grid. Though the capacity is not associated with any particular generation unit operated by EdF, it does have certain traits that mimic baseload or peaking generation characteristics. EdF is obliged to auction off 6,000 MW of capacity (6 percent of EdF's total installed capacity) for five years to any operator wishing to procure electricity produced in France. Likewise, in Belgium in 2003, Electrabel started to auction off 1,200 MW of capacity to open up its generation sector to more competition. In Ireland, ESB is auctioning off 400 MW of virtual capacity to open its generation sector.

Meanwhile, another market exists in Europe for interconnection capacity between countries. While some capacity is reserved on the basis of "priority lists," such as between France and Belgium, Germany, and Spain, there are also public auctions of capacity, such as on the interconnector between the UK and France. In the case of the latter, capacity is allocated based on the price bid. This approach also is used in the Netherlands, which has very congested import capacity and auctions its capacity to and from Germany and Belgium in annual, monthly, and daily auctions. Likewise, there are also auctions between Germany and Denmark's border, and between Germany and the Czech Republic's border. The price of interconnector capacity usually is determined as a differential between the average or expected market price in the two countries, and, as such, is higher in the direction of cheaper electricity to more expensively priced electricity and vice versa. As an illustration, in the 2003 auction for annual capacity rights between Germany and the Netherlands, 356 MW of capacity was auctioned between Tennet and the RWE network in Germany for an average price per megawatt of €59,130 to the Netherlands and €920 to Germany.⁴

Finally, there are markets for real-time balancing energy in the UK and Scandinavia. Germany and Austria are establish-

ing real-time balancing markets. Other ancillary services are usually procured on a bilateral basis, though increasingly accomplished through a competitive tender process.

European Transmission: Truly Independent?

Following the EU directives, almost all European countries have created fully independent grid operators that, even if owned by the incumbent utility, are managed independently, with sufficient "Chinese walls" in place to ensure full transparency and fair access. The only country that still has not accomplished this is Latvia.

Most countries in Europe have one transmission system operator (TSO) responsible for operating the entire nation's grid. However, there are a few exceptions, including Germany, Austria, and Denmark, where transmission operators are only responsible for certain regions and must coordinate with one another for cross-regional flows. The ownership of TSOs varies. In some cases, the state owns the TSO, such as in the Czech Republic and Norway. In other cases, the TSO is separated officially from the incumbent utility but continues to be owned by it, such as in France, Germany, and Austria. The TSO also can be owned by a separate private company, such as in the UK.

Most countries have several distribution system operators, depending on the size of the country and the original structure of the market. Many European countries had a heritage of small municipal distributors, resulting in hundreds of local distribution companies. With liberalization, many of these distributors are being acquired by the larger actors in the market, as is clearly evidenced in Germany, where E.ON and RWE directly and indirectly control 70 percent of the country's distribution networks through their myriad holdings in local Stadtwerke.

Other countries, such as Poland, are restructuring these small distributors into bigger companies by grouping together as many as 30 local distributors under one umbrella organization. Distributors are often ripe for privatization, especially in Eastern Europe, where privatizing distribution has been a way to improve cash collection and thereby improve the financial viability of the entire electricity sector. In other regions, such as in Austria, Germany, the Netherlands, Scandinavia, and Switzerland, significant municipal ownership is likely to continue in the distribution sector.

Most countries have adopted clearly published tariffs for transmission and distribution grid use. Germany, with its original approach of negotiated tariffs, was the major exception, but it has been obliged by the EU to develop a regulated tariff regime. Tariff-setting regimes vary widely in Europe, with some countries, such as France, using a standard cost-of-service regime, while others, such as Austria, Denmark, Finland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden,

FIGURE 6
INVESTMENT OPPORTUNITIES IN EUROPE

Country	Generation	Distribution	Other Activities	Comments
Austria	Low	Low	Medium	While Austria's market is open, its overcapacity and restriction on non-state ownership make investments less attractive. However, location between East and West means it is becoming an active trading hub.
Baltic Countries	Low	Low	Low	The size of each market on a standalone basis is small, and the sector is still largely controlled by the government, which under public pressure has taken a negative stance toward privatization.
Belgium	Low (Except VPP)	Medium	Low	The highly fragmented distribution sector presents attractive opportunities to take part in the sector consolidation. Electrabel still dominates the generation sector and is unlikely to cede control of its assets beyond VPPs.
Bulgaria	Low	High	Low	Sell-off of distributors to private companies is expected to be completed by the end of 2004. Activity on generation side limited by large amount of state-owned nuclear capacity.
Czech Republic	High	Medium	Medium	Further privatization of CEZ will drive generation investment while the distribution sector has been largely privatized. Development of the wholesale market presents opportunities for entry by traders and suppliers.
France	Medium	Low	Medium	VPPs and small renewables provide generation-related investment opportunities. EdF likely to continue controlling most distribution activities.
Germany	Medium	Medium	Medium	Need to replace nuclear units and meet Kyoto targets presents investment opportunities in generation. Continued existence of local utilities opens possibility for consolidation, but RWE and E.On market power extensive.
Greece	High	Low	Low	Need for much additional generation capacity over next 10 years will drive investment; PPC continues to own and control all distribution activities.
Hungary	Medium	Medium	Medium	Private-sector participation along the entire value chain, excluding transmission, is substantial and at present the opportunities to enter the market are limited.
Ireland	High	Low	Low	High projected economic growth coupled with generation shortfall present attractive opportunities in generation.
Italy	High	Medium	Medium	Investments in generation will be driven by the tight reserve margin, environmental standards, introduction of a wholesale power market, and a reduction of Enel's market power.
Netherlands	Medium	Low	Medium	Despite recent consolidation, opportunities in the generation segment are still present. The state has, however, taken a hostile attitude toward privatization of distribution.
Poland	High	High	Medium	Opportunities are attractive for domestic and foreign investors in generation and distribution, given past experience and projected demand growth.
Portugal	Medium	Low	Low	EdP dominates the power sector, however its privatization and the introduction of pan-Iberian electricity market could result in generation investment opportunities.
Romania	High	High	Low	Romania is seeking private investors for its generators and distributors, but a still uncertain regulatory framework and significant political involvement in regulation make investments challenging.
Russia	Low	Low	Low	Although the Russian power market is a huge potential market for power-sector investment, the slow pace of power-sector reforms has stymied private-sector investment.
Scandinavia	Medium	Medium	High	Generation and distribution are highly fragmented and the largest players account for only 1/3 of the market. The opportunities for consolidation highly likely though non-Nordic actors may be limited.
Slovak Republic	High	Low	Medium	The privatization of the Slovak generator, expected demand growth, and the projected phase-out of nuclear units represent key investment opportunities.
Slovenia	Low	Low	High	The power sector is controlled by the government and is expected to remain so, yet, the strategic positioning of the country in the Southeast European market potentially makes it an important trading hub.
Spain	Medium	Low	Medium	While numerous generation investments are required to meet demand growth and Kyoto targets, market power of incumbents is challenging to new entrants.
Switzerland	Low	Low	Low	Although the market is highly fragmented and is expected to consolidate, opportunities for foreign investors are not widespread given the country's resistance to sector liberalization.
Ukraine	Low	Low	Low	Political and economic instability coupled with chronic non-payment make the Ukrainian sector an unlikely area of investor interest in the near future, despite government efforts to improve regulatory framework.
United Kingdom	Medium	Medium	High	The UK is a fully privatized and deregulated market that has sophisticated and well developed market structures in place.

and the UK use a more ambitious performance-based rate-making (PBR) approach that requires the grid operator to regularly improve its efficiency. Accession countries, such as Hungary, Latvia, Lithuania, Slovakia, and Slovenia, also have started to widely implement PBR regimes. Romania and Bulgaria both intend to launch PBR regimes in the near future.

While most countries in the region have sufficient transmission capacity internally, some interconnections are still insufficient between countries. There are three distinct grid regions in Europe—the UK grid region, the Scandinavian region (Nordel), and the continental European region, usually referred to by the acronym of the group that coordinates this region, UCTE (Union of Coordination of the Transmission of Electricity). UCTE incorporates all of Western Europe and is starting to link up with the countries of Eastern Europe.

Italy, the Iberian Peninsula, Greece, and the Netherlands do not have sufficient import capacity, resulting in relatively higher electricity prices in those regions. However, according to the UCTE reliability assessment for 2004-2010, no significant reliability problems are anticipated in the short to mid term in any European grid zones. Moreover, the construction over the next two to five years of major interconnections across Europe will help to improve reliability and give the more isolated regions additional access to the continental European market.

The anticipated interconnection projects include: Belgian-French border, Belgian-Netherlands border, Spanish-Portuguese border, French-Spanish border, Swiss-Italian border, and a variety of additional connections in Southeastern Europe.

Electric Competition: Why the Incumbents Dominate

In Western Europe, where the percentage of end consumers eligible to choose their electricity supplier averages more than 75 percent, a multitude of retail suppliers has emerged. Some are the affiliates of the major European utilities, while others have a specific regional focus or a particular niche market, such as green energy. However, the number of suppliers with more than 5 percent market share is relatively low, and incumbent utilities continue to dominate.

The UK, which arguably has the most competitive supply sector in the region, has seven suppliers with more than 5 percent market share, while Norway has five. Spain, Italy, Belgium, and Austria have four, while the remaining countries have less. Only the UK, Sweden, and Finland have a significant number of foreign-owned suppliers, at 64, 40, and 21 percent, respectively. Among the Accession countries, Slovenia is the only country that stands out, with six suppliers holding more than 5 percent market share and 20 percent foreign ownership of suppliers.⁵

Switching rates for large industrial customers in Western Europe in 2002 ranged from a low of 5 percent in Belgium to 45 percent in Denmark, with 20 percent being average. In the countries where residential and/or small commercial customers were free to choose their supplier in Western Europe, the rate of switching in 2002 ranged from 2 percent in Ireland to 14 percent in Norway. Scandinavia and the UK all had 10 percent and above.⁶ In the Accession countries, there has been limited switching for large industrials, with only Hungary reporting more than 50 percent switching for this customer segment.⁷

The impact of the competition is telling: Prices to end-consumers are steadily decreasing. In the original 15 EU members, there has been an average decrease of 11 percent for industrial and 6 percent for residential consumers from 1995 through 2002. The Accession countries have seen a contradictory trend, with prices increasing as governments reverse years of subsidized electricity and begin forcing consumers to pay the full cost of electricity. ■

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Endnotes

1. Richards, Mark and Georgia Quick, "Eastern Europe, Nuclear and EU Accession," Nuclear Engineering International, Oct. 31, 2002.
2. The Renewable Energy Certificate System grants a renewable energy certificate (REC) for each megawatt-hour of renewable production from qualifying renewable resources. Each REC is unique, which ultimately enables these certificates to be transferred from owner to owner before being used as proof of generation, or exchanged for financial support.
3. Plans are currently under way to create an Iberian market that will integrate Spain and Portugal. The market structure will closely resemble that of Spain. The power pool will be called MIBEL, and there will also be a bilateral market. However, this market was due to start operations in April 2004, and it is still not in place. No new starting date has been set.
4. TSO-Auction BV, subsidiary of TenneT (the organization that manages the auction of the interconnector capacity); All prices for Dutch interconnection auctions available at www.tso-auction.org.
5. Commission of the European Communities, "DG TREN Draft Working Paper: Third Benchmarking, EU Report on status of the Internal Market in Electricity and Gas," Brussels, March 2004.
6. Ibid.
7. Ibid.