

Europe Rewired: A Giant Awakens

EU nations are taking slow steps toward an integrated energy market, but they are many paces ahead of U.S. efforts.

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By Arthur J. O'Donnell

Despite recent setbacks in establishing an acceptable balance of voting power among member nations, a new constitution for the European Union (EU) is expected to bring together dozens of separate nations into a single economic and political superpower and lead to an interconnected energy market throughout the European continent—one that will eventually stretch from Portugal to the Baltic Sea and from Ireland to Greece and perhaps beyond.

In contrast to the restructuring of the U.S. electric industry, which was driven largely by an ideological belief in the supremacy of markets over regulation, the drive for change in Europe's markets has critical social and political components, as well as economic aspects. Loyola de Palacio, vice president in charge of transport and energy for the European Commission, has emphasized the linkage of power market reforms with the evolving sense of European community. "Creating a single market would link up power grids across the length and breadth of the EU and put an end to the predicament of some countries [that] feel isolated," she says.

In demographic and economic terms, the EU market will indeed be a giant, moving from the 375 million citizens of the current 15 members to a 25-member consortium of 440 million inhabitants, with the addition of 10 new member states in May. The annual economic output of the EU will rise from 8.5 trillion Euros—approximately \$10.7 trillion (U.S.) at today's exchange rates—to more than 13 trillion Euros, or \$16.25 trillion by the year 2020.

The outlines of an integrated European network for fuel, power, and energy services have been defined through a long process of negotiation and compromise that stretches back nearly a decade. In the past year, though, specific directives have begun to emerge from EU headquarters in Brussels, including one that will require members to completely open their retail energy markets to competition within four years. Newer directives debated during recent meetings of the European Commission focus on ensuring security of electricity supplies in the aftermath of last summer's blackout events in London, Italy, Sweden, and Denmark, while revising the existing guidelines for expansion of electricity transmission networks and opening access to gas pipelines.

Meanwhile, the European Commission's Energy Council has voted in support of energy market integration in the Balkans that eventually will bring full interconnection among power systems in Southeast Europe and those of current EU members. Palacio hailed these moves as "momentous" and indicative of how energy policies match the broader objectives of EU expansion.

"For the first time," Palacio says, "on a regional level, encompassing all countries and states, a regional market with political function [is being created]. This is a new, very important step of a long process toward a closer cooperation that will ensure peace and stability in this European region."

Retail Competition Brings Wholesale Changes

On the retail side of the ledger, the European Commission last June determined that all commercial and industrial electricity consumers in member states will have a choice of supplier by July 2004, while residential consumers will be able to fully exercise choice of supplier three years later. Natural gas pipelines and distribution hubs will be required to open their networks to third-party shippers as well, and published tariffs will govern non-discriminatory access throughout the continent, the commission ruled.

Many nations already have adopted policies to encourage or require retail open access or customer choice regimes, although the penetration of competition in electricity varies by country (see Figure 1). The rate of change has been "incredibly fast," says Boaz Moselle, managing director for competition and trading arrangements for the British regulatory agency Ofgem. "There's been a real impact, but there are real limits," Moselle noted during a talk at the Power Generation World Europe 2003 conference in London last November. "In electricity, every market has felt the change; however, in gas, there's not yet much change on the ground."

The United Kingdom, of course, has been a pioneer in power competition, creating new market structures beginning in the late 1980s and, through trial and error, pointing the way to an understanding of how state-controlled industries can evolve into market-based regimes.

Retail competition in domestic markets is seen by many as the first-step toward full integration of markets—first by region, then throughout the expanded EU. "It means that we can look to a much bigger marketplace and expect to see electricity traded over what is a vast area compared with the opportunities that are there for us today," says David Porter, chief executive officer of the Association of Electricity Producers, a UK-based trade group. "Some of our members will be looking at the liberalization in Europe in terms of opportunities to develop new generating projects. Others may want to get into European markets to get access to retail customers."

Simon Lewis is managing director of Europe for Centrica, a retail energy services provider that is active around the world. Based on the European Commission's retail service directives, Lewis foresees full competition taking hold in Europe over the next five years, although different nations will reach the goal at different times. "My personal belief is that a 2007 timetable will come forward in some of those markets as the pressure to liberalize continues," Lewis says.

While Lewis insists he is optimistic that the proper conditions for competition eventually will reach all segments of the market, he acknowledges some formidable barriers to entry into retail markets. "As a retail new entrant, there are certain conditions we need," Lewis explains. "We need to have proper unbundling, so we can get hold of the customer. We need to have independent regulation. We need third-party access, which is critically important. We need liquid wholesale markets, because without liquid wholesale markets you are pretty dependent on the incumbents to acquire your gas and electricity. They're not exactly going to be bending over backward to encourage new entrants."

Besides promoting retail competition and liquid wholesale markets, a seamless European grid will help ensure the reliability of service and supply throughout the Continent, argues Torsten Amelung, managing director of continental markets for Statkraft Markets GmbH, Norway's state-owned power marketing company. "No system is 100 percent secure," Amelung explains.

"Interconnectivity increases security of supply and provides a backup in the system. When you add two countries together, the needed reserve margin is lower and you increase the number of power plants at your disposal," he adds.

He points to the fact that within individual countries, certain generation resource types might dominate electricity production, as with nuclear power in France, hydroelectric in Norway, coal in Eastern Europe and, increasingly, natural gas-fired plants in Italy and Spain. But taken as a whole, the European mix of power sources is quite diverse (see Map 1). "Interconnection allows you to balance these assets," he says, and it reduces the ability of one or two players to dominate markets or set prices.

The frequency of price spikes in the Netherlands "would go away if a new cable [to Germany] had been built. But it won't because of the economic interests of Dutch generators. There is much less ability of collusion in markets if you have high interconnectivity," Amelung concludes.

Interconnectivity to Modernize Power Plants

Greater interconnectivity also may prove essential to efforts to expand and modernize the generation system across the continent, says an industry analyst. Long-term projections of a 44 percent increase in energy consumption in Europe by 2020 dictate a need for 300 GW of new power plants, approximately the capacity of 750 large power plants, according to another expert. The capital cost of these developments is estimated at 250 billion Euros-and some anticipate that transmission modernization might be equally costly.

The generation development effort is well under way, he notes, with 11 new or repowered power plants with 7,670 MW of added capacity under way in Italy, for instance, and nine in Spain that could add 2,800 MW this year. Without the ability to connect to the expanding market, these stations risk being isolated, "like currants in a bun," he says.

This is a concern that underlies the new European Commission directives on security of energy supply. New investments in power generation have not been accompanied by the construction of additional transmission capacity or interconnections, and that failure will carry adverse implications for both wholesale and retail markets. The commentary that describes the security directive reads: "Unless this happens, customers will remain captive in practice, even if they theoretically have a choice between suppliers."

Guiding the provisions of this directive is a stated goal of "ensuring the highest quality of service" through measures to promote security of electric supply. The directive will:

- Require member states to have a clearly defined policy to achieve supply/demand balance through adequate reserve margins and demand-side measures;
- Require defined standards related to security of transmission and distribution networks;
- Require that all transmission system operators submit multi-year investment plans to their national regulators;
- Obligate the regulators to summarize these investment plans to the commission, which will consult with the European Regulators Group to make sure that the proposed spending matches previously identified needs; and
- Give regulators the right to accelerate completion of projects or to issue a "call for tender" for certain projects in the event that the transmission system operator is unable or unwilling to complete the projects.

According to the European Commission's Palacio, this latter requirement could help break the long impasse that has prevented infrastructure improvements in the past. "The current situation, whereby the necessary investment is held up in interminable disputes on planning issues, cannot be allowed to continue," she says.

Not everyone agrees with the emphasis on an integrated grid, however. The World Wildlife Federation, a vocal critic of European Commission energy policies, has called the energy package "a real mess" for giving energy efficiency and decentralized power sources a back seat to centralized supply-side solutions. "A centralized pan-European grid system is very costly and may lead to higher vulnerability, to future blackouts and brown-outs," the organization complains.

Fragmentation and Domination

The legacy of localized markets and government control has been that of severe limitations on the electric interchange ability between nations and the continued domination of markets by a few or even a single incumbent utility (see Figure 2). The mass exodus of American energy companies from the European market-most recently signified by Reliant's fire sale of its Dutch utility holdings-has only exacerbated the trend toward oligopoly control (see "Competition Lost," Public Utilities Fortnightly, Feb. 1, 2003).

A study of electric flow patterns for 2000 by the European Commission showed that cross-border trades accounted for only 7 percent of total electricity consumption, with the import ability of many states limited to just 2 or 3 percent of their total demand. Severe bottlenecks were identified in many areas, and as a result, seven "priority axis" upgrade projects were endorsed under the Trans-European Energy Networks (TEN-E) initiative. They are:

- System reinforcements at the connections among France, Belgium, the Netherlands, and Germany to resolve frequent congestion throughout the Benelux;
- Increasing capacity at interconnections among Italy and France, Austria, and Switzerland;
- Adding new capacity between France and Spain, and Spain and Portugal;
- Development of new connections between Greece and the Continent;
- Increasing connections between the United Kingdom and the Continent;
- Upgrading systems that link Ireland and Northern Ireland (United Kingdom); and
- Increasing interconnection capacity between Denmark and Germany.

A secondary goal was adopted during meetings in Barcelona in 2002 to increase the interchange capacity of each member to 10 percent of its domestic installed capacity.

Despite these goals and priorities, investment has not flowed readily into the transmission sector, and European energy companies encounter the same kind of resistance to new power lines that U.S. utilities and ISOs face. "It is almost impossible to construct new interconnections in Europe today," says Philippe Boulanger, director of Endesa - Bureau France.

Lessons From Summer 2003

The record heat wave experienced by Europe last summer and several subsequent system failures reveal both the strengths and weaknesses of the European grid. On one hand, several countries reported record levels of imports and exports to meet load as

the combination of air-conditioning demand and limitations on nuclear plant output in France and Germany put unprecedented strains on the system.

During the worst of the heat, however, power flowed where it was needed most, although sometimes at a very high cost in order to overcome transmission congestion and competing demands from buyers. Record prices for baseload and peak power were recorded on France's Powernext Exchange, the Amsterdam Power Exchange, and in Germany's domestic markets, while the export price of energy flowing from England into France also hit record highs.

With fresh memories of the massive North American power failure of Aug. 14, 2003, some European power managers downplayed the possibility that a similar event could strike the Continent. But they were soon proven wrong by three separate outages-though they were unrelated to the heat storms.

The first event affected London on Aug. 28, when a failure on a 275-kV distribution circuit stranded evening commuters and cut power to a quarter of a million people for periods ranging from 30 minutes to several hours.

Less than a month later, power outages struck Denmark and southern Sweden, depriving nearly 4 million residents of electricity for an afternoon. Then, early in the morning of Sept. 28, Italy experienced its worst blackout in history, when a transmission failure in Switzerland cascaded across the Alps, blacking out local systems all the way to Sicily. In all, some 50 million Italians experienced "Black Sunday."

These system failures derived from what might be considered classic outage causes, says David Porter, head of the United Kingdom's Association of Energy Producers. "The problems we had in the U.K. could have arisen just about anywhere at any time," Porter says. "The famous power cut we had here in parts of London was the result of somebody fitting the wrong relay, in effect putting the wrong rate fuse into the system. It was a human error."

The triggering event of the Italian outage was a power line sagging into a tree, although failures in communication made the event far worse. At the time, Italian utility operators were in the process of refilling pumped-storage hydro reservoirs, using approximately 2,500 MW of energy. Had Swiss grid controllers gotten the word out to the Italians to cease the pumping operations, much of the damage might have been contained.

"This does suggest that countries need to look at security of supply in terms of the physical assets and re-evaluate whether systems are strong enough," Porter suggests.

That is exactly how the European Commission has responded-even though a formal memo on the Italian blackout stated, "This incident is independent from the creation of the EU internal market." Re-evaluating the TEN-E list of transmission and distribution priorities, energy officials have proposed expediting development of several projects into the 2005-07 period. Top on the list, of course, was the Italian/Swiss border interchange, along with improved links between the Continent and Scandinavia and Russia, between France and Belgium, and modernizing the Haru-Espoo high-voltage network to improve connections among countries on the Baltic Sea. Also proposed for development by 2008 are upgrades between Spain and Portugal, and a fourth undersea cable connection from Denmark and Norway.

First Regional Markets, Then a Unified Grid

The tide of political and legislative change is moving more rapidly than the physical modernization of transmission systems and power markets, and the trend in Europe is to solidify the workings of regional markets in advance of the creation of a single grid structure. One such proposal envisions as many as eight potential regional electricity markets within Europe by 2008 (see Map 2).

As expected, some areas are moving faster than others, with the Nordic market already operating in such a unified manner. The advantages of creating regional markets are especially apparent in the Baltic region, says Vidmantas Janauskas, chairman of the Lithuanian National Control Commission for Prices and Energy. Each of the three nations comprising a Baltic market-Lithuania, Estonia, and Latvia-are liberalizing their power utilities at the same time and trying to coordinate their rules. However, Janauskas points out, each country is too small for its own internal market to function efficiently, and the generation mix is "far from optimal," with a single generator dominant in each of the local markets.

Energy regulators from the three nations signed an agreement in November 2002 that establishes common pricing and payment principles, and a strong interconnection already exists. "This could be a good school to learn from before entering the bigger markets," Janauskas says.

Reviewing the status of other Eastern European accession states that will become EU members beginning in May, Janauskas foresees the possibility of stronger ties and interchanges-but not until new transmission interconnections can be built. "To have a real market we need regionalization," he concludes. But we cannot interconnect with the other accession countries. There is no connection."

Forging a regional market might not be any easier, even when it involves just two countries, as with the planned Iberian market that will link Spain and Portugal. Jose Luis del Valle, director of strategy for Iberdola, says several barriers to regional integration remain, even though the two nations have committed to creating the Iberian Electricity Market (MIBEL) beginning April 20, 2004.

On the surface it would appear that Spanish and Portuguese generation markets are reasonably complementary, he says. However, the Spanish market is "totally and effectively" liberalized, with at least six viable competitors, while Portugal's market is currently controlled by a single company-EDP-that holds nearly three quarters of the market. This domination has caused a slowdown in creating the rules needed for market integration, he says. "I think it's because EDP wants to be reinforced before it can compete with the Endessas and Iberdolas," del Valle says. "If they can gain some time from that process to be better prepared, I think that's what they are trying to do."

Another barrier to competition and regional integration is the need to fix and allocate stranded costs of investment in existing power plants, which del Valle estimates to be in excess of 1 billion Euros. The desire of incumbents to receive compensation for those investments is understandable, he says. "What we are saying is, whatever allocation we do, please do not let that allocation affect the formation of prices in the wholesale market. We understand that the stranded costs have to be included in the picture, but do it in such a way that does not affect price formation in the future.

However the regional approach to power markets works out across the continent, the clear implication of European integration will be that each nation's individual regulation of its energy will need to be done with an eye toward Brussels, suggests Ofgem's Boaz Moselle. Even though the United Kingdom is something of a "regulatory island," the onus will be on the agency to act more in harmony with its European counterparts. "The success of EU liberalization has a major impact on Great Britain," Moselle says.

"Regulations will come from Brussels whether or not we participate ... [but] they will be different if we don't."

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EU Emissions Trading Plan Not Dependent On Kyoto Protocol Ratification

Despite rejection of the Kyoto Protocol by the United States, and on-again/off-again support from Russia, the European Commission continues to support the Kyoto Protocol as the best framework to combat climate change. "We are not changing our position or going back on the targets that we have agreed," says Romano Prodi, president of the commission. The Kyoto Protocol commits EU member states to reduce their greenhouse gas (GHG) emissions by 8 percent by 2008-2012, with reference to a 1990 baseline.

All EU members, including the 10 accession states that will join in May, have ratified the treaty.

Prodi notes that EU greenhouse gases were reduced by 2.3 percent by 2001, but increased economic activity has led to increased emissions in the past two years.

Besides promoting renewable resources, the commission has adopted an emissions trading plan that begins in January 2005, covering all 25 members of the union.

"This will be the largest cap and trade scheme to date," says Olivia Hartridge, administrator of the European Commission's trading program, which also developed the world's first GHG trading platform in the United Kingdom. The commission finalized its directive outlining the plan in October 2003 [2003/87/EC].

More than 15,000 industrial and commercial entities will participate, and there is much work to be done, she adds. Top on the agenda will be for the European Commission to formalize emissions-credit allocation rules for its members by the end of 2003, then establish technical regulations in early 2004. Member states must enact national allocation plans by March 31, 2004.

The timetable has been known for months, but "a lot of people had trouble seeing or believing this is happening," says Andre Marcou, president of the International Emissions Trading Association.

Both Hartridge and Marcou emphasize that the European trading scheme will proceed whether or not Kyoto is fully ratified by Russia. "If Kyoto does not come into force, this directive will not fall," Hartridge affirms.

"In the long run, Kyoto is a useful first step, but the carbon market is different. It is about changing the way you think about economic decisions," Marcou says. "We need a number of tools. A market mechanism does not produce reductions by itself. It puts a price on a ton of carbon that will provide signals to the people making decisions."

There will be winners and losers. Among those nations that may see a real economic benefit are the newest members of the EU, those Eastern European states where the collapse of manufacturing has brought an associated reduction in carbon emissions.

Eva Snajdrova, head of the climate change unit of the Czech Republic's Ministry of Energy, reported that the nation's 1990 baseline for CO₂ was almost 190 metric tons, but just 141.8 metric tons in 2000. "The Czech Republic has reduced its emissions of CO₂ by approximately 25 percent in comparison to 1990 levels, which puts it in a very different situation than the current members states who are obliged to reduce emissions from the very start," she notes. That means the government won't need to impose new restrictions on industry, and companies will have a chance to recoup some losses through the sale of credits.

A key to success of the program will be allowing widespread trading among companies and across borders, says the European Commission's Hartridge. She termed Phase I of the plan, lasting from 2005 to 2007, the time to "learn by doing." Regulators will allow some deficiencies to be made up from purchased credits or through payment of fines of up to 100 Euros per ton. Member states may auction up to 5 percent of their allowances during Phase I.

Beginning with Phase II in the 2008-2012 period, violators can expect to see their names published, but more than 10 percent of available credits may be auctioned.

"The greenhouse gas market can't be seen as a way for people to buy out of their commitment," Marcou concludes. "It must lead to real reductions." -A.O'D.