

## **Can Public Service Survive the Market? Issues for Liberalized Electricity**

Briefing Paper

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*As governments around the world liberalize their electricity systems, they are overturning the guiding principles that have shaped electricity for the past century. Yet they continue to regard electricity as a public service. The consequent inconsistencies and contradictions are already evident, and intensifying. This Briefing Paper outlines the implications. It is based on a research project now under way in the Energy and Environmental Programme, entitled Keeping The Lights On: Public Service in Liberalized Electricity.*

### **Public service electricity**

For half a century governments have considered electricity a public service. They still do. In the European Union, Article 3.2 of the Electricity Directive, which came into force 19 February 1999, declares that 'Member States may impose on undertakings operating in the electricity sector, in the general economic interest, public service obligations which may relate to security, including security of supply, regularity, quality and price of supplies and to environmental protection'. In the US, the activities of electricity companies are supervised by agencies of state governments explicitly called Public Service Commissions or Public Utility Commissions; Chambers's Dictionary says 'utility' means 'public service'. In most countries outside the Organization for Economic Cooperation and Development (OECD), electricity remains explicitly a branch of government, either national, regional or local - a service the government provides, with varying success, to the public under its jurisdiction.

In the 1990s, however, governments both inside and outside the OECD have begun to liberalize their electricity systems. They may allow independent generation; sell electricity assets previously owned by government to private investors, possibly foreign; establish a regulatory agency to some extent independent of government; require separate accounts for generation, transmission, distribution and supply to users; break up and restructure systems previously integrated, into separate bodies for generation, transmission, distribution and supply to users; and introduce competition between different generators and different suppliers, possibly across national borders. In spite of all this upheaval governments continue to regard electricity as a public service. In practice, however, liberalization is drastically altering the policy levers by which government can direct the public service dimension of electricity.

Privatization alone is not important. Electricity systems in Germany, Japan and the US, for instance, have long been mainly privately-owned. But breaking up integrated systems, introducing competition, and making electricity activities international is changing the fundamental guiding premises that have shaped electricity systems for

the past century. (For a detailed discussion of the process and its possible implications see *Transforming Electricity*, by Walt Patterson (RIIA/Earthscan 1999).) In a liberalized system, in which the private and possibly foreign owners of electricity facilities compete for business, what becomes of public service? What does it entail, who delivers it and on what basis?

Member states of the EU, for instance, in compliance with Article 3.2 of the Directive, have notified the European Commission of plans to impose an assortment of public service obligations on electricity-sector companies within their national borders. Across the EU such obligations will include security of supply; obligation to supply; compulsory purchase of power from renewables and cogeneration; demand-side management; use of indigenous fuels; emergency power supply; environmental protection; and various compensation schemes. As liberalization proceeds, however, the mechanisms and policy levers that governments can use to impose such public service obligations are already controversial, and will grow more so. Which participants on a liberalized system are to provide which public service to whom, on what basis and why? Can such arrangements even be called 'public service' in the traditional sense?

Electricity systems now being liberalized are still in transition. Many systems still have a margin of redundant generating and network capacity, built under the old regime when captive customers of the monopoly had no choice but to pay for the redundancy. Many systems, moreover, still have at least the remnants of a culture of public service in the traditional sense - of staff who still feel almost a moral obligation to keep the lights on. In the new liberal framework, however, both system redundancy and public service culture are inexorably fading. The longer-term implications of liberalization for the public service dimension of electricity have not been adequately considered.

One of the most intractable problems of the transition stage of liberalization has been dealing with 'stranded assets' - electricity facilities that can no longer pay their way in the new market-based framework. However, the converse of this issue is only beginning to emerge - the problem of 'stranded obligations', the public service that participants in a competitive electricity market may no longer be prepared to deliver. If electricity is still to have a public service dimension, both the public service and the way it is delivered will have to change to fit the evolving liberal context, with all the consequent technological and institutional implications.

As yet, the process of liberalizing the public service of electricity has barely begun. This Briefing Paper outlines the issue and indicates how it may be addressed.

### **Liberal and reliable?**

The reliability of electricity systems has long been both economically and politically essential. The public takes reliable electricity completely for granted. Even a brief power cut causes outrage, and an extended blackout, for whatever reason, is not only economically damaging but politically explosive, a serious failure of public service. For more than three decades traditional electricity systems have been dominated by engineering criteria in which reliability has been uppermost, almost regardless of cost. In OECD countries the cost-plus context of traditional electricity planning, in which

captive customers of a monopoly pay whatever the central authority tells them to pay, has allowed electricity systems to incorporate extravagant redundancy of both generation and network capacity. Outside the OECD, however, in what are now often called 'transition' and 'emerging' countries, electricity systems tend to be much less reliable. Ironically, many countries whose governments insist most vociferously that they must retain ownership and control of the electricity system as a public service are among those with the poorest records for reliability.

Keeping electricity reliable requires meticulous and continuous attention. In a traditional electricity system, large remote central stations generate electricity in the form of so-called 'synchronized alternating current', and deliver it to users through a network of wires including long so-called 'high voltage transmission lines'. Electricity is not a fuel; it is a physical phenomenon happening throughout the entire system simultaneously. Electricity cannot be stored; the total amount being used must be matched moment by moment by the amount being generated, under some form of central control. The entire system operates as a single vast machine, in real time. Operating criteria must be maintained to very close tolerances. Any significant deviation from normal operation can damage or destroy equipment; and a disturbance can travel over the network for thousands of kilometers almost instantaneously. Protective devices must function immediately to isolate any fault. If they fail, the entire system may shut down. Such a 'power failure' can black out an entire country, and may take days or weeks to rectify.

With adequate redundancy to back up equipment failures, with capable and assiduous system management and a culture devoted to 'keeping the lights on' under all conditions, traditional electricity systems, at least those in OECD countries, have an impressive record of reliability. Liberalization, however, can impose additional strain on a system. Redundant generating plant that operates only infrequently and does not pay its way may be permanently closed, reducing reserve margins. When competition enters, cutting costs invariably means sacking staff, sometimes to a drastic extent. That may weaken maintenance regimes and prolong recovery from faults; it may also undermine the public service culture of dedicated employees.

A more indirect and subtle consequence for reliability may be the effect of liberalization on the technological configuration of the system. On a traditional system, generation is in large units, comparatively few in number. After liberalization such units become more difficult to finance; the system evolves toward smaller and more numerous units. Below a certain size, and especially if they are operating for cogeneration, small units may be reluctant to be centrally controlled or 'dispatched'. In any case, when different units have different owners, each owner wishes to maximize revenue by maximizing operating hours; no one willingly follows load unless suitably paid. On-site generation and cogeneration make the load on the rest of the system more variable or 'peakier', aggravating the problem of stability. Other system services essential to keep a synchronized AC network stable, such as 'reactive power' and 'frequency control', provided implicitly on a traditional system, must be explicitly bought and paid for on a liberalized competitive system, in transactions that may need to be almost instant.

Liberalization and its corollaries therefore point to trouble for a synchronized AC system. As the system gets less reliable, and the power quality poorer, more users will leave the system in favour of on-site generation, imposing further stress on the

remainder of the system. In these circumstances licence conditions, a grid code and other technical rules may not suffice to keep the system stable.

Access to a stable network is crucial for contracts between generators and users; but the basis, including access charges, is already controversial and will become more so, especially as competition crosses national borders. What if a liberal contract-based system collapses? Who bears the liabilities, which may be substantial? Can government impose penalties for the failure of this essential public service? On whom do they impose them, how and on what basis? What if the facilities are owned by foreign companies? Major power failures in Argentina in February 1999 and in Brazil in March 1999 involved foreign owners, with implications still unclear. Liberalization of a traditional electricity system creates an entire complex of unfamiliar risks and responsibilities - including the risk of system collapse. Who, then, is to be responsible for the crucial public service of keeping the system stable, and how is this responsibility to be exercised? The answers are not obvious.

'Reliability' of electricity is assumed to mean reliable delivery of units of electricity at users' meters. But what users actually want are reliable electricity services. As stresses on traditional electricity systems intensify, we may need to redefine the nature of the public service that can be provided reliably.

### **Liberal and universal?**

If electricity is a public service, all of the public feel equally entitled to benefit from it. On a traditional monopoly franchise system, the usual arrangement is a pattern of invisible cross-subsidies, mandated directly or indirectly by government, between categories of customer cheaper or more expensive to supply. In particular, government may mandate provision of electricity to the poor, and to rural areas where users are more widely dispersed and network connections therefore more costly. The tariff may have a 'postage-stamp' structure, in which all users of a given category, such as households, pay the same price per unit of electricity, no matter where they are on the system or how much they cost to supply. Some governments subsidize the poor directly, by 'fuel supplements' that help them to pay their electricity bills; such supplements are often paid directly to the electricity system. Some governments mandate a 'lifeline' tariff; those who use a minimal amount of electricity for essentials pay a sharply reduced tariff for a set maximum number of units.

Liberalization, and in particular the introduction of competition, may jeopardize such arrangements. In a market context, in which sellers of electricity compete to win contracts with buyers who can choose between different sellers, some customers are more desirable than others. Customers that are cheap to supply, use a lot of electricity at a fairly steady rate, and pay their bills promptly and in full are clearly the most attractive. They will find sellers eager to win their business, and will be offered the most advantageous terms. At the other end of the scale of desirability are thinly scattered customers in remote areas, and those in poor neighbourhoods. In a competitive market they have little bargaining power. As suppliers jostle to 'cherry-pick' the most desirable customers, the least desirable ones get pushed to the back of the queue.

In a traditional electricity system, one corollary of the monopoly franchise is the 'obligation to supply'. The government mandates the franchise holder to supply all the electricity required by all users in the franchise area. When electricity is

liberalized, this ‘obligation to supply’ becomes hard to pin down, and may vanish entirely. A network operator, whose activities still constitute a monopoly, may be subject to government regulation that imposes an ‘obligation to connect’ all potential electricity users in the franchise area to the network. The cost of the connection, however, may fall on the user, especially in a remote area, and may be substantial. Moreover, a connection alone does not entitle a user to take electricity from the network; the user must also contract with a supplier to buy electricity and pay for it. If the user fails to pay, the user may be summarily disconnected.

Not surprisingly, among those who fail to pay electricity bills the poor figure prominently. Even before liberalization, on traditional electricity systems, cutting off the electricity of the poor caused outrage. Campaigners attacked electricity companies, governments objected, and company public relations suffered. In recent years, however, companies have often introduced another way to tackle the problem. Users with an unsatisfactory record of paying bills are fitted with so-called ‘prepayment meters’. Only when the user has fed coins into the meter does the electricity flow. The company does not disconnect the user for non-payment; it does not have to. A user who does not feed the meter is ‘self-disconnected’. Where prepayment meters have been introduced, the reported rate of disconnections has plummeted. But that does not mean that the poor are getting electricity.

In the transition from a traditional to a liberalized framework, until full retail competition is established, the operator of a local electricity distribution network is effectively the supplier of last resort. Unless a user explicitly signs up with another supplier, the default supply comes from the local network, and the user pays the local network operator accordingly. This of course places the onus on the local operator to have or to buy in enough generation to fulfil its role as supplier of last resort - a challenging requirement when the size and shape of the residual demand may be hard to foresee. Once full retail competition is established, however, and the role of the network operator is definitively separated from the role of the electricity supplier to users, the status and function of ‘supplier of last resort’ becomes much harder to discern.

In the transition to full liberalization, so long as all the competing interests involved are making enough money to keep them happy, these unresolved tensions may remain below the surface. However, some companies in liberalized contexts are already facing shareholder discontent, collapse of market value and takeovers. Bankruptcy is no longer inconceivable. As competition intensifies, margins tighten and profits shrink. Companies may become less willing to deliver services that do not contribute adequately to accounts and balance sheets. The consequence will be a growing challenge to governments that continue to view universal provision of the benefits of electricity as an issue of social and political policy. Outside the OECD, failure of universal provision has long been a factor in political unrest. In OECD countries, where universal provision is now widely taken for granted, any weakening could cause major trouble for governments.

Can a liberalized framework deliver universal provision of the benefits of electricity? We may need to rethink and redefine what is provided, by whom and how.

### **Liberal and sustainable?**

Government takes the lead responsibility in social and environmental policy, including that affecting provision and use of electricity. At the UN Conference on Environment and Development in Rio in 1992, the governments of the world committed themselves to pursue 'sustainable development'. However it is defined, sustainable development must encompass 'sustainable electricity'. The benefits of electricity must be provided reliably and universally, without doing serious damage to the environment.

Where electricity is available, its positive environmental impact is taken for granted; but the negative impact of traditional electricity systems is long since hotly controversial and growing more so. The siting of electricity facilities, their emissions to atmosphere, their effects on local water systems, and the solid waste they produce, all raise questions becoming ever more difficult to resolve. Government imposes planning constraints as general law on all of industry, including the electricity industry. Government may issue directions about fuels and technologies to be used, for environmental or social reasons. It may set standards for performance and efficiency of energy use, in part to reduce environmental impacts of electricity. It may impose levies and mandate subsidies for environmentally or socially desirable reasons. Such policies can be strikingly inconsistent. In the UK, Germany and Spain, for instance, current policies to support the use of coal for social and political reasons run directly counter to government undertakings to reduce greenhouse gas emissions.

Liberalization and the introduction of competition intensify the split between winners and losers among electricity technologies and fuels according to environmental criteria. Natural gas, for instance, becomes a winner, coal a loser. This problem becomes more acute when electricity becomes an international economic activity. Environmental policy measures 'distort' competition, both internally and internationally. Opposition by prospective losers may make environmental controls weaker, and more difficult to impose and enforce; the long and convoluted struggle over proposals for carbon taxation is only the most obvious example.

In a liberal competitive context for electricity, the public service of environmental protection becomes harder for governments to maintain. Traditional policy levers are enfeebled. If governments are to foster successfully a trend toward 'sustainable electricity', they need to take a different approach. So long as government policies continue to treat 'environment' as a constraint on electricity, the conflicts will proliferate. Governments will have to refocus environmental policy and electricity policy so that they point in the same direction.

### **Public electricity service**

The technological and institutional configurations of electricity systems are already beginning to change. The changes will be rapid and profound. (See *Transforming Electricity* by Walt Patterson (RIIA/Earthscan 1999) for a detailed discussion.) As yet, their long-term implications for electricity as a public service have received too little attention. As electricity evolves, its public service dimension must also evolve. In due course, the public service dimension of sustainable electricity may entail delivering not units of electricity but the electricity services that people actually want - reliably, universally and sustainably. That implies a radical change in how we think about electricity, and in the role and nature of electricity in society.

A long and uncomfortable transition lies ahead. But we can make it less uncomfortable if we know we are going where we want to go, and how to guide the process.

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