

**LEVERAGING ENVIRONMENTAL CHANGE:
POLICY DESIGN AND BUYER POWER IN THE ELECTRIC POWER
SECTOR**

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INTRODUCTION¹

Two separate trends – environmental concern and a changing policy framework – promise to make the next decade an important one in shaping long-term patterns of electricity supply. Power plants account for between one-third and two-thirds of the major conventional pollutants, NO_x and SO₂, which threaten public health and ecosystems in the U.S.² Worldwide, there is growing concern about fossil fuels' contribution to climate change. The fifteen hottest years on record have all occurred since 1980. Further warming is likely to lead to changes in traditional climate patterns, capable of disrupting human agriculture, ecosystems and disease vectors. The electricity sector is a major contributor to the build-up of green house gases (GHGs), accounting, for example, in the U.S. for 36 percent of total carbon emissions.³

As environmental concerns rise higher on the agenda, the power sector is in a state of flux in many parts of the industrialized and developing world. Over the last ten years, long-held assumptions about the structure and functioning of the sector have crumbled, and a new orthodoxy is rapidly emerging. These new views are not merely in the realm of theory; many countries have begun dramatically reforming their power sector, a process that often involves inviting in the private sector, selling off public assets, and restructuring the sector to stimulate competition.

These shifts hold both potential opportunities and costs for advocates of environmentally and socially progressive outcomes. Reforms of the power sector allow for the emergence of new actors, and the flexible application of new technologies such as renewable energy systems. In this paper we argue that in order for power sector reforms to lead to positive outcomes, two conditions must hold. First, reforms must provide the appropriate incentives to clean energy supply technologies, promotion of end-use energy efficiency, and expansion of broad access to electricity services. While competition and privatization may introduce some efficiency gains into the sector regardless of other incentives, the environmental gains will be enhanced by explicit attention to a public benefits agenda in the design of reforms. Second, the private sector must respond appropriately to market incentives embedded in reformed market structures, by proactively investing in environmentally sustainable energy technologies. Although market incentives are a necessary condition for investment in sustainable power technologies, they are not sufficient in the face of considerable transaction costs.

In this paper, we describe two initiatives at the World Resources Institute that aim to address the intersection of environmental concerns and seismic shifts in the electric power sector. Part I lays out a framework in which to examine the process of power sector reform in developing and transition economies. This decision-making process is highly politicized. The goal is to understand how decisions about the power sector are made, in order to explore how incentives for environmental and socially positive goals can be incorporated into power sector reforms. Part II examines how adoption of renewable energy technologies can be accelerated in one market, the

¹ The authors thank Shehnaz Atcha for her assistance in producing this paper.

² "Inventory of US Greenhouse Gas Emissions and Sinks: 1990-1997", EPA, pp. 2-13, Table 2-11. Electric Utilities accounted for 36.3% of US CO₂ emissions in 1997.

³ "National Air Quality and Emissions Trends Report, 1997", EPA, pp. 114-18, Table A-4 and A-8. Utilities accounted for 26% of NO_x in 1997 and 64% of SO₂ emissions in 1997.

U.S., where power sector reforms have already set in place a supportive incentive structure. The approach is to transform the market for green power by promoting the formation of a green power buyers group.

PART I. PROMOTION OF ENVIRONMENTAL AND SOCIAL BENEFITS IN RESTRUCTURED POWER SECTORS

The shift in many countries from vertically integrated monopoly in the power sector to decentralized and regulated market competition poses new challenges for advocates of sustainable energy sources. The new market structure will have to provide systematic incentives to attract the private sector to investments that also contribute to environmental and social sustainability. However, this market design will take place in the context of structural inefficiencies, a shortage of cash and limited institutional capacity in many countries. Hence, the extent to which reforms incorporate explicit recognition of social and environmental interests depends on the political economy of the process, and whether and how various interests are voiced in the design of reforms. In this part of the paper, we lay out a framework within which to explore the reform process, so as to assess the opportunities provided by power sector reform for environmental and social gain.

Background: Competition and Privatization in the Electric Power Sector

The shift in the conventional wisdom in electric utility circles began with the privatization of power generation facilities in Chile in the early 1980s and privatization along with competition in the U.K. in the mid 1980s.⁴ The goal was to privatize previously publicly owned electricity infrastructure, and to introduce competition into a monopoly sector (Patterson 1999). Several industrialized countries have adopted variations of this approach. The different models are distinguished by the level at which competition has been introduced – generation (single buyer), generation and distribution (wholesale competition) and generation, distribution and consumption (retail competition) (Hunt and Shuttleworth 1996). The requisite policies include commercialization (government ownership but commercial principles in operation), privatization (a shift to private ownership), and unbundling (separation of generation, transmission, distribution and retailing of electricity). Here, the term “power sector reform” is used to refer to this broad set of changes.

In 1993, the World Bank made reform in the electric power sector an explicit condition of its continued lending for the power sector in borrower countries. In part, this shift in policy was based on an assessment of World Bank projects in the power sector which stated that continued investment in power projects was counter-productive when the sector was ridden with structural problems (Oliviera 1997; World Bank 1993b). The new policy called for developing countries to: establish transparent regulatory processes; commercialize and corporatize the power sector; allow for importation of power services in some cases; and encourage private investment in the power sector. The new policy also stated that the Bank should only lend to countries that demonstrated a commitment to these principles (World Bank 1993b). A separate paper laid out a four-point program to encourage energy efficiency in borrower countries (World Bank 1993a).⁵ This emphasis on reform in the power sector in developing countries is not unique to the World Bank, and is shared by a range of bilateral and multilateral donors. Since multilateral and

⁴ In the case of the U.K., the far-reaching implications of attempting to introduce competition into this sector were not fully appreciated by the early proponents of reform. Indeed, it is likely that there was no clear vision of how this transformation was to be achieved (Hunt and Shuttleworth 1996, p. 5).

⁵ A more recent statement of the World Bank’s environmental strategy in the energy sector is contained in the draft paper, “Fuel for Thought” (World Bank 1999).

bilateral development agencies are the only sources of financing to governments for policy reforms, they are a potentially important factor in determining the form of power sector reform in many developing countries. However, the degree of engagement, participation and influence of donor agencies remains to be examined.

The diagnosis of developing country problems in the power sector includes inefficient operation of existing capacity, theft of power, capacity shortfalls, and financial bankruptcy of public utilities. While the broad thrust of privatization and promotion of competition is common to the approach adopted by many countries,⁶ there is considerable debate over how to implement this vision. As a result, no single model of reform appears to have broad sanction as a uniform solution for the range of problems faced by developing countries. In addition, the models currently being promoted for developing countries are largely drawn from industrialized country experiences, and need to be closely examined for their applicability to developing countries (Bruggink 1997; Oliviera and MacKerron 1992; Oliviera 1997). For example, the implementation of regulated competition in developing countries may be hampered by: difficulties in establishing strong and independent regulators; the burden of capacity shortage; inefficient and run-down plants that may not be attractive to investors; small power sectors that are not large enough to support a market in generation; and the difficulty of simultaneously expanding access to affordable electricity and providing incentives to private sector investors.

What is at Stake in Electric Power Sector Reform?

There are considerable indirect and direct *environmental* interests at stake in the process of restructuring. These include local environmental effects of power generation such as particulate emissions, regional effects such as acid rain, and global effects such as climate change. If restructuring efforts manage to achieve a better functioning and less wasteful power sector, then these reforms could promote more efficient fuel use and fuel switching and hence indirectly result in positive environmental consequences.⁷ In addition, the reforms provide opportunities to introduce targeted incentives for private sector investment in end-use efficiency and renewable energy technologies (Crawford-Smith, Ellis, and Outhred 1996; Hagler-Bailly Services Inc. 1998; Kozloff 1998; Lee and Darani 1995). There may also be scope to tie these incentives to the Clean Development Mechanism that is in development as part of the Kyoto Protocol. The opportunity to shape these incentives provides a direct environmental interest.

Power sector restructuring also has *social* consequences. For example, in a restructured power sector the state has limited ability to promote social goals such as increasing access of rural populations and the poor to electricity services. In another example, reform will likely lead to electricity price increases in most countries, which could disproportionately affect the poor. As with environmental concerns, social impacts could be direct or indirect.

A key concern in the restructuring process is the *governance* structure of new regulatory processes. The process of reform in the power sector likely requires dismantling the control of political and economic interests over the power sector that have led to highly inefficient, ill-functioning and ill-managed power sectors in many countries. These interests include favored consumers who benefit from subsidies, politicians that follow populist policies, and bureaucrats

⁶ There are important exceptions, such as Norway, which has pursued competition without privatization (Magnus 1997).

⁷ It is also possible, however, that if competition results in lower prices, electricity demand will go up and neutralize some or all of the environmental gains from more efficient fuel use. In many developing countries, however, electricity is subsidized for some sectors, which suggests that, at least in the short run, prices will go up for at least some users as a result of restructuring.

with interests in retaining control over decision-making. The same combination of forces that has crippled state-led power sectors, or new forces unleashed by privatization, could potentially also threaten a restructured and unbundled private sector. Much depends on the governance mechanisms – the mechanism for tariff structures, transparency of the regulatory structure, processes of consultation etc. – built into the process of restructuring (Byrne and Govindrajalu 1997; PRAYAS 1999). Moreover, the chances of establishing an open and transparent governance structure for the power sector are improved if these norms are incorporated into the process of reform itself.

The process of reform dramatically increases the interests of *private capital* in the energy sector. The regulatory framework set in place through the restructuring efforts will largely determine the attractiveness of the sector to private capital, and also affect the degree to which environmental and social goals are internalized into the functioning of a privatized and unbundled power sector. If publicly owned assets are privatized in the course of reform, international private capital are the likely purchasers. These investors, drawing on their experience with deregulated power markets in the industrialized world, are also the most likely to establish new energy generation, transmission and distribution companies to take advantage of newly liberalized sectors. However, the state has a unique opportunity to shape the rules of investment to provide incentives for private capital to invest in appropriate fuel sources, green power and end-use efficiency.

Finally, financial sector reform, which is now being initiated in many developing countries, has implications for processes of power sector restructuring. At the national level, financial sector and power sector reform are both driven by the same current of liberalization and increased engagement of the private sector. It is useful to examine the extent to which reforms are being shaped by this broader ideological current versus by the specifics of the sector. At the sectoral level, power sector reforms will shape the profitability of investments, the time frame for returns, and the risk profile of investments. Financial sector reforms will influence how investors react to this new set of signals. Pathways that link the two sets of reforms might include: capital markets which determine whether and how private (particularly domestic) investors can mobilize capital; capital controls which change the time horizon of external investors; and reporting and transparency requirements for investments. A better understanding of the links between reforms in these two sectors would contribute to better design of reform in both sectors.

Towards a Public Benefits Agenda in Power Sector Reform

Bringing about power sector reform is by no means simply a technical matter. Reform will create many winners and losers from among government agencies, private sector actors, and consumer groups. Hence, the same strategy will not work in all places, and the form of power sector reform will be shaped by local politics as well as by local techno-economic considerations. For this reason, it is important to examine the political economy of the reform process in specific countries, to ask whether and how opportunities to advance environmental and social goals have been seized, by whom and with what effect, and, similarly, whether the potential costs of restructuring have been addressed.

The World Resources Institute will address this question in six countries that are in the process of power sector reform: Argentina, Bulgaria, Ghana, India, Indonesia, and South Africa. The premise of this work is that in order for reforms to yield public benefits, explicit attention to social and environmental concerns is required in the design of power sector reforms. In this section, we lay out a framework for research that examines the political economy of reform, with a view to understanding the potential for insertion of a public benefits agenda in reform processes.

A basic understanding of the technological, financial and organizational status of the sector is a necessary starting point for this research. In addition, a list of perceived problems in the sector and their causes will provide the basis for an understanding of the political economy of the sector.

The specific approach to reform of the power sector adopted in any country is likely to be shaped only partially by the initial diagnosis of problems in the sector. Of equal or more importance is the socio-political context for reforms, the relative power, capacity and voice of different interest groups, and the influence of outside actors such as donor agencies. Hence, while technical and economic considerations will provide some constraints on the range of choices, the final outcome of reforms is likely to be influenced by various entrenched interests in the sector, or by the intent to dislodge these interests. Interest groups might include government bureaucracies, private sector participants in the power sector, sectoral groups of consumers, NGOs with social or environmental agendas, and international financial agencies. These groups might shape various dimensions of sector reform, including pricing reform, governance and regulatory reform, unbundling, etc. In order to understand the process by which power sector reforms were designed, it is necessary to first identify these various interest groups, their degree of influence, and their stakes in the sector.

A careful disaggregation of the process by which power sector reforms were designed (and where appropriate, implemented) will provide an understanding of the political space for insertion of an environmental and social agenda. The first step is to identify the actors concerned with public benefits in the reform process, and their relative strengths and weaknesses. Second, it is relevant to ask how these concerns were raised and in what context. For example, expression of concern over local environmental issues is likely to appeal to a somewhat different constituency than a call to address global environmental problems. Third, the ability of actors who pursue this agenda (e.g. NGOs, some government bureaucracies, some donors) to influence outcomes depends on their access to decision-making, their relative power and ability to leverage change, their ability to mobilize constituencies for change, and the trade-offs with other elements of the reform process. It is important to examine the degree to which the reform process provides access to information and opportunities for consultation by various stakeholders. Finally, it is important to look also at the governance framework for the sector that emerged from the reform process, in order to assess whether the framework provides space for social and environmental constituencies to express their voice on an ongoing basis.

Donor agencies can influence the design of power sector reforms in several ways: donor articulation of development priorities (expressed in a Country Assistance Strategy); conditions on lending for the power sector; provision of technical assistance (often through consultants with industrialized country experience); and engagement with broader constituencies (domestic and foreign NGOs). The multiple avenues for donor influence and their relative effectiveness has been the subject of recent debates on aid effectiveness (World Bank 1998). The emerging consensus is that “arm-twisting” borrower governments is of limited effectiveness, particularly when it comes to complex institutional reforms, and where effective reform requires borrower “ownership” over reform processes. However, there is little clarity on what is meant by ownership, and on how it might be operationalized (Seymour and Dubash 2000). For example, is there only one readily discernable policy framework over which donors seek borrower ownership? Can a donor discern, in advance, commitment or lack thereof to a reform agenda? Is ownership a binary variable or are there degrees of ownership fragmented across actors in a reform process? Finally, can a donor help build “ownership” within a country?

In sum, a careful analysis of the roles of different governmental, civil society, private sector and international agency actors in designing power sector reforms will yield insight into the scope for

environmental and social incentives in power sector reform. However, creation of these incentives does not guarantee positive outcomes. Positive outcomes on the ground require that private sector actors react to these market signals by investing appropriately. In Part II, we describe an initiative in one industrialized economy, the United States, to mobilize the private sector to take advantage of deregulated retail markets by investing in renewable energy sources.

PART II. GREEN POWER MARKET DEVELOPMENT GROUP

Energy use is fundamental to economic activity - powering our homes, businesses, and transportation systems. Increasing use of fossil fuel has had the unintended consequence of increasing air pollution and greenhouse gas emissions. Today, a wide array of economically attractive and environmentally sustainable energy technologies are available that can effectively break the link between increasing energy use and increasing air pollution.

To address these issues, many have long advocated greater use of renewable energy sources – hydroelectric, wind, solar, geothermal and landfill gas – which dramatically reduce pollution. Though many of these renewable technologies are less developed than their conventional counterparts, technological improvement has been rapid, and costs are falling quickly.

In May 2000, the World Resources Institute launched the Green Power Market Development Group in partnership with ten multinational corporations⁸ and Business for Social Responsibility (BSR). The Green power Group is working together to help make green power more affordable and widely used in the United States by developing corporate markets for 1,000 megawatts (MW) of cost-competitive, new capacity green power by the year 2010. Total energy demand by partner companies represents 8% of total industrial electrical energy use in the U.S. A target of 1,000 MW would roughly meet 7% of their demand.

In late 2001, the Green Power Market Development Group will be seeking opportunities and interest to work with partners in Asia and around the world to help companies build energy strategies that support a clean energy future.

Through an intensive workgroup structure, companies learn about the opportunities for increasing their use of renewable resources through green power purchases from the grid and development of distributed power generation options. The project brings these potential purchasers of competitively priced renewable power together to develop tools and models for purchasing clean, renewable energy from green power suppliers.

By bringing together buyers, suppliers and distributors of renewable energy the project will demonstrate that by working together, companies can address some of the major economic, policy and technology challenges that are currently preventing companies throughout the United States from using renewable power. The agreements reached with participating companies will send a clear signal to the market that demand for cost-effective renewable resources exists and supporting renewable power generation is a good business decision for providers. To fulfill its own emissions reduction commitment, WRI will also participate as a buyer.⁹

Context for Green Power Development

The policy framework governing electricity supply is changing. Most importantly, the deregulation of retail electricity markets will allow commercial, industrial and residential customers to choose, for the first time, their electric utility provider. While the break-up of traditional utility monopolies will undoubtedly make electricity procurement more complex, it

⁸ Partner corporations are Alcoa, Cargill-Dow, Delphi Automotive, DuPont, General Motors, IBM, Interface, Johnson & Johnson, Kinko's and Pitney-Bowes.

⁹ As part of increased global climate protection efforts, WRI has committed itself to reducing emissions of carbon dioxide. We will reduce our net emissions to 7 percent below our 1990 levels by October 2000 and to zero or better by 2005.

offers companies the opportunity to customize their electricity use, either to lower costs or to secure certain supply attributes. In particular, companies will have greater opportunity to purchase environmentally friendly “green” power.

Companies face several incentives to include renewables as one part of their overall energy portfolio. First, purchase of renewables allows companies to reduce exposure to future air quality regulatory changes and liabilities. Pressure is growing for fuel prices to reflect differential environmental impacts. Including renewables as part of one’s energy mix would offer some insulation to an increase in fossil fuel-derived electricity, which a company might otherwise be wholly exposed to.

Second, even without imminent regulatory change, companies confront a growing customer and investor sensitivity to environmental issues. This can increasingly affect access to, and success in, certain markets. In deregulated markets, actual energy procurement decisions will become part of a company’s public image subject to the scrutiny of customers, shareholders and other stakeholders.

Third, distributed renewable technologies are already being installed to improve reliability of electricity supply. Business systems increasingly rely on 24 hour-a-day computer networks that depend upon a high quality, uninterrupted electricity supply. In addition, distributed technologies offer companies an alternative to grid power during peak pricing periods. In a growing number of cases, on-site generation may be not only environmentally beneficial but also economically sensible.

Finally, where companies can support the addition of new renewables capacity, they will be providing demonstrable leadership in the development of important new markets and in a sustainable future for our planet.

Emerging Corporate Activity

Several companies have already begun leading efforts to reduce greenhouse gas emissions through improved energy efficiency and purchasing cleaner power. Companies like General Motors have made commitments to reduce energy use by significant amounts through efficiency gains. Others like BP-Amoco have committed to a 10 percent reduction from 1990 levels of corporate greenhouse emissions by 2010 and DuPont has committed to reducing its emissions by 65 percent and to make 10 percent of its energy portfolio from cost-competitive renewables.

Despite the increasing availability of cleaner, more sustainable forms of electricity, greater public attention and increase interest from business leaders, the move towards green power has been relatively slow. Companies often have a hard time gathering information about renewable power and energy efficient technologies because of missed opportunities, the changing cost of technologies, and cost structures. While there are a number of programs designed to provide information and aggregate residential purchases of green power, no corresponding effort exists to aggregate industrial demand, which accounts for 34% of the \$200 billion electricity market.

Most companies need help identifying cost-effective ways to integrate green power into their power acquisition and environmental strategies. The economic and technical challenges they face are significant. Obstacles to purchasing green power include:

- making the business case for investing in green power and/or on-site power generation;

- overcoming high transaction costs associated with identifying potential green power providers;
- helping develop new green power products for commercial and industrial customers;
- overcoming regulatory barriers to purchasing power from renewable energy sources including monopoly structures
- differing state-by-state approaches to energy deregulation;
- differing technology options, including distributed vs. grid-connected power;
- varying definitions of green power;
- existence of utility monopolies;
- lack of regulatory incentives to purchase renewable power; and
- the need for validation that new, additional green electricity will be generated as a result of corporate purchases.

Rather than wait for market forces to play out, the activities of the Green Power Market Development Group help companies articulate a vision for long-term leadership on environmentally preferable energy consumption. We are working to reduce transaction costs for purchases, increase dialogue with a diverse set of energy suppliers, and ultimately, to increase green power investments.

The Buyers Group Model

WRI and BSR have been exploring buyers groups as an opportunity to change markets. Creating change in large industrial sectors is a tremendous challenge that can only be brought about by a combination of “push” forces (regulatory and stakeholder pressure) and “pull” forces (market demand). Within the current marketplace, improved environmental performance has been largely the result of a push strategy with external stakeholders – primarily regulators – setting standards and driving improved environmental performance. On the “pull” side, lack of demand for green products throughout the supply chain is specifically mentioned by leaders as an important barrier to investing in the capacity to produce green products. In the absence of this market pull or competitor activity, producers have little advantage to making significant changes or differentiating themselves based on environmental characteristics such as cleaner production or cost-effective alternatives.

As long as price, performance, and availability are ensured, an increasing number of companies – because of long-term business strategy, brand image, or internal corporate values – are interested in greening their products and addressing issues of environmental stewardship. This nascent corporate demand for environmentally preferred inputs offers a unique opportunity to use market forces to reduce environmental footprints.

One of the main barriers to investment in additional green energy capacity is the perceived lack of commitment by buyers. Green power is also perceived as relatively risky and so the costs of capital are higher and economies of scale more difficult to achieve. Buyers groups can overcome this problem by making purchasing commitments and aggregating demand.

The Buyers Group Model has worked successfully in other areas. Initiatives that were created in the 1990s to stimulate demand for products that are less damaging to the environment include

The Certified Forest Products Council,¹⁰ which helps member companies find suppliers of wood products that adhere to the principles of sustainable forestry. These efforts stimulate demand by providing credible information and cause-related marketing. With greater demand, responsible suppliers can generate competitive advantage from their investments. Other efforts, such as GreenSeal, Green-e and other green product certification efforts, endorse environmentally preferred consumer products in order to stimulate demand from “green” consumers.

The Buyer’s Group Model has several strengths. First, a group with significant size and long-term commitment could help overcome some of the current economic challenges to providing low-cost green power. Second, a group could raise and resolve barriers to green power penetration within operations of the interested buyers and investment barriers faced by the producers. Third, a large group would be able to attract the resources necessary to develop appropriate technical, legal, and financial strategies that could then be immediately shared and put to use within the group, and shared with other companies not part of the group.

This Green Power Market Development Group not only includes companies, but also policy and technical advisory groups to provide support. The Green Power Market Development Group is on WRI’s many collaborative efforts with the private sector on environmentally sustainable business development. WRI’s strategy is to convene companies, increase their understanding and awareness on key environmental issues and work with them towards a clean energy future.

¹⁰ <http://www.certifiedwood.org/> WRI played a formative role in the creation and incubation of CFPC.

CONCLUSION

This paper describes two distinct yet necessary strategies toward a clean energy future: research to understand the underlying decision-making process as a pre-requisite to inserting incentives for sustainable energy futures, and direct engagement of the private sector in clean energy investments.

Incorporating incentives for environmental and social goals into power sector reforms is critical to the development of clean energy markets. Private investors, who will play a major role in these deregulated power markets and developing strategies for their participation, such as creating buyers groups that aggregate their purchasing power, can also promote and accelerate the development of a clean energy market.

Reforms in the power sector bring potentially significant market opportunities. In order to realize these opportunities, however, significant work remains to be done – upstream, at the design change, and downstream, at the investment stage. This paper has sought to illustrate useful approaches to both stages.

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