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Unplugged - The Effect of the New World Electric Power Order on Renewable Energy Industries

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I. Introduction

Following the end of the Cold War, countries on every continent moved to market-driven economies—selling state-owned enterprises and structuring economic regimes to encourage private-sector investment and market competition. Many countries broke up vertically integrated monopolies in an effort to spur price reductions through competition.[1] In addition, many nations privatized state-owned enterprises in the hopes of infusing new management skills into these staid ventures.[2] This dynamic is at work in the world's electrical energy sector.[3]

Steadily increasing demand for electric energy has created requirements for new capital investments that exceed the ability of governments to provide. Consequently, nations have opened up their energy sectors in order to tap new capital sources, even when they have left their state-owned enterprises intact.[4]

Not since 1910, when Samuel Insull first advocated the electric utility monopoly,[5] has there been such a worldwide move toward the complete transformation of the electrical energy industry.[6] In the midst of this dramatic transformation, several electricity system models have emerged. None of these new electricity system models have reached a level of acceptance so as to replace Insull's electric utility monopoly model.[7] One model, however,

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[1] *See* David L. Moore & Diana M. DePinto, *Solving the Capital Crises: Energy Sector Restructuring, Commercialization and Privatization*, LATINFINANCE 19 (Supp. June 1994) (discussing project finance in Latin America).

[2] *See id.*

[3] *See id.*

[4] *See id.*

[5] *See* Ralph Cavanagh, *Responsible Power Marketing in an Increasingly Competitive Era*, 5 YALE J. ON REG. 331, 333-34 (1988) [hereinafter Cavanagh, *Responsible Power*] (citing Samuel Insull, Sell Your Product at a Price Which Will Enable You to Get a Monopoly, Address (Jan. 6, 1910), *in* CENTRAL STATION ELECTRIC SOURCE 116-17 (1915)).

[6] *See* Moore & DePinto, *supra* note 1, at 19.

[7] The sweeping reforms in Latin America have not been universal. Indeed, this is not a monolithic world, and in its 193 nation states and 57 overseas territories and dependencies there are countless combinations and permutations of electricity systems. *See, e.g.*, MINISTRY OF ENERGY, MINING AND PUBLIC SECTOR INDUSTRY, DOCUMENT INDICATING THE OUTLOOK FOR THE ELECTRIC POWER SYSTEM (1994) (describing an alternative model in place in Mexico).

has emerged as the most likely to supersede the electric utility monopoly model as the world standard—the "fully unbundled, competitive electricity market" model.[8]

The fully unbundled, competitive electricity market model was first advocated in the 1980s by Professor Stephen Littlechild of the United Kingdom[9] and by Sebastion Bernstein, then a member of the National Energy Commission of Chile.[10] In 1988, the Conservative government of the United Kingdom, under the leadership of Prime Minister Margaret Thatcher, adopted the "Littlechild Model."[11] In the aftermath of its adoption by the government of the United Kingdom, similar legislation implementing variations of this model has been enacted in Chile,[12] Peru,[13] Bolivia,[14] and Argentina[15] in South America—known as the

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[8] For an explanation of the fully unbundled, competitive electricity market model, see *infra* note 104 and accompanying text.

[9] *See* Stephen Littlechild, *Spot Pricing of Electricity: Arguments and Prospects*, ENERGY POLICY, Aug. 1988. Kyle Pope, *Utility Privatizations Backfire in the U.K.*, WALL ST. J., Mar. 30, 1995, at A10. Stephen Littlechild, an academic when he proposed the model, currently serves as head of the United Kingdom's Office of Electricity Regulation. *See generally id.* (noting that Littlechild "dreamed up the industry's incentive-based rate scheme nearly a decade ago").

[10] *See* Sebastion Bernstein, *Competition, Marginal Cost Tariffs and Spot Pricing in the Chilean Electric Power Sector*, ENERGY POLICY, Aug. 1988, at 369.

[11] *See* Tim Woolf, *Retail Competition in the Electricity Industry: Lessons from the United Kingdom*, ELECTRICITY J. 56, 57 (1994) (analyzing the impact of electricity industry reform in the United Kingdom).

[12] *See* CHILE FOREIGN INVESTMENT COMMITTEE, ENERGY INVESTMENT OPPORTUNITIES 10-11 (1995) (discussing the legal framework that guarantees "the rights of private ownership" of energy enterprises); *see also* Saud Siddique, *Financing Private Power in Latin America and the Carribean*, FIN. & DEV., Mar. 1995, at 18, 19 ("Chile's privatization program during the early 1980s involved the reorganization of the state power utilities and the sale of their assets to private investors to form a system of competing generation and distribution companies, with concomitant changes in pricing and management policies."). The first country that deregulated the power sector on the basis of unbundling their activities and creating a competitive market was Chile, which initiated its reforms in 1980. Privatization of all government-owned facilities was done in the period of 1982 to 1996.

[13] *See Peru*, INT'L PRIVATE POWER QUARTERLY, Second Quarter 1995, at 186, 188-89 [hereinafter *Peru*, Second Quarter 1995] (noting that, in November 1992, Peru removed most of the barriers to private ownership and operation of generation, transmission, and distribution facilities).

[14] *See* Ley de Electricidad (Law of Electricity) No. 1604 (Dec. 21, 1994) (Bol); *see also Bolivia*, INT'L PRIVATE POWER QUARTERLY, Second Quarter 1995, at 24, 26

"Southern Cone Model"[16]—and in Guatemala[17] in Central America. In addition, the model has been promoted, in concept, in the United States not only by academics, but also by the Federal Energy Regulatory Commission and the California Public Utilities Commission.[18] Moreover, Columbia, Costa Rica, the Dominican Republic, El Salvador, Honduras, Jamaica, Trinidad and Tobago, and Venezuela are considering introducing new electric power laws that will likely reflect this model.[19]

Central and South American countries are among the vanguard of nations reforming their electrical energy industry by adopting the Littlechild model. These same Central and South American

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[hereinafter *Bolivia*, Second Quarter 1995] (discussing the legislation, adopted in December 1994, that allowed privatization of the Empresa Nacional de Electricidad).

[15] *See* FELIX HELOU & MARTIN RODRIQUEZ PARDINA, TRANSFORMATION OF THE ELECTRICAL SECTOR §§ 1-3 (unpublished manuscript on file with author) (discussing the implementation of Ley Numero 24065 adopted in December 1991). Argentina's power sector reform was initiated in 1989 and privatization was completed between 1991 and 1994.

[16] *See* Peter Lalor & Hernan Garcia, *Reshaping Power Markets: Lessons from South America*, ELECTRICITY J. (Mar. 1996).

[17] *See* Ley General de Electricidad (General Law of Electricity), Borrador § 5-C2-24, Comision de Energia, Congreso de Republica (Oct. 1996) (Guatemala); Energy Commission Congress of the Republic of Guatemala, Draft Law 5-62-24. *See generally* A. John Armstrong, Legal and Institutional Issues Relating to Private Investment in the Guatemalan Energy Sector 4-11 (Oct. 1, 1991) (unpublished manuscript on file with author) (reviewing the laws of Guatemala that allow for private sector energy production (citing GUAT. CONST. § X, ART. 129)); MERIDIAN CORP., FOCUS ON GUATEMALA: A GEOTHERMAL INTERNATIONAL SERIES (1987) (discussing Guatemala's commitment to the free enterprise system and to the private sector).

[18] *See* Ralph Cavanagh, *The Future of America's Electric Utilities: Reconciling Deregulation and Least-Cost Planning*, ELECTRICITY J., May 1991, at 20, 20-22 [hereinafter Cavanagh, *Future*] (discussing changes in electric utilities); *see also* News Release, *CPUC Offers Electrical Restructuring Proposals for Comment*, California Public Utilities Commission (1995) (describing the restructuring suggestions that were proposed on May 24, 1995). The movement towards reform of the electricity industry in the United States is beginning to spread. *See* John Greenwald, *Power to the People*, TIME, Mar. 10, 1997, at 53, 53-54 (discussing the movement towards unbundling and deregulating the electricity industry in the United States).

[19] *See* Siddique, *supra* note 12, at 18, 19 (listing other Latin American nations that are considering adopting new electricity laws); *see also* Michael T. Burr, *Success in South America*, INDEP. ENERGY, May-June 1994, at 18, 18-23 [hereinafter Burr, *Success*] (discussing power development in Latin America). *See generally* Lisa Sedelnik, *Power Surge: Countries and Companies Connect to Electrify the Region*, LATINFINANCE, Oct. 1994, at 89, 89-91 (reviewing the electricity industry in Latin America).

nations represent a significant emerging market for the renewable energy industry; thus, there is a real and present necessity for the renewable energy industry to understand the implications of the enactment and institutionalization of the Littlechild model in Latin America and to develop a strategic approach for this market. These implications will have the most immediate and direct effect on that sector of the renewable energy industry that incorporates base-load or dispatchable power sources, such as geothermal, hydropower, bioenergy, and wind energy.[20] Unless new and innovative legal and financing approaches are developed, the implementation of the Littlechild model in Latin America may cause a major setback to the renewable energy industry's movement into new international markets.[21] The Littlechild model has stimulated and will continue to stimulate significant changes in the worldwide electrical energy industry.[22]

In order to evaluate the potential impact of the Littlechild and Southern Cone models on the renewable energy industry, one must understand the fundamental difference between the economies of the models and the economics of the renewable industry. The models mandate a focus on short-term prices and the renewable industry is dependent on long-term pricing.

For renewables, the bulk of a project's total lifetime cost is represented by the initial capital cost, and will be incurred before the project ever comes on line. The cost of a renewable energy is

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[20] *See* Agis Salpukas, *70's Dreams, 90's Realities*, N.Y. TIMES, April 11, 1995, at D8 (discussing the decline in popularity of renewables in the wake of widespread sector reforms). *See id.* at D9 (reviewing the various costs to produce different forms of renewable energy).

[21] *See generally* Francisco J. Gutierrez, *A Region in Transition*, INDEP. ENERGY, Jan. 1995, at 33, 36-37 (discussing the need for environmental responsibility in the Latin American electricity sectors).

[22] *See id.* at 37 (discussing changes and possible changes in the energy sectors of Latin American nations); *see also Chronological Summary Environmental Events in Latin America, 1995*, 6 COLO. J. INT'L ENVTL.L. & POL'Y 367, 368 (1995) [hereinafter *Chronological Summary*] (discussing the CONCAUSA Declaration). In the CONCAUSA Declaration, signed by the President of the United States and the leaders of several Central American countries in December 1994, the countries of the region committed themselves to "[e]stablish, as soon as possible, policy and regulatory reform that will increase the participation of the private-sector in the electricity sub-sector, and that will ensure reliable service and rational energy pricing."

in the technology effort exerted at the outset of a project and all of the renewable share "front-end-loaded" cost profiles. Consequently, the majority of new generation facilities are funded through project financing whereby the principal and interest (and profit) is paid from the proceeds of the project. The power purchase agreement rather than the credit-worthiness of the developer collateralizes the loan. Since renewable energy projects are front-end-loaded, the cost of capital significantly affects installed cost.

Renewable energy costs are competitive with those of conventional fuels if life-cycle costs are taken into consideration; but the new models virtually eliminate life-cycle cost considerations, threatening the viability of the renewable energy industry.

This Article will consider the effect of the new world electric power order on the renewable energy industry. Having posited that the renewable energy industry is in the midst of a classic paradigm shift, the Article will then consider whether such a shift foreshadows serious problems for the renewable energy industry, or merely signals a relatively benign change in circumstances. To explore this question, the Article will examine the current use of the Littlechild model by: (i) discussing the two electricity systems that traditionally dominated the industry;[23] (ii) describing pressures for reform of the status quo, including the need to generate private-sector capital, to respect worldwide environmental concerns, and to navigate the internal political and social mandates that confront developing countries;[24] and (iii) outlining the evolving reform trends.[25] The Article will then consider the implementation of the Littlechild model in the United Kingdom and Peru.[26] In addition, it will briefly review the implementation of the Littlechild model in Bolivia and Argentina.[27] Next, this Article will closely examine the potential impact of the Littlechild model on the renewable

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[23] *See infra* notes 30-51 and accompanying text.

[24] *See infra* notes 52-70 and accompanying text.

[25] *See infra* notes 71-102 and accompanying text.

[26] *See infra* notes 103-247 and accompanying text.

[27] *See infra* notes 248-65 and accompanying text.

energy community.[28] Finally, this Article will explore ways in which the renewable energy community can mobilize a responsive strategy and, in so doing, give direction to the countries that want to develop indigenous energy.[29]

II. Evolution to a New World Electricity Order

A. The Status Quo

The electric utility monopoly model is the predominant electric power industry model worldwide.[30] Self-generation, however, continues to be a supplementary model that has survived the demise of the integrated utility in many of the developing nations.[31]

1. The Self-Generation Model

The self-generation model prevailed during the industrial revolution.[32] Under this model, electricity is produced for self-use; for instance, each company produces the electricity that it needs to operate.[33] As industries multiplied in the early part of the twentieth century, economic efficiency dictated a move away from the self-generation model.[34]

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[28] *See infra* notes 266-91 and accompanying text.

[29] *See infra* notes 292-313 and accompanying text.

[30] *See* Cavanagh, *Responsible Power*, *supra* note 5, at 333-34.

[31] *See id.* at 332.

[32] *See generally id.* (discussing the history of the electric utility industry).

[33] *See id.*

[34] *See generally id.* (discussing the history of the electric utility industry). In 1910, Samual Insull stated:

> If you [electric utilities] will bring your price down to a point where you can compel the manufacturer to shut down his private plant because he will save money by doing so; if you can compel the street railway to shut down its generating plant; if you can compel the city waterworks, whether privately or publicly owned, to shut down its power plant because of the price you quote—then you will begin to realize the possibilities of this business, and these possibilities may exceed your wildest dreams.

Id. (alteration in original) (statement of Samuel Insull) (quoting Samuel Insull, Sell Your Product at a Price Which Will Enable You to Get a Monopoly, Address (Jan. 6, 1910), *in* CENT. STATION ELECTRIC SERVICE 116-17 (1915)).

Despite its decline, the self-generation model continues to supplement the electric utility monopoly model in developing countries like India and Peru. In India, for example, the delivery of electric power by utilities is unreliable; thus, for industrial survival, manufacturing facilities that require reliable electricity twenty-four hours a day generate their own electricity.[35] In Peru, the transmission systems do not reach some of the isolated mining areas of the country; thus, self-generation of electricity by the mining companies is required.[36]

2. *The Electric Utility Monopoly Model*

Throughout the twentieth century, the organization of the electric power industry has been heavily influenced by "[n]atural monopoly considerations."[37] The organization of the industry has been characterized by the integration of both the generation and the distribution of power.[38] This integration of generation and distribution brings economies of scale into both producing and distributing power.[39]

As competition increased during this century, some companies responded by focusing on base-load capacity, which uses generators with relatively low operating costs, such as coal plants.[40] By operating these types of plants at maximum capacity, an electric company is able to spread a plant's high fixed costs over many sales hours, thereby reducing rates.[41] As predicted by Samuel Insull,[42] the father of the electric utility monopoly model, these economies reduced electrical rates enough to remove the attractiveness of self-generation.[43]

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[35] *See* Bodhisatva Ganguli, *A Private Power Plan*, INDEP. ENERGY, Jan. 1995, at 18 (discussing the methods by which electricity is produced in India).

[36] *See Peru*, Second Quarter 1995, *supra* note 13, at 188 (noting that 1400 megawatts of electricity are self-generated by private industrial companies).

[37] Cavanagh, *Responsible Power*, *supra* note 5, at 334.

[38] *See id.*

[39] *See id.*

[40] *See id.* at 332 n.4.

[41] *See id.*

[42] *See supra* text accompanying note 2.

[43] *See* Cavanagh, *Responsible Power*, *supra* note 5, at 332.

The electric utility monopoly model is characterized by a move from self-generation to government participation.[44] At one end of the spectrum, total government ownership and control of the utility characterize government participation.[45] For instance, the governments of Kenya,[46] Indonesia, and Honduras own and control their respective utility industries. At the other end of the spectrum, the operation of the generation, transmission, and distribution facilities are controlled by the private sector, as is the case in Chile, and, to a lesser extent, Mexico.[47] In between these two extremes, one finds nations, like the United Kingdom, in which the electricity industry is privately owned and government-controlled.[48] In most of the developed nations, like the United States,[49] and increasingly in the developing countries, like the Philippines,[50] the electrical energy sector is characterized by a mix of government-owned, government-regulated, and privately owned systems. Generally, if a nation's utilities are privately owned, then the government grants exclusivity rights and guarantees asset-based rates of return.[51]

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[44] *See id.* (discussing the history of the electric utility industry).

[45] *See generally* Cavanagh, *Future*, *supra* note 18, at 21 (discussing the types of electricity monopolies that have existed and continue to exist around the world).

[46] *See generally* INVESTMENT PROMOTION CENTRE, INVESTOR'S GUIDE TO KENYA 7 (1989) (noting that all electricity in Kenya is supplied by Kenya Power and Lighting Company Ltd. and its affiliates).

[47] *See* Roger D. Feldman, *Power and Infrastructure Privatization in Mexico*, TRANSACTIONAL FINANCE (McDermott, Will & Emery, Washington, D.C.), Apr. 1993, at 6. *See generally* MINISTRY OF ENERGY, *supra* note 7 (describing the model in place in Mexico).

[48] *See generally* Woolf, *supra* note 11, at 57-60 (discussing the privatization of the United Kingdom's electricity industry and noting that the government of the United Kingdom "has been involved in nearly every aspect of the electricity industry").

[49] *See generally* Cavanagh, *Future*, *supra* note 18, at 21 (describing the electricity industry in the United States).

[50] *See generally* Dennis P. Pedron, Private Power Program in the Philippines 1-2 (Sept. 21, 1993) (unpublished manuscript on file with author) (discussing the electricity industry in the Philippines).

[51] *See generally* Cavanagh, *Responsible Power*, *supra* note 5, at 333-53 (describing marketing in the electricity industries of many nations).

B. *Pressures on Electric Utility Monopolies That Motivate Reform*

1. *The Need for New Sources of Capital for New Power Projects*

Despite the relative success of the electric utility monopoly model, the need for capital for new power projects served as a catalyst for change.[52] One major change occurred when nations began opening their electrical energy markets to private investment, which, in turn, made the industry more effective and cost competitive.[53] In developing countries, the majority of the state-owned utilities traditionally funded new power projects in three ways: (i) governmental appropriation, (ii) bilateral aid tied to equipment purchases, and (iii) World Bank funding.[54] Over the last decade, these systems of funding began to break down.[55] In particular, the funding dissipated because many governments experienced cash flow problems, many countries stopped offering bilateral aid, and the World Bank loans became more difficult to obtain due to the attachment of more demanding conditions to the loans.[56] At the same time, the worldwide demand for electrical energy created requirements for capital investment at a time when

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[52] *See* Moore & DePinto, *supra* note 1, at 19-20; *see also* Terry Newendorp, *Financing the 90s* 2 (Sept. 22, 1993) (unpublished manuscript, on file with author) (noting that the "shortage of public sector capital is one of the driving factors in the world's push toward privatization of many of the industrial and utility sectors that were previously controlled by governments"); Siddique, *supra* note 12, at 20-21 (discussing the need for capital to build new power projects in order to satisfy Latin America's electric power needs).

[53] *See* Moore & DePinto, *supra* note 1, at 22.

[54] *See* Ganguli, *supra* note 35, at 18 (discussing the financing methods used by the Indian government). *See generally* Siddique, *supra* note 12, at 20-21 (reviewing financing methods in Latin America).

[55] *See* Ganguli, *supra* note 35, at 18.

[56] *See id.* (discussing the problems that arose in implementing India's method of financing new energy projects); *see also* Sridhar Samudrala, *Opportunity Emerges*, INDEP. ENERGY, Jan. 1995, at 26 (discussing the difficulties faced by Indian energy companies in obtaining resources for projects); Michael T. Burr, *Survival of the Strategist*, INDEP. ENERGY, Oct. 1994, at 10 [hereinafter Burr, *Survival*] (noting worldwide capacity projections of 884 gigawatts of new capacity added by utilities and independent power producers through 2003).

state-owned utilities were unable to provide it.[57] Experts generally acknowledge that the electricity industry generates sufficient revenue to be self-sustaining. Indeed, realizing that the electric power industry is among the highest grossing industries in the world,[58] what caused the capital shortfall in the state-owned utility sector that created the current crisis?

This relationship becomes clear when one examines countries in which the electrical energy sectors were operated as instruments of government.[59] In those nations, funds generated by the electrical energy sector have been diverted into non-energy related social and political programs.[60] The energy sector, in general, and the electricity sector, in particular, have been historically a revenue source by which social policies, such as employment programs and subsidies to low-income customers, were financed.[61] This diversion of funds from the energy sector has resulted in a lack of available capital for needed investment in state-owned electricity systems.[62] In turn, the need for increased capitalization of state-owned electricity systems has placed, and is continuing to place significant pressure on many nations operating under the electric utility monopoly model.

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[57] *See* Moore & DePinto, *supra* note 1, at 19.

[58] The business of generating and distributing electricity engenders annual revenues estimated at more than $800 billion—twice the size of the world's automobile industry. *See* Christopher Flavin & Nicholas Lenssen, *Powering the Future: Blueprint for a Substantial Electricity Industry*, WORLDWATCH PAPER, June 1994, at 19. Although it may be debatable whether the electricity industry has been self-sustaining considering its historical debt dependency, one may reasonably argue that growth through debt rather than equity is a managerial choice that does not undermine the contention that a government-owned utility, without taxes or shareholder dividends to pay, could well be a self-sustaining industry. *See id.*

[59] *See generally* Moore & DePinto, *supra* note 1, at 19-20 (discussing the ways that governments control the electricity sector).

[60] *See generally id.* at 20-21 (noting that, in the past, the electricity sectors in many countries were using their capital to puruse social and political goals).

[61] *See* Moore & DePinto, *supra* note 1, at 20-21. German law supports the purchase of German coal. Quebec law subsidizes hydro electric dams. French law supports nuclear power. *See* Flavin & Lenssen, *supra* note 58, at 15.

[62] *See generally* Moore & DePinto, *supra* note 1, at 20 (noting that a government owned electric utility industry is not operated in an "economically efficient manner").

2. *The Need to Upgrade Existing Facilities*

Although the creation of private capital sources for funding new electricity sector capacity may be the overriding goal in the worldwide restructuring of the government-owned utility sector, there are a number of other significant problems with which both public and private utilities are coping—the upgrade of existing facilities to meet environmental imperatives, for example.[63]

International concerns about the environmental degradation resulting from the burning of non-renewable fossil fuels and about the concomitant effect on global warming, acid rain, and other air pollution problems must be considered by electrical industry strategists worldwide. In Latin America, the new environmental policies adopted by lending and technical assistance institutions dovetail into the economics of creating new environmental sources of funding to cope with these imperatives.[64] Even in countries in which there is little current need for new generation capacity, environmental concerns create pressures to make capital expenditures to address these concerns. For example, although demand for new power is relatively modest in the European Union, international and domestic pressure to reduce emissions of sulfur dioxide, nitrogen oxides, and particulates compelled some members of the European Union to clean up, re-power, and replace their already installed bases.[65]

3. *The Need to Infuse New Management*

In addition, the traditional electric utility monopoly feels pressure to change in order to realize an infusion of new management skills into a stagnant industry.[66] For instance, throughout Latin America, an overhaul of the management of the utility systems seems imperative in order to achieve adequate service delivery.[67] Generally, in nations operating under the

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[63] *See generally* Gutierrez, *supra* note 21, at 33-36 (discussing the increased desire of Latin American nations to become environmentally responsible).

[64] *See id.* at 21.

[65] *See* Michael Burr, *Harmonizing and Liberalizing*, INDEP. ENERGY, April 1994, at 21-22 (discussing current trends in Europe's power industry).

[66] *See* Moore & DePinto, *supra* note 1, at 20.

[67] *See* Gutierrez, *supra* note 21, at 33 (discussing the need for improved

electric utility monopoly model, it is perceived that the managers of electric utilities are insulated from accountability for their performance due to a growing bureaucracy and an ever-increasing political intrusiveness in managerial decisions.[68]

4. *The Need to Eliminate Subsidies and Rationalize Electricity Prices*

Finally, debtor countries are under increasing pressure from their multi-national lending institutions to bring tariffs into line with costs in order to meet debt burdens and as a condition precedent to obtaining new loans. Thus, countries such as Guatemala instituted rate hikes in response to pressure from their lending institutions.[69] After raising rates, these countries found themselves in turmoil, with the governments' political survival in jeopardy and the countries' continuing stability in question.[70] In essence, governments are reforming their electric utility industries because of the pressure to find a way to create downward pressure on costs and prices.

C. Evolving Trends in Electric Utility Monopoly Reform

There is not just one problem facing the world's electricity industry; and there is not just one solution to each problem. In fact, nations are either considering or implementing a wide variety of solutions. A litany of all that is occurring around the world would be extremely complex if described with accuracy, and inaccurate if oversimplified. Nevertheless, some simplification is necessary for the analytic purpose of this Article. With this caveat in mind, at least four predominant trends can be identified: (i) private sector investment of capital,[71] (ii) infusion of new management skills,[72] (iii) maximization of competition,[73] and (iv)

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management in the power sector in Latin America).

[68] *See id.*

[69] *See* Lee M. Goodwin, *Central America and the Carribean: No Place for the Unwary*, PUB. UTIL. FORT., Nov. 15, 1994, at 58.

[70] *See, e.g., id.*; Lee M. Goodwin, *Know Your Buyer*, PUB. UTIL. FORT., Apr. 1, 1994, at 37.

[71] *See infra* notes 75-80 and accompanying text.

[72] *See infra* notes 81-90 and accompanying text.

[73] *See infra* notes 91-95 and accompanying text.

purchase of new technologies.[74]

1. Private-Sector Investment of Capital

In one trend, governments are turning to the private-sector as a capital source to create new generation capacity and to clean up, re-power, and replace their existing facilities.

First, in order for a government to generate private-sector capital, it must amend its laws to allow private-sector investors to invest in and make a profit from the building of new generation, transmission, and distribution facilities.[75] This course of action implies some degree of private-sector ownership and control, and it suggests a concomitant relinquishment of existing government ownership of the electric utilities.[76] Other theoretical options, such as the Build-Own-Operate-Transfer (BOOT) concept, may be compatible with private-sector investment in some government monopolies, but they are not yet widespread in the electricity sector, where turnkey projects are still preferred.[77]

Second, some private-sector investors prefer to invest in cleaning up, re-powering, and replacing existing generation facilities.[78] For that reason, some governments restructure their

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[74] *See infra* notes 96-102 and accompanying text.

[75] *See* Anthony A. Churchill, *Beyond Project Finance*, ELECTRICITY J., June 2, 1995, at 23, 24-25.

[76] *See id.* at 24.

[77] *See id.* at 27-28 (discussing financing options and noting that some new options are beginning to emerge for private companies wanting to invest in the electricity sector). *But see* Pedron, *supra* note 50, at 1-2 (citing Republic Act No. 6957, An Act Authorizing Construction, Operation and Maintenance of Infrastructure Projects (July 1990) (Phil.)). The Act Authorizing Construction, Operation and Maintenance of Infrastructurre Projects was also known at the "BOT/BT [l]aw." *See id.* at 1. The BOT/BT law and its implementing rules and regulations set forth the mechanics of the implementation of both the Build, Own, Transfer (BOT) and the Build, Transfer (BT) infrastructure projects. *See id.* at 2. The BOT projects in the Philippines include the Hopewell Holdings Navotas Gas Turbines with 310 megawatts capacity and the Enron Power Corporation's Pinamucan, Batangas Diesel Power Plant with 105 megawatts capacity. *See id.* at 15. An example of the BTO model in the Philippines is the Liman, Bataan Combined Cycle Gas Turbine Power Plant with a 210 megawatts capacity. *See id.*

[78] *See* Ganguli, *supra* note 35, at 21; *see also* Gutierrez, *supra* note 21, at 34 (discussing the need to improve and make more efficient the current power plants in Latin America).

legal regimes to allow the sale, in whole or in part, of existing facilities to private-sector investors, thereby ensuring capitalization.[79] These governments either rely exclusively on the profit motive to ensure the desired upgrades or couple the sale with the condition that revenue will be reinvested in specified upgrades.[80] In either event, the sale of such facilities ends long-standing government monopolies.

2. *Infusion of New Management Into Existing Facilities*

In another trend, nations are attempting to infuse new and better management skills into their electric utilities.[81] Improving management skills implies managerial autonomy and performance accountability—in other words, control and ownership of electrical generating facilities.[82] Improving management by allowing control and ownership of electrical generating facilities is accomplished by either "privatization" or "capitalization."[83]

a. Privatization

When a country turns to "privatization" to infuse new management, the government sells assets, like an electrical generating facility, to a private investor.[84] The private investor then wholly owns the asset.[85] Just as the utility is infused with new management, the national treasury is infused with capital in the amount of the private investor's purchase price, thereby allowing the government to plug a fiscal deficit or to spend on state priorities.[86]

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[79] *See* Siddique, *supra* note 12, at 19.

[80] *See generally* Beth McGoldrick, *The 10 Most Creative Deals of 1994*, INFRASTRUCTURE FIN., Feb.-Mar. 1995, at 25 (discussing various elements of deals).

[81] *See* Moore & DePinto, *supra* note 1, at 20.

[82] *See id.*

[83] *See generally id.* at 20-23 (discussing privatization and capitalization in energy sector restructuring).

[84] *See id.* at 22 ("Privatization requires the transfer of ownership, as well as operational and administrative control, to the private sector.").

[85] *See id.* (noting that there are many techniques of privatizaton, including wholly owning the asset).

[86] *See id.* at 24 ("Privatization has been an effective tool for improving the fiscal health of a country by immediately reducing . . . the national debt."). Interestingly, many

b. Capitalization

Under a capitalization scheme, a government contributes a specific state asset that is matched by a capital contribution from a private investor equivalent to the market value of the asset.[87] A new corporation, generally jointly owned by the government and the private-sector "strategic investor," is formed to hold and manage the asset.[88] The private investor administers or manages the new corporation as its single largest stockholder.[89] Under a capitalization scheme, a nation benefits not only from the infusion of new management, but also from the fact that the capital remains with the company for new investment and production—an important benefit.[90] Moreover, for example in Bolivia, the government has sold its share of capitalized utility stock to an employee trust, thereby funding a retirement system.

3. Maximization of Competition

Some nations are opting to maximize competition in order to increase downward pressure on costs and prices.[91] Capitalism's conventional wisdom suggests that a nation's need for a new supply of energy is best filled by unleashing market forces, so long as inter-utility transmission is reasonably available to all who need it.[92] This is achieved primarily by transforming transmission systems into the functional equivalent of common carriers for transactions between generators and utilities that sell to end-users.[93] As a study by the British House of Commons suggested, increased competition "create[s] downward pressure on costs and

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of the world's lending institutions support privatization because it allows for a complete infusion of new management and, subsequently, operational efficiency.

87 *See id.* at 20 (discussing recent trends in commercialization).

88 *See id.*

89 *See* MINISTRY OF CAPITALIZATION OF BOLIVIA, CAPITALIZATION MONITOR 1 (Oct. 30, 1994).

90 *See* Moore & DePinto, *supra* note 1, at 20.

91 *See* Cavanagh, *Future*, *supra* note 18, at 22-23 (noting that the Federal Energy Regulatory Commission and elements of the faculties at Harvard College and the Massachusetts Institute of Technology are among the most enthusiastic of supporters of the deregulation of electric utilities).

92 *See id.* at 23.

93 *See id.*

prices, and ensure[s] that the customer, not the producer or distributor, comes first."[94] In essence, increased competition is an attempt to reduce costs and to boost supplies by spurring increased competition in the sale of kilowatt-hours.[95]

4. Development of New Technologies

Another trend finds national governments encouraging the development of new technologies in an attempt to reshape their utility industries.[96] An example of technology development is the advent of new generation technologies,[97] which have the potential of revolutionizing the electric power industry in much the same way the computer chip revolutionized business office machines and the communication industry.[98] Governments are advocating the development of technologies with a view towards improving energy efficiency and harnessing renewable energy resources economically and competitively.[99] Some suggest that these nations give only lip service to developing new technologies, but others point to the global treaty signed at the Earth Summit in Rio de Janeiro in 1992 as evidence of sincerity.[100]

Whether governments will support new technologies by merely encouraging research and development or by directly

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[94] HOUSE OF COMMONS ENERGY COMMITTEE, 1 CONSEQUENCES OF ELECTRICITY PRIVATIZATION ¶ 31 (1992) (discussing the underlying philosophy of privatization of the publicly owned electricity supply industry in England and Wales by the government of the United Kingdom).

[95] *See* Cavanagh, *Future*, *supra* note 18, at 23.

[96] *See* Roger D. Stark, *Private Investment in Latin American Infrastructure: The Next Wave*, TRANSACTIONAL FIN. (McDermott, Will & Emery, Washington, D.C.), Apr. 1993, at 7, 7-8.

[97] New generation technologies include gas turbines, wind turbines, and new electronic control technologies—each with varying degrees of proven performance in the field.

[98] *See* Flavin & Lenssen, *supra* note 58, at 7-9.

[99] *See United Kingdom*, INT'L PRIVATE POWER QUARTERLY, Second Quarter 1995, at 263 [hereinafter *United Kingdom*, Second Quarter 1995] (describing the desire of the government of the United Kingdom to increase private cogeneration projects).

[100] *See generally* CHRISTOPHER FLAVIN & NICHOLAS LENSSEN, POWER SURGE: GUIDE TO THE COMING ENERGY REVOLUTION 297-98 (1994) ("The world has now pledged to fundamentally transform an energy system that has served us well for many decades but that now puts our future at risk.").

subsidizing the technologies through such measures as tax increases or mandatory purchases is yet to be determined.[101] A look at Brazil's response to the 1992 Earth Summit initiatives provides some insight into this unanswered question. Following the 1992 Earth Summit, Brazil went to the Inter-American Development Bank (IADB), asking it to provide financial support for an investigation of ways to encourage energy efficiency and co-generation.[102] This illustrates the typical response of developing nations: if an international institution agrees to fund a study, then a national government will conduct a study.

III. The Unbundled Electricity Model

The most significant trend in the worldwide reform of the electric utility industry is the move towards the implementation of a "fully unbundled, competitive electricity market" model by an ever-increasing number of nations.[103] In the context of the electricity market, unbundling is the breaking up of an electric utility monopoly into three distinct areas: generation, transmission, and distribution.[104] The United Kingdom was the first to unbundle it's electric power industry.[105] The United Kingdom's experiment in creating an unbundled competitive electricity market was followed by the institutionalization of similar unbundled schemes in Chile,[106] Peru,[107] Argentina,[108] and

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[101] *See generally* Burr, *Survival*, *supra* note 56, at 10-12 (discussing the ways in which nations support new technology).

[102] *See id.* at 11.

[103] *See* Moore & DePinto, *supra* note 1, at 19-20; *see also* Roger D. Feldman, *Public-Private Ventures—A Strategy for Market Penetration,* INT'L BUS. & TRADE BRIEFS (McDermott, Will & Emery, Washington, D.C.), May 1, 1991, at 10; *see also* Siddique, *supra* note 12, at 18.

[104] *See* Churchill, *supra* note 75, at 30 (discussing the components of the electricity industry that may be unbundled); *see also* Siddique, *supra* note 12, at 18 (noting that an "important structural change that is occurring in many countries is the separation of generation from the transmission and distribution of power").

[105] *See* Pope, *supra* note 9, at A10.

[106] *See* Ley No 18.959, Ley General de Servicios Electricos (July 1992) (Chile) (Superintendencia de Electricidad y Combustibles de Chile); *see also* CHILE FOREIGN INVESTMENT COMMITTEE, *supra* note 12, at 10-11 (discussing Chile's unbundled scheme).

[107] *See* Ley No. 25844, Law of Electrical Concessions (1993) (Peru).

Bolivia.[109]

This section of the Article will review the implementation of the Littlechild model in the United Kingdom. It will then explore Peru's adoption of an unbundling scheme as an illustration of the way in which the unbundled, competitive electricity market model was and continues to be adapted in Latin America. This section will also briefly consider the ways in which the model has been enacted in Bolivia and Argentina.

A. The Littlechild Model in the United Kingdom

1. Implementation

In 1988, Stephen Littlechild, a British academic, proposed an incentive-based utility rate scheme[110] that was adopted by the Conservative-led government of the United Kingdom in its push for a "free market" change in direction from a central, "socialized" utility system.[111] With the enactment of the Electricity Act of 1989,[112] the British government split apart the monopoly of its government-operated electricity system and opened it up to new independent developers.[113]

The United Kingdom's version of the Littlechild model splits the electric power industry into three distinct components: generation, transmission, and distribution.[114] It also deals with two components that, while less distinct, are significant: marketing and regulation.[115]

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[108] *See* Ley No. 24.065 (1992), Electrical Energy Law, 27.306 Boletin Official de Argentina 1 (16 Gueves 1992) (Arg.); *see also* HELOU & PARDINA, *supra* note 15, at § 1.

[109] *See* Ley de Electricidad (Law of Electricity) No. 1488 (Dec. 20, 1994) (Bol.).

[110] For a more complete discussion of the genesis of the Littlechild model, see *supra* notes 9-11 and accompanying text.

[111] *See* Churchill, *supra* note 75, at 57 (describing the recent experiences of the British electricity industry); *see also* Pope, *supra* note 9, at A10.

[112] *See* Electricity Act, Ch. 29 (1989) (Eng.).

[113] *See* Edison Electric Institute, The British Model and Assessment, Power Supply Monograph No. 2 (Mar. 29, 1995).

[114] *See* Woolf, *supra* note 11, at 56 ("The electricity industry in the United Kingdom was recently privatized and restructured, resulting in separate generation, transmission, and distribution companies.").

[115] *See id.* at 57.

a. Generation

One of the major components of the subdivided British electricity utility is the generation component. In implementing the Littlechild model, the government sold its generation units to private-sector investors.[116] In addition to privatizing the existing generation units, the government also allowed Independent Power Producers (IPPs) to enter the market, thereby providing competition in the generation sector.[117]

b. Transmission

The National Grid Company, the owner and manager of the United Kingdom's transmission network, is owned by the twelve Regional Electricity Companies (RECs) that, in turn, own and operate the distribution system.[118] The National Grid Company (NGC) is responsible for the bulk transfer of electricity and the coordination of individual power plants in order to match supply and demand.[119] Interestingly, for peak capacity, the NGC operates 2000 megawatts of "pumped-storage hydro capacity."[120]

c. Distribution

The government also privatized the distribution system—the system that supplies retail electricity to customers.[121] The government established the twelve RECs to collectively own and operate the distribution system.[122] The government franchised each REC to ensure distribution of electricity to all, but it also allowed other entities to compete with the regional electricity

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[116] *See id.*

[117] *See id. See generally* Stephen Peppiatt, *Introduction to Power Station Project Financing*, 13 INT'L TAX & BUS. LAW. 46 (1995) (discussing Independent Power Project Financing).

[118] *See* Woolf, *supra* note 11, at 57.

[119] *See id.*

[120] *See United Kingdom*, Second Quarter 1995, *supra* note 99, at 262.

[121] *See* Woolf, *supra* note 11, at 57; *see also United Kingdom*, Second Quarter 1995, *supra* note 101, at 262.

[122] *See* Woolf, *supra* note 11, at 57; *see also United Kingdom*, Second Quarter 1995, *supra* note 101, at 262 (noting that the distribution of electricity falls to the 12 RECs).

companies to supply electricity within each franchise.[123] Generators, both the privatized generating companies and the IPPs, were able to sell retail electricity to any customer using more than 100 kilowatts of electricity.[124] The British government plans to extend this competition to all customers by 1998.[125]

d. Marketing

The government established an Electricity Pool, thereby creating a spot market in electricity.[126] The Electricity Pool decides upon the dispatch of power plants and provides a forum in which prices are set and payments for electricity traded are distributed.[127] In addition, the Electricity Pool provides payments to encourage electricity developers to construct plants that will generate capacity to satisfy peak demand.[128]

e. Regulation

The government of the United Kingdom also established the Office of Electricity Regulation (OFFER) to oversee the nation's privatized electricity industry.[129] The OFFER establishes pricing formulas for all three segments of the privatized electricity industry—the generation, the transmission, and the distribution businesses.[130] For instance, in both the generation and the distribution segments, the pricing formulas established by the OFFER are based on a price cap tied to inflation.[131]

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123 *See* Woolf, *supra* note 11, at 57.

124 *See* Steve Thomas, *Electric Reform in Great Britain: An Imperfect Model*, PUB. UTIL. FORT., 1996, at 20, 22. When first enacted, the law limited retail electricity sales to customers using more than one megawatt of electricity. *See id.* Subsequent government action decreased the amount to 100 kilowatts in 1994. *See id.* The government of the United Kingdom intends to extend retail competition to all customers by 1998. *See id.*

125 *See* Woolf, *supra* note 11, at 57.

126 *See id.*

127 *See id.*

128 *See id.*

129 *See id.*

130 *See id.*

131 *See id.*

2. *Results of Implementation*

a. *Profit Motive*

In implementing the Littlechild model, the United Kingdom restructured its rate base for both generators and distributors, establishing pricing formulas based on a price cap tied to inflation.[132] Under the price cap, the distributors (i.e., the RECs) may increase prices to customers at a rate 2.5% higher than the official rate of inflation in the United Kingdom.[133] As an incentive, the distributors are allowed to retain as profit the difference between the price cap and their operational costs, if the costs are below the price cap.[134] Conversely, if distributors are unable to contain costs and their costs exceed the price cap, then they lose money.[135] Thus, due to the pricing system, distributors in the United Kingdom have an economic incentive to minimize costs.[136] In other words, the Littlechild model motivates distributors to purchase the least expensive forms of generated electricity in order to drive down generation costs in the short-term.[137]

b. *New Capacity—Gas, Co-generation, and Expansions*

The important point from the perspective of the renewable energy industry—which is dependent on long-term power purchase agreements—is that the Littlechild market focuses on short-term generation costs, de-emphasizes longer range capacity considerations, making long-term power purchase agreements difficult, if not impossible, to negotiate.[138] This limitation on

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[132] *See id.* For purposes of comparison, the electric utilities in the United States use a rate base rate-of-return approach. *See id.*

[133] *See United Kingdom*, Second Quarter 1995, *supra* note 99, at 264 (discussing the pricing system and noting that the RECs increased prices by the maximum amount "for the last five years").

[134] *See* Woolf, *supra* note 11, at 57-58.

[135] *See id.*

[136] *See id.* at 58.

[137] *See id.*

[138] *See id.* ("This puts a significant damper on large capital investments (e.g., baseload plant), risky investments (e.g., renewables), or demand-side management

renewable capacity expansion, however, has not impeded construction of generation facilities that do not require high front-end expenditures. Following the implementation of the Littlechild model, construction of new capacity in the United Kingdom continued.[139] In fact, between 1989—the year in which the privatization of the electric power industry in the United Kingdom began—and 1995, the British government received applications to build twenty-eight new plants, totaling 22,370 megawatts.[140] Slightly more than fifty percent of these new projects had been financed. Much of this financed new capacity represented expansion of existing facilities.[141] The overwhelming majority of the new plants that were financed were to be gas-fired.[142] Of the remaining plants, 660 megawatts were to be lignite-fired,[143] over 900 megawatts were to be waste-fired,[144] and approximately 100 megawatts were to be wind energy.[145] Notably, the establishment of the new wind energy capacity was funded under the United Kingdom's renewable set-aside program.[146]

c. Renewable Set-Asides

The Littlechild model is based on a theoretical notion of perfect competition in the market system, free from government interference.[147] In practice, however, the government of the United Kingdom has remained involved in nearly every aspect of the

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(DSM).").

[139] *See generally United Kingdom,* Second Quarter 1995, *supra* note 99, at 253-64 (describing the construction of new power projects).

[140] *See id.* at 263 (discussing the private power needs of the United Kingdom).

[141] *See generally id.* at 254-62 (describing the new power projects in the United Kingdom).

[142] *See id.* at 256-58.

[143] *See id.* at 259 (describing two coal-fired plants).

[144] *See id.* at 259-60 (describing eight waste-fired plants).

[145] *See id.* at 260 (describing twelve wind projects and noting that National Wind plans to develop 250 megawatts of wind energy by 2000).

[146] *See id.* at 260 (noting that qualified wind power projects receive a special rate under the Non Fossil Fuel Obligation). It is also interesting to note that the majority of the smaller plants, 200 megawatts or less, that had been financed were co-generation units. *See id.* at 256-59.

[147] *See* Woolf, *supra* note 11, at 57.

electricity industry after its Littlechild model implementation.[148] For instance, one such intrusion was the establishment of the Non-Fossil Fuel Obligation (NFFO), a levy added to all retail electricity sales and used, in part, to subsidize nuclear energy.[149]

The NFFO was also designed to help finance renewable resource developers.[150] By providing a subsidy, the British government hoped to assist the private sector to overcome the barriers to developing renewable resources, especially the financial barriers created by the perceived high risks.[151] In 1993, the government of the United Kingdom expanded application of the NFFO in order to provide renewable developers up to fifteen to twenty years of financing.[152] The British government also set a goal of financing 1500 megawatts of renewable capacity by the turn of the century.[153]

In addition to these set-asides, the government of the United Kingdom created an Energy Savings Trust in order to reduce the costs of electricity and to meet environmental goals.[154] In establishing the Energy Savings Trust to increase energy efficiency, the government intended to finance this program by charging a fee to all electricity and gas customers.[155] This method of funding has been criticized as a regressive tax, and there is reason to believe that the trust may never achieve its purposes.[156]

In short, both the NFFO subsidy and the Energy Savings Trust were created to encourage the establishment of renewable resources in a competitive market system that would otherwise turn its back on renewable resources due to development costs.[157]

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148 *See generally id.* at 56-62 (discussing the many ways in which the British government remains actively involved in the privatized electricity industry).

149 *See id.* at 63 n.14 (discussing the establishment of the NFFO).

150 *See id.*

151 *See id.*

152 *See id.*

153 *See id.*; *see also NFFO3 Bid Prices Plummet*, POWER IN EUROPE, Jan. 12, 1995, at 8.

154 *See* Woolf, *supra* note 11, at 63 n.14.

155 *See id.*

156 *See id.* at 61.

157 *See id.*

3. Consumer Prices

In enacting the Littlechild model, the United Kingdom's stated goal was to "create downward pressure on costs and prices, and [to] ensure that the customer, not the producer or distributor, comes first."[158] In other words, one measure of the success of implementation of the Littlechild model is the price to the consumer. Commentators and analysts have reached diametrically opposite conclusions about whether the goal of lower electricity prices has been achieved.[159] Some observers, including the House of Commons Trade and Industry Committee, have concluded that cost savings have not found their way to customers.[160] In fact, the Trade and Industry Committee indicated that residential prices averaged twenty percent to twenty-five percent higher than would have been expected based on pre-privatization trends and that industrial prices averaged nineteen percent higher.[161] In contrast, in 1995, a consultant to the U.S. Department of Energy, after reviewing the reformed British system, concluded that, while nominal prices are up by six percent to twenty-four percent, real prices are generally down by one percent to ten percent.[162]

One observer, Gordon MacKerron, senior fellow at the Science Policy Research Institute of the University of Sussex, commenting on the United Kingdom's system, noted that prices increased just before privatization and that price reductions were not realized by the consumers for approximately five years.[163] MacKerron

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[158] *See* Cavanagh, *Future*, *supra* note 18, at 23.

[159] *See generally* Woolf, *supra* note 11, at 62 (discussing the different views that analysts have of the implementation of the Littlechild model in the United Kingdom).

[160] *See* HOUSE OF COMMONS TRADE & INDUSTRY COMMITTEE, BRITISH ENERGY POLICY AND THE MARKET FOR COAL 295 (Jan. 1993) [hereinafter TRADE & INDUSTRY COMMITTEE] (reporting that the shareholders of the regulated electric distribution companies, not the customers, were the beneficiaries of privatization and efficiency); *see also* Woolf, *supra* note 11, at 57-58 (noting that "customers have not yet seen any benefits of privatization in terms of electricity prices" (citing G. YARROW, BRITISH ELECTRICITY PRICES SINCE PRIVATIZATION 33 (1992))).

[161] *See* TRADE & INDUSTRY COMMITTEE, *supra* note 160, at 295.

[162] *See* U.S. DEPARTMENT OF ENERGY, POTENTIAL IMPACTS OF ELECTRIC ENERGY RESTRUCTURING 20 (June 6, 1995) (report prepared by Brattle/IRI) (describing the British electricity industry and discussing lessons that can be drawn from it).

[163] *See Warnings on Restructuring from Abroad*, SOLAR LETTER, July 7, 1995, at

observed that "in generation, the market has been dominated by the two incumbent private generators, to such an extent that OFFER ... has imposed a two-year price control on the 'pool' (the wholesale market) and is trying to force both companies to divest" plant ownership in the amount of nearly 6000 megawatts.[164] He also noted that, in order to achieve lower prices, the government originally foresaw dividing the generation assets into three companies and encouraging new private sector participants in the generation sector as part of horizontal reforms for the industry.[165]

In addition, the British government attempted to stimulate reductions in customers' prices by allowing customers a choice of suppliers, thereby increasing competition among suppliers and stimulating price reductions.[166] Thus, beginning in 1990, the government planned to allow customers with a demand of more than one megawatt to have a free choice of suppliers.[167] Thereafter, the government was to extend choice of suppliers to 100-kilowatt customers in 1994 and to all 22 million consumers in 1998.[168] In short, the privatization of the electric utility industry in the United Kingdom has not resulted in timely price reductions for consumers.[169]

The question of how long a new system must be in place before the effect of competition on prices flows through to customers remains open. Until that question is answered, it should at least be noted that the corporate profits of these private electricity companies have risen.[170] In March 1995, Stephen Littlechild, as director general of the United Kingdom's Office of

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219 [hereinafter *Warnings*] (noting that the United Kingdom's experiment with the Littlechild model revealed that "renewables and other sources could be in for some trouble in as so-called competitive market"). *See generally* GORDON MACKERRON, THE U.K. ENERGY EXPERIENCE: A MODEL OR A WARNING? (1996) (discussing the effects of the adoption of the Littlechild model in the United Kingdom).

164 *Id.* (second alteration in original) (internal quotation marks omitted).

165 *See id.*

166 *See* Thomas, *supra* note 124, at 22.

167 *See Warnings*, *supra* note 163, at 219.

168 *See id.* (noting that MacKerron believed the 1998 goal to be possible only if there was a large expansion in regulatory powers).

169 *See* Woolf, *supra* note 11, at 62.

170 *See United Kingdom,* Second Quarter 1995, *supra* note 99, at 263-64.

Electricity Regulator, announced that a new round of electric company price controls was being studied with a view towards decreasing the profits that have passed through to private utility stockholders.[171]

B. The Unbundled Electricity Model in Peru

The reforms of Peru's President Alberto Fujimori graphically illustrate the policy concerns that underlie the reforms that are opening the Latin American market in the electricity sector and producing opportunities and challenges for U.S. renewable energy industries. The centerpiece of President Fujimori's policy reforms was the decision to shift politico-economic decision-making from the government to the free market, thereby allowing economic decisions to be based on market signals rather than structured planning.[172] Peru's adoption of this policy will have profound implications on the renewable industries as they attempt to gain toeholds in Peru.

1. Historical Background

National policy is seldom established in a vacuum, and its full import cannot be appreciated except in the historical context in which it came into being. In the early 1990s, Peru's politico-economic picture was dismal.[173] The terrorist activities of *Sendero Luminoso* (Shining Path), a group of freedom fighters, threatened the stability of the government, the personal safety of the citizens, and the active life of the community.[174] Moreover, Peru had been bankrupt since 1987, and the inflation rate had soared to

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[171] *See id.* at 263; *see also* Pope, *supra* note 9, at A10 ("In a sign of how tough times have become for the electric utilities, the first of a new round of rate cuts, some as much as 4%, began yesterday.").

[172] *See* Alan Kovski, *Petroperu sell-off delayed until elections; firms poised to take plunge into upstream*, OIL DAILY, Jan. 19, 1995, at 1 (discussing the 1995 Peruvian elections and the reform efforts led by Fujimori). *See generally Peru,* Second Quarter 1995, *supra* note 13, at 188-91 (discussing the purposes behind the reforms in the electricity industry in Peru).

[173] *See generally id.* at 189 (discussing the business climate in Peru).

[174] *See generally id.* at 190 ("Peruvian businesses spend between 2% and 7% of their annual operating budget on security measures to protect against terrorists.").

remarkable levels.[175] Then, in 1990, the country elected the little-known Alberto Fujimori, an independent, on an anti-corruption platform.[176] In an extraordinary series of actions designed to end the activities of the terrorists and to revive the economy, President Fujimori dismissed the parliament, replaced it with an unelected Constitute Congress, introduced a new constitution, and launched a successful anti-terrorist campaign.[177]

In perhaps an even more extraordinary action, President Fujimori, after first consolidating enormous power in his government, transferred much of that power to the private-sector.[178] In the process, his government initiated constitutional, legislative, and regulatory reforms designed to inhibit, if not prevent, reversion to a government-dominated economy.[179] By reducing government size,[180] much of the resistance to change generated by entrenched government bureaucracies disappeared. In response to these reforms, inflation dropped dramatically,[181] the gross national product jump-started at ten percent and leveled off at a respectable five percent to six percent, and, in 1996, Peruvians expressed their support for the reforms by re-electing President Fujimori.[182]

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[175] *See id.* at 189 (noting that Peru was still negotiating with the international banking community to relieve some of its $18.5 billion foreign debt and that the inflation rate was 3400% in 1989).

[176] *See* ELECTROPERU S.A., PRIVATISATION OF THE ELECTRICITY GENERATION AND TRANSMISSION BUSINESSES OF THE CENTRO NORTE INTERCONNECTED SYSTEM OF ELECTROPERU S.A. 3A (N.M. Rothschild & Sons Limited, Sept. 1994) [hereinafter PRIVATISATION] (profiling the privatization effort in the country of Peru).

[177] *See Peru,* Second Quarter 1995, *supra* note 13, at 190 (reviewing the political tactics employed by Fujimori in his reform effort, and noting that Abimeal Guzman, the leader of Sendero Luminoso, was captured).

[178] *See generally id.* at 188 (noting that, in 1992, the Peruvian government "removed virtually all barriers to the private ownership and operation of generating, transmission and distribution facilities").

[179] *See id.* at 189-90.

[180] *See* PRIVATISATION, *supra* note 176, at 3A. For instance, in the case of the Ministry of Energy and Mines, as many as nine out of ten employees were "retired."

[181] *See generally Peru,* Second Quarter 1995, *supra* note 13, at 189 (noting that inflation fell from 3400% in 1989 to about 60% in 1992); PRIVATISATION, *supra* note 176, at 3A (noting that inflation dropped from 7000% in 1990 to 39% in 1993).

[182] *See Peru Re-elects Alberto Fujimori*, ROCKY MTN. NEWS, Apr. 16, 1995, at 82A.

Peru's private-sector policies were designed to help it meet immediate national goals.[183] The sale of government assets alleviated some of the country's debt burden, entrepreneurial investment bolstered the economy, and competition lowered consumer prices.[184] In fact, Peru is relying upon the private-sector to an unprecedented extent to fund its strategic reserves, to pay its international debt, and to handle long-term strategic planning.[185] However, using the private-sector to meet short-term goals may have created long-term problems in the electricity sector. Renewable generating facilities and rural electrification development have to be funded and made attractive to a private industry that has cherry-picked the choice generation and distribution assignments.

2. *Unbundling Peru's Electricity Market*

President Fujimori's privatization policies are embodied in the restructured electricity sector in Peru.[186] As the electricity sector currently operates, all energy sources in Peru compete within a fully unbundled, competitive electricity market in which government action is very limited.[187]

Peru used three mechanisms to institutionalize the free market system in the electricity sector. First, Peru privatized the electricity industry by transferring state-owned electricity companies to private investors.[188] Second, Peru fully unbundled its electricity market by splitting the electricity power industry into three distinct components—generation, transmission, and distribution—and by keeping a company in one subsector from

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[183] *See Peru,* Second Quarter 1995, *supra* note 13, at 189-90; *see also* Moore & DePinto, *supra* note 1, at 24 (discussing the ways in which nations reap the benefits of privatization).

[184] *See generally Peru,* Second Quarter 1995, *supra* note 13, at 189-90 (describing improvements to Peru's business climate)

[185] *See* Moore & DePinto, *supra* note 1, at 24; *see also Peru,* Second Quarter 1995, *supra* note 13, at 189-90.

[186] *See* Burr, *Success*, *supra* note 18, at 23; *see also* Kovski, *supra* note 172, at 1 (discussing the privatization of Peru's electricity industry).

[187] *See id; see also Peru,* Second Quarter 1995, *supra* note 13, at 188.

[188] *See* Burr, *Success*, *supra* note 19, at 23.

owning a company in another.[189] Finally, Peru established a competitive electricity market by treating the sale of electricity as a commercial business.[190]

The government of Peru opted to "privatize" its electricity infrastructure, as opposed to Bolivia's government, which decided to "capitalize" its electric industry.[191] Under Bolivia's capitalization scheme, the government retains a non-controlling interest in the state electricity assets; thus, the private investor does not wholly own an electrical plant, rather the private investor makes a capital contribution that remains with the company and is channeled into new investment and production for that plant or company.[192] Peru, however, decided to privatize its electric utilities, because it needed an infusion of hard currency in order to stabilize its national bank reserves, thereby allowing it to emerge from international bankruptcy.[193] Thus, the proceeds from the sales of government assets to the private sector enabled Peru to service its debts pursuant to its agreements with the International Monetary Fund, the World Bank, and the Paris Club.[194]

In privatizing the electric power sector, Peru divided the sector into three primary components—generation, transmission, and distribution.[195] Like the United Kingdom, Peru included marketing and regulation in its privatized electricity sector.[196]

First, Peru divided its generation component into ten units, seven in the Central North Interconnected System (SICN) and three in the South Interconnected System (SIS). The country is in the process of privatizing the ten major generation units that

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189 *See id.* (discussing the unbundling of the electricity industry).

190 *See id.* (noting that Peru instituted "an innovative electricity pricing system that uses market rates to set marginal cost tariffs").

191 *See Peru,* Second Quarter 1995, *supra* note 13, at 186; *Bolivia,* Second Quarter 1995, *supra* note 14, at 24.

192 *See Bolivia,* Second Quarter 1995, *supra* note 14, at 26.

193 *See* Moore & DePinto, *supra* note 1, at 24.

194 *See generally id.* (discussing the ways in which privatization allows nations to reduce their national debts).

195 *See* Decree Law No. 25844, Law of Electrical Concessions (1993) (Peru); *see also* Burr, *Success*, *supra* note 19, at 23.

196 *See id.*

comprise this system. Peru opted to privatize this sector by offering a majority interest in the assets of a generating station or of a group of generating stations.[197]

The government established eleven regional distribution companies, ten of which are connected to the main transmission systems—seven to SICN, three to SIS. The distribution companies are also in the process of selling a sixty percent interest in each of the distribution companies.

In addition, Peru is planning to establish a private transmission company in each of the interconnected systems in the nation.[198] Then, the Peruvian government intends to privatize the primary transmission assets in each of the interconnected grid sectors.

The reformed Peruvian electricity industry, like the United Kingdom's scheme, is organized to create a spot market in electricity. The primary transmitters and significant generators in each interconnected system are required to establish an electricity pool, named the Committee for the Economic Operation of the System (COES).[199] The COES must perform certain basic functions, including the performance of the calculations to be used by the autonomous regulatory authority, the Electrical Tariffs Commission (CTE).[200] The COES guarantees member generators the sale of all their firm capacity at the regulated price, as well as the purchase or sale of energy at the short-run marginal cost.[201]

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[197] *See Peru*, Second Quarter 1995, *supra* note 13, at 190 (discussing the way in which the parts of the electricity industry will be sold to the private sector).

[198] The two major systems are the Centro Norte Interconnected System and the Sur Interconnected System. *See* Decree Law No. 25844, Law of Electrical Concessions, Temporary Provisions (1993) (Peru). In addition, there are a number of isolated and small scale electricity systems.

[199] *See Peru*, Second Quarter 1995, *supra* note 13, at 189 (discussing the need to form COESs).

[200] *See generally id.* (discussing the important functions of the Electricity Tariffs Commission). The Electricity Tariffs Commission is also translated as the Electric Rates Commission. *See id.*

[201] *See* Decree Law No. 25844, Law of Electrical Concessions, art. 41 (1993) (Peru).

The CTE regulates electricity prices.[202] The COES performs the calculations,[203] while the CTE sets the regulated tariffs.[204] The Peruvian electricity law provides for the regulation of prices for three things: (1) the sale of electricity to distribution concessions for the purpose of supplying Public Electricity Service Customers;[205] (2) payments for use of transmission systems;[206] and (3) sales of capacity and energy between generators up to the firm capacity and energy of the purchaser.[207] The law specifically states that the prices for other sales and activities will not be regulated.[208]

Peru's fully unbundled, competitive electricity market resembles the Littlechild model. The Peruvian privatization is set forth in the Electricity Concessions Law that was promulgated in November 1992.[209] This law defines four types of transactions within the Peruvian market. The first transaction is the "Free Market," and it is applied between major customers whose consumption exceeds one megawatt. Second, the "Spot Market" applies to transactions at a given moment under unforeseen conditions of supply and demand. Third, the "Inter Generator Market" is for transactions between electricity generating

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202 *See Peru*, Second Quarter 1995, *supra* note 13, at 189. The CTE has five members. *See id.* CTE members are selected from the industry ministry, the energy and mines industry, the economy and finance ministry, the transmission concessionaires, and the generation concessionaires. *See id.* In order to be a member of the board, a director must have at least fifteen years experience in the industry, must have a good reputation, and must be professionally competent. *See* Decree Law No. 25844, Law of Electrical Concessions, art. 12 (1993) (Peru). There is also a long list of things that will keep a person from serving as a director; this list is aimed at preventing conflicts of interest. *See* Decree Law No. 25844, Law of Electrical Concessions, art. 14 (1993) (Peru).

203 *See* Decree Law No. 25844, Law of Electrical Concessions, art. 41 (1993) (Peru).

204 *See Peru*, Second Quarter 1995, *supra* note 13, at 189 ("[T]he Electric Rates Commission (CTE) will set, review and modify rates.").

205 *See* Decree Law No. 25844, Law of Electrical Concessions, art. 43(c) (1993) (Peru). *See generally* Decree Law No. 25844, Law of Electrical Concessions, art. 2 (1993) (Peru) (regarding public electricity service). Public Electricity Service Customers are electricity consumers whose maximum demand is less than one megawatt.

206 *See id.*, art. 43(b).

207 *See id.* art. 43(a).

208 *See id.* art. 44.

209 *See id.*

companies. These transactions are calculated at marginal cost corresponding to real time system operation. Finally, the "Public Service Market" is used by customers whose consumption is less than one megawatt. The rates for these transactions are fixed by a calculus incorporating short-term marginal cost plus distribution value-added costs.

3. *New Capacity Under the Littlechild Model as Enacted in Peru*

The Littlechild model, in its various manifestations, does not set forth a comprehensive framework to guide the process of bringing new generation on line. In this respect, it is particularly interesting to consider the way a nation's unbundled electricity industry, which generally uses short-term pricing, makes long-term plans for new electricity generation. Peru's experience in long-term planning in the electricity industry serves as an example.

a. *No Long-Term System Planning or Load Forecasting Makes it Difficult to Justify Resource Exploration*

Although the government of Peru ostensibly retained a vestige of its long-term planning responsibility, it in fact gave up a good deal of its long-term planning authority.[210] Under the Law of Electrical Concessions, the Ministry of Energy and Mines (MEM) is responsible for a Reference Plan, which is a tentative program that studies the generation and transmission projects that will cover medium-term demand growth.[211] Although the MEM grants concessions and authorizations to prospective generators[212] and has control over new entrants, it retains neither the fiscal wherewithal to finance nor the mandate to enforce private-sector development of new generation capacity.[213] The CTE is responsible for

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[210] *See Peru*, Second Quarter 1995, *supra* note 13, at 188.

[211] *See* Decree Law No. 25844, Law of Electrical Concessions, Definition Annex (1993) (Peru) (defining the Reference Plan in the Peruvian electricity system).

[212] *See generally id.* arts. 22-38 (setting forth the powers of the MEM with respect to concessions and authorizations).

[213] *See Peru*, Second Quarter 1995, *supra* note 13, at 188-89 (discussing the

conducting the relevant studies and for setting forth the replacement cost of transmission and distribution systems in setting electricity tariffs, but the CTE is not responsible for the generation systems.[214]

A system analysis of electricity generation in Peru falls, in the first instance, to the electricity pool.[215] For instance, in Peru, the COES is charged with "guaranteeing the reliability of the electrical energy supply" for the entire nation.[216] In this regard, each COES is obligated to project a forty-eight month demand from among the customers in its system and to plan a generation and transmission works program, taking into account both works under construction and works contemplated in the Reference Plan prepared by the MEM.[217] Since some of the members of the COES are, by law, representatives of the existing generator concessionaires,[218] they may have a conflict of interest that could effectively discourage the growth of new generator capacity from sources other than the existing generator concessionaires.

Practically, the impetus for expansion of new generator capacity falls to the distributor concessionaires. The distributor concessionaires have the most obvious motivation for encouraging the development of new generation concessions and more economical generation concessions within a grid.[219] In addition to the distributor concessionaires, the existing generation concessionaires are also in a position to play a decisive role in determining new capacity for the system. Since the Electrical Concessions Law allows generators to market power and energy in any busbar of the main transmission system and to connect to the main system through secondary systems,[220] each of the generation

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MEM's regulatory role).

214 *See* Decree Law No. 25844, Law of Electrical Concessions, art. 18(j) (1993) (Peru).

215 *See Peru*, Second Quarter 1995, *supra* note 13, at 189.

216 Decree Law No. 25844, Law of Electrical Concessions, art. 39 (1993) (Peru).

217 *See id.* art. 47; *see also Peru*, Second Quarter 1995, *supra* note 13, at 189.

218 *See* Decree Law No. 25844, Law of Electrical Concessions, art. 39 (1993) (Peru).

219 It should be noted, however, that generator concessionaires may contract with third parties for power. *See id.* art. 40(f) (1993) (Peru).

220 *See id.* arts. 58-60.

concessionaires is in a position to consider system capacity in much the same way that a central governing authority or utility is in a position to consider system capacity under the electric utility monopoly model. It is less clear, however, to what extent all of the generation concessionaires within a single transmission system will be allowed to jointly study and act on system long-term planning due to the anti-monopoly policies in place in Peru.

b. Pricing Characteristics

There are two fundamental pricing characteristics in Peru's scheme. These pricing characteristics will determine the fate of any proposed investment in generating capacity. First, when a generator contracts with a distributor to supply capacity and electricity that is destined for the general consumer, the generator is prohibited from agreeing to a fixed price that exceeds the busbar price that was calculated by the electricity pool and set by the CTE. Second, when a distributor enters into a contractual relationship with a generating company, the contract must, by law, be for a minimum term of twenty-four months.[221] Contracts may include terms that are longer than twenty-four months, but it is difficult to imagine a distributor's motivation to enter into a contract for a longer term, unless it receives a price break for entering the agreement.

The Peruvian system was designed to encourage the development of only those generation facilities that are likely to meet cost and profit requirements at a price below the foreseeable busbar rates. Firm-price private power projects that are developed in nations that have not adopted the Littlechild or Southern Cone system have some flexibility in planning for rising costs. In Peru, or other nations that have adopted one of these models, however, a generator developing a new generating facility must be concerned that the costs of the utility system will change and that the costs of the new systems, like cost overruns, will effect the costs of the system as a whole and, subsequently, the busbar rates. In the way that the formulas adopted by Peru actually work, prices will always lag behind the actual costs of new facilities.

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[221] *See id.* art. 34(b).

c. *Power Purchase Agreement in the Peruvian Version of the Littlechild Model*

In undertaking the financing and construction of an infrastructure facility, the heart of the private-sector investment is the contractual arrangement that allows the investor to charge fees sufficient to allow the investor to recover construction costs, operating costs, and maintenance costs, and to afford the investor an opportunity to receive a reasonable profit. The price that consumers pay is an important factor in stimulating private power development, and the predictability of recapturing costs is essential to financing development. The way in which predictable prices effectively stimulate private-sector investment is evidenced by the results of the U.S. Public Utility Regulatory Act of 1978 (PURPA).[222] For example, following the enactment of the PURPA, the California Public Utilities Commission developed a series of standard fixed price contracts to be used by the private power developers wanting to sell power to the utility grid. As a result of these "take-and-pay" contracts, more than ten thousand megawatts of private generation were brought on-line in California.[223]

However, the "take-and-pay" agreements, like those used in California, have met with worldwide resistance. For example, the President and Director of the PLN, the state-owned electric utility of Indonesia, stated that, while he recognizes that the lack of a guaranteed price makes the private-sector reluctant to invest in power production, governments should attempt to stimulate true competition and to arrive at the least-cost generation mix, rather than making take-and-pay guarantees.[224]

In theory, any new generating company, including a renewable energy company, is allowed to come to Peru, receive a temporary

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[222] *See* Michael Oldak, *PURPA in a Competitive Environment*, EDISON TIMES, June 1995, at 12.

[223] *See generally* USAID, SUMMARY OF THE INTERNATIONAL WORKSHOP ON OPPORTUNITIES FOR THE PRIVATE-SECTOR POWER GENERATION IN INDONESIA, REPORT NUMBER 89-17 (1989) (reporting on a workshop that took place March 6-8, 1989 in Jakarta, including a discussion of the success of PURPA in California).

[224] *See id.* at 2.20.

concession to carry out resource studies,[225] receive a permanent concession,[226] generate electricity for sale to distributors, and become a part of the COES.[227] Nevertheless, it seems clear that a large scale hydropower or geothermal private-sector investor would be financially unable to form a new generating company in an undeveloped Peruvian market on pure speculation. The conventional wisdom among private-sector developers is that there are two conditions precedent to securing either equity or debt financing: (1) an established or predictable market demand, and (2) a commitment from a solvent customer. Thus, whether the construction of new generating facilities is initiated by the prospective generator or by the prospective distributor, the private-sector investor will require a firm understanding that a customer stands ready to purchase agreed to capacity and power when the generating company is prepared to deliver that capacity and power.

d. Duration of Contracts

For all of its generation and distribution members, the COES guarantees the sale of their contracted power, not to exceed the limit of their firm power,[228] at a regulated price.[229] There are only two regulated generator sales: (1) sales of electricity by generators to distribution concessionaires for the purpose of supply to Public Electricity Service Customers, who are defined as persons requesting electric energy and located within a distribution concession area;[230] and (2) sales of capacity and energy between generators up to the firm capacity and energy of the purchaser.

Distributors are required to enter into contracts with generators

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[225] *See* Decree Law No. 25844, Law of Electrical Concessions, art. 22 (1993) (Peru).

[226] *See id.* art. 25.

[227] *See id.* art. 39.

[228] *See id.* (defining firm power as "the power that each generating unit can provide in peak hours with a high degree of certainty, with a higher or equal probability as that defined by the Regulations"). All of the firm power of the members of a COES "cannot exceed the maximum demand of the interconnected service." *Id.*

[229] *See id.* art. 41(f).

[230] *See id.* art. 82.

for capacity and energy for at least twenty-four month terms.[231] Sales under these contracts are effected at the busbar rates that are set by the COESs.[232] Distributors are allowed to enter into multi-year contracts with prospective generators, including power purchase agreements. Any power purchase agreement entered into between a generator and a distributor is limited by the provisions of the Law of Electrical Concessions, which, in effect, disallow generators and distributors from contractually agreeing to fixed tariffs for energy and capacity.[233] The parties may not contractually establish fixed tariffs, because the base tariff for energy and the base tariff for capacity are calculated by the COES.[234] In order to calculate the base tariff for energy, the COES semi-annually simulates the operation of the system for the next forty-eight months and calculates the net present value of the demand-weighted average expected short-run marginal cost for each of the hourly blocks.[235] The base tariff for capacity is also determined semi-annually from a review of the annualized investment and fixed operating cost of the type of generation that would provide peak capacity at the lowest cost, assuming a twenty year life for the generating equipment and a thirty year life for the connection equipment.[236] The base tariffs for both energy and capacity are amended for each busbar by applying energy and peak

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[231] *See id.* art. 34(b).

[232] Busbar Rates are the allowed tariffs for sales of capacity and energy by generators to distribution concessionaires for the purpose of supplying Public Electricity Service Customers. *See id.* art. 47 (describing the calculations used by each COES in determining the busbar rates).

[233] *See generally id.* arts. 45-73 (setting forth maximum prices).

[234] *See id.* art. 47.

[235] *See id.* arts. 46-47. As of May 1994, energy tariffs varied from an off-peak low of U.S.$2.14 per per kilowatt hour to a peak high of U.S.$6.14 per kilowatt hour. *See* PRIVATISATION, *supra* note 176, at 29. The COES calculates the system short-run marginal cost of energy in each hour in order to determine the base tariff for energy for the hourly blocks for typical days, and to calculate and value member generators' purchases and sales of energy at the system short-run marginal cost and sales of firm capacity at regulated prices. *See* PRIVATISATION, *supra* note 176, at 28-29.

[236] *See* Decree Law No. 25844, Law of Electrical Concessions, art. 46-47 (1993) (Peru). For instance, by May 1994, the base tariff for capacity was U.S.$5.73 per kilowatt per month for an open cycle gas turbine. *See* PRIVATISATION, *supra* note 176, at 28.

capacity loss factors to account for transmission losses.[237]

e. Generator-to-Generator Sales

The COES may best be conceptualized as an energy pool established in a defined area, into which all dispatched generators in that area sell the entirety of their output at a system marginal cost for each hour and from which all distributors purchase their needed energy at the system marginal cost for each hour.[238] In order to operate the system in the most cost effective manner, the generation plants will be dispatched in accordance with an ascending merit order that is determined by reviewing the marginal costs of generation by each plant and first dispatching energy from the plant that produces energy in the most inexpensive manner.

Generators with high variable costs may not be dispatched; nevertheless, they may meet their commitments by purchasing energy from the COES pool of generators that is dispatched.[239] Such purchases of energy by generators will be priced at the short-run marginal cost of the system.[240] If generators are unavailable, then those generators would also be allowed to purchase energy from the COES pool at the system marginal cost. Generators with low variable costs may be required to produce more energy than the amounts they would produce to fulfill their contractual commitments in order to sell the surplus through the COES at system short-run marginal cost.

Contracts for the sale of energy and sales of energy to distributors at busbar tariffs are not related to actual generation and transactions in the energy pool. A generator's revenue from the sale of energy can be determined with the following calculation:

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[237] *See* Decree Law No. 25844, Law of Electrical Concessions, art. 47 (1993) (Peru). As of May 1994, the base tariff at the busbars varied from U.S.$5.74 to U.S.$6.84 per kilowatt per month. *See* PRIVATISATION, *supra* note 176, at 29.

[238] *See generally* Decree Law No. 25844, Law of Electrical Concessions, arts. 39-41 (1993) (Peru) (setting forth the laws governing the COES).

[239] *See generally id.* art. 43(a) (1993) (Peru) (noting that "[p]ower and energy transfers between generators" are governed by Article 41 of the Law of Electrical Concessions).

[240] *See* PRIVATISATION, *supra* note 176, at 33. The short-run marginal cost is determined by "referring the generators' variable costs to the reference busbar." *Id.*

the revenue derived from selling all of its output to the pool minus its generating costs minus the cost of its purchases from the pool for the purposes of fulfilling its contractual commitments plus the revenue from sales to distributors at busbar tariffs plus the revenue from sales to other customers.

A generator may not enter contracts for more energy or capacity than is allocated by the COES unless it purchases the shortfall from the other generators. In the case of firm energy,[241] a generator must have contracts in place before it can exceed its own allocation, and the energy prices in these contracts are not subject to regulation—meaning that the generator is supplying electricity to a customer other than a distributor supplying to the Public Electricity Service or another generator. In the case of firm capacity, a generator may purchase the shortfall from other generators at the regulated capacity tariff when needed.

f. Sales to Unregulated Customers

The generator and the unregulated customer negotiate a price for the sale of electricity. The Peruvian electricity law requires that busbar tariffs may not differ by more than ten percent from the price of such sales.[242] In addition, generators are required to submit to the CTE certain information about the sales that they make to these unregulated customers. The CTE then compares these sales figures with busbar rates to determine whether the busbar rates need to be modified.

4. Rural Electrification

Peru has not yet established a comprehensive plan for rural electrification. Most observers believe the Peruvian government must play a much more direct role if the "have-not" areas of the country are to be electrified. How the private-sector-oriented policies of the Fujimori government can be applied in areas where the market cannot afford electricity remains unanswered.

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[241] Firm Energy is defined as the "maximum electrical energy production anticipated in conditions of dry hydrology for the units of hydroelectric generation and of unavailability anticipated for the thermal generation units." Decree Law No. 25844, Law of Electrical Concessions, Definitions Annex (1993) (Peru).

[242] *See id.* arts. 53-56.

5. The Renewable Energy Industry in Peru

From the perspective of the renewable industries, the Peruvian adaptation of the Littlechild or Southern Cone model presents a number of hurdles. First, the Peru Electricity Law places its highest premium on encouraging distributors to buy the least expensive electricity on the current market. Second, the government transferred its long-term planning function, which allowed for the planned development of long-term, strategic electricity sources, to the private-sector. Finally, under the new system in Peru, there is, arguably, no "obligation to supply" in the historical utility sense whereby a government enforced the requirements established to plan and to acquire adequate generating capacity to meet future need. Despite the lack of an "obligation to pay," the purchasers of Peru's government utilities have undertaken some contractual expansion obligations.

In a system geared to short-term economic signals, compelling reasons for distributors to enter into long-term power purchase agreements with the dispatchable renewable energy generators are difficult to envision. Front-end-loaded capital costs coupled with long-term fuel and operating economies characterize the development of renewable generation facilities. Long-term power purchase agreements have, therefore, always been required for self-financed, base-load or dispatchable, independent power projects. Although Peru's electricity law guarantees to the interconnected owners of generation plants and transmission systems "the sale of their contracted power, up to the limit of their firm power, at a regulated price,"[243] most of the renewables, except hydropower, remain unproven resources in Peru, and lending institutions may view renewable energy generation facilities as a high risk. That risk factor, along with the lack of the long-term contracts that traditionally supported low equity investment project financings, will make it difficult to steer potential generators away from the more favorable equity requirements that prevail in the conventional fuel arena. Consequently, it may be virtually impossible for the prospective developers of greenfield geothermal, hydropower, wind power, biomass, and solar sites to

[243] *See id.* art. 41(f).

compete successfully if equity to debt ratios of fifty to fifty become commonplace.

Paradoxically, one of the principal reasons Peru adopted its version of the Littlechild or Southern Cone model was to create new sources of capital for new generation capacity. In adopting these privatization measures, the government seemed convinced that a competitive marketplace will ultimately encourage new capital expenditures in the electricity industry. Peru has remained steadfast in its belief in competition; it has not accepted the criticism that an emphasis on short-term market prices will probably have a chilling effect on the financial market's underwriting of private-sector investment. Thus, Peru has not adopted the "strategic reserve" concept implemented in other nations that have adopted versions of the Littlechild or Southern Cone model, like the United Kingdom and Bolivia. For example, in recognition of the importance of developing renewable resources, the United Kingdom established a renewable set-aside designed to achieve a nationally promoted goal of having 1500 megawatts of renewables on line by the turn of the century.[244] For purposes of comparison, Bolivia established a policy where, as an exception to the general rule, distribution companies may own generation facilities for meeting up to fifteen percent of their projected load, provided that such generation facilities are based on renewable resources. In the short term, the renewable energy industry will probably need some government regulatory assistance in order to succeed in nations that have adopted the Littlechild or Southern Cone model. Such regulatory assistance is, however, no different from any of the countries in which the renewable electricity industry is already established. Historically, the renewable electricity industry has depended on government action to nurture it through its infancy and to enable it to mature to the point that it can be competitive with established fuel sources.

Governments support the renewable technologies to the extent that they believe there is a value in presently developing a technical capability to tap indigenous fuels in the event of future shortfalls in the supply of carbon fuels. In essence, they invest in a

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[244] For a discussion of the renewable set-asides in the United Kingdom, see *supra* notes 147-57 and accompanying text.

technology "strategic reserve." An added motivation is the fact that the renewable resources are environmentally benign and can be developed in remote locations, where they are cost-effective components of a rural electrification strategy. In some nations, like Indonesia, using renewable energy is economically strategic, since hydrocarbons can be exported at premium prices when an indigenous, substitute fuel can be used to generate electricity. In Peru, however, direct government support is contrary to a public policy that is based upon competition.[245]

Although it is firmly committed to the free market system, Peru is sensitive to the fact that new sources of renewable energy are underdeveloped. The government, under the Law of Electrical Concessions, is charged with the continuing duty to promote the conservation of the environment and the "rational use of natural resources in the undertaking of activities related to the generation, transmission and distribution of electric energy."[246] This legislatively mandated policy of promoting the environment and natural resources has been viewed by the Ministry of Energy and Mines as a policy that is easily harmonized with the economic policy of depending on economic signals from the market to determine when to build in the electricity sector.

Since direct government support of the renewables is contrary to Peruvian public policy, the country is attempting to avoid employing some of the more direct incentives, such as a mandated energy mix, direct subsidies, or artificial renewable energy pricing. Thus, when Peru drafted a geothermal resources law,[247] the development of environmentally benign geothermal resources was promoted by fiscal incentives that were not extended to established resources. These incentives were defended within the government on the basis that the geothermal industry is a "pioneer industry." This favored status encourages the renewable industry to come to Peru and permits a young industry to compete with an established one on a more level playing field.

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[245] *See generally Peru*, Second Quarter 1995, *supra* note 13, at 188-90 (discussing the Peruvian electricty system and Peru's commitment to competition).

[246] Decree Law No. 25844, Law of Electrical Concessions, art. 9 (1993) (Peru).

[247] A geothermal resources law is pending before the Peruvian Congress.

The incentive package set forth in Peru's proposed geothermal resources law has six parts: (1) treatment of geothermal resources as sui generis, (2) one stop shopping, (3) predictability, (4) use or lose, (5) pioneer industry, and (6) minimal government interference.

The first part of the incentive package defines geothermal resources as unique and allows the creation of a separate legal regime for geothermal development. In this way, geothermal resources are separated from other resources and allowed to avoid the complexities of integrating geothermal development laws into an already established legal regime, such as the one that exists for hydropower.

Second, the issuance of all licenses, concessions, and permits for everything from initial exploration to production of electricity for the grid are the sole responsibility of the MEM. The third part of the incentive package is the three-tiered system of resource license, resource concession, and electricity concession. This incentive package is crafted to assure a developer from the outset of exploration that if the developer invests in resource development and fulfills the obligations it undertakes in a timely manner, then the developer will be guaranteed to receive the requisite permits, licenses, and concessions that will allow the developer to produce and sell electricity to the grid.

The fourth incentive in the package is the "use or lose" policy that prohibits a developer from sitting on a resource without developing it. This policy is important because, in Peru, a qualified party is allowed to file a claim on a resource area on a first-come first-serve basis. Claim jumping is dealt with by allowing a party with a preexisting claim of a different legal nature, for instance mining, sixty days to substitute itself for a claimant submitting a resource claim. The "use or lose" policy means that a development license is valid for only five years and that a holder of a development license has five years to develop a commercial resource or it reverts to the government.

The fifth part of the incentive package sets forth incentives that treat the geothermal industry as a pioneer industry. These incentives are necessary to allow the industry to compete with established competitors on a level playing field. As a pioneer industry, the geothermal industry receives five advantages: (1) the

income tax advantage, (2) customs and duties incentives, (3) accounting incentives, (4) convertibility incentives, and (5) revenue incentive. First, geothermal rights bearers may elect to grandfather the tax regime in existence at the time a license or concession is granted by entering into a judicial stability contract. In that way, taxes will only be levied on income generated in Peru. In other words, no long-arm taxation is allowed. In addition, if the company incurs any losses, then they can be carried over and used to offset any other Peruvian investments. Moreover, exploration and financing costs are cumulative and may be carried over and amortized by an accounting process elected by the concessionaire upon its issuance. Second, all goods and supplies imported for exploration purposes are exempt of all duties. Further, all goods and supplies imported for the first five years of the exploitation of geothermal resources and the production of electricity from geothermal resources are also exempt. Third, a foreign company is benefited by a flexible accounting system that allows it to maintain its balance sheets in a foreign currency. Fourth, the Central Reserve Bank of Peru will guarantee the availability of foreign currency, which allows for easy convertibility. Finally, Peru does not charge private developers for the state-owned resources they develop. State revenue will come through income taxes, not through royalty payments. The law does, however, levy a small validity fee per hectare of an exploration area to remove any incentive for speculators to claim large tracts without any serious developmental intentions. In addition, it levies a royalty of not greater than one percent of the average price of energy at its generation level to fund the regulatory oversight functions.

The sixth part of the incentive package set forth in the Geothermal Resources Law is minimal government interference. At every point in the law and regulations, ministerial and regulatory discretion is circumscribed. The criteria for decisions is sharply drawn, and if the government does not act within the proscribed time, usually about a week, then private-sector petitions are automatically approved. In short, the regulatory structure is geared toward industry self-regulation.

C. *Bolivian and Argentinean Versions of the Littlechild Model*

Versions of the Littlechild or Southern Cone model were also enacted in Bolivia and Argentina.[248] A review of the implementation of these versions will illustrate the ways in which the model may vary from country to country.

In Bolivia, the Law of Electricity separates the electricity supply into generation, transmission, and distribution companies.[249] In isolated systems the electricity supply may be vertically integrated.[250] As the capitalization plan begins, the generators will be required to sell to the distribution companies; eventually, however, they will be allowed to sell directly to industrial customers.[251] Until a power pool is established in Bolivia, power sales will be determined based on contracts.[252] The Bolivian power pool is known as the National Load Dispatch Committee (NLDC).[253] The NLDC represents the generation, transmission, and distribution companies, the non-regulated consumer, and the government.[254]

In Bolivia, as in Peru, the distribution companies are required to maintain current contracts with generation companies.[255] The law requires distributors to sign with generators "in order to fulfill the electricity demand within its Concession area according to rates agreed between the parties within the framework of this [Electricity Law]."[256] The Bolivian law also mandates that these contracts cover, at a minimum, eighty percent of the maximum demand in the area for which a distribution company is responsible, for at least three years. The NLDC is responsible for calculating the node prices from the busbar in forty-eight month

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248 *See Bolivia*, Second Quarter 1995, *supra* note 14, at 24; HELOU & PARDINA, *supra* note 15, § 1.

249 *See Bolivia*, Second Quarter 1995, *supra* note 14, at 26.

250 *See* Ley No. 1604, Law of Electricity, 34 Gaceta Oficial de Bolivia 1862, art. 20 (Dec. 21, 1994) (Bol.).

251 *See Bolivia*, Second Quarter 1995, *supra* note 14, at 26.

252 *See id.*

253 *See* Ley No. 1604, Law of Electricty, art. 18 (Bol.).

254 *See id.*

255 *See id.* art. 30.1(c).

256 *See id.* art. 31.

projections, calculating the Basic Energy Price[257] and the Basic Peak Power Price.[258]

One of the significant differences between the Peruvian and Bolivian laws is that the transfer prices of power between generators and distributors are regulated only if they are *not* addressed in supply contracts.[259] Thus, the pricing in power purchase agreements is unregulated. Nevertheless, the maximum prices for the supplies to distribution companies at the delivery nodes are subject to regulation by the Ministry of Energy & Hydrocarbons.[260] The effect appears to be a regulatory cap on electricity prices, if not capacity. Finally, with respect to the rate structure, tariffs that are paid to generators are to be linked to short-term, marginal costs in determining a maximum price.[261]

The electricity law enacted in Argentina[262] is similar to the laws—based on the Littlechild or Southern Cone model[263]—that were adopted in Bolivia, Chile, and Peru.[264] There is, however, at least one notable difference—the Argentine law uses marginal cost to fix electricity prices.[265]

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[257] *See id.* art. 49(d). The balanced average of the marginal costs calculated before the projected demand value. *See id.*

[258] *See id.* art. 49(e). The "Annual Amount" of investment and the "Annual Amount" for fixed operation, maintenance and administration cost, corresponding to the most economical generation unit, to supply additional power during the annual hours of maximum demand for the system. *See id.*

[259] *See id.* art. 45.1(a).

[260] *See id.* arts. 45.1(c), 47; *see also Bolivia*, Second Quarter 1995, *supra* note 14, at 26 (discussing the regulation of the Bolivian electricity industry).

[261] *See Bolivia*, Second Quarter 1995, *supra* note 14, at 26 (discussing the rate structure).

[262] *See* Law No. 24065 (Dec. 19, 1991) (Arg.).

[263] *See* Burr, *Success*, *supra* note 19, at 22 ("The power market is well developed in Argentina, following a structure similar to the U.K. power pool system.").

[264] For a discussion of the unbundled electric utility scheme in Bolivia, see *supra* notes 248-61 and accompanying text. For a brief review of the unbundled electric utility scheme in Chile, see *supra* note 12. For a discussion of the unbundled electric utility scheme in Peru, see *supra* notes 172-247 and accompanying text.

[265] *See* HELOU & PARDINA, *supra* note 15, at §§ 1-2 (discussing the privatization of the Argentine electricity industry).

IV. The Effect of Electricity Sector Reform on Renewable Energy Development

A. Background

Over the past several decades, the primary international market for the U.S. renewable energy industry consisted of foreign governments and government-owned utilities.[266] Under the Littlechild model, government ownership and control of the electric utilities is turned over to companies in the private sector.[267] Thus, in order to find success in the nations that have adopted the Littlechild model, the renewable energy industry will either need to develop a market from among the new private-sector energy companies or develop industry-owned merchant plants, developed on a speculative basis and selling to the grid. The threat to the renewable energy industry from the institutionalization of the Littlechild model does not lie in the "unbundling" concept, the concept of breaking up utility monopolies into arms-length generation, transmission, and distribution companies.[268] Rather, the threat to renewable energy lies in the Littlechild model's emphasis on short-term market prices to the exclusion of long-term planning.[269] In other words, a utility enterprise conducting business under the Littlechild model's market structure will not have an "obligation to supply," in the utility sense of being required to plan to acquire adequate generating capacity to meet future demand. Under the Littlechild model's market structure, each distribution company is only obligated to connect all customers in its region and to sell them energy at a price that reflects current costs plus a small, regulated premium. Moreover, a generation company is not obligated to build plants, and a distribution company is not obligated to enter into long-term contracts on behalf of its customers. Consequently, under the

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[266] *See generally* FLAVIN & LENSSEN, *supra* note 100, at 240-66 (discussing the reshaping of the electric power industry).

[267] *See* Moore & DePinto, *supra* note 1, at 19 (discussing the transformation of the energy sector).

[268] For a discussion of the unbundling of electric utilities in the United Kingdom, see *supra* notes 110-31 and accompanying text.

[269] *See* Cavanagh, *Future*, *supra* note 18, at 23.

Littlechild model, new capacity will only be built when an electrical energy enterprise decides, based upon market analysis, that new capacity will provide a favorable return on investment relative to projected pool prices.

In the United States, long-term power purchase agreements serve as the foundation for independent renewable energy power project financing. The Latin American legislation, on the other hand, offers little incentive for a private distributor to enter a contract for long-term generation capacity. In fact, under the Littlechild model, it is difficult to imagine many compelling reasons for distributors to enter into long-term power purchase agreements with prospective renewable power generation developers.[270] Thus, in those Latin American nations that have adopted a form of the Littlechild model, renewable energy developers will lack a traditional government customer and will likely find it difficult to negotiate and enter long-term power purchase agreements, which heretofore have been prerequisite for renewable energy development by independent power producers.

Moreover, the laws enacted in Latin America which are similar to the Littlechild model do not provide special consideration for the development of renewable energy resources. Interestingly, after the Littlechild model was implemented in the United Kingdom, this factor was deemed a deficiency in the model.[271] Consequently, the United Kingdom established a 1500-megawatt set-aside for renewable resources, with a special funding consideration earmarked for the development of the more capital-intense renewable technologies.[272] Such a renewable energy set-

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[270] By analogy to the mortgage industry, an argument may be constructed that customers may be convinced that it is preferable to enter into a long-term, predictable agreement (a 30-year mortgage), than into a short-term, unpredictable agreement (a variable-rate mortgage), in spite of the short-term economic advantages of such a short-term agreement. In other words, the best Littlechild-country customer for the renewable energy industry may be the customer that wants to lock in its cost for electricity.

[271] *See* Woolf, *supra* note 11, at 60 (noting that the British government was forced to intervene in order to support renewable resources).

[272] *See Renewables*, POWER IN EUROPE, Aug. 13, 1993, at 22 (discussing the support of renewable energy by the United Kingdom). The United Kingdom levies a supplemental tax on electricity bills in order to fund renewable energy. *See id.* By the year 2000, the goal is to have 1500 megawatts of renewable energy. *See id.*

aside has not been adopted by any of the Latin American countries that have adopted systems similar to the Littlechild model.

That is not to suggest that these Latin American countries are not interested in renewable energy development.[273] For instance, some Latin American countries have long indicated a strong interest in developing geothermal energy.[274] Nevertheless, some of these same nations adopted an electricity-system model originally designed for countries that have no geothermal resources. Consequently, these Latin American countries have no precise precedent upon which they may draw to develop geothermal energy under the new electricity regimes.[275]

In fact, the geothermal developer, operating under the new electricity regimes in place in Latin America, may be limited to building merchant plants. In general, a merchant plant is built on speculation; in other words, the plant is investor-financed, has no long-term contract, and must compete to sell its electricity in the open market once it is on-line. In the more developed markets, merchant plants are built by companies that develop assets, establish an income stream, and then sell the income stream to institutional customers.[276] In essence, a merchant plant venture capitalist is interested in turning around capital, not in ownership of assets.[277] Any geothermal developer seeking to compete on the merchant plant level will be in competition with the conventional fuels and with the established power generation companies. If merchant plants emerge as the dominant generation facilities in the countries that have enacted the Littlechild or Southern Cone model, then geothermal developers will be forced to compete with

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[273] *See, e.g., Chronological Summary, supra* note 22, at 369 (noting that, on December 13, 1994, Chile and the United States "agreed to cooperate in developing renewable energy projects to supply electricity to Chile's rural population").

[274] *See, e.g.*, ABEL H. PESCE, SECRETERIA DE MINERIA, ENERGIA GEOTERMICA: PROMISORIA ALTERNATIVA 11-28 (1994) (reviewing the history of geothermal energy and discussing the potential benefits of geothermal energy in Argentina).

[275] *See generally* CHILE FOREIGN INVESTMENT COMMITTEE, *supra* note 12, at 12, 16 (noting that Chile, a nation that adopted an electricity system similar to the Littlechild model's system, has geothermal energy sources that have not been developed).

[276] *See* Churchill, *supra* note 75, at 22, 24.

[277] *See id.* at 24 (noting that the institutional investors "will want to turn around their capital as fast as possible and reinvest it in the development business").

the well-financed, conventional fuel giants for debt and equity monies. Since geothermal energy has not been commercialized in most of Latin America, lending institutions will predictably view the Latin American markets as a high risk. This risk factor, coupled with the absence of long-term contracts that have traditionally supported low equity investment, will make it difficult for project financing to avoid the higher equity investment requirements prevailing in the conventional-fuel arena.[278] Similar analyses apply to the other renewable energies.

One of the goals of the countries implementing the Littlechild and Southern Cone models was to seek new sources of capital for new generation capacity. Paradoxically, the system they enacted results in a pro-demand-side competitive market that is at odds with their self-proclaimed, pro-supply-side goal of raising private-sector capital to build new facilities.

In all fairness, it should be noted that, in adopting the Littlechild or Southern Cone model, governments seemed convinced that the new electric power generation structure would deliver electricity to the maximum number of consumers at the lowest possible price. Currently, there is no way to know whether that conviction will be borne out in practice, "and the political acceptability of any power model will ultimately depend upon the actual price paid by the consumer."[279] These governments are convinced, almost as a matter of faith, that a competitive marketplace will encourage new capital investment. The leaders of these nations are unreceptive to the possibility that the Littlechild and Southern Cone models' emphasis on short-term market prices may have a chilling effect on the financial markets' underwriting of private-sector investment. The leaders of these nations seem unreceptive because, in large measure, the governments have little or no experience with private-sector project financing.[280]

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[278] *See id.* at 22 (concluding that project financing is only moderately useful and that the development of local capital markets is a long-term solution).

[279] *See* Ganguli, *supra* note 35, at 22 (discussing the opportunities for independent power companies in India).

[280] Ironically, Britain's massive effort to privatize utilities is becoming a model for the world just as the model is starting to show flaws. In Britain, the incentive-based rate

The countries of Latin America must make a strategic assessment and determine the actions that they will need to take in order to secure indigenous, base-load energy resources. The short-term pricing mechanisms of the new electricity regimes create dynamics that favor established generation companies whose cash flow allows debt secured by a proven income stream and whose established facilities can be upgraded at lower costs than development of a "greenfield" site, a site developed from scratch. The playing field is not level for a new entrant who would be burdened with start-up costs that are not borne by the members of the generation establishment. Those Latin American countries that have the major renewable resource development potential have, as a national strategy, opted for private development. These same countries must now strategically consider whether to offer sufficient incentives to promote greenfield sites and to assist the greenfield industry in competing directly with the established generation companies within the Littlechild or Southern Cone framework.[281]

B. Industry Growth Through Project Financing

The renewable energy development community has, over the past several decades, evolved along two market tracks: domestically, the industry has grown through independent power producers, funded by project financing; overseas, the industry has grown primarily as a result of turn-key sales to governments and government-owned utilities. Industry sales were funded in the earlier years by international or regional bank government loans, and in more recent years by loans arranged through such institutions as the Export-Import Bank of the United States (EXIMBank),[282] the Overseas Project Investment Corporation

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scheme has resulted in rising household bills and large profits for the regional electricity companies—i.e., the distribution sector. *See* Pope, *supra* note 9, at A10. *See also supra* text accompanying note 35.

[281] *See generally* Burr, *Success*, *supra* note 19, at 22 ("Significant greenfield development will require a realization at the government or industrial level that new development has long-term planning and economic advantages.").

[282] *See* EXPORT-IMPORT BANK OF THE UNITED STATES, PRESS RELEASE 1 (May 1995) [hereinafter EXIMBANK 1995 PRESS RELEASE] (announcing the signing of an agreement between the EXIMBank and two U.S. corporations to commit $165 million to the Mahanagdong Geothermal Power Station in the Philippines).

(OPIC), and the Foreign Investment Corporation (FIC).

1. Exporting Project Financing

As public-sector markets have opened up to private-sector investment, various members of the United States geothermal and hydropower development communities have attempted to export domestic project financing packages. This process required educating both the lending institutions and the borrowing customers. OPIC has been engaged in project financing of energy projects since the 1980s. EXIMBank, however, only recently developed a project financing approach to the energy sector; in fact, it funded its first project in the energy sector in 1992.[283] Convincing international lending institutions of the efficacy of project financing within the context of renewable energy development has been a Herculean task; however, educating the customer to the intricacies and prerequisites of project financing has proven to be even more difficult.[284] Although many of the potential government customers for the products of the industry are very sophisticated in World Bank and public-sector financing, they have proven to be unfamiliar with, and unreceptive to, the mandates and intricacies of project financing.

There are two distinct forms of project financing within the electricity generation business: (1) the creation of new generating capacity for a utility customer, and (2) the creation of generating capacity for the self-generation or direct-use customers such as mining and manufacturing corporations—the "inside-the-fence" generation units. In both cases, power purchase agreements have historically been prerequisites to project financing. Moreover, in the case of a government-owned utility customer, lending institutions often require government guarantees. In the case of private-sector utilities or private end-user customers, the financial viability of the customer is essential to the approval of a project

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[283] *See* EXPORT-IMPORT BANK OF THE UNITED STATES, PRESS RELEASE 1 (May 31, 1994) [hereinafter EXIMBANK 1994 PRESS RELEASE] (discussing the EXIMBank's 1992 agreement with Peru that enabled OPIC to extend its services to Peru); *see also* EXIMBANK 1995 PRESS RELEASE, *supra* note 282, at 1.

[284] *See generally* Churchill, *supra* note 75, at 22-25 (discussing the intricacies of project financing).

financing loan or guarantee.[285]

One final issue completes the description of the evolution of project financing on the international scene. Competitive bidding is becoming an integral part of independent power production. Domestically, the majority of the renewable energy community in the United States does not compete in all-source bidding. Internationally, when a government is determined to exploit its resources such as geothermal or hydropower, RFPs are issued in which only the developers of a designated resource are competing—such bids are government-issued after the process of long range planning has been completed at the government level. As an open market economy becomes more and more prevalent and long-range government planning takes on a diminished role, competition will increase among competing energy sources and decrease among developers within a pre-approved, single energy sector.

2. *Exporting Equity and Bond Financing*

Other sectors of the energy industry, outside of the renewable resources sector, have approached project financing in a way that may change overseas project financing forever.[286] Independent power producers have consistently attempted to minimize the amount of their equity in a power project; during the past decade, however, equity participation has become essential.[287] The large, well-financed companies in the hydrocarbon area are better positioned than the companies in the renewable sector to put up substantial equity resources. Investment by the hydrocarbon companies is up from the historical debt to equity ratio of seventy to thirty in developing countries to as high as fifty to fifty.[288] This higher debt to equity ratio has become a standard for lending to

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[285] *See generally* Siddique, *supra* note 12, at 20 (discussing the importance of financial viability when considering developing a private power generator).

[286] *See generally* Churchill, *supra* note 75, at 22-23, 27-29 (discussing the ways in which project financing is changing); Joseph G. Sauvage, *Private Power Evolution Presents Challenges and Opportunities*, PRIVATE POWER EXECUTIVE, Mar.-Apr. 1995, at 35, 36 (discussing trends in corporate financing, in public capital market financing, and in equity financing of power projects).

[287] *See* Sauvage, *supra* note 286, at 36.

[288] *See* Churchill, *supra* note 75, at 23, 28-29.

overseas power projects. Furthermore, the hydrocarbon industry has made great inroads into the developing countries that have a viable investment market, proving that equity can be raised through the issuance of bonds and other investment instruments.[289]

C. *Emergence of the Merchant Plant Under the Littlechild Model*

From the perspective of the renewable energy industry, the major concern lies in the Littlechild and Southern Cone models' promotion of short-term market prices to the exclusion of long-term planning.[290]

The Littlechild and the Southern Cone model both purport to foster open competition in the electricity sector, but ingrain short-term pricing into implementing legislation. Mandated short-term pricing distorts market forces by giving great weight to short-term considerations to the detriment of long-term considerations. The model is geared towards encouraging distributors to buy the least expensive electricity on the current market and measures the distributors' profit accordingly. In the short-term, this approach tends to favor existing generators.

The model does not provide adequate encouragement of the introduction of new capacity over the longer term, for it discourages the long-term pricing structures required by those financial markets underwriting private-sector capital investment in new generation. Until new capacity requirements outstrip the ability to re-power existing generators, a hiatus in new capacity of the more capital-intensive technologies seems likely. After this hiatus, it seems that the legislated isolation of generation from transmission and distribution, coupled with short-term pricing structures, will result in narrowing the universe of new generation vehicles to only one—the merchant plant. The merchant plant is built on speculation, meaning that it is investor-financed, has no long-term contract, and, once on-line, competes to sell its electricity on the open market.

In essence, the Littlechild model limits the purchase price of

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[289] *See id.* at 25-26.

[290] *See generally Renewables*, POWER IN EUROPE, Nov. 18, 1994, at 23, 24 (noting that "it would be cheaper not to generate from renewables at all").

capacity and electricity that are destined for the general customer to busbar tariffs. These busbar rates are calculated for electricity as average-expected, short-run marginal cost and are calculated for capacity as the annualized investment and fixed operating costs of the type of generation which would provide peak capacity at least cost. Thus, the prospective renewable resources developer must buy into a system in which prices for electricity are never fixed and prices for capacity are based on a hypothetical least-cost calculation. In both cases these prices are calculated by an electricity pool, the members of which represent the status quo establishment. Furthermore, there are few incentives for a distributor to enter into long-term contracts with generators; with the potential exception of a distributor's locking in a low price for a long term. Although countries in which the Littlechild model is in place still offer fixed-price, long-term opportunities, either through direct sales to industry, like inside-the-fence contracts, or through investment in grid-isolated areas, renewable energy development, as a main-stream energy source, will undoubtedly incur roadblocks.[291]

V. Conclusions and Strategic Recommendations

Both the Littlechild model and the Southern Core model are elegant in structure; and, given the current belief that unleashing market forces to work without the involvement of government is best for the consumer, the industry, and the world's economy,[292] the unbundled model is powerfully compelling. Thus, regardless of the merits of the model, the renewable energy industry will have to work within the new framework. How the industry adapts to meet this new challenge will determine whether this new world order for the electrical generation business represents an impenetrable barrier or a small bump in the road.[293]

Since the inception of the renewable energy industry in the

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[291] *See* Tim Hennagir, *From Midland to Magellan*, IND. ENERGY, Oct. 1994, at 30 (noting that when "the price of power is set by a competitive pool . . . this would make new project development difficult").

[292] *See* Cavanagh, *Future*, *supra* note 18, at 23.

[293] *See* Salpukas, *supra* note 19, at D9 (discussing the floundering of renewable energies in the "bottom line 90s").

United States, the industry's primary export partners have been the foreign governments or government-owned utilities.[294] The industry has always had in its hip pocket two alternative approaches: (1) project financing based on the revenues from long-term, power purchase agreements with low equity-to-debt ratios,[295] and (2) the BOT, BOOT, and BTO models.[296]

With the advent of the Littlechild and Southern Cone models, the ground rules changed in three fundamental ways. First, privatization and capitalization effectively removed the government as the client.[297] Second, short-term contracting and short-term pricing began to dominate the marketplace.[298] Moreover, international financial institutions, perceiving increased risk due to the short-term nature of energy contracts under the new electricity regimes, are likely to ratchet-up their debt-to-equity ratio requirements to as high as fifty percent equity and are likely to loan only short-term funds.[299] The legislative encouragement of short-term contracting along with concomitant disincentives to long-term financing and low equity requirements bring into question whether traditional project financing models are able to support new development in the electricity industry. Third, the new and pending national electricity laws based on the Littlechild and Southern Cone models effectively discourage the development of any new generation source requiring large capital investments and entailing high risk.

As the new market system takes hold and government monopolies disappear, the industry may face a long period of inactivity unless one of the following three things occurs: (1) the evolving legal regimes recognize the intrinsic value of encouraging the development of renewable energy, (2) new and creative ways of financing are developed, or (3) new technologies significantly reduce the up-front cost of renewable technology

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294 *See supra* notes 266-67 and accompanying text.

295 *See supra* notes 282-89 and accompanying text.

296 *See supra* note 77 and accompanying text.

297 *See supra* notes 84-90 and accompanying text.

298 *See supra* notes 137, 281 and accompanying text.

299 *See* Churchill, *supra* note 75, at 23; *see also* discussion *supra* notes 286-89 and accompanying text.

development. For the most part, industry investments in countries enacting the new legal regimes will be from independent power producers, who rely on project financing.[300] Project financing of new generating capacity is dependent upon long-term assurances that a generation facility will be able to sell its power at a calculable, if not predictable, price.[301] In contrast, a market system primarily or exclusively focused on the current price of electricity will not foster the long-term conditions requisite to financing the construction of new renewable resource generation projects under traditional project-financing models.[302] If the industry does not act quickly to transform its financing structure, it may soon find itself to be an outsider in the base-load, core electricity industry.

The three fundamental changes in the electricity industry under the Littlechild model will require the renewable energy industry to develop a new entry strategy. It seems that there are at least seven viable options that the renewable energy industry should consider in its effort to develop a new entry strategy.

First, the renewable energy industry should consider rethinking the structuring of industry financing in the nations that have adopted the new model.[303] In reconsidering the structuring, new alliances must be forged, old financial mechanisms must be recast, and new financial devices must be created. If the renewable energy industry is determined to compete as a serious developer of merchant plants, the renewable energy companies currently competing as vendors domestically and internationally will need to rethink the viability of a coordinated, consolidated international strategy. The building of merchant plants cries out for pooling of equity resources and sharing of risks[304]—the classic situation for the formation of export trading companies. As an alternative to independent merchant plants, renewable energy companies may decide to buy into existing generation facilities in order to leverage existing income streams in a country for the purpose of raising

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300 *See generally id.* at 23-25 (discussing project finance).

301 *See id. See generally* Peppiatt, *supra* note 117, at 46 (discussing the project financing of power stations).

302 *See* Churchill, *supra* note 75, at 24.

303 *See id.* at 28.

304 *See id.* at 27.

sufficient debt and equity to add capacity. If the foregoing approaches prove strategically impossible, the renewable energy industry may decide to focus its market efforts on inside-the-fence development, thereby dedicating itself to sales to large mining and industrial complexes in the market countries.

A second option for the renewable energy industry is to convince governments that renewable energy development is in their self-interest.[305] This approach would entail persuading government officials and legislators that developing a country's renewable technologies will make a significant contribution to economic independence by utilizing indigenous resources, by avoiding the cyclical supply and cost disruptions due to international economics or political events, by conserving hard currency, and by improving environmental and health quality. One viable option is a renewable set-aside as added to the United Kingdom's electricity system.[306] The renewable energy industry should establish a program focused on educating the decision makers in the key market countries about the positive externalities that renewable energy adds to the energy mix.[307]

Third, the renewable energy industry should undertake a detailed analysis of the capacity payments in each of the market countries. Energy and capacity payments vary within different formulations of the Littlechild or Southern Cone model enacted in Latin America. These capacity payment formulations need both an exacting and a detailed economic analysis in each country.

Fourth, the renewable energy industry should articulate and promote the value of renewable resource development at the inception of the legislative and regulatory process that alters a nation's electric power sector.[308] Policy makers are most receptive at the outset of the policy making process, but it is virtually

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[305] *See* FLAVIN & LENSSEN, *supra* note 100, at 299 (noting that governments will need to focus "on ways to ensure that environmental costs are considered when economic decisions are made").

[306] *See id.* at 262-63 (discussing set-asides as a mechanism to address environmental problems).

[307] *See id.* at 307.

[308] *See generally id.* at 307-08 (discussing the importance of encouraging the use of renewable energy as nations develop their infrastructure).

impossible to reinvent the wheel. The renewable energy industry should be positioned to assist developing countries in establishing their legal regimes for renewable energy.

The fifth option that the renewable energy industry should consider is the expansion of the base of support for development. By increasing in each country the number of players that have a stake in renewable energy development, the industry may better position itself to achieve concrete results.

Sixth, the renewable energy industry should invest in privatized utilities. Although the renewable energy industry does not have significant experience in utility management, the industry can conceivably form coalitions, combining its expertise with the expertise of other industry corporations to bid collectively on generation facilities that are being privatized or capitalized. Moreover, the industry can invest in established sites in countries, like Mexico, where the refurbishment of existing facilities is a legislative priority. Seventh, the renewable energy sector should continue to develop new technology.[309] Advancements in renewable energy technology are a condition precedent to the industry becoming competitive.[310] In whatever way one evaluates the importance of emerging technology, like the hot dry rock technology being studied by the geothermal industry,[311] the immediate success of the renewable energy industry will be determined by whether the bread and butter of the industry can be brought into economic alignment with the more competitive fuel resources.[312]

Defining the problem is half the battle.[313] The renewable energy industry's strategic planners must begin to forge the solution. In short, the renewable energy industry must mobilize its forces to ensure that the countries promoting private-sector development of renewable resources have the mechanisms in place to allow the realization of their goals. The greatest challenge for

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309 *See* FLAVIN & LENSSEN, *supra* note 100, at 302-04.

310 *See id.*

311 *See Renewables*, POWER IN EUROPE, Sept. 23, 1994, at 24.

312 *See id.* at 304.

313 *See generally* Burr, *Survival*, *supra* note 56, at 10 (discussing some of the problems that arise in nations that adopt versions of the Littlechild model).

the renewable energy industry is to convince each developing country that it is in their own self-interest to implement policies that establish and promote a viable renewable-energy industry in their country.