

## INTRODUCING GREEN POWER FOR CORPORATE MARKETS: BUSINESS CASE, CHALLENGES, AND STEPS FORWARD

INSTALLMENT 1

BY DUNCAN AUSTIN AND CRAIG HANSON

### I. INTRODUCTION

Green power technologies have long been overlooked by corporate energy buyers. Generally viewed as immature and costly, green power traditionally has been deemed unattractive for large-scale energy purchases by companies operating in competitive markets. But that perception is changing. Some major U.S. companies are paving the way for the creation of a cost-competitive market for green power by more aggressively pursuing renewable and clean power options. For instance:

- General Motors recently announced two new projects in which it will directly use landfill gas (LFG) as fuel for powerhouse boilers, as well as another deal for purchasing at least 8 million kilowatt hours (kWh) per year of electricity generated from landfill gas.
- IBM facilities in Minnesota and Texas are purchasing more than 5.4 million kWh of wind-generated electricity per year.
- Johnson & Johnson has installed solar photovoltaic systems with a capacity of nearly 350 kW (kilo-

watts) on the rooftops of three of its buildings.

- Kinko's is now purchasing renewable power to provide electricity to over 80 of its branches nationwide.

These examples are just a few of the growing number of cases in which large companies are turning to green power to meet some of their energy needs. What is triggering this activity?

This publication, the first installment of WRI's *Corporate Guide to Green Power Markets*, sheds light on the emerging corporate interest in green power. The *Guide* is a series that will be published during the next 18 months and that will discuss in detail multiple aspects of green power markets for corporate buyers. The series will be based on WRI's experience with the Green Power Market Development Group. Convened in 2000, the Group is a cohort of large U.S. industrial and commercial energy users that are committed to developing corporate green power markets. Participants in the Group are Alcoa Inc., Cargill Dow LLC, Delphi Corporation,

### What Is Green Power?

Various definitions of green power exist. The Group has defined it as energy sources that are commonly accepted as having a relatively low impact on human, animal, and ecosystem health. Under this definition, green power encompasses renewable energy sources including solar (PV and thermal), wind, biomass, landfill gas (for electricity and for direct use), and geothermal. The Group also includes "clean" energy technologies such as fuel cells and microturbine systems. How "clean" fuel cells are depends on the source of the hydrogen and the quantity of CO<sub>2</sub> and other pollutants that are emitted in producing the hydrogen. The environmental benefits of microturbines are sensitive to fuel choice. In considering green power projects, the Group takes into account the life-cycle impacts associated with "clean" energy technologies.



Convened by the World Resources Institute and Business for Social Responsibility in 2000, the Green Power Market Development Group is a unique commercial and industrial partnership dedicated to building corporate markets for green power. The Group is working to transform energy markets to enable corporate buyers to diversify their energy portfolios with green power and to reduce their impact on climate change. Representing an estimated 8 percent of total corporate energy use in the United States, the Group seeks to develop 1,000 megawatts (MW) of new, cost-competitive green power by 2010 (enough electricity to power 750,000 homes).

Working closely together over the last 2 years, WRI and the Group's 10 companies have:

- Conducted research on green power technologies, applications, and suppliers

- Mapped renewable resource locations and corporate facility demand
- Reviewed and facilitated green power project negotiations
- Developed innovative analytical tools to build the business case for green power
- Recommended public policy actions to address barriers to corporate procurement of green power.

In June 2002, the Group announced its first set of green power projects and purchases—a total of 15 MW at over 50 facilities in 12 states. More information about the Group and its activities is available on its website: [www.thegreenpowergroup.org](http://www.thegreenpowergroup.org). The website also contains background information on various green power technologies, an introduction to the green power marketplace, and a software tool for calculating emissions reductions achieved by switching to green power sources.

DuPont, General Motors, Kinko's, IBM, Interface, Johnson & Johnson, and Pitney Bowes. (See Box 1 for more details.)

This first installment provides an introduction to factors underlying the emergence of green power markets in the United States, the potential benefits of green power technologies for commercial and industrial energy users, and the challenges green power faces in becoming a commercially viable alternative to traditional energy sources. It also outlines some of the steps that companies can take to address several of these challenges.

Future installments will explore different aspects of the green power marketplace, focusing on three areas:

1. Major green power technologies including wind, landfill gas (for electricity and for direct use), and biomass
2. Strategies for corporate procurement of green power and methods for evaluating green energy opportunities
3. Policy opportunities for addressing obstacles to the creation of a robust corporate market for green power.

## II. FACTORS UNDERLYING THE EMERGENCE OF GREEN POWER

Three main factors appear to underlie green power's emergence as an increasingly attractive energy source for corporate users:

1. Technological improvements in green power sources
2. Rapidly changing energy markets
3. Increasing corporate awareness and concern about environmental issues.

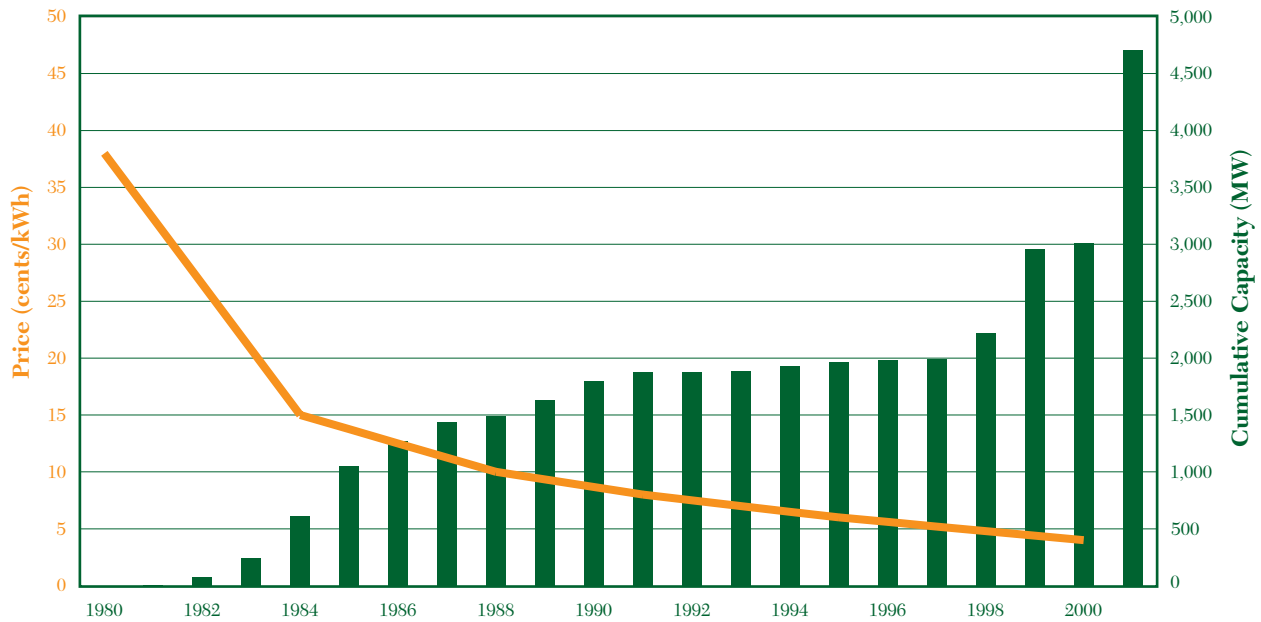
### Improving Technologies

The steady advance of technology is making green power sources increasingly competitive. Wind power is now 80 percent less expensive than it was 20 years ago, with good sites generating electricity at less than 5 cents per kWh.<sup>1</sup> (See Figure 1.) Direct use of landfill gas already is cost-competitive with conventional fuels in many instances. The average price of a solar photovoltaic module has declined by over 80 percent over the past 25 years.<sup>2</sup> As prices continue to fall, green power capacity is expanding, providing the opportunity to achieve further economies of scale and to initiate a new cycle of learning and development. In 2001 alone, a record 1,700 megawatts (MW) of new wind generation capacity was installed in the United States.<sup>3</sup> Also in 2001, over 150 LFG projects began development. These projects represented 300 MW of electricity capacity and an additional 70 million cubic feet per day of gas for direct use in industrial applications.<sup>4</sup>



Figure 1

## Generation Costs and Cumulative Capacity of Wind Energy in the United States, 1980 to 2001



Source: American Wind Energy Association, June 2002.

### Changing Energy Markets

Energy markets are changing rapidly, increasingly forcing energy buyers to reconcile multiple objectives. For instance, the spread of deregulation across many U.S. states gives a growing number of companies greater choice over their energy purchases. Vivid memories of California's recent energy crisis create pressure for companies to develop diverse energy portfolios capable of withstanding price and supply volatility. At the same time, proliferation of sophisticated equipment raises the demand for high-quality electricity and emergency back-up systems to guard against power interruption.

This effectively requires energy managers to consider the issue of power *quality* in addition to that of *quantity*. These and other trends place new demands on energy managers—demands that green power technologies can help satisfy.

### Increasing Environmental Concern

Companies increasingly are becoming sensitive to environmental developments. Public concern about environmental issues such as climate change forces energy managers to consider how existing energy costs might be affected by future regulations. In addition, an increasing number of companies are making voluntary commitments to improve their environmental performance

either to attract customers, or to satisfy other stakeholders, or to enhance their corporate image. In these companies, energy managers and environmental managers often are being asked to tap energy sources with lower emissions profiles, namely green power.

### III. UNDERSTANDING THE BUSINESS CASE FOR GREEN POWER

When a company procures green power it buys more than just electrons. It secures a wide range of benefits that it otherwise might have to acquire through contractual means or through tapping into other budgets within the corporation. In particular, green power can:



- **Help stabilize corporate energy costs.** Although green power technologies typically have higher initial capital costs, options such as solar, wind, and geothermal do not require fuel purchases. Consequently, ongoing payments for electricity from these sources are immune to fluctuations in fossil fuel prices. As such, these green power technologies offer energy managers a means of diversifying their energy portfolios, thereby ensuring some degree of cost stability in the face of future fuel price uncertainty. For example, by purchasing a fixed-priced green power product offered by Austin Energy, IBM and Kinko's facilities in Texas have insulated themselves from electricity price fluctuations driven by movements in natural gas prices. This has resulted in periods during which they pay less than the price for conventional electricity.

Whether or not it is more cost-effective to establish a physical hedge against future electricity price movements through green power as opposed to a traditional contractual hedge depends on the forward prices for conventional electricity. For instance, at the end of 2001, low forecast prices for fossil fuels such as natural gas ensured that financial

hedges were the more attractive option in the near term. Given the traditional volatility in fossil fuel markets, however, this is unlikely to remain the case.

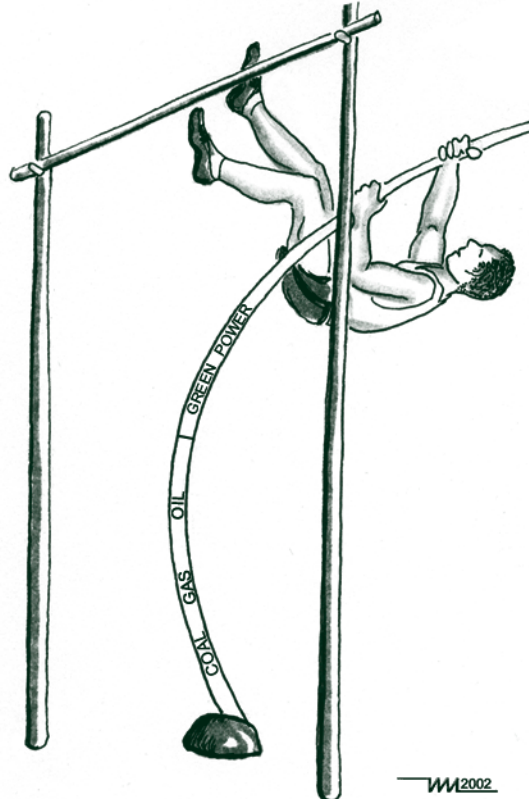
- **Provide a hedge against the uncertainty of future environmental regulations.** Public pressure for environmental improvement makes it likely that new regulations will emerge to reduce emissions of both *conventional air pollutants*, such as sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), mercury, and particulates, and *greenhouse gases*, such as carbon dioxide (CO<sub>2</sub>). In sharp contrast to traditional fuel sources, green power technologies generate few, if any, emissions. Depending on the

precise form of new policies, pressure to reduce conventional pollutants or greenhouse gases either could lead to increased costs for fossil fuels (especially coal) or could spawn new market mechanisms that offer financial incentives and rewards to customers and developers of emissions-free technologies.

- **Provide the multiple benefits of on-site electricity generation.** A number of green power technologies, such as solar photovoltaic systems, microturbines, and fuel cells, can be co-located with electricity loads. Thus, these technologies could provide "peak-shaving" benefits<sup>5</sup>, serve as a secure backup and uninterruptible power supply, and reduce transmission losses. Some technologies, such as fuel cells, could achieve even greater efficiency benefits by generating heat that could be utilized in cogeneration or combined heat and power (CHP) operations. These benefits of on-site generation constituted part of the business rationale for Johnson & Johnson's decision to install solar photovoltaic systems on the roofs of three facilities.

While the factors discussed above all have a quantifiable monetary value, other potential benefits of green power are more difficult (or impossible) to quantify. These other benefits are rooted in a number of factors that can enhance a company's overall public image and its stakeholder relationships. For example, all of the companies that participate

### BUSINESSES REACH HIGHER... BY ADDING GREEN POWER



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with WRI in the Green Power Group have cited a desire to be seen as corporate leaders as one of the reasons for their participation. Support of new technologies that provide broad social benefits is a time-honored way of demonstrating corporate leadership and engendering goodwill among a company's stakeholders. Though leadership in itself can be an important element for companies, the benefits of leadership can be manifested in several ways. For instance, procuring green power can:

- **Appeal to consumers.** Leadership efforts may be linked directly to corporate public relations (PR) as part of a company's efforts to develop a more environmentally sensitive image or to appeal to certain customer groups. As consumers become increasingly more conscious of corporate environmental performance, green power purchases provide an opportunity for a corporation to build a "green" image in the public eye that it can use to differentiate itself from its competitors. This strategy can be particularly effective for a company that sells products directly to the public. "Green" purchases can even be linked explicitly to certain products as part of a branding strategy to earn greater market share or to develop a new market niche. For example, Interface linked its use of renewable energy directly to one of its carpet brands and subsequently marketed it as a "solar-powered" carpet.

- **Strengthen relations with local communities.** A corporate commitment to green power can improve relations with the local community by establishing the company as a good neighbor and fortifying its "license to operate." In situations where a company's green power purchase displaces existing or prospective conventional energy generation in the local area, the community could be a direct beneficiary of the improved environmental conditions resulting from avoided pollution. Communities also benefit if a large corporate load creates the base demand for a green power project in the local area and the surplus power becomes available for purchase by local businesses and consumers.
- **Facilitate relations with state and federal regulators.** By taking a proactive approach to addressing environmental issues, companies that use green power may be better positioned when engaging environmental decision-makers and will be viewed with more credibility when meeting with legislators and regulators.
- **Enhance relations with employees.** Employees are an important audience for company management. By purchasing green power, a company signals its concern for environmental and social values that may be important to both its current and prospective employees. A commitment to green power can therefore improve employee morale and help a company attract high-quality employees.

The relative importance of the benefits of green power will vary by technology and by company. Not all benefits will be relevant in every case. However, they represent additional sources of value that corporate energy buyers should consider beyond the mere receipt of power.

#### IV. THE CHALLENGES OF PROCURING GREEN POWER

Although the business case for green power is strengthening, several important challenges remain. Through our experience with energy professionals in the Green Power Market Development Group, we have developed a clear understanding of a number of the current barriers to corporate green power procurement. Some of these obstacles are rooted in corporate practices and will require changes in the way companies approach energy procurement and participate in the energy market. Others relate to the current market landscape and to existing policy frameworks. In order for green power to become even more attractive to commercial and industrial users, many of the following barriers will have to be overcome.

##### Corporate Challenges

A number of internal challenges face companies as they delve into the green power market for the first time:

- **Cost alone has been the conventional basis for deciding among electricity sources.** On this basis, sales of



renewables traditionally have lagged for several reasons. First, green power technologies are competing against mature energy generation technologies that operate with well-established infrastructures and that are supported by an entrenched set of favorable subsidies and tax provisions. At this early stage in their development, renewables have much smaller economies of scale and are not as far along the learning curve relative to coal or natural gas. Second, the small size of many renewable projects, such as solar photovoltaic systems (typically 5 to 200 kW) and landfill gas-to-energy projects (typically 1 to 6 MW), increases their capital and labor costs on a unit basis. Third, because administrative and procurement costs associated with securing power are relatively fixed regardless of the amount of power involved, small projects yield high transaction costs. This fact, coupled with the relatively novel nature of green power transactions, means that a 50 MW “traditional” transaction may be easier and less costly to execute than a 3 MW transaction involving green power.

- **Few companies have established channels through which to articulate the non-energy benefits of green power to appropriate audiences within the company.** Although green power provides multiple benefits, corporate energy decisions are typically made by a dedicated energy team

who may not recognize the full value of green power’s non-energy attributes. Even if these benefits are recognized, an energy team may not have the means to communicate these attributes to colleagues in other corporate departments.

- **Many companies are not willing or able to pay a price premium for electricity.** While some companies can tolerate a small price premium for electricity in return for the multiple benefits of green power, many companies cannot. Even a small premium can entail a substantial increase in operating costs when applied to large electricity loads and could be a potential deal-breaker for a large commodity manufacturer operating on thin margins. Moreover, given that such companies are located upstream on the value chain, they may not be able to reap the customer relationship benefits of purchasing green power.

### Marketplace Challenges

A number of procurement challenges face companies wanting to purchase green power. They arise from the particular characteristics of the technologies involved or from existing marketplace practices that have not yet adapted to cater to commercial and industrial buyers. These challenges include:

- **Existing green power pricing programs are not tailored to the needs of commercial and industrial users.** Green power

continues to be sold as a niche product at premium prices. Many utilities and developers focus on selling small amounts of green power to individuals and corporations who will pay premiums to ensure that green power is supported on the grid. For some utilities, green power pricing programs are considered successful if only 2 to 3 percent of their customer base signs up and generates enough demand for only 5 to 10 MW of green power. Unfortunately, this strategy leaves behind many potential customers who—given the relatively large volume of their energy requirements—may not have the ability to pay premiums but might consider leveraging their aggregated purchasing volume to directly support the development of larger projects capable of producing power at competitive prices.

- **Companies may not be able to independently secure output from projects.** Current transaction structures in both regulated and deregulated environments make it difficult for individual consumers to secure the output from a particular green power project. This forces corporate buyers to rely on intermediary parties, which adds complexity and cost to a transaction.
- **Certain technologies face inherent operating limitations.** For example, wind farms experience intermittent energy output, with electricity generation occurring only 30 to 40 percent of the time. Furthermore, genera-



tion from wind often is concentrated during off-peak hours when market prices are the lowest. Many wind farms also experience seasonal variance in output.

- **Additional generation assets may be required to offset such operating constraints.** The variability in output from wind farms can be absorbed and managed better by entities with multiple generating resources and/or positions (e.g., large regional utilities) than by individual consumers. This limits the ability of corporations to participate in the development of wind projects without engaging utilities or other intermediaries. These intermediaries can increase overall power costs to corporate buyers.
- **Some green power options may be handicapped by unfavorable locations and high delivery costs.** Many green energy sources—for example, geothermal, wind, and biomass—are location-specific, requiring an additional cost for moving the generated power across distribution and transmission systems. This added cost can make an otherwise cost-effective energy source noncompetitive. For example, while North Dakota has some of the nation's best wind resources, few major electric loads are located nearby. As a result, this otherwise attractive wind resource area has yet to be fully exploited.

### Policy Challenges

Existing policies and regulations also can create barriers to successful green power procurement. For instance:

- **The current policy framework does not place monetary value on the superior environmental characteristics of clean and renewable power technologies.** Corporate energy managers often recognize the environmental benefits associated with green power technologies. However, they do not incorporate these factors into their company's energy price comparisons because these benefits cannot be assigned a specific monetary value.

A market-based emissions trading system is a potentially efficient mechanism for placing financial value on these positive attributes. In such a system, energy from renewable and clean sources could earn tradable credits for their emissions reductions relative to conventional energy (i.e., fossil fuels). However, although national SO<sub>2</sub> and regional NO<sub>x</sub> emissions markets already exist in the United States, they offer only very limited incentives for green power.

In order to effectively catalyze corporate markets for green power, emissions markets should extend to cover greenhouse gases. Markets also should be open to sectors beyond large power generators. In particular, commercial and industrial enterprises should be allowed to

earn and trade emissions reduction credits generated by green power. Furthermore, supporting frameworks such as a standardized corporate greenhouse gas emissions registry will need to be developed.

- **Current tax provisions supporting green power apply to only a narrow range of technologies and suffer from periodic lapses.** Until emissions markets are firmly established and fully recognize the benefits of green power, tax incentives such as production tax credits (PTCs) will be vital for supporting near-term development and application of green energy technologies.

Although PTCs supporting green power currently exist at the federal level, they suffer from several shortcomings. First, existing PTCs support only a few renewable energy sources. Currently, only wind, closed-loop biomass (i.e., dedicated energy crops), and poultry wastes are eligible for PTCs. However, corporations are also interested in energy from other renewable sources including geothermal, landfill gas, and open-loop biomass (i.e., other forms of biomass such as agricultural residues). In addition, existing tax credits often do not cover the direct use of renewable energy sources (e.g., conversion to industrial heat and steam). They only cover use of fuels for generating electricity. However, directly using landfill gas, for instance, as a substitute for natural gas in industrial power-



houses offers many environmental benefits (including high efficiencies) and can be a viable energy solution for some corporations.

Second, current tax provisions have brief authorization periods and unpredictable renewals. Short authorization periods (e.g., 2 years) prevent tax incentives from maximizing their potential positive impact. Since green power projects often take several years to develop, uncertainty regarding whether or not a PTC will be renewed can stall investments well before the incentive's actual expiration date. For example, during late 2001, the uncertainty regarding whether or not the PTC for wind-generated electricity would be renewed by Congress stalled development of wind projects that could not meet the December 31, 2001, "in service" deadline.

- **Integrating renewable-generated electricity into the conventional grid can pose challenges.** Many forms of green power use distributed generators and intermittent renewable energy sources (e.g., wind, solar). Because of these unique characteristics, existing regulations can impede the integration of green power with the nation's electricity transmission and distribution network. For instance, the current interconnection process and procedures are not streamlined; distributed power sources often must undergo lengthy, expensive studies and approval processes. Once interconnected, intermittent

renewable generators can incur heavy transmission tariffs for deviations from power contract schedules. These fees can increase the costs of what otherwise would be viable renewable energy projects.

Policy options for addressing these challenges will be explored in more detail in subsequent installments.

## V. STEPS FORWARD

Our experience with the Group has highlighted a number of positive steps that companies already can take to overcome many of these barriers. Pioneering firms already are beginning to experiment with the following strategies:

- **Companies may find cost-competitive green power opportunities by exploring nontraditional procurement opportunities.** In particular, the value chain for green power can be unbundled, providing companies with an opportunity to participate in the energy market in ways other than as a retail buyer. For instance, corporations could develop their own green power projects, take an equity or partnership position in a new development, or sign long-term agreements directly with a green power developer.

WRI has been helping Group companies to investigate non-traditional procurement opportunities in depth. After examining the value chain in detail, the Group found that in some situa-

tions costs could be minimized if companies contracted directly with developers. However, few companies are licensed to receive electricity directly from a generator and many of the standardized contracts for green power procurement are not attractive to corporations.

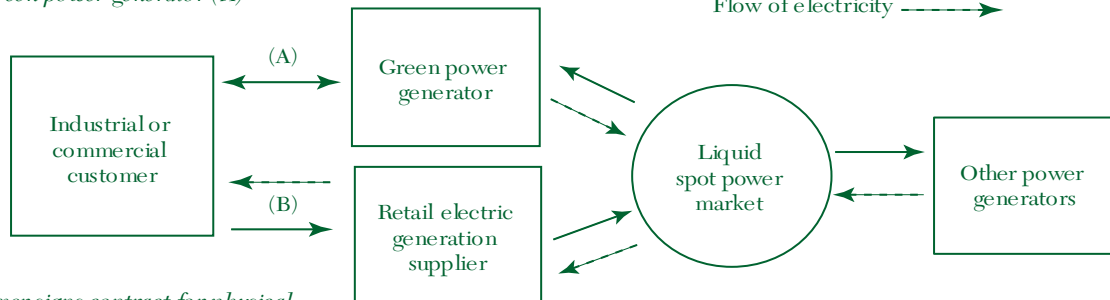
Consequently, the Group has been investigating new contractual structures as the basis for innovative relationships between companies and green power developers. For example, in a deregulated power market, an industrial customer interested in procuring green power and its environmental attributes could replace the spot market price it will pay a retail electric supplier with a fixed price by entering into a "contract for differences" with a green power project developer. As Figure 2 illustrates, the contract for differences ensures fixed-priced electricity to the corporate customer (and steady revenue streams to the developer), even though the electricity is sold into a liquid power market where spot price varies by the hour. When the hourly spot price is higher than the green power generation costs, the developer passes on revenue streams above the contracted level to the corporate customer. Similarly, when the hourly market price is lower than the generation costs, the corporate customer passes back some of the savings to the green power developer. Structures like these, in which the financial flows are separated from



Figure 2

## Fixing the Price of Green Power: A “Contract for Differences” between a Customer and a Green Power Generator

Customer signs contract for differences with green power generator (A)



Customer signs contract for physical supply with retail electric supplier based on spot market price (B)

If the contract for differences is signed at...	and the current spot price is...	the amount the customer receives from (pays to) the green power generator is...	and the net cost to the customer is...
\$40/MWh	\$55/MWh	\$15/MWh	\$40/MWh
\$40/MWh	\$25/MWh	(\$15/MWh)	\$40/MWh

Source: V. Van Son, Alcoa Inc.

the electricity flows, could benefit both developer and purchaser and facilitate the development of the green power market.

- **Companies are considering green power not just for electricity but also as a direct fuel source.** For example, the Group has explored several different opportunities to substitute landfill gas for natural gas or coal in facilities that generate their own heat and steam. For example, beginning in March 2001, the Group began mapping landfill gas sites identified through the EPA’s Landfill Methane Outreach Program against the location of the Group’s more than 250 U.S. facilities. The

Group collectively identified and reviewed over 30 potential sites and met with the appropriate developers. As of June 2002, two sites have been developed, four sites are in negotiation, and six sites are undergoing feasibility studies. (*Box 2 describes GM’s experience with landfill gas projects.*)

- **Companies can consider value, not just cost, when assessing green power projects.** Properly assessing green power requires a value comparison rather than the traditional cost comparison. A value comparison is most effective because it systematically incorporates the diverse benefits

of green power (outlined in Section III) into the purchasing decision. For example, companies could consider the degree to which a prospective green power purchase will hedge energy costs against future fossil fuel price fluctuations or emissions regulations. They also could assess how a green power purchase aligns with corporate image or branding strategies. To facilitate this “value” approach, the Group is developing analytical tools that allow companies to consider—and in some cases, measure and integrate—green power’s myriad attributes in order to provide a more comprehensive basis for project selection. These tools will



**Box 2****Finding Cheaper Energy in Municipal Waste: General Motors' Experience with Landfill Gas**

Corporations already are using green power and, in some instances, are saving money in the process. General Motors (GM), a member of the Green Power Market Development Group, currently utilizes landfill gas (LFG) to provide energy and to save money at three of its assembly plants. The LFG displaces natural gas and coal, thereby reducing emissions of SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub>.

Most recently, at its Fort Wayne Truck Assembly Plant, GM converted one of its three on-site powerhouse boilers to use landfill gas that is delivered via pipeline from a landfill 8 miles away. The LFG, which now provides 16 percent of the plant's energy needs, is expected to flow for at least 30 years. The company anticipates that using LFG will save up to \$500,000 per year relative to the 5-year average price for natural gas at the plant. In addition, most of the LFG price is fixed, insulating the plant from fluctuations in energy costs.

be outlined in a subsequent installment in this series.

- **Energy managers can convey the non-energy benefits of green power to appropriate audiences within the company.** If corporate procurement of green power is to increase, managers across multiple corporate functions—energy, operations, environment, public/external relations, brand manage-

ment/marketing—must begin to recognize green power as another means of achieving their respective functional goals. This may require energy managers to forge new working relationships with staff within the company who have not normally been perceived as “relevant” for making power procurement decisions. For example, in negotiating green power deals, Kinko's environment manager has engaged staff in the company's PR division. Together, they have calculated the benefits of the “free publicity” that Kinko's receives from media coverage of its green power purchases.

- **Companies can explore partnerships with other firms interested in procuring green power.** A group of companies working together can accelerate the pace at which they learn about green power. Such partnerships allow companies to pool scarce staff resources that otherwise may not be able to devote adequate time to understanding a new market. Partnerships even could extend beyond learning to include the development of a buyer's group in which interested companies aggregate their demand to create a larger (and more attractive) market signal for developers. A buyer's group potentially could lower the overall cost of procuring green power.
- **Companies could signal to utilities and developers the type of green power products that would be attractive to the corporate sector.** One

reason for the limited corporate participation in green power programs offered by utilities is that such programs tend to focus on selling small amounts of green power at premiums too large for companies to pay. Tellingly, initial research indicates that the residential sector accounts for approximately 70 percent of green power purchases to date in the United States<sup>6</sup>, despite the fact that commercial and industrial electricity demand is nearly twice that of the residential sector.<sup>7</sup> Corporations need to communicate to utilities and developers the types of products that would be attractive to them. For example, if corporate customers indicated their much greater potential demand for green power directly to providers, new programs could be designed in which developers sold much larger quantities of green power.

These and other steps will be explored in more detail in subsequent installments of the *Guide*.

## VI. CONCLUSION

Green power, long overlooked by corporate energy managers, seems poised to become a mainstream component of corporate power procurement. A number of commercial and industrial companies already are purchasing renewable energy and many others are beginning to explore the market for opportunities. This activity is being driven by technological advances, changes in energy markets, and increased corporate concern for environmental issues. If



these trends continue—as most expect that they will—green power will likely play an increasing role in helping commercial and industrial users meet their energy needs.

Companies still face many challenges as they consider green power options for the first time. For instance, they will need to develop an understanding of the various green power technologies and their particular characteristics. They will need to adapt their (perhaps long-standing) methods of energy procurement and find ways to integrate energy buying decisions with other relevant parts of the business. They also will need to apprise themselves of new types of contractual arrangements and perhaps conduct business with new actors in the marketplace.

Many companies now are taking on these challenges. Through our experience in the Green Power Market Development Group, we have worked through many of the issues raised here with large U.S. corporations who are approaching the market for the first time. These issues will be addressed in future installments of this series to provide corporate energy managers with the necessary foundation to identify, evaluate, and ultimately purchase renewable and clean energy.

## ABOUT THE AUTHORS

Duncan Austin is a senior associate in the Economics Program at WRI. Craig Hanson is a senior associate in WRI's Sustainable Enterprise Program.

## ACKNOWLEDGMENTS

The authors would like to thank Shehnaz Atcha, Tim Daniels, Paul Faeth, and Jennifer Layke for assistance in preparing this installment. Thanks also to Pankaj Bhatia, Kurt Johnson, Christian Layke, Jim MacKenzie, Anne Marie McShea, David Monsma, Jim Perkaus, Gabe Petlin, Daniel Prager, Dan Reicher, and corporate members of the Green Power Market Development Group for their comments and suggestions. The authors also thank Hyacinth Billings, Bill LaRocque, Maggie Powell, and Martha Schultz for assistance with design and production.

WRI would like to thank all of those who have supported the Green Power Market Development Group over the past 2 years, including The Pew Charitable Trusts, The Energy Foundation, Oak Foundation, Spencer T. and Ann W. Olin Foundation, U.S. Department of Energy, and the U.S. Environmental Protection Agency. WRI also would like to thank all of the Group's collaborators, including the National Renewable Energy Laboratory, the Renewable Energy Policy Project, Center for Resource Solutions, the Environmental and Energy Study Institute, Think Energy, Inc., Cummins & Barnard, Foresight Energy Company, and the many other suppliers and developers with whom we have interacted. The authors alone are responsible for the views and opinions expressed in this installment.

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5. "Peak-shaving" is the practice whereby an electricity user (e.g., corporation) lowers its electricity costs by reducing its demand from the grid during time periods when power prices are high (e.g., the middle of the day). Peak-shaving can be achieved either contractually or by diverting energy demand to on-site power sources.
6. Personal communication with WRI, Lori Bird, National Renewable Energy Laboratory, February 14, 2002. Data indicate that businesses purchase approximately one third of the power sold under utility green pricing programs. In addition, "nonresidential" customers (including corporations, government, and other organizations) purchase 29 percent of Green-e certified power in competitive markets.
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The second installment of WRI's *Corporate Guide to Green Power Markets* will examine commercial opportunities for landfill gas-to-energy projects and will be available in the fall of 2002. For more information on green power markets for corporate users, visit our website and on-line green power marketplace at [www.thegreenpowergroup.org](http://www.thegreenpowergroup.org).



The **World Resources Institute** is an environmental think tank that goes beyond research to create practical ways to protect the Earth and improve people's lives. Our mission is to move human society to live in ways that protect Earth's environment for current and future generations.

Our program meets global challenges by using knowledge to catalyze public and private action:

- *To reverse damage to ecosystems.* We protect the capacity of ecosystems to sustain life and prosperity.
- *To expand participation in environmental decisions.* We collaborate with partners worldwide to increase people's access to information and influence over decisions about natural resources.
- *To avert dangerous climate change.* We promote public and private action to ensure a safe climate and sound world economy.
- *To increase prosperity while improving the environment.* We challenge the private sector to grow by improving environmental and community well-being.

In all of its policy research and work with institutions, WRI tries to build bridges between ideas and actions, meshing the insights of scientific research, economic and institutional analyses, and practical experience with the need for open and participatory decision-making.

For over a decade, WRI's **Sustainable Enterprise Program** has harnessed the power of business to create profitable solutions to environment and development challenges. WRI is the only organization that brings together corporations, entrepreneurs, investors, and business schools to accelerate change in business practices. The program improves people's lives and the environment by helping business leaders and new markets thrive.

Working with global, national, and local partners, the **Economics Program** at WRI identifies and promotes environmentally sound practices and policies to reduce pressures on our natural resource base and to encourage sustainable economic activity. Our projects promote the use of economic incentives to achieve sustainable development, to integrate environmental and economic factors into policy decision-making, and to create value for environmental services. Through our work we are improving the quality of life for all human beings and protecting the Earth's environment for current and future generations.



World Resources Institute

10 G Street, NE  
Washington, DC 20002 USA  
<http://www.wri.org>

ISBN: 1-56973-526-3

