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SAMANTHA PUTT DEL PINO

SWITCHING TO GREEN

A Renewable Energy Guide for Office and Retail Companies

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A RENEWABLE ENERGY GUIDE FOR OFFICE AND RETAIL COMPANIES



SAMANTHA PUTT DEL PINO

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MARGARET YAMASHITA
EDITOR

HYACINTH BILLINGS
PUBLICATIONS DIRECTOR

MAGGIE POWELL
LAYOUT

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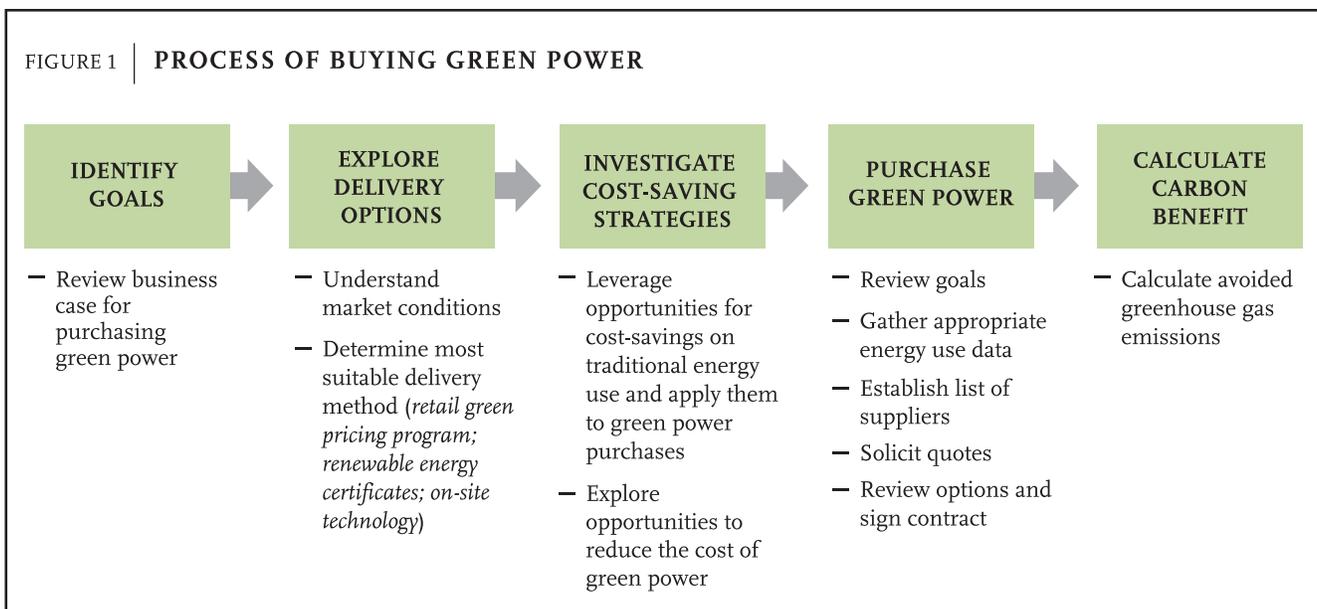
INTRODUCTION

More than 70 percent of electricity in the United States is generated using fossil fuels such as coal, oil, and natural gas.¹ The environmental impacts from this generation are considerable, ranging from air and carbon pollution to the myriad consequences of mining and drilling for fuel. Obtaining energy from clean, renewable resources—“green power”—can provide both environmental and economic value, and a growing number of American companies are making the switch.

In recent years, the market for green power in the United States has grown exponentially, a good example being wind power. In 1989, U.S. wind farms generated 2.1 million megawatt-hours (MWh) of renewable electricity,² and in 2005, wind farms in 31 states³ generated 14.6 million MWh of renewable electricity,⁴ an increase of 595 percent. According to the U.S. Energy Information Administration, the 55.15 million MWh of renewable energy generation in 2005 was equal to 1.5 percent of the country’s total elec-

tricity generation. In 2030, 177.13 million MWh of renewable electricity are expected to be generated, equal to 3.3 percent of the total electricity generation.⁵

Although many types of green power are not difficult to procure, the overwhelming amount of information available can make this confusing to do, especially for newcomers. Accordingly, this guide was designed to cut through the clutter and provide the essential information for companies wanting to “green” their energy supply. It is intended specifically for office- and retail-based companies and organizations, defined as those that do not have manufacturing operations. Examples include financial institutions; real estate, retail, law, and publishing firms; universities; and nonprofit organizations. The readers of this guide do not need an energy background to understand the information. To begin, figure 1 shows the steps for purchasing green power, each of which will be described in detail.



The guide draws heavily on the lessons and publications of the Green Power Market Development Group (see box 1) whose members include many of the largest corporate users of renewable energy.

THE DEFINITION OF GREEN POWER

Green power, also referred to as “renewable energy,” can be used to generate both heat and electricity. The World Resources Institute (WRI) views green power as energy generated from resources that are commonly accepted as having a relatively low impact on the health of humans, animals, and the ecosystem. These energy sources include

- Solar
- Wind
- Biomass
- Landfill gas
- Geothermal
- Some types of certified hydropower⁶

Unlike fossil fuels, these resources do not contribute to emissions of carbon dioxide (CO₂), which causes global warming. Although power derived from nuclear energy is not polluting, it is not considered a green power source because it is not renewable and spent nuclear fuel carries environmental and health risks. In addition, some hydropower projects can have significant adverse environmental impacts on water quality, river flows, and fish populations and thus are not considered “green.” One way to ensure that green power meets strict environmental standards is by purchasing a product that has been certified through a program such as Green-e (see box 2).

BOX 1

THE GREEN POWER MARKET DEVELOPMENT GROUP

Convened in 2000 by the World Resources Institute, the Green Power Market Development Group is a unique commercial and industrial partnership dedicated to building corporate markets for green power. The Group is transforming energy markets to enable corporate buyers to diversify their energy portfolios and reduce their impact on climate change by developing 1,000 megawatts (MW) of new, cost-competitive green power by 2010—enough energy to power 750,000 homes. The Group’s current partners are Alcoa, Dow Chemical Company, DuPont, FedEx Kinko’s, General Motors, IBM, Interface, Johnson & Johnson, NatureWorks LLC, Pitney Bowes, Staples, and Starbucks.

More information about the Group and its activities, including publications, case studies, background information on green power technologies, and an online green power marketplace, can be found at www.thegreenpowergroup.org.

BOX 2

GREEN-E CERTIFICATION

The nonprofit Center for Resource Solutions administers the Green-e certification program, which offers an easy way for consumers to quickly identify environmentally superior electricity products. Green-e certifies renewable electricity products that meet the program’s strict environmental and consumer protection standards. For example, Green-e certifies only “new” renewables from facilities put online since 1997 and does not certify renewables that were mandated by government. Consequently, companies know their dollars are making a real difference. Green-e also requires that electricity providers disclose information about their product to their customers in a standardized, easily comparable format. Finally, Green-e allows qualifying purchasers to use the Green-e logo on their web site, in their communications, and on their products. For more information, visit www.green-e.org.

THE BUSINESS CASE



The demand for green power from states to individuals to businesses is growing. Twenty-two states and the District of Columbia have passed legislation (known as “Renewable Portfolio Standards”) requiring utilities to generate a specified percentage of their power from renewable sources.⁷ In addition, utilities in thirty-four states offer a green power option to household consumers,⁸ and the list of municipal, commercial, and industrial users of renewable energy continues to grow. Many of them belong to the U.S. Environmental Protection Agency’s Green Power Partnership, which now has more than 600 members that use more than 5.5 billion kWh of renewable energy annually.⁹

Several notable office- and retail-based companies and organizations, as well as universities, are on this growing list of green power purchasers (see table 1). These companies and organizations have a variety of reasons for wanting a clean and sustainable energy future, including reducing greenhouse gas (GHG) emissions to reach climate change goals; building stronger relationships with customers and employees; lowering or stabilizing operating costs; and securing their energy supply.

- *Reducing greenhouse gas emissions.* Fossil fuel-based energy contributes to both air and carbon pollution. More and more companies now understand the dangers of climate change and have responded with a corporate strategy, which includes establishing an emissions reduction target. Energy is a significant source of greenhouse gas emissions for most office- and retail-based companies, so switching to renewable energy can help them reach their emissions reduction targets. Information about accounting for the carbon benefit of renewable energy purchases is on page 16.
- *Strengthening relationships with customers and employees.* Using renewable energy can strengthen a company’s relationship with its stakeholders. Moreover, deriving renewable energy from resources close to home has

TABLE 1 SOME OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY’S GREEN POWER PARTNERSHIP “TOP 25 PARTNERS”

Company	Green Power Usage (kWh)	Percent of Total Electricity
Whole Foods Market	463,128,000	100
Starbucks	150,000,000	20
HSBC North America	124,544,000	35
University of Pennsylvania	112,000,000	29
World Bank Group	106,762,000	100
Safeway	87,000,000	2
FedEx Kinko’s	54,690,033	15
Duke University	54,075,000	31
White Wave Foods	49,500,000	100
Staples	49,497,588	10
Tower Companies	41,000,000	100
Northwestern University	40,000,000	20

Source: U.S. Environmental Protection Agency, Green Power Partnership, “Top 25 Partners,” June 2006, <http://www.epa.gov/greenpower/partners/top25.htm>.

the added advantage of improving local air quality and thus may enhance a company’s local corporate image.

- **Customers.** Purchasing renewable energy may be particularly beneficial to some business-to-consumer companies. For example, Whole Foods Market bought renewable energy certificates (RECs)* for all its stores, distribution centers, commissaries, bakeries as well as its regional offices and headquarters

* Renewable Energy Certificates (RECs) are discussed in detail on p. 7.

in the United States and Canada, which helps differentiate Whole Foods Market from its competitors and aligns its mission of environmental stewardship with its customers' values.

- **Employees.** Strong companies value their employees, and purchasing renewable energy may enhance employee relations. A recent KPMG survey of 1,600 of the world's largest companies found that approximately half believed that motivating their employees is a major driver of corporate social responsibility (CSR) activities.¹⁰ Buying green power can be one element of a comprehensive CSR strategy. A strong commitment to green power and CSR can help make employees feel better about their employer and, in turn, may help the company attract and retain high-quality employees.
- *Lowering or stabilizing operating costs.* Fossil fuels are not renewable sources so their prices can be volatile. Some companies, however, may be able to stabilize their energy costs by switching to renewable energy. For example, in 2001 IBM signed a five-year contract with its utility to provide wind-generated electricity at a fixed price for its operations in Austin, Texas. At the outset, even though the green electricity was slightly more expensive than the utility's conventional power, as the price of natural gas soared during 2001, the

cost of conventional power also rose until it was more expensive than the utility's wind-generated electricity. Because the price of natural gas has remained high, IBM expects to save more than \$60,000 a year through its fixed-price contract.

As another example, Staples hosts solar photovoltaic (PV) systems on the rooftops of two of its California distribution centers (see case study B on page 11). These PV systems reduce the amount of power that Staples must buy from its utility during the peak—and most expensive—hours of the day. In addition, the price it pays for the solar power is fixed, so the company has a buffer against retail electricity price increases and can better forecast its future energy costs.

- *Securing energy supply.* Because the United States imports about one-third of its energy,¹¹ unstable and hostile political regimes in many of the world's oil-producing regions are causing Americans to become more and more concerned about energy security. Indeed, recent polls by the Pew Research Center for the People and the Press indicate that 63 percent of Americans give priority to reducing their country's dependence on foreign oil.¹² By switching to renewable energy, companies can help build the market for newer, alternative forms of energy and also diversify the energy mix.

GREEN POWER DELIVERY OPTIONS



The United States is subdivided into a network of regional “power pools,” each of which is made up of one or more states (see figure 2). When electricity is generated—by either fossil fuels or renewable resources—electrons physically flow along the path of least resistance into the nearest electricity grid or “power pool.” Electricity providers then distribute the electricity to consumers along local transmission lines (see figure 3). It is not possible for customers to know whether the electrons they receive were generated using fossil fuels or renewable resources. But by buying green power, companies increase the amount of renewable energy that is generated in the power pool. The purchaser signs a contract with a renewable energy provider or marketer ensuring that the same quantity of renewable electricity that the customer purchased is being generated and put into the system and that the purchaser “owns” the environmental benefits of the renewable electricity.

MARKET CONDITIONS

Before procuring renewable energy, companies must learn about the market(s) in which they operate and the various green power delivery options available. The electricity markets of some states are regulated, which means that just one utility serves all consumers, at a set rate and in a defined service area (usually a state or a portion of a state).

As of July 2006, seventeen states and the District of Columbia have deregulated their electricity markets. This means that consumers in these states can shop around for an energy provider and select the one that meets their pricing or product needs. Therefore, companies wanting to buy renewable energy should find out whether their market is regulated or deregulated, as this will affect their product choices and supplier options.

GREEN POWER DELIVERY OPTIONS

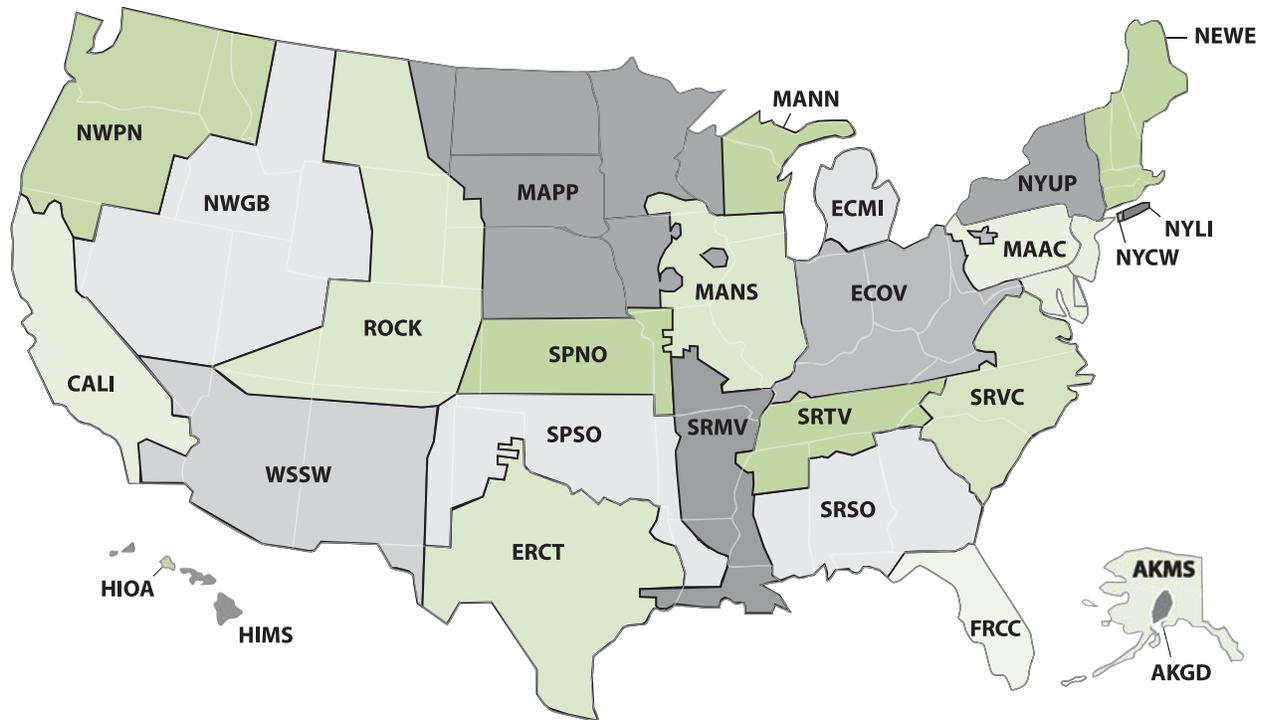
The three methods of purchasing green power are through retail green power programs, renewable energy certificates (RECs), and on-site generation. The following is a general description and the principal advantages and disadvantages of each.

Retail green power programs

Both regulated and deregulated markets offer retail green power programs. In regulated markets, companies can participate in utility-sponsored “green pricing” programs that allow customers to buy green power by paying a special rate for electricity—usually a premium. This premium helps the utility invest more money in renewable energy and thus increase the amount of renewable electricity produced, generally in the purchaser’s power pool¹³ (see figure 2). In deregulated markets, customers can buy green power through either their utility or a competitive power marketer.

Retail green power offerings vary widely from program to program. Customers may buy up to 100 percent green power, often in a “blend” of various renewable resources. Retail green power usually is purchased either in fixed-quantity “blocks” or as a percentage of the customer’s monthly electricity use. One block is usually equal to 100 kilowatt hours (kWh) of renewable electricity and is available for a fixed monthly fee above the cost of conventional electricity. Customers may buy as many blocks as they wish, depending on how much of their electricity supply they want to be green. The cost for customers that buy renewable energy as a percentage of their monthly electricity use varies each month depending on how much energy is used.

FIGURE 2 | U.S. POWER POOL SUBREGIONS



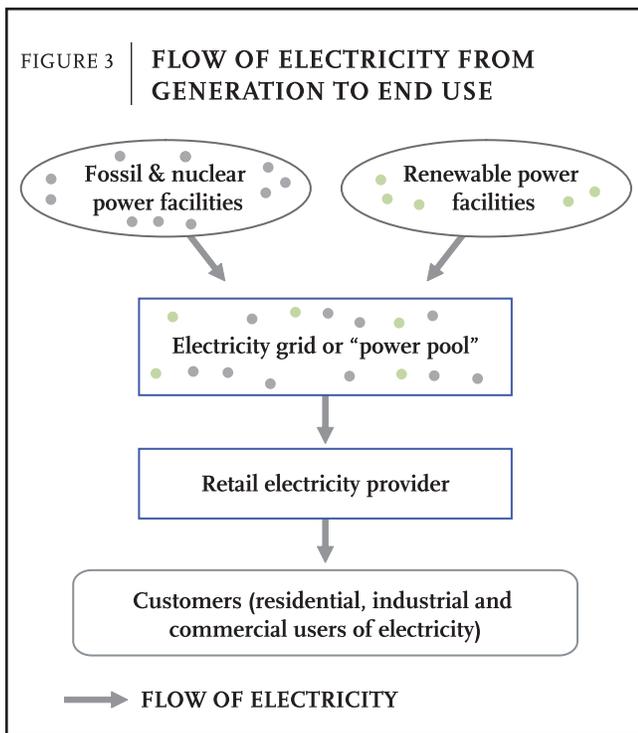
Source: Approximation of NERC Region and eGRID power pool subregion map. NERC is the North American Electric Reliability Council. eGrid is the Emissions & Generation Resource Integrated Database and is published by the U.S. Environmental Protection Agency.

Advantages

- *Simple transaction.* Customers contract directly with their utility or power marketer and simply pay a premium on their existing bill.
- *Local environmental benefits.* The power pool in which the customer is located accrues the improved environmental benefits associated with the generation of renewable energy.
- *Stable rates.* When a company buys renewables from an electricity supplier, it may be eligible for the cost stability of renewable fuels. Be sure to ask the provider whether the price of its green power product is excluded from the volatility of fossil fuel prices.

Disadvantages

- *Cost.* Because local utilities run retail green power programs, they usually select local renewable energy sources, which may result in higher costs, depending on the abundance of the local renewable resource. In addition, providing green power is not a central part of most utilities' business, and thus the transactions costs are higher for them.
- *Less geographic flexibility.* Customers with green power needs in multiple states may find retail green power too geographically limiting because they need to make several green power transactions for each utility or power marketer service area in which they are located.
- *Source.* Customers generally have fewer choices of the fuel source of their green power—for example, wind, solar, biomass—and must accept whatever the utility or power marketer offers.



Renewable energy certificates (RECs) / “green tags”

Renewable energy certificates (RECs), also known as “green tags,” “green certificates,” and “renewable energy credits,” are a relatively new but increasingly popular method of supporting green power. Renewable energy generates two products: electricity and the technology and environmental benefits associated with renewable energy generation (see figure 4). These benefits are generally referred to as environmental “attributes” and may include a reduction in the air pollution and particulate matter that would have been generated by burning fossil fuels as well as a reduction of greenhouse gas emissions. The electricity and attributes can be sold together, in retail green power programs, or they can be sold separately. RECs represent the technology and environmental attributes of renewable energy and allow customers greater flexibility in “greening” their electricity. That is, customers can continue to purchase their electricity from their existing suppliers and “green” it by supporting a renewable energy source of their choosing.

One REC generally represents the technology and environmental attributes associated with generating one megawatt-hour (MWh) of renewable energy. Along with the environmental attributes, each REC also documents

the renewable resource used to generate the underlying electricity, the location of the generation, and the date of generation. Certification programs such as the Green-e label (see box 2) are in place to audit REC generation and ensure product quality.

Figure 5 illustrates RECs in more detail. Renewable power facilities sell the electricity they generate into the wholesale power market, where it is then bought by retail electricity providers and sold to customers. RECs are sold either directly to retail electricity providers or to third-party REC suppliers. When retail electricity providers sell electricity plus RECs to a customer, the product being sold is *green power*. If RECs are not sold along with the electricity, the product being sold is *conventional electricity*. In other words, the “greenness” of renewable power follows the REC. If a company can claim ownership of the REC, it also can claim the environmental benefits of the associated green power. The main difference between retail green power products and RECs is the supplier from which the customer buys the RECs (see table 2).

Some companies and organizations have purchased RECs to meet their green power needs either completely or partly, including Coca Cola, Duke University, FedEx Kinkos, Harvard University, National Geographic, Lowe’s Home Improvement, Nike, Staples, the Tower Companies, the U.S. Army, the World Bank, Whole Foods (see case study A), and the World Resources Institute. The U.S. Environmental Protection Agency’s Green Power Partner-

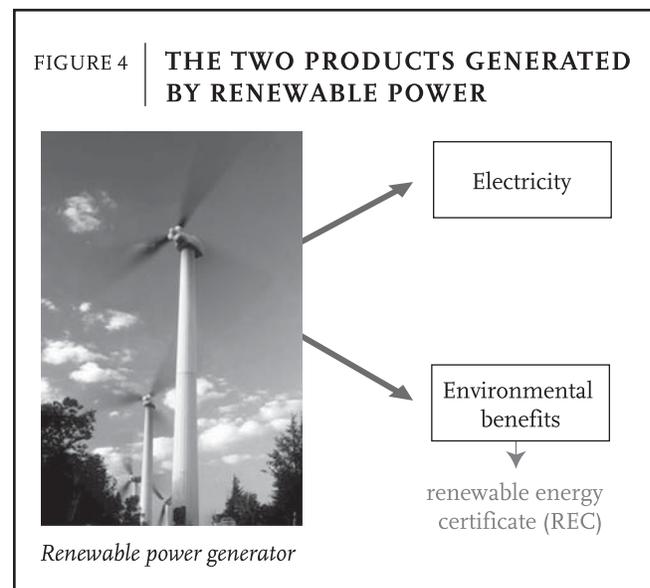
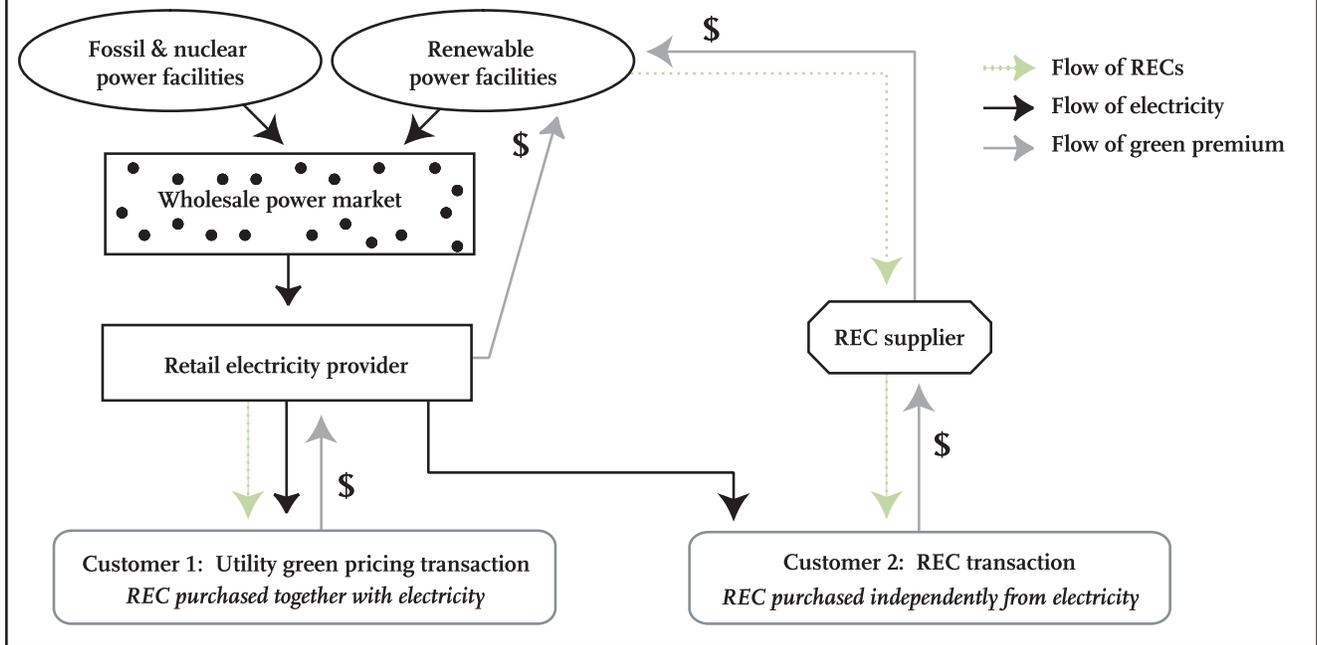


FIGURE 5 | FLOW OF RECs AND ELECTRICITY



ship web site (http://www.epa.gov/greenpower/partners/gpp_partners.htm) lists more than 600 members, many of which are buying RECs.

Advantages

- *Flexibility.* RECs may be purchased from suppliers anywhere in the country, giving customers an opportunity to shop around for the best available price or the resources or environmental attributes most attractive to the buyer. For example, companies with greenhouse gas reduction targets may want RECs sourced from carbon-intensive areas of the country, as this will maximize the carbon benefit of their green power purchases. (For information about accounting for the carbon benefit of green power purchases, see p. 16.)
- *Simplified transactions for multiple sites.* Rather than work with several utilities, companies with multiple sites can “green” their electricity through one supplier.
- *Cost.* The flexibility of RECs often means they can be bought for less than what many retail green power products cost.

Disadvantages

- *Multiple bills.* If RECs are bought through a third-party broker, the purchasers must pay two bills: one to their utility or power marketer for their electricity and another to the RECs’ broker to “green” the electricity. As a result, the RECs purchase appears as a new expense rather than a simple change in the electricity bill.
- *Communications.* Even though RECs are a widely accepted method of procuring green power, the concept still is new to some stakeholders. Also, companies must be careful to describe their RECs purchase accurately, by following the rules of the states’ attorneys general to ensure “truth in advertising.”¹⁴ For example, a company that has bought RECs sourced from wind cannot claim to be *powered* by wind, because the company has purchased the environmental attributes of the wind generation, not the electricity itself. Box 3 contains examples of how companies describe their RECs purchases. Green-e (see box 2) can help companies that buy Green-e-certified RECs use the appropriate language in their communications.

CASE STUDY A

WHOLE FOODS MARKET'S RECORD-SETTING PURCHASE OF RECS

In early 2006, Whole Foods Market, the world's leading natural and organic foods supermarket, announced a landmark purchase of renewable energy certificates (RECs), making Whole Foods Market the country's leading corporate purchaser of RECs. Whole Foods Market bought more than 458,000 megawatt-hours (MWh) of RECs from wind farms to offset 100 percent of the electricity used in all of its stores, facilities, bakeries, commissaries, distribution centers, regional offices, and national headquarters in the United States and Canada. This purchase also avoids more than 700 million pounds of carbon dioxide pollution, roughly equivalent to removing 60,000 cars from the road or planting more than 90,000 acres of trees.

The World Resources Institute facilitated the purchasing process for Whole Foods Market, and the RECs were supplied by Renewable Choice Energy. Whole Foods Market's selection of RECs enabled it to meet its green power needs and to complete the transaction much more easily than if it had tried to buy a separate green power product for each of its facilities operating in different markets around the country.

On-site generation

Some companies may be able to install technologies at their own facilities to generate electricity or heat from renewable resources. For non-manufacturing companies, these opportunities are most likely to be the installation of solar photovoltaic (PV) panels, solar water heaters, or geothermal heat pumps. Some companies have even installed wind turbines, although this type of on-site technology is usually less feasible for offices and retailers. One of the main reasons is that urban areas—where many of these companies are located—are not prime sites for wind technology. In some cases, companies may buy the technology themselves or allow another company to install the technology on its property and then buy the electricity that is generated (see case study B). Note that if a company using on-site green power sells the associated RECs, it cannot claim to be using green power, because the “greenness” of renewable energy follows the REC (see “Renewable Energy Certificates” on p. 7). Unlike green pricing programs or RECs, however, on-site renewable power generation means that the purchasers' facilities will receive the actual electricity generated by the renewable energy technology.

TABLE 2 | RETAIL GREEN POWER AND RECS: MORE SIMILAR THAN DIFFERENT

Similarities	Differences
<ul style="list-style-type: none">• Renewable power facility generates and delivers electricity to the wholesale electricity market.• Customer receives electricity from a mix of sources.• Emissions from dirty coal, oil, or natural gas plants are avoided.• Buyers support renewable energy generation.• Buyers can claim environmental benefits.• No change in the reliability or quality of electricity.	<ul style="list-style-type: none">• With retail green power, the utility sells the “greenness” of renewable power generation, whereas with RECs, the REC marketer sells the “greenness.”• Electricity and the “greenness” of renewable power generation appear on the retail green power customer's bill/invoice. The RECs customer must pay two bills/invoices: one to its utility for electricity and one to the REC marketer for the “greenness” of renewable power generation.

BOX 3**EXAMPLES OF HOW COMPANIES DESCRIBE RECS**

- “In 2003, Pitney Bowes started purchasing renewable energy certificates (RECs) *equivalent to 10* percent of the electricity consumed annually by the company’s home office facilities. The RECS are being generated by projects that produce electricity from wind and landfill gas.”
- “The American Psychological Association will buy renewable energy in the form of renewable energy certificates (RECs) *equivalent to 13,000,000 kWh* per year.”
- “NatureWorks, LLC is *matching 100* percent of its annual electricity consumption with renewable energy certificates (RECs) from wind farms in the Great Plains.”
- “This FedEx Kinko’s facility is *‘greening up’ 100* percent of its electricity supply by purchasing renewable energy certificates from wind farms in the Pacific Northwest.”
- “Staples is buying 46 million kWh per year of renewable energy certificates (RECs). Ten percent of the RECs are generated from wind farms in the Great Plains and 90 percent are generated by projects that produce electricity from biomass and landfill gas resources.”

Note: Key words are italicized.

Advantages

- **Reliability.** If a facility’s power is derived from an on-site source, the facility may be wholly or partly protected against any periodic power outages on the grid. This may be desirable if the facility (e.g., hospitals and data centers) is highly dependent on a reliable power source. Note, however, that many on-site systems do not operate continuously. For example, solar PV is an intermittent resource that operates only when the sun is shining.
- **Net metering.** If a company generates more electricity on-site than it purchases from its utility in a given month, some states will allow it to sell the excess power back to its utility.

- **Lower electricity cost.** Companies that use electricity generated on-site to help meet their power needs—rather than relying solely on electricity from the grid—can lower the cost of their electricity, especially if they use an on-site source during the “peak” and most expensive times of day.
- **Image.** On-site power sources, such as a roof covered with solar PV panels, communicates the company’s environmental commitment in a highly visible way.

Disadvantages

- **Cost.** The up-front capital cost of installing on-site renewable power technology may be expensive, but it sometimes can be offset by applying for state incentives. For more information, see “Procurement Strategies.”
- **Availability.** Only limited types of on-site renewable energy technology are practical for office- and retail-based companies. Companies may also be limited by the availability of the renewable resource (e.g., sun, wind) in their locale.
- **Interconnection.** Rules covering the interconnection of on-site power generators to the local grid can be problematic and burdensome, although some states have simplified their interconnection rules. Information about interconnection rules in each state (as well as renewable energy incentive opportunities) can be found in the Database of State Incentives for Renewable Energy (DSIRE), available at www.dsireusa.org.
- **Utility charges.** Some utilities charge “standby charges” or “exit fees” to customers who meet part of their energy needs through on-site generators but remain connected to the grid for additional power. These fees can be excessive and can make some on-site power options economically unfeasible.

CASE STUDY B

THE SOLAR SERVICES MODEL

When evaluating options for on-site power generation, companies interested in solar PV may decide not to choose solar PV because of its high capital cost and financial rate of return.

One way to overcome the disadvantages of solar PV is through a financing approach known as the “solar services” model. Under this arrangement, the customer hosts an on-site generation system and buys its power but does not own the PV equipment. By eliminating up-front capital expenses to the host customer, this innovative business model could significantly increase large U.S. corporations and institutions’ use of PV technology. A solar financier and/or developer such as SunEdison would instead finance, design, install, own, and operate a PV system.

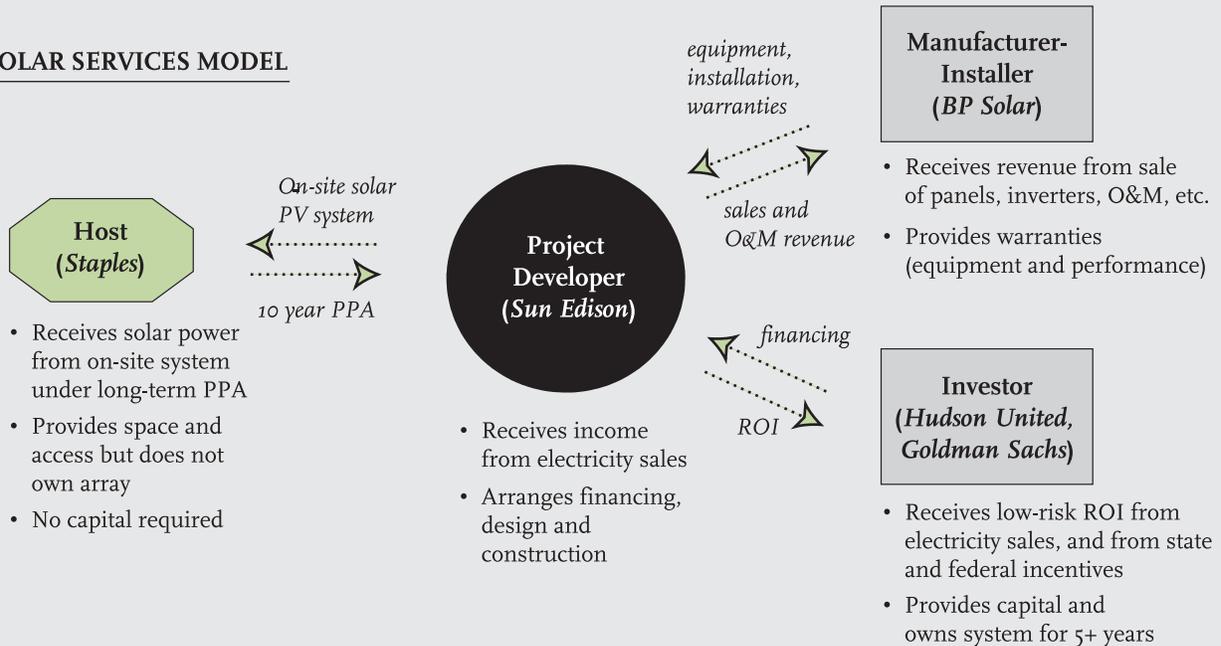
Staples is one of the first major corporations to use the solar services model. In 2004, Staples signed contracts with SunEdison, LLC to purchase 10 years worth of solar electricity from two 280-kW on-site solar PV projects at two of its distribution centers in California, which serves about 10 percent of each facility’s load.

The figure shows how the solar services model worked for Staples. The project developer, SunEdison, arranged the

financing, design, equipment supply, and construction for both sites. In return, Staples signed a ten-year, fixed-price power purchase agreement (PPA) with SunEdison, with the option of renewing it in five-year intervals. Hudson United Capital (now TD Banknorth), a financial lender specializing in renewable energy projects, provided construction and senior-term loans, and a Goldman Sachs affiliate supplied the equity. The PV units were manufactured and installed by BP Solar.

The solar services model can be structured to minimize risk and transfer risk to those entities that can best manage it. For example, Staples can assign the rights to the PPA to a future tenant or landlord, which allows Staples to transfer its obligations if it vacates the property. In addition, BP Solar offers a performance guarantee that its array will generate a certain number of kilowatt-hours of electricity per year as it is confident of the performance of its equipment. Hudson United and Goldman Sachs receive a low-risk return on their investment through the sale of fixed-price electricity to a financially stable firm and the monetization of renewable energy incentives including depreciation benefits and a federal tax credit.

SOLAR SERVICES MODEL



PROCUREMENT STRATEGIES



Green power often is bought at a premium over the cost of traditional power, but a number of strategies can be used to minimize the additional expense.

- *Efficiency upgrades.* The cost of a company's energy is linked to how much it uses. Some companies help pay for their green power by implementing energy savings programs and then using the cost savings to buy renewables. Although the overall energy purchasing budgets remain the same, the environmental results are better because of lowered consumption and the purchase of green power. See case study C.
- *Supplier switching.* In deregulated markets, customers have the option to switch from one energy provider to another. Switching to a less expensive energy supplier may enable a company to buy green power with the money saved. (*Note:* Before switching to another supplier, find out whether the company's current contract with its power provider includes a penalty for switching to another provider before the contract expires.)
- *Percent purchased.* A company's decision to procure renewable energy does not necessarily mean that all of its energy must come from renewable sources. Many companies buy some of their energy from conventional sources and some from renewable ones. This approach can help the company meet its goal of integrating green power into its portfolio of energy sources while keeping the cost down.
- *Aggregate demand.* Green power purchased in high volumes typically costs less per kilowatt-hour than that purchased in small volumes. One way to achieve high volumes is to aggregate the demand for green power across multiple facilities within the company or to join other companies looking for affordable green power.
- *Customized retail products.* Many utilities offer only an "off-the-shelf" green power product, but some may be willing to develop a customized product if the

CASE STUDY C

PARLAYING EFFICIENCY INTO GREEN POWER: STAPLES' EXPERIENCE WITH OPTIMIZING GHG PERFORMANCE

When getting started in 2001 to meet its GHG reduction target of 7 percent below that year's levels by 2010, Staples aggressively and systematically identified and implemented best-practice approaches to energy management in all its company stores and distribution centers. These projects ranged from control technology retrofits for lighting and HVAC load to incorporating more green design principles into new construction. Through its initial round of efficiency measures, Staples reduced its energy consumption by 12.3 percent per square foot of floor space. This included 46,000 megawatt-hours in the first year and an additional 19,000 megawatt-hours in the second, with savings of \$4.5 million and \$2.0 million, respectively. By reducing its energy consumption, Staples also reduced the indirect GHG emissions released when electricity providers burn fossil fuels to generate power. Using the average emission factor for the United States, Staples' energy efficiency avoided more than 41,000 metric tons of GHG emissions over two years, equivalent to taking nearly 8,000 cars off the road.

The effort to reduce emissions through energy efficiency allowed Staples to use a small portion of the money it saved from its efficiency investments to buy green power, including RECs equivalent to 46,000 megawatt-hours each year. Consequently, in 2003 Staples was able to increase its use of renewable power from less than 2 percent of its annual electricity consumption in the United States to 10 percent. The use of green power resulted in an additional 35,000 metric tons of avoided GHG emissions. The company has maintained its green power purchases at 10 percent of total consumption, with 2005 purchases totaling 49,458 MWh and in 2006 increased its green power goal to 20 percent of total consumption.

company's purchase is large. For example, in 2003, the Tower Companies joined Pepco Energy Services to develop a new product that would meet the Tower Companies' need for a less expensive green power option. See case study D.

- *Location and source of RECs.* The cost of RECs can vary widely depending on the technology and the geographic location of the source. For example, in some years, depending on a number of market factors, RECs sourced from wind may be less expensive than RECs sourced from biomass. But in other years, landfill gas may be the least expensive option. Depending on the company's priorities, it may be able to meet its goals with a blended product. For example, the company may request that 10 percent of the RECs be sourced from wind or solar and 90 percent from landfill gas. Finally, a particular renewable resource, for example, wind or biomass, may be more abundant in some areas than others and thus less expensive. Sourcing RECs nationally rather than locally, considering blended products, and specifying that the underlying power generation is from the least expensive source all are ways of reducing the cost of procuring green power. Up-to-date market data for RECs can be found by visiting the web site of Evolution Markets Inc. (www.evolutionmarkets.com).
- *Energy Services Companies (ESCOs).* Companies with facilities in several locations may find that working through a third-party energy services company (ESCO) may help them lower the cost. For example, Citigroup found that contracting an ESCO to broker a green power deal for several of its facilities located in deregulated states simultaneously allowed it to save staff time negotiating contracts as well as to save money by aggregating the green power demand across the company.¹⁵
- *Incentives.* A number of incentives are available to companies to make some forms of renewable energy more economically feasible. Depending on the type of renewable energy, incentives may be in the form of tax credits and deductions, grants, loans, net metering, or other programs. The incentives vary from state to state and most often are applicable to on-site sources of power generation. For a comprehensive list of renewable energy incentive opportunities, visit the Database of State Incentives for Renewable Energy (DSIRE), available at www.dsireusa.org. DSIRE provides comprehensive, searchable information about

CASE STUDY D

A CORPORATE CUSTOMER TAKES THE LEAD

In 2003, the Tower Companies—a major commercial and residential developer in the Washington, D.C., metro area, recognized for its green building designs—started buying green power for 25 percent of seven apartment complexes' annual load and for 50 percent of six large office buildings' load. Although this 16-million-kWh-per-year deal was the first used by a private developer in the nation's capital, it was not a typical green power transaction.

When Tower first expressed an interest in buying green power, its retail electricity provider offered only an off-the-shelf product. The supplier, Pepco Energy Services (PES), had wholesale power contracts with several local projects that were producing electricity from landfill gas, so it was offering this landfill gas-based green power to retail commercial and residential customers. But the premium price charged for this electricity was too high for Tower's budget.

Working with the World Resources Institute and the consulting firm Think Energy, Tower requested that PES create a new, alternative green power offering that would meet Tower's high-volume demand, but at a lower price. One option was for PES to partner with a REC marketer to source less expensive RECs that could serve as the basis of this new product. PES responded by structuring a deal with the REC marketer Sterling Planet, which agreed to supply RECs wholesale to PES from biomass-fueled power facilities in several states across the country. In turn, PES rebundled these nationally sourced RECs with conventionally generated electricity to form a new retail green power product. The cost of the RECs would be incorporated seamlessly into the customer's monthly electricity bill.

By proactively engaging its electricity supplier, Tower was able to receive green power that met its requirements. Most important, the cost of the green power using nationally sourced RECs was lower than that of the existing product. By responding to Tower's request, PES strengthened its relationship with a major customer and expanded its portfolio of green power options.

state, local, utility, and federal incentive programs for renewable energy. Also contact the local public utilities commission for local information and contacts.

THE PURCHASE OF GREEN POWER



Before you actually purchase green power, you should review your company's goals to make sure you understand its reasons for wanting to buy it, as this may affect the type of renewable power you buy or from whom you buy it. For example, if your company is concerned about local air quality or benefits to the local community, then you should explore local green power options. If your company is more interested in finding the cheapest possible green power, a nationally sourced product may be best. Some companies want to reduce their emissions of greenhouse gases and therefore to procure their renewable energy from carbon-intensive regions in order to capture the greatest carbon benefit. A company interested in broadly advertising its green power purchase may wish to source it from a resource that its audience will easily recognize, for example, wind power, or from a provider with the marketing skills to help it promote its purchase.

Once you understand your company's goals and the green power options available, unless you are pursuing on-site generation options (see box 4), you can begin the four-part process of actually buying it. First, you should know what data you will need. Second, you should establish a list of potential providers. Third, you should request information from your potential providers and evaluate their responses. Fourth, once you have selected a provider and agreed on a price, you will have to sign a contract. When shopping around for green power, remember to look for products that have been certified to meet strict environmental and consumer protection standards, such as through the Green-e certification program (see box 2).

- *Know what data you need*

Before you approach potential green power providers, you should know your energy profile. For most transactions, all you need to know is how many kilowatt-hours (kWh) of electricity your facilities use in one year and what percentage of that you wish

to be green. You should be able to determine your company's electricity use from monthly electricity bills. If your company conducts a regular greenhouse gas (GHG) inventory, this also will be a good source of this information. If you are buying green power for more than one location, you must break down your information by location or billing account. If a percentage of your monthly use is to be green, you will need to separate your data by month.

- *Establish a list of potential providers*

As with any purchase, it is smart to shop around. Start by developing a short list of potential green power providers, which will depend on the products you select. For example, if you are interested in retail green power offerings, you should identify the utilities or power marketers serving your region. REC purchasers may consider providers from inside or outside their region, depending on their goals. The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (www.eere.energy.gov/greenpower/) is an excellent resource for information about each state's green pricing programs, utilities, and power marketers offering retail green power products, as well as a list of REC marketers. Be sure to seek out providers whose products have been certified to meet high environmental and consumer protection standards. See "Certification."

- *Request information*

To determine the best available price that will meet your company's renewable energy goals, you will need to request information from the providers on your list. Many utilities and power marketers offer an "off-the-shelf" green power product. Information may be available online or from a company representative. Some utilities may offer customized pricing to large customers.

BOX 4**TIPS FOR PURSUING ON-SITE RENEWABLE ENERGY POWER GENERATION**

The procurement process for on-site green power generation is more complicated than buying retail green power or RECs. You must analyze your electricity load and determine which types of on-site green power generation are appropriate for the facility. For office- and retail-based companies, on-site options are most likely to be solar photovoltaics (PV) panels or solar or geothermal heaters. You will need to evaluate the available incentives, zoning rules, permit requirements, interconnection rules, and net-metering opportunities. Generally, for most office- and retail-based companies, the most cost-effective and efficient method of procuring an on-site green power system is to hire a general contractor or an energy services company (ESCO) to handle the analysis, system design, installation, commissioning, and financing. Some of the complexities of on-site green power procurement can be avoided through innovative methods such as the “solar services” model described in case study B.

REC customers, especially those purchasing a high volume, may be best served by drawing up a Request for Proposals (RFP) to gather relevant information from multiple suppliers. Some elements to include in an RFP are

- *Volume.* How many RECs do you want to buy each year? Request information for multiple quantities.
- *Contract duration.* Specify the number of years for which you want to buy RECs and ask whether there is a discount for a long-term purchase.
- *Type of renewable resource.* State whether you want your RECs to be sourced from a particular type of renewable resource. Likewise, let potential providers know if this is not a priority.
- *Geographic preference.* If the location of the renewable resource is important, for example, if local air quality benefits are important to your company or if geographic preferences are not material to your consideration of the proposal, make this clear.
- *Certification.* Ask if the REC will be certified by an independent auditing program such as Green-e, at no extra cost. Green-e–certified RECs ensure

the environmental integrity of the product and verify that the power was actually generated by the renewable facility and that the REC was sold to only one customer.

- *Vintage.* State whether you want the RECs generated in a particular year. If the RECs are to be recorded in your company’s greenhouse gas inventory, it may be important to select them from a particular year.
- *Delivery start date.* Specify the date on which the delivery of the RECs should begin.

Ideally, ask all the providers to whom you send your RFP to send the information to you in a specified format, as it will help you compare the responses more easily. More information about RFPs can be found on WRI’s Green Power Market Development Group web site, at www.thegreenpowergroup.org/pdf/Elements_of_a_REC_RFP.pdf.

Once you have received the information from your selected providers, compare each response. Other considerations for evaluating potential suppliers depend on your goals. For example, if you plan to publicize your green power purchase, the provider’s ability to help you with public relations may be a factor in your decision.

- *Sign a contract*

Once you have chosen your green power provider, you must sign a contract to receive the green power or RECs. You can negotiate many of its parts. For example, if your goal is to buy RECs as a percentage of your annual electricity use and you base your purchase on historical electricity use information, once you know your actual annual electricity use at the end of the year, you may want to “true-up” your purchase. If you used more electricity than anticipated, you may have to buy additional RECs to meet your goal. You can negotiate the price of the additional RECs with your REC supplier and specify this in the contract.

Remember to follow your company’s standard legal review of contracts. You should check all the details of the green power purchase to make sure they are consistent with the offer to which you agreed. To review a sample RECs contract, visit www.thegreenpowergroup.org/samplecontract.cfm. It is important that the contract specify who will “claim” the various environmental attributes associated with that REC.

GREENHOUSE GAS ACCOUNTING FOR GREEN POWER



Companies that procure renewable energy to help meet greenhouse gas (GHG) reduction targets must account for their renewable energy purchases when they conduct their annual GHG inventories. Detailed guidance for office- and retail-based companies on developing a GHG inventory can be found in the WRI publication *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management*, which is available for download at www.ghgprotocol.org. Developing a GHG inventory has many benefits; for example, it identifies emission reduction opportunities and helps companies track their overall emissions to ensure that they are meeting their targets through projects like green power procurement.

The guidelines for accounting for the GHG benefits of green power in corporate GHG inventories have been evolving. The U.S. Environmental Protection Agency offers a draft set of guidelines through its Climate Leaders program (www.epa.gov/climateleaders), which describe the types of RECs that qualify as green power. For example, the RECs must be “new”; that is, they must come from facilities that began operating after 1997. They also describe RECs that do not qualify. For example, companies cannot count RECs that are used to meet Renewable Portfolio Standards (RPS) in their inventory. These eligibility guidelines follow the standards developed by the Center for Resource Solutions’ Green-e program. A brief overview of the GHG accounting guidelines for green power is provided here, but for more detailed information, consult Climate Leaders.

METHODOLOGY

To calculate GHG emissions from electricity, companies must determine how much electricity they have used and multiply it by an appropriate emission factor:

$$\text{Electricity used (kWh or MWh)} \times \text{emission factor} = \text{GHG emissions}$$

The emission factor applied will depend on the power pool subregion (see figure 2) where the renewable energy is generated. Each power pool subregion has a unique emission factor, which takes into account the mix of energy generated in that subregion. The U.S. Environmental Protection Agency provides a database, known as “e-GRID,” of all power pool subregion emission factors, which can be downloaded from www.epa.gov/airmarkets/egrid.

- *Retail green power and RECs.* Most office- and retail-based companies do not generate their own electricity but instead buy it from a utility, power marketer, or REC marketer. In this case, the green power that is generated flows into the local power grid. Therefore, quantifying the emissions avoided by buying the green power depends on the types and quantities of conventional power used on the grid where the green power is produced. To calculate this, multiply the quantity of retail green power or RECs purchased (in MWh or kWh) by the e-GRID emission factor for the e-GRID subregion where the renewable energy was generated. For retail green power, the subregion where

TABLE 3 | HYPOTHETICAL ACCOUNTING EXAMPLE OF THE CARBON BENEFIT OF RETAIL GREEN POWER AND RECS

STEP 1. Calculate Emissions from Conventional Energy Use

<i>Energy used</i>		<i>Emission factor (metric tons of CO₂ per MWh)</i>	<i>e-GRID subregion where conventional power is used</i>		<i>Total emissions</i>
1000 MWh	×	0.63	FRCC	=	630 metric tons of CO ₂

STEP 2. Calculate Emissions Avoided Owing to Renewable Energy Purchase

<i>Renewable energy purchased</i>		<i>Emission factor (metric tons of CO₂ per MWh)</i>	<i>e-GRID subregion where renewable power is generated</i>		<i>Total emissions</i>
30 MWh	×	0.89	ECOV	=	26.7 metric tons of CO ₂

STEP 3. Report Renewable Energy Purchase as a Negative Line Item in the Company's GHG Inventory

Emissions source	Emissions total
Scope 2 (emissions from use of purchased electricity)	630 metric tons of CO ₂
RECs/retail green power purchase	-26.7 metric tons of CO ₂
Total NET emissions	603.3 metric tons of CO₂

Note: "Scope 2" is GHG accounting terminology used to describe the emissions from using purchased electricity. More information can be found in *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Accounting*, which can be downloaded from www.ghgprotocol.org.

the green electricity is used and the subregion where it is generated are most likely the same. In the case of RECS, the underlying renewable energy may have been generated in a subregion different from that where the purchaser is located. Either way, this value appears as a negative line item in the company's GHG inventory (see table 3).

- *On-site green power generation.* Accounting for and reporting GHG emissions from on-site green power generation for a GHG inventory is much easier. Companies simply multiply the amount of energy used from on-site generation by zero, because the on-site green power system produces no GHG emissions.

RESOURCES

- *Center for Resource Solutions/Green-e*: The Center for Resource Solutions (CRS) is a national nonprofit organization working to build a robust renewable energy market by increasing the demand for and supply of renewable resources. CRS also administers the “Green-e” program, which certifies renewable energy products to ensure their environmental credibility. See www.resource-solutions.org.
 - *Database of State Incentives for Renewable Energy (DSIRE)*: DSIRE is a web database of up-to-date information about renewable energy and energy efficiency incentives offered by the U.S. states and the federal government. See www.dsireusa.org.
 - *Green Power Market Development Group*: In the United States, the Green Power Market Development Group is a collaboration of twelve leading corporations and the World Resources Institute dedicated to building corporate markets for green power. In Europe, the group is convened in partnership with the Climate Group. Business-centered publications on green power are available for download at www.thegreenpowergroup.org.
 - *Green Power Partnership*: The Green Power Partnership is a voluntary program administered by the U.S. Environmental Protection Agency to promote corporate renewable energy procurement. See www.epa.gov/greenpower/. The site includes downloadable publications such as the *Guide to Purchasing Green Power* and the *Communications Guide*, which has ideas about crafting messages and outreach. The site also has a “Green Power Locator” which provides state-by-state information about green power procurement options.
 - *Low Impact Hydro Institute*: The Low Impact Hydro Institute is a nonprofit organization dedicated to reducing the impacts of hydropower generation through the certification of environmentally responsible, “low impact” hydropower. See www.lowimpacthydro.org.
5. U.S. Energy Information Administration, *Annual Energy Outlook 2006, with Projections to 2030* (Washington, D.C.: U.S. Department of Energy, 2006), reference tables 8 and 16.
Note: These numbers are for the electric power sector only. They include geothermal, solar thermal, solar photovoltaic, biomass, and wind sources as renewables but not conventional hydropower, municipal solid waste, combined heat and power generation.
 6. Low-impact hydropower is certified by the Low Impact Hydropower Institute, <http://www.lowimpacthydro.org>.
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 11. U.S. Energy Information Administration, *Monthly Energy Review*, February 2006.
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 14. The guidelines can be found at http://www.naag.org/issues/pdf/Green_Marketing_guidelines.pdf.
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NOTES

1. U.S. Energy Information Administration, *Annual Energy Review 2004*, report no. DOE/EIA-0384 (2004) (Washington, D.C.: U.S. Department of Energy, 2005).
2. U.S. Energy Information Administration, *Annual Energy Review 2005* (Washington, D.C.: U.S. Department of Energy, 2006), table 8.2c.
3. <http://www.awea.org/projects/> (updated July 31, 2006, accessed on August 14, 2006).
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ABOUT THE AUTHOR

Samantha Putt del Pino is a Project Manager in WRI’s Climate, Energy and Pollution program.

ABOUT WRI

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.

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