



learned that what appeared to be an opportunity for savings could quickly turn into an expense risk when incorrect assumptions are made against the backdrop of a highly volatile market.

In the early stages of its market participation, Citigroup secured power through a competitive bidding process. Numerous, complex rate alternatives were provided by competing suppliers and the required response time was extremely short. Strategic planning for energy purchases was determined to be extremely difficult in this environment. Citigroup decided to change the process and partner with an Energy Service Company (ESCO) that would act as a broker and provide competitively priced, fixed rate, hedged alternatives as well as current market intelligence. This process change enabled Citigroup's internal staff to improve the alignment of energy usage characteristics of the portfolio with the opportunities available in the energy market. Variables such as current and forward pricing, fixed price options, quantities and market timing were factored into decisions that resulted in better price risk management.

With a clearer understanding of markets and creation of a strategic framework, Citigroup was then able to focus on the composition of the energy purchased. The ESCO was asked to provide green power pricing options. Citigroup's energy managers were interested in including green power in order to offset the company's indirect GHG emissions and other environmental impacts and enhance the company's public image as a corporate environmental leader. Four aspects of green power were of particular interest:

- Cost and economies of scale
- Availability and diversity of green power products
- The purchasing process
- Promotion of greater market demand for renewable power

## First Year with Green Power

There are five competitive U.S. electricity markets in which Citigroup has operating facilities: Maryland, New Jersey, New York, Texas and Delaware. Citigroup bought its first green power through the ESCO Constellation New Energy (CNE) in 2004 when the company requested separate power quotes for each market that included green power in various percentages (from 3 percent to 15 percent) so as to evaluate the incremental costs for each quote. (Delaware was not an active deregulated market at the time of this initial purchase). CNE solicited green power contracts through the market to fulfill Citigroup's request, either by buying green power directly from renewable energy generators or buying conventionally generated power and bundling it with renewable energy certificates (RECs) sourced within each state's power pool.

After receiving the quotes, Citigroup decided to purchase 5 percent of its New York and New Jersey loads and 3 percent of its Maryland load from green power sources. For its 2004 contracts, Citigroup bought approximately 8,800 MWh of green power in New York, New Jersey, and Maryland (see table 1). The green power in New York and Maryland was certified by the Center for Resource Solutions, an independent third party, which developed the "Green-e" certification method that is widely used in the United States. For New Jersey, the green power purchases met the applicable state renewable portfolio standards.

Cost was a consideration when reviewing the power quotes. In New York, New Jersey and Maryland, Citigroup was able to use its leverage as a large power purchaser, and its good working relationship with CNE, to keep its costs low. In fact, CNE was able to take advantage of surplus green power available in its pool and included that in the Citigroup contracts at no additional cost when the market premium for green

**Table 1. Citigroup's Green Power Purchases in Competitive Markets, 2004–2005**

	New York	New Jersey	Maryland	Total
Load	5%	5%	3%	
Amount of green power purchased (MWh)	3,400	4,400	1,000	<b>8,800</b>

power ranged from 3 to 5 percent. At the same time, Citigroup chose not to buy green power in the state of Texas because of an 8 to 14 percent higher cost premium.

This initial entry into the green market opened the door toward securing additional green power at favorable rates. In regulated markets, the incumbent utility often does not offer a green power option, or if it does, it is at a much higher price. Buying green power in competitive markets enabled Citigroup to use its purchasing power to minimize cost premiums and establish a way to pay for green energy that was part of the normal monthly billing cycle.

### Lessons Learned

Citigroup learned several lessons in its first year of green power purchases. First, it found in Texas that the restructured market did not always mean that green power was cost effective. For states such as Texas and New Jersey that have mandatory renewable portfolio standards compliance buyers can drive up demand and the price of RECs. Second, the only way that Citigroup could secure good prices for green power was with short-term, one-year contracts. Longer-term, single-market contracts carried a considerable premium for green power.

Finally, it quickly became clear that not all the available green power products were from verifiable green sources. This was especially the case in states without a renewable portfolio standard that defines eligible green power sources. Citigroup became concerned that its green power purchasing claims might not be entirely

accurate. Prior to purchasing, the company learned about the Center for Resource Solution's Green-e renewable energy certification program. Citigroup decided to require CNE to verify that all the green power it supplied from states without a renewable portfolio standard would be Green-e certified.

### Second Contract for Green Power

In its second year of buying green power, Citigroup wanted to do even more. Its goal was to buy a larger percentage of its power from renewable sources while simultaneously keeping costs down and securing a longer two-year contract.

By working in tandem with CNE, Citigroup negotiated a two-year, aggregate electricity contract for four competitive markets: Maryland, New Jersey, New York, and Texas. CNE purchased Green-e certified national wind Tradable Renewable Credits (TRCs) for 10 percent of the purchased electricity, which allowed Citigroup to source RECs from a larger, national market through only one contract. Collectively, these factors enabled the company to buy a larger amount of green power at a much lower premium than the prevailing rates for purchases in individual markets. The favorable rates allowed consideration of the desired longer-term contracts. In all, Citigroup will purchase 30,000 MWh of green power each year for the two-year term between December 2005 and December 2007.

### Carbon Value

As of June 2006, the United States

**Table 2. Citigroup's Indirect GHG Emission Reductions from Green Power Purchases**

Period	2004/2005	2005/2006
Load	New York: 5% New Jersey: 5% Maryland 3%	New York, New Jersey, Maryland, Texas: 10%
Annual amount of green power purchased (MWh)	8,800	30,000
GHG reduction (tonnes of CO <sub>2</sub> )	3,872	25,018

has no policies that would allow Citigroup to receive credit for the indirect GHG emissions reductions related to its green power purchases. The Northeast's Regional Greenhouse Gas Initiative (RGGI) cap-and-trade program does include end-use emission reduction incentives that may add value to such reductions in the future. The RGGI is currently being implemented, and once it is operational, signatory states<sup>1</sup> like New Jersey and New York will be required to set aside carbon dioxide allowances for significant end-use efficiency and green power initiatives that substantially reduce GHGs. Depending on how the RGGI is implemented, companies that purchase green power may be awarded allowances that they then can sell on the carbon market.

Citigroup's green power purchases made a significant impact. The firm's 2004-05 purchases of 5 percent green power in New York and New Jersey and 3 percent in Maryland reduced its indirect GHG emissions by 3,872 metric tons of CO<sub>2</sub> (See table 2). In its current contract, Citigroup's annual purchases will reduce its indirect GHG emissions by 25,018 metric tons.

The RECs in the current contract were sourced from central plains states such as Nebraska and Kansas, which have carbon intensive power pools. In the first year, the RECs were sourced from Northeastern power pools. This accounts for the six-fold annual reduction in emissions in 2005-2006 compared to the previous contract, although the amount of green power

purchased tripled. Because of this difference in carbon intensities, the renewable energy sourced from the central plains displaced more GHG emissions per MWh than the renewable power sourced from the Northeast. The cost of GHG reductions attributed to the RECs used with the original power contract was attained at a higher price per ton, owing to the higher green power premium in the Northeast. The purchase of less expensive RECs from the central plains in the second contract produced a carbon price that was much lower and that also resulted in greater marginal emission reductions.

There have been valuable lessons learned over the past two years that will enable Citigroup to reach its 2011 goal, as the company expands its purchasing program, sets and meets corporate-wide environmental targets and explores opportunities to mitigate increasingly volatile energy prices. Citigroup's annual Citizenship Report includes information about this purchasing program as well as other initiatives undertaken by Citigroup in its commitment to reduce its carbon footprint and take a leadership role in sustainable business practices.

<sup>1</sup> At the time of this writing, Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont are signatory states in RGGI; Maryland has passed legislation that will lead to its full participation in 2007.