CENTER FOR RESOURCE SOLUTIONS **REPORT**

INSIGHTS INTO THE RENEWABLE ENERGY MARKET

A Brief Overview of Procurement Trends, Drivers, and Impacts of Voluntary Commercial Purchasers

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September 2009

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Acknowledgements

This work was funded by the U.S. Environmental Protection Agency. The authors wish to thank Lori Bird of the National Renewable Energy Laboratory, Jan Hamrin of HMW International and the Environmental Tracking Network of North America, Ed Holt of Ed Holt and Associates, Inc., Dan Lieberman of 3Degrees, Inc., and Marty Sedler of Intel Corporation, for their thoughtful review of this document and their valuable commentary. The authors also wish to thank Center for Resource Solutions (CRS) staff Jennifer Giles, Jennifer Martin, Andrew Nourafshan, Arthur O'Donnell, Alex Pennock, and Jeff Swenerton for content development and editorial support. This document can be downloaded on the publications page of the CRS website at www.resource-solutions.org.

Table of Contents

I. Executive Summary 1

II. Introduction 2

III. Methodology 3

IV. The Growth of the Voluntary Renewable Energy Market and the Increasing Demand of Commercial Purchasers 3

Figure 4.1: Voluntary Market vs. Compliance Market Demand Growth, 2003–2008 4

Table 4.1 Renewable Energy Purchases by Customer Type 4

V. Criteria for Renewable Energy Purchase Decisions 4

A. Renewable Energy Product Choice 5

Table 5.1 Renewable Energy by Purchasers and Product Type, 2008 5

B. Length of Contract 5

C. Location of Generation 6

D. Price 6

Table 5.2 Residential Price Premiums of Utility Green Power Products, 2000–2008 6

Table 5.3 Voluntary Market Average National REC Prices by Type 7

E. Resource Type 7

F. Certification 7

Table 5.4 Green-e Energy Commercial Sales vs. Total Voluntary Commercial Sales 8

VI. Drivers of Voluntary Commercial Purchasing 8

A. Consumer-Driven Demand for Environmental Products 8

B. Growth of Green Pricing Programs 9

C. Recognition and Certification Programs 9

C1. LEED 9

C2. EPA Green Power Partnership 9

C3. Green-e Marketplace 10

Figure 6.1 Growth of Green Power Partners and Green-e Marketplace 10

C4. EPA Climate Leaders 10

VII. Supply Impacts of the Voluntary Renewable Energy Market 11

Figure 7.1 "New" Renewable Energy Capacity (MW), 2004–2008 11

VIII. Conclusion 12

IX. Notes 13

X. References 14

I. Executive Summary

Commercial entities and organizations are increasingly looking to reduce the environmental impacts they are responsible for. The potential of renewable energy as a practical and effective market solution to a number of societal issues has garnered support from social, political, and business communities. This report documents increasing renewable energy purchases by commercial customers and offers analysis of procurement trends, market drivers, and impacts. The major findings of this paper include:

- "Business executives now regard the environment as the sociopolitical issue that will attract the most attention by far from the public and politicians over the next five years."[1]
- A survey of over 4,000 U.S. citizens found that 55 percent of consumers would like companies to increase their use of renewable energy. [2]
- Voluntary renewable energy purchases increased by over 500 percent between 2003 and 2008.
- From 2005 to 2008, the volume of voluntary renewable energy purchased by commercial entities rose from 5,500 Gigawatt-hours (GWh) [3] to 18,800 GWh, and Green-e Energy Certified[4] commercial purchases nearly doubled. [5]
- Voluntary renewable energy purchases in 2008 account for more than 50 percent of total new renewable energy[6] demand in the United States. [7]
- Renewable energy certificates (RECs) are the primary renewable energy product choice of the voluntary commercial market, accounting for 83 percent of commercial renewable energy purchases.
- Contract lengths for commercial purchases typically range from one to three years.
- A substantial number of commercial renewable energy purchasers also participate in environmental recognition programs such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, U.S. Environmental Protection Agency's Green Power Partnership, and Green-e Marketplace.
- During the years 2004-2008, the growth of renewable energy capacity closely paralleled the combined demand of voluntary and compliance renewable energy markets.

Commercial demand significantly influences the overall renewable energy market, as commercial purchasers have become the largest and fastest growing sector of the voluntary renewable energy market. Together with demand from state renewable portfolio standards, the increasing demand of the voluntary market is a clear driver for renewable energy in the United States.

II. Introduction

Renewable energy is a practical solution to many concerning problems. Climate change, energy independence, and sustainable economic development are among the critical issues facing governments, private citizens, and the business community. In the last few years, as political and scientific discourse brought these issues to prominence, renewable energy has become recognized as an innovative approach to addressing these concerns. Along with state mandates for renewable energy purchases, individuals and businesses have already begun addressing the need for more renewable energy as is seen through the growth of voluntary purchases of renewable energy. The proactive and unregulated nature of these purchases suggests that both civic responsibility and the growing importance of adopting sustainable business practices are responsible for increasing demand. In fact, voluntary renewable energy purchases made specifically by commercial parties have grown dramatically in the last few years and have become the largest and fastest growing sector for voluntary renewable energy sales.

Early commercial supporters of the renewable energy market have increased the size of their purchases, and thousands of organizations have made their first significant purchases of renewable energy in the last few years.[8] These companies have taken the lead in addressing the environmental impacts of their electricity use with clean, renewable energy as a vitally important step toward reducing the environmental impacts for which they are responsible. In addition, U.S. consumers are driving demand for goods that have a lower environmental footprint, and they are increasingly interested in supporting companies that have made renewable energy commitments. In this paper, we explore the recent growth of commercial purchases of renewable energy in the voluntary market, focusing on the procurement trends and demand drivers for commercial purchasers, and the overall market impact of this trend.

Following this introductory section, Section III provides a summary of the methodology used for this paper.

In Section IV, we document the growth of voluntary renewable energy demand and in particular that of commercial purchasers. We also highlight the difference between voluntary and compliance demand.[9] In particular, we show that the voluntary demand for renewable energy from new renewable energy facilities has outpaced demand from government mandates for each of the past six years.

In Section V, we analyze the factors that commercial customers take into consideration when purchasing renewable energy. The location of a renewable energy project and the price of the product are two of the most influential characteristics factored into purchasing decisions. This section also examines product type, contract length, resource type, and certification as factors that play a role in commercial purchasers' decision making.

In Section VI, we document the drivers for recent growth of commercial renewable energy purchases. Among the many reasons for such growth, recognition programs such as LEED, EPA Green Power Partnership and Green-e Marketplace appear to play a significant role.

In Section VII, we focus on the supply and demand of the overall renewable energy market. Current projections indicate that as renewable energy supply becomes increasingly constrained as regulated entities seek to meet their compliance requirements, the impact of voluntary market demand may play an increasingly influential role in driving new development. In this section we also share a word of caution in regards to current policy proposals that may have unintended negative effects on the voluntary renewable energy market.

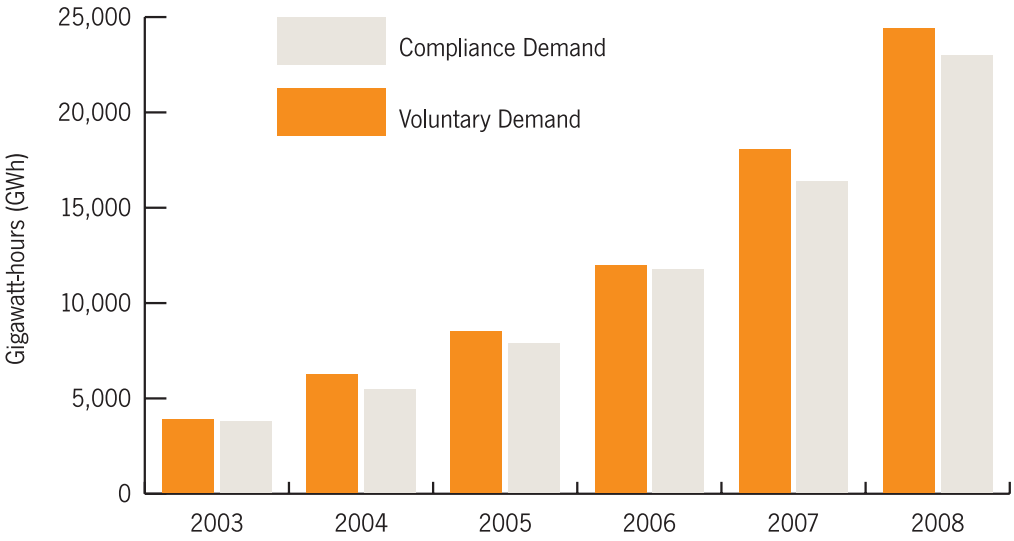
III. Methodology

Data for this paper are drawn from publicly available documents spanning multiple years including reports from Center for Resource Solutions (CRS) and the National Renewable Energy Laboratory. CRS staff also conducted a survey of renewable energy marketers, project investors, and developers in the United States that identified key trends within the market. Approximately 70 participants responded to this survey. Due to the relatively small size of the survey, its results are interpreted as qualitative information and potentially indicative of market trends. We also used data from public surveys on consumer behavior and the role of third-party certification.

IV. The Growth of the Voluntary Renewable Energy Market and the Increasing Demand of Commercial Purchasers

The renewable energy market has grown significantly in recent years. Regulatory requirements, in the form of state Renewable Portfolio Standards (RPSs), and voluntary purchases have driven demand for new renewable energy output. While both clearly play significant roles, voluntary market demand has accounted for more renewable electricity from new renewable generation facilities[10] than the compliance market in the United States for each of the last six years. According to the National Renewable Energy Laboratory (NREL), the voluntary market has grown a staggering 530 percent in those six years, from 3,840 GWh of sales in 2003 to 24,300 GWh in 2008.[11] The compliance market has grown over the same time period to reach demand of 22,926 GWh from new renewables facilities in 2008 (Figure 4.1).[12]

Figure 4.1 **Voluntary Market vs. Compliance Market Demand Growth, 2003–2008**



Residential and commercial purchasers are driving voluntary demand through purchase of green pricing products offered by utilities and competitive electricity providers, and renewable energy certificates (RECs).

The strong growth in demand in the voluntary market can, in large part, be attributed to significant purchases by commercial entities. According to NREL, the percentage of overall voluntary renewable energy market sales accounted for by commercial purchasers grew to 77 percent in 2008 (Table 4.1).[13] The number and size of commercial purchases have risen particularly dramatically in the last five years. Total purchases by commercial customers nationwide grew to 18,800 GWh in 2008.

Table 4.1 **Renewable Energy Purchases by Customer Type**

Year	2005	2006	2007	2008
Residential (GWh)	3,000	3,200	4,500	5,500
Commercial (GWh)	5,500	8,700	13,600	18,800
Total (GWh)	8,500	11,900	18,100	24,300
% Commercial	65%	73%	75%	77%

Data from the U.S. Environmental Protection Agency's (EPA) Green Power Partnership also reflect this trend. In 2004, the top 25 renewable energy purchasers accounted for 1,300 GWh of renewable energy demand. In 2008, the top 25 purchasers accounted for 8,800 GWh of demand, an increase of over 575 percent.[14]

V. Criteria for Renewable Energy Purchase Decisions

For commercial entities, procuring renewable energy requires the evaluation of multiple criteria including: product type, contract length, location of generation, resource type, price, and certification. In this section we evaluate these factors that affect commercial entities in their consideration of renewable energy purchases.

A. Renewable Energy Product Choice

Many businesses would like to install renewable energy generation at their own facilities. However, there are often cost and service considerations that can make on-site generation difficult. For those who can not install on-site generation, commercial customers can purchase renewable energy from utilities, competive electricity suppliers, or REC marketers. Commercial entities overwhelmingly purchase RECs over these other renewable energy product offerings. Recent NREL data show that of the 18,800 GWh of voluntary renewable energy demand by commercial purchasers in 2008, 15,400 (or 82 percent) was derived from REC sales. In the same year only 4 percent of residential purchases were of REC products[15] (Table 5.1).[16]

Table 5.1 Renewable Energy by Purchasers and Product Type, 2008

Customer Segment	Green Pricing	Competitive Markets	REC Markets	Total
Residential (GWh)	2,600	2,700	200	5,500
Commercial (GWh)	2,100	1,200	15,400	18,800
Total (GWh)	4,700	3,900	15,600	24,300
% Commercial	45%	31%	99%	77%

The dominance of REC products among commercial purchasers is due to a variety of factors. REC products can be lower in price than electricity products and offer greater flexibility in resource type, location, contract length and number of potential retail providers. Organizations may not have a local utility or competitive electricity supplier that offers a renewable energy product, or organizations may have facilities across the country and prefer to make one purchase from a single national REC seller than from multiple local electricity suppliers.

B. Length of Contract

Retail renewable energy purchasers have historically procured their renewable energy under short-term contracts. Renewable energy marketers responding to a CRS survey indicated that the majority of customers purchase renewable energy for terms of four years or less, with half engaging predominantly in one-year contracts.[17] However, some marketers reported contracts lengths of 6 years or more.[18] The same survey revealed that in the last three years, 22 percent of responding marketers have seen contract lengths shorten, while none reported contract lengths increasing.

It is unclear from survey analysis why shorter contract length is preferred. Buyers may resist making long-term commitments in hope of obtaining lower prices in

the future. Generators might also not want to commit to the voluntary market in hopes of fetching a higher price in the future as compliance markets ratchet up.

There are both pros and cons regarding longer contract length. On the one hand, longer contracts give sellers revenue security and buyers price certainty in a fluctuating market. On the other hand price transparency and liquidity in the overall market are diminished with long-term contracts.

C. Location of Generation

CRS survey data suggest that, in general, renewable energy purchasers are often concerned with supporting renewable energy within the region of their organizations' facilities, even if it sometimes results in a higher-priced product.[19] This trend is often more prevalent in smaller-sized businesses although it occurs with larger purchasers as well. Increasing purchases of renewable energy from a given area will increase regional demand for more renewable generation capacity. Many consumers would like to help drive local economic development and as a result want to know the project's specific regional location.

The carbon value associated with the renewable energy product varies by region and is important to some purchasers. Renewable energy generated in states or regions with electricity generation mixes containing high proportions of fossil fuels can be more desirable since each MWh of clean generation displaces a relatively larger quantity of harmful emissions. This factor was cited as being important to a number of purchasers in their renewable energy procurement.[20]

D. Price

As with nearly all commodities, price can significantly influence demand. In cases where the location of generation or resource type is not the most important factor to the customer, price tends to be the primary determinant. However, price is linked in many cases to regional availability and resource type. For example, wind generation typically costs less than solar energy due to greater supply and lower production costs. Additionally, local regulations can influence renewable energy costs. In California, utility demand for renewable energy to meet the state RPS requirements is driving prices up in both the compliance and voluntary markets.

Prices for voluntary renewable energy products vary by product type, region and resource type. Data recorded by NREL have shown that average residential price premiums for utility green power products nationwide decreased each year since 2000. Average 2008 prices represent a 49 percent decrease from 2000 levels. While not directly citing commercial price premiums, this data suggest prices are decreasing for commercial customers as well.

Table 5.2 **Residential Price Premiums of Utility Green Power Products ($/kWh), 2000–2008**[21]

Year	Average Premium
2000	.035
2001	.029
2002	.028
2003	.026
2004	.025
2005	.024
2006	.021
2007	.019
2008	.018

However, renewable electricity supply and demand can vary by region. As such, some utility and competitive electricity providers have higher or increasing price premiums depending on where they are located and if they source their renewable energy locally.

In general, REC products are less expensive per MWh than procurement through utility green pricing programs. This is due to the fact that a REC product can be sold nationally, allowing marketers a wider supply pool from which to source. Utilities typically must source from their local electricity grid and have additional costs associated with transmission and delivery, and face a potentially larger administrative burden compared to marketing firms. The implications of this are if utilities do not offer competitive pricing, their customers may instead turn to RECs.

Prices charged for REC products are more difficult to track. From 2005 through mid-2008, data from Evolution Markets, an environmental commodities broker, showed that the voluntary market average national wholesale REC price rose during this time period, though not all REC prices followed this trend. REC prices from technologies such as wind and biomass rose in average cost, while prices of solar RECs dropped precipitously (See Table 5.3).

Table 5.3 **Voluntary Market Average National REC Prices by Type ($/MWh)**[22]

	January 2005	July 2008
Solar RECs	$50.00	$10.00
Wind RECs	$1.93	$8.42
All RECs	$2.04	$7.38

CRS research suggests that average REC prices as of October 2009 may range between $2–$25/MWh depending upon the technology type.[23] REC prices in regions with technology-specific RPS requirements can reach much higher prices. In New Jersey, for example, Solar RECs (SRECS) have reached as high as $680.[24] Depending on the rules of each state's RPS regarding location of generation, technology type, and whether RECs must be delivered with electricity or not, REC prices for compliance markets can be much higher than for voluntary products. In

addition, larger voluntary market customers are typically able to negotiate lower purchase prices through bulk discounting.

E. Resource Type

Resource type is defined as the resource used to produce renewable energy (e.g. wind, solar or geothermal). For commercial purchasers, the resource type was found to be an important purchasing factor, along with location and price.[25] However, it is important to acknowledge a link between resource type and price. For example, solar electricity is generally viewed as a highly attractive renewable energy source, is more expensive as a generation type, and in shorter supply, therefore commanding a higher price.

F. Certification

Buyers and sellers in the voluntary market find certification by an independent third party vital to protecting the validity of their transactions and effectively representing the environmental value of their products and purchases. Certification of renewable energy products typically includes verifying that technology-specific environmental standards have been met in addition to verifying transactional history of renewable energy to ensure clear ownership of renewable attributes. A recent survey of Americans' understanding of environmental messages pointed to the fact that 90 percent of their respondents said companies must not simply say a product or service is good for the environment, they need to prove it.[26] In the case of renewable energy, the certification program Green-e Energy is often cited by commercial purchasers as a way to demonstrate the renewable energy component of their commitment to sustainability to their customers. Since 1997, Green-e Energy has been the leading certification program for renewable energy products sold in the voluntary market in the United States. The importance of the certification to commercial buyers has increased as the voluntary market has grown, as new sellers enter the market, and as interest in the market from government and corporate stakeholders intensifies.

From 2005 to 2008, Green-e Energy Certified commercial sales rose from 1,852 GWh to 11,412 GWh. In addition, the percentage of overall commercial purchases that were certified nearly doubled. Table 5.4 demonstrates the growth of Green-e Energy as the certification program of choice for commercial voluntary market transactions.

Table 5.4 **Green-e Energy Commercial Sales vs. Total Voluntary Commercial Sales**[27]

	2005	2006	2007	2008
Green-e Energy Certified Commercial Sales (GWh)	1,852	3,900	7,922	11,412
Total Voluntary Commercial Sales (GWh)	5,500	8,700	13,600	18,800
% Green-e Energy Certified (commercial)	34%	45%	58%	61%

According to the CRS survey, of renewable energy sellers that offer Green-e Energy products, 90 percent offer only Green-e Energy Certified products.[28] Sellers participating in Green-e Energy find significant value in independent, third party certification in the promotion of their brand and business. As will be discussed in the following section, Green-e Energy certification is also required for eligibility in multiple labeling and recognition programs.

VI. Drivers of Voluntary Commercial Purchasing

The decision by organizations to purchase or use renewable energy can be influenced by numerous factors. This section documents some of the primary drivers of renewable energy purchases by commercial entities.

A. Consumer-Driven Demand for Environmental Products

According to a McKinsey report on consumer concerns about climate change, "business executives now regard the environment as the sociopolitical issue that will attract the most attention by far from the public and politicians over the next five years." [29] Increasingly, corporations must differentiate themselves from their competitors by acting on environmental issues and successfully publicizing their environmental activities in order to build trust and further environmental awareness among consumers.

These data are echoed from the consumer side as well. The McKinsey report also indicated that of the many environmental efforts the energy industry could take to improve its reputation, investing in renewable and alternative energy sources is the most important to consumers. The Natural Marketing Institute (NMI) recently conducted a survey of over 4,000 U.S. citizens and found that 55 percent of consumers would like companies to increase their use of renewable energy.[30]

B. Growth of Green Pricing Programs

With access to customers in their service territories, municipal and investor-owned utilities, electric cooperatives, and other electricity suppliers can open the door for millions of environmentally minded residential and commercial customers to make renewable energy purchases. Data indicate that a growing number of electricity suppliers are meeting increased consumer demand for renewable energy by providing green power programs. According to NREL and the Department of Energy's Green Power Network, the number of utilities with a green power pricing program grew from 45 in 2003 to 184 in 2009.[31] This figure includes utilities that serve hundreds of electricity distribution companies.

C. Recognition and Certification Programs

As large institutions can often face a credibility gap with customers, they frequently turn to third-party certification and recognition programs to provide their customers with confidence and verified information about their product or program.

Data from NMI show that 60 percent of the surveyed population would like to see trusted third-party sources endorse the claims made by companies.[32]

Companies are looking not only to make renewable energy claims, but to do so in order to earn specific recognition by an acknowledged leadership program. CRS survey responses indicate that 70 percent of purchasers consider qualifying for the Leadership in Energy and Environmental Design (LEED) green building certification, EPA's Green Power Partnership, Green-e Marketplace and other recognition programs was "somewhat important, important, or very important" in the decision to purchase renewable energy.[33] In addition, commercial entities indicated that their purchase of renewable energy helped them to differentiate and add value to their company brand, communicate their commitment to renewable energy, show industry leadership, reach environmentally minded consumers, and achieve a competitive advantage. The following are some of the available programs that encourage or help drive renewable energy purchases. Renewable energy purchases are also recognized by certification and recognition programs not listed here including Cradle to Cradle certification and Green Seal.[34]

C1. LEED

Renewable energy purchases can earn credits toward a green building standard administered by the US Green Building Council. The Leadership in Energy and Environmental Design (LEED) green building certification program awards points to buildings that generate or purchase renewable energy. For purchased renewable energy, LEED requires that renewables meet the criteria of Green-e Energy.[35]

C2. EPA Green Power Partnership

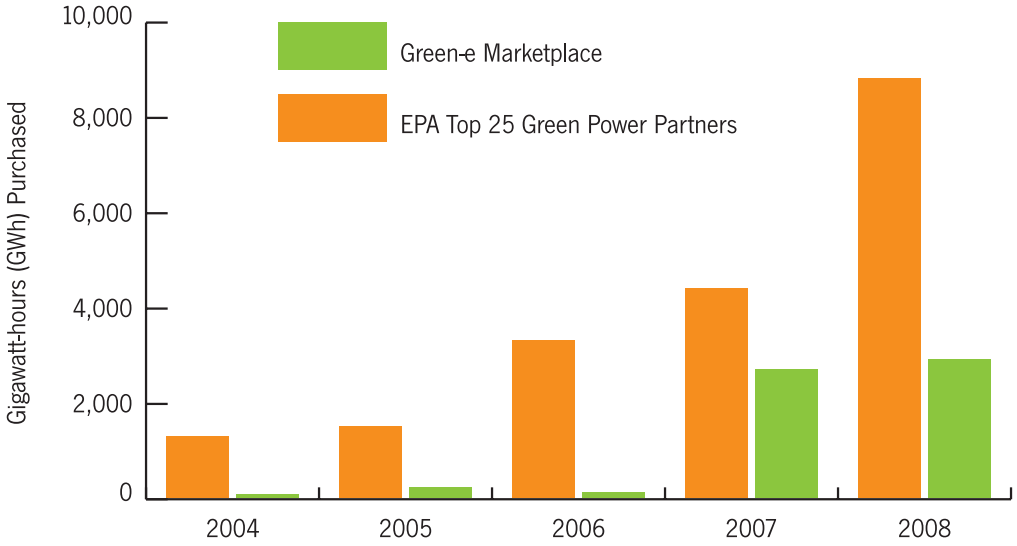
The U.S. EPA's Green Power Partnership is a voluntary program aimed at increasing the use of green power among leading U.S. organizations. Organizations that purchase the required minimum amounts of renewable energy as a way to reduce the environmental impacts associated with conventional electricity use can be listed as a "Green Power Partner." Minimum purchase requirements vary depending on the customer's total annual electricity use. The Green Power Partnership helps to garner publicity and recognition for participating companies. The total GWh purchased by the EPA's Green Power Partners Top 25 list jumped from 1,300 GWh in 2004 to 8,800 GWh in 2008, an increase of over 575 percent.[36] In addition, the total number of Green Power Partners grew from 544 participating organizations in 2004 to 1,200 in 2009.[37]

C3. Green-e Marketplace

Green-e Marketplace is a recognition program that allows organizations that make significant purchases of Green-e Energy Certified renewable energy the ability to display the Green-e logo in their own promotional materials. Participation and purchase amounts have grown tremendously in the last five years. In 2004, Green-e Marketplace participants purchased roughly 80 GWh of Green-e Energy Certified renewable energy. That number grew to 2,900 GWh in 2008. Figure

6.1 notes the growth of the amount of renewable energy purchased by participants in both Green-e Marketplace and the EPA's Top 25 Green Power Purchasers.

Figure 6.1 Growth of Green Power Partners and Green-e Marketplace[38]



Green-e Marketplace also aligns with current consumer sentiment that highly values third-party certification. Of the general population looking for certification, 70 percent would prefer the endorser to be a nonprofit organization.[39] The use of the Green-e logo and claims statements substantiated by Green-e Marketplace provide consumers such assurances.

C4. EPA Climate Leaders

Climate Leaders is an industry/government partnership administered by the U.S. EPA that provides guidance and recognition to companies developing long-term strategies to reduce their green-house gas emissions. Through program participation, companies create a credible record of their accomplishments, reduce their climate impact, and identify themselves as corporate climate leaders. Companies have the option of reducing their greenhouse gas emissions by purchasing renewable energy. In October 2009, Climate Leaders had 285 participating companies.[40]

VII. Supply Impacts of the Voluntary Renewable Energy Market

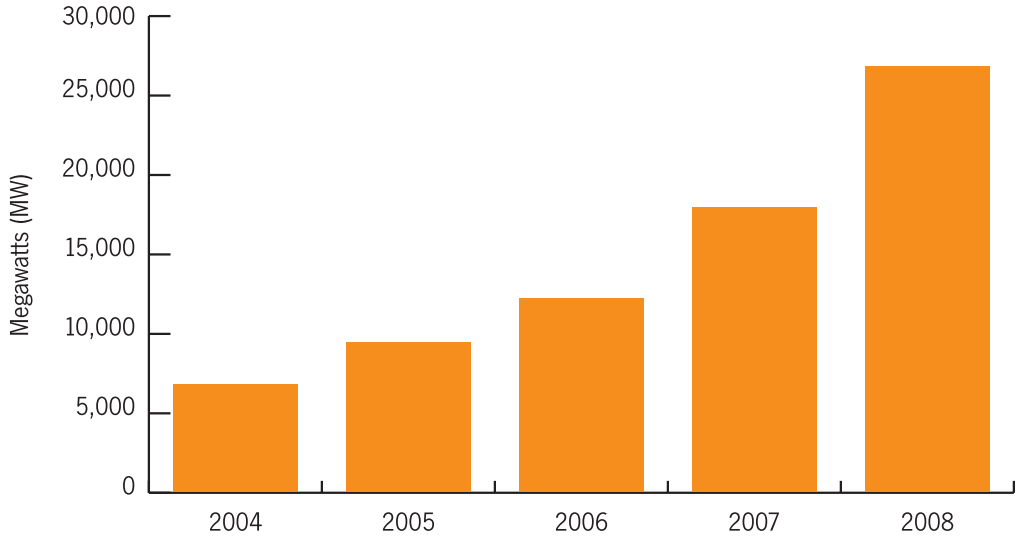
One of the key goals of the voluntary renewable energy market is to drive new renewable energy development. As the joint demand from voluntary and compliance markets grows, investors are responding. According to the CRS survey, the presence of the voluntary renewable energy market plays a clear role in renewable

energy developers' decision-making.[41] The majority of developer respondents indicated that it was important to their organization that new U.S. renewable energy generation facilities they developed would be eligible to sell output into the voluntary market. [42]

The role the voluntary market plays in a developer's financing plan varies. According to the survey results, 40 percent of developers indicated that the voluntary renewable energy market plays a major or critically necessary role in a project receiving financing. In addition, 90 percent of CRS survey respondents that factored participation in the voluntary market into their development decision confirmed that the returns they received from the voluntary market met or exceeded their expectations. While investors are driven by the availability of revenue from a variety of sources, sales of renewable energy to the voluntary market clearly plays a significant role in project investment decisions.

The amount of new renewable energy being built in the United States is driven in large part by the combined demand from the voluntary and compliance markets. As is demonstrated in Table 4.1 (p.10), between the years 2004-2008 the size of the combined voluntary and compliance renewable energy demand quadrupled. During that same period the amount of installed capacity of new renewable energy grew four-times its size as well. This complements the CRS survey results which indicate that developers are building renewable energy projects to serve these markets. Figure 7.1 displays the growth of renewable energy capacity from 2004–2008.

Figure 7.1 "New" Renewable Energy Capacity (MW), 2004–2008[43]



In the event of more stringent compliance requirements in the near future, the additional renewable energy demand would reduce available supply. Likewise, additional increases in voluntary market demand may further limit the supply of renewables available to meet state and federal RPS requirements, in turn spurring new renewable energy development. Such growth is likely as the awareness of the benefits of renewable energy rises among consumers. The voluntary market will also grow along with increased trust in the marketplace that arises in part due to continued development and uptake of electronic systems used to track environmental attributes, and to increased awareness of consumer protection mechanisms. Should individual and commercial demand for renewable energy continue to rise, the voluntary market will continue to drive new development of renewables.

A Word of Caution

The hopeful scenario that this section presents whereby increased voluntary market demand results in greater renewable energy supply being built faces an uncertain future. If not designed carefully, regional or federal GHG emissions cap-and-trade systems that do not specifically account for the environmental attributes of renewable energy could substantially diminish the GHG avoidance claims of voluntary renewable energy purchasers. The voluntary market could be unintentionally injured if individuals and organizations are not able to explicitly claim the environmental attributes associated with renewable energy. However, if voluntary renewables are allowed to retain their GHG avoidance value under a cap-and-trade system, then the potential of the voluntary market to grow renewables and continue to reduce GHG emissions beyond the cap will increase in the years ahead.

This debate is being had in a number of different arenas, on the state and federal level. Currently there is only one mandatory GHG cap and trade program active, known as the Regional Greenhouse Gas Initiative (RGGI), in the Northeastern United States. Nine of the ten states in RGGI have adopted measures to ensure that voluntary purchasers of renewable energy have a direct effect on lowering the emissions cap, to preserve the environmental benefit associated with renewable energy. This model can also be implemented in other state, regional, and federal GHG reduction programs allowing the voluntary market to continue to grow additional renewable energy capacity and as a result reduce carbon emissions that otherwise may have taken place.[44]

VIII. Conclusion

Renewable energy is at the very beginning of a long challenging road ahead. Along this road renewable energy will be relied on to mitigate climate change, help achieve energy independence, and spur sustainable economic development. In this paper, we have documented the trend whereby commercial entities that recognize renewable energy's positive societal impacts have chosen to support it proactively

and voluntarily. At the same time these companies demonstrate leadership in their field and connect with their customers along the way.

We found that the percentage of renewable energy sold to commercial customers in the voluntary market has risen continuously over the past six years and currently accounts for 77 percent of total voluntary market sales. The greater demand for certified renewable energy from large commercial purchasers has helped the voluntary market grow over 500 percent from 2003 to 2008. This has resulted in the voluntary market demanding more new renewable energy than state-mandated renewable portfolio standards during this period.

We found that the top criteria for commercial purchases of renewable energy are location of generation, price, resource type, and certification. In addition, commercial purchasers most often purchase renewable energy in the form of RECs over utility and competitive electricity green power pricing program offerings.

We found that growth of renewable energy sales has been driven by commercial purchasers of renewable energy who are either proactively supporting the technology or reacting to increased demand from their customers for more environmentally conscious products and business operations. As concern for the environment rises among Americans renewable energy is increasingly playing a role in their product-purchasing decisions. Labeling and recognition programs have aided in this trend by providing buyers and sellers with credibility and facilitating communication efforts to their stakeholders.

The momentum being built by commercial purchasers supporting renewable energy beyond government mandates is only made possible through the recognition of the voluntary market. If the ability of voluntary markets to reduce overall GHG emissions is retained in future legislation, the door is left open for commercial purchasers to have an even greater impact on new renewable energy development thus reducing greenhouse gas emissions faster than would be possible with State or Federal cap-and-trade and RPS programs alone. •

IX. Notes

1. Bonini et al., "Addressing Consumer Concerns about Climate Change," The McKinsey Quarterly, March 2008.
2. Center for Resource Solutions and Natural Marketing Institute, "Unlocking the Power of Renewable Energy Certification to Build Credibility with Consumers," June 2009.
3. One Gigawatt-hour (GWh) equals 1,000 Megawatt-hours (MWh) or 1,000,000 Kilowatt-hours (kWh)
4. The Green-e programs, Green-e Energy, Green-e Marketplace, and Green-e Climate are administered by the Center for Resource Solutions. More information can be found at www.green-e.org.
5. Lori Bird. et al., "Green Power Marketing in the United States: A Status Report (2008 Data). Technical Report NREL/TP-6A2-46581. September 2009.
   Center for Resource Solutions, "2008 Green-e Verification Report," www.Green-e.org/docs/2008 Green-e Verification Report.pdf. September 2009.

6. New renewable generation refers to output from renewable energy projects installed after January 1st 1997 as defined by the Green-e Energy National Standard (www.Green-e.org/getcert_re_stan.shtml) and by the National Renewable Energy Laboratory to measure voluntary market activity (www.nrel.gov/docs/fy09osti/45041.pdf).
7. Lori Bird. et al., "Green Power Marketing in the United States: A Status Report (2008 Data). Technical Report NREL/TP-6A2-46581. September 2009.
8. Center for Resource Solutions, "2008 Green-e Verification Report," www.Green-e.org/docs/2008 Green-e Verification Report.pdf. September 2009.
9. Compliance demand accounts for the amount of renewable energy supplied in each utility's electricity supply mix to meet requirements for state (or potential federal) Renewable Portfolio Standards, Renewable Electricity Standards, or renewable energy goals. Voluntary demand refers to renewable energy purchased by individuals, businesses and organizations to support claims concerning their electricity use above and beyond any renewable energy government mandate.
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Version 2.2, **Released** 1/6/10