Voluntary Carbon Confusion:
A Consumer's Guide to Purchasing Carbon Offsets and Renewable Energy Certificates

by Mary E. Lemmer

Faculty Advisor:
Andrew J. Hoffman

Frederick A. and Barbara M. Erb Institute
For Global Sustainable Enterprise
University of Michigan

January, 2008

ERB INSTITUTE
FOR GLOBAL SUSTAINABLE ENTERPRISE
UNIVERSITY OF MICHIGAN

Contents

EXECUTIVE SUMMARY

The voluntary carbon market has soared in the opening decade of the 21st century. As more players enter the market, consumers face perplexing choices and risk investing in phony greenhouse gas reduction projects. Without uniform standards, consumers must develop their own criteria for choosing quality products and may end up paying for phantom emissions reductions. *Voluntary Carbon Confusion: A Consumer's Guide to Purchasing Carbon Offsets and Renewable Energy Certificates* is the result of eight months of research on the voluntary carbon market. It is a guide for consumers interested in purchasing voluntary carbon offsets or renewable energy certificates in the voluntary carbon market. The report is targeted to individuals, business owners, government institutions, event planners, or any party curious about voluntary carbon instruments.

This report first describes the general condition of the market and provides a brief overview of the four types of voluntary offset products available to consumers. It answers commonly asked questions, such as: who is buying voluntary offsets; why are they buying them, and; what are the advantages and disadvantages? The report warns readers of the buyer-beware principle and prepares them to make an educated purchasing decision based on ten factors they should consider before deciding on a particular voluntary offset supplier or project. The report concludes with insights on the future of the voluntary carbon market.

As a supplement to the report, a spreadsheet of existing REC and carbon offset suppliers provides a resource for potential buyers to use to guide their purchasing decisions. The spreadsheet contains data from one hundred and fifty four suppliers. It includes information about each company as well as details about how they address important variables as covered in the body of the report.

Readers of this report will be able to:

- Recognize the growth of the voluntary carbon market.
- Identify the pros and cons of RECs and carbon offsets.
- Name the principle categories of buyers.
- Describe variables to consider when searching for a suitable voluntary offset supplier.
- Determine important factors to guide their voluntary offset purchases.
- Choose a voluntary offset product and supplier to invest in.

In the end, it is clear that the voluntary carbon market is gaining popularity among individuals, businesses, governments, and other organizations. Already, the market is undergoing rapid changes and is expected to continue expanding in the coming years. As in any transaction, there are risks and opportunities, so it is best for buyers to learn about their options and the market players in order to make an informed investment in carbon offsets and renewable energy certificates.

INTRODUCTION

As public awareness of global warming increases, the options to mitigate global carbon emissions are overwhelming. The voluntary carbon market has emerged as one of the main tools devised to reduce global carbon emissions and tilt the balance toward zero emission renewable energy. Individuals, companies, governments, and event planners are typical purchasers of these financial instruments as it is becoming easier to purchase voluntary carbon offsets over the Internet. Interested buyers simply visit a webpage or an offset supplier and first calculate their carbon footprint, or the total amount of greenhouse gases produced from their lifestyle, in terms of tons carbon dioxide equivalent.[i] By answering simple questions about lifestyle choices, such as transportation, electricity use and diet, buyers receive a number expressing the magnitude of their impact. For instance, traveling by plane 1.75 miles, operating a computer for thirty-two hours, the production of five plastic bags, and the production of one-third of an American cheeseburger add one kilogram of carbon dioxide to a carbon footprint.[ii] Factors such as driving a fuel-efficient vehicle, conserving water and energy, and eating less meat, give way to a smaller carbon footprint. The purchaser then has the option to buy the equivalency of their carbon impact in the form of carbon emission reductions or renewable energy, thereby offsetting their carbon impact. If a buyer so chooses to purchase the equivalent of their entire impact, they can claim carbon neutrality, or emission of zero emissions. Reducing carbon emissions is shown to provide several benefits, as discussed later in this report.

This report covers the essentials an interested buyer needs in order to make an educated purchasing decision in the voluntary carbon market. It is meant to provide an overview of the voluntary carbon market as well as specifically cover critical factors to consider when purchasing carbon offsets and renewable energy certificates (RECs). It is split into eight topics to address the available voluntary carbon products, growth of the market, types of buyers, the advantages and disadvantages of voluntary carbon instruments, variables for purchasers to consider, alternative means to reduce emissions, and the future of the voluntary carbon market.

PRODUCT TYPES

Once a decision has been made to invest in renewable energy purchasers must make an upfront choice – what type of product to buy? The most popular choices for consumers are carbon offsets and Renewable Energy Certificates (RECs), with less popular choices being Certified Emissions Reductions (CERs), and Verified Emission Reductions (VERs).

Carbon Offsets

Offset - *n.* 1. Something that counterbalances, counteracts, or compensates for something else; compensating equivalent.[iii]

Carbon offsets are distinct reductions in carbon emissions achieved through a specific mitigation project. Offsets are measured in terms of tons of CO_2 equivalent, converting six greenhouse gases into one measurement.[iv] Every ton of carbon emissions reduced as a result of a project

that reduces carbon dioxide emissions yields one carbon offset. Offsets can be sold in order to finance carbon reduction projects' operations. When a consumer purchases offsets they are doing what the title implies, offsetting emissions by purchasing the equivalency in reductions. Essentially, purchasing carbon offsets is paying someone else to reduce emissions of carbon dioxide on his or her behalf. Offsetting allows purchasers to make up for the unavoidable carbon emissions from daily lifestyle decisions, such as travel, heating homes, or using electronics. For instance, some people need to fly for their job, so rather than not traveling, individuals can make up for their travel emissions by helping finance carbon reduction projects, such as wind farms. Carbon offset projects include tree planting and carbon sequestration projects, energy efficiency projects, renewable energy projects, and landfill methane capture, discussed in greater detail later in the report.

Carbon offsets are a tradable commodity and allow purchasers to claim carbon emission reductions. Anyone can purchase carbon offsets, and they are commonly sold to individuals who are seeking to reduce their carbon footprint. Families offset home electricity use, individuals offset travel emissions, and even newlyweds boast carbon free weddings. Carbon offsets differ from RECs in that they are exchanged within a cap-and-trade market. In such a market, coal power plants must purchase offsets before producing power, so by purchasing credits from a cap and trade market, voluntary buyers decrease the available pool of offsets for power plants to buy, thereby forcing them to clean up their operations.[v] The goal being to reduce the amount of carbon being traded on the market, so that a company emitting large quantities of carbon dioxide might purchase credits, making fewer credits available for other companies to purchase.

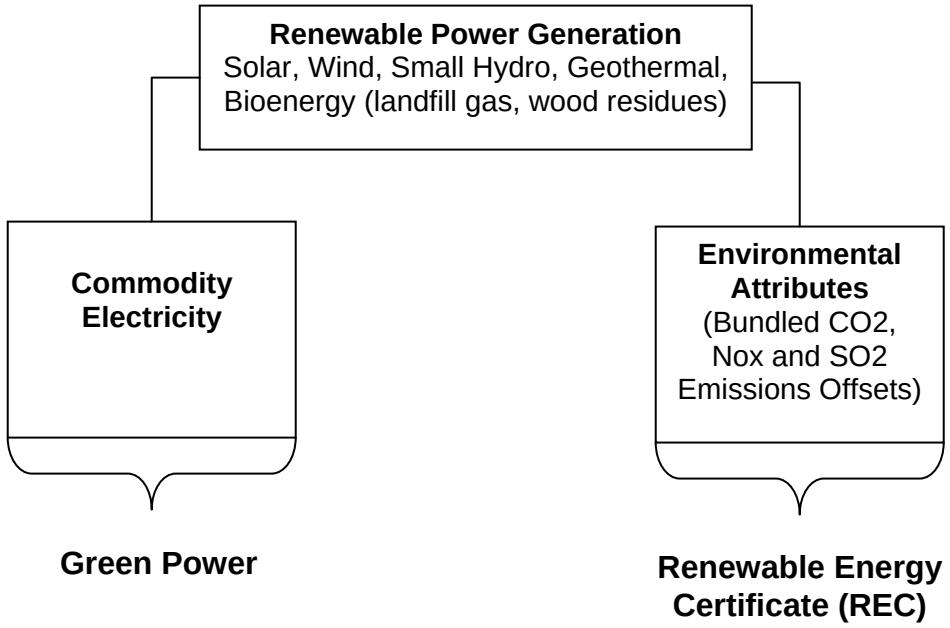
Certified Emissions Reductions (CERs)
Measured in metric tons of carbon dioxide equivalent, a CER represents a unit of greenhouse gas emission reductions issued in conjunction with the Clean Development Mechanism of the Kyoto Protocol.[vi] Typical purchasers of CERs live in countries that have ratified the Kyoto Protocol. It is not in United States consumers' best interests to purchase CERs as they are harder to find and meet no mandatory regulation.

Renewable Energy Certificates (RECs)
Renewable Portfolio Standards (RPS) are leading to the development of tradable certificate programs. Since renewable energy cannot service all the households and companies that might want their power and their costs are often higher, it is considered more efficient to allow the environmental attributes associated with renewable electricity generation to be traded as a separate commodity.

A renewable energy certificate (REC), also known as a renewable energy credit or green tag, represents the environmental attributes of renewable electricity generation, created when a renewable energy facility generates electricity. At the retail level RECs are measured in kilowatt hours (kWh), and megawatt hours (MWh) at the wholesale level.[vii] When consumers purchase RECs they are paying for an authorized representation (typically in the form of an electronic or paper document) that signifies the intangible benefits of displacing a specific amount of electricity generated from non-renewable sources, such as coal, nuclear, oil or gas, from the electric grid.[viii]

The principle idea behind RECs it that the environmental attributes of renewable energy can be separated, or unbundled, from the generated energy itself, and sold as a commodity independently of the underlying electricity. As illustrated in Figure 1, the process of generating renewable power yields two separate products: 1) a certificate representing the attributes (REC), and 2) the energy generated and delivered to an end user. Since all electricity is the same, purchasing an amount of any electricity and an equivalent amount of RECs is deemed to be ownership of renewable electricity.[ix] This enables consumers whose utilities do not source their electricity from renewable energy generation to purchase renewable energy without switching utilities.

Figure 1. What is a REC?



What is the impact? The logic is that every megawatt generated by renewable power is a megawatt not produced by burning fossil fuels. Renewable energy credits are sold to subsidize renewable energy generators' higher production costs compared to fossil fuel energy production.[x] As more renewable energy generators develop, the cost of renewable energy will fall in comparison to fossil fuel power.[xi] For a clearer idea, consider that each kWh of renewable energy you purchase saves 1.97 pounds of carbon dioxide.[xii] Although no direct greenhouse gas emissions reductions occur, in theory, purchasing RECs reduces overall emissions by making emission free power generation viable.

There are two separate REC markets in the United States: a voluntary market and a compliance market. In the voluntary market buyers are primarily interested in supporting renewable energy or claiming to use clean power for their electricity needs. They purchase RECs in primary concern for the environmental benefits, whereas in the mandatory market RECs are not valued

for their environmental attributes. Government regulation prompts purchasers to buy RECs in the compliance market, as RECs are typically used to fulfill a quota.[xiii]

RECs are versatile and are often converted into carbon offsets by multiplying them by a factor relating to the avoided greenhouse gas emissions.[xiv] There is often a misconception about the differences between RECs and carbon offsets because of their similarities. It is important to distinguish between the two. Carbon offsets are legally bound to cancel greenhouse gas emission rights, whereas renewable energy credits do not guarantee any emissions reductions.[xv] Renewable energy certificates ensure that renewable energy has been generated on the buyers' behalf, but cannot always guarantee actual emissions reductions. Therefore, RECs are not always carbon offsets. A purchaser looking to reduce greenhouse gas emissions produced from a particular event, vacation, or wanting to claim "carbon neutrality" should consider buying carbon offsets. On the other hand, a purchaser simply desiring to purchase green energy should focus on renewable energy certificates.

Verified Emissions Reductions (VERs)
A VER represents a unit of greenhouse gas emission reductions verified by an independent auditor, but not qualified as a CER under the Kyoto Protocol. Even though VERs are often sold at a discount, buyers risk credibility when purchasing unregistered emission reductions.[xvi]

MARKET GROWTH

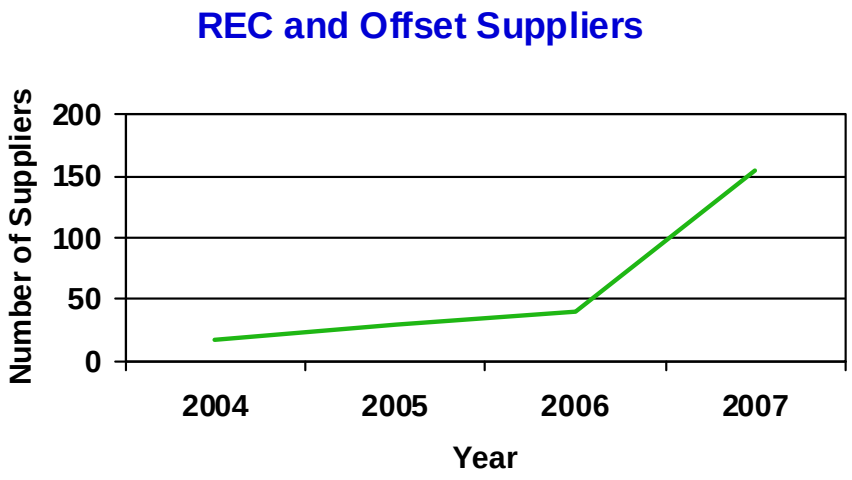
Several factors are driving the growth of the voluntary carbon market. National and international policy, such as the Kyoto Protocol and European Trading Scheme, are spurring awareness of climate change. People are beginning to consider offsets a feasible mitigation strategy.[xvii] Environmental reporting has also raised awareness in the public and business communities. As more and more corporations are taking on a corporate social responsibility agenda, they find voluntary carbon products more attractive.

The market has grown rapidly since 2001 and has continued to expand (see Figure 2).[xviii] Carbon offset providers have been in operations since the nineties, but the market has experienced its fastest growth between 2005 and 2007.[xix] In 2004 there were approximately eighteen providers.[xx] According to "Growing Pains: The Voluntary Offset Market," between 2005 and 2006 the number of suppliers grew by over 42%.[xxi] In 2006 there were an estimated 30 to 40 suppliers in the world, concentrated primarily in the United States, Europe, and Australia.[xxii] As of December 1, 2007, there are in the order of 154 vendors (see Appendix), with new players entering rapidly.

Not only are more companies entering the market, but sales are surging as well (See Figure 3). A review of the global carbon market discovered that the volume exchanged on the carbon market has more than doubled since 2002, with more than 70 million tons of carbon dioxide equivalents, which are inclusive to both offsets and RECs, traded as of November 2003.[xxiii] Between 2004 and 2005 sales of renewable energy, in terms of million MWh, more than doubled, from 1.6 million MWh to 3.8 million MWh, and reached roughly six million in 2006.[xxiv] The lack of registry or standard makes it difficult to track the exact number of

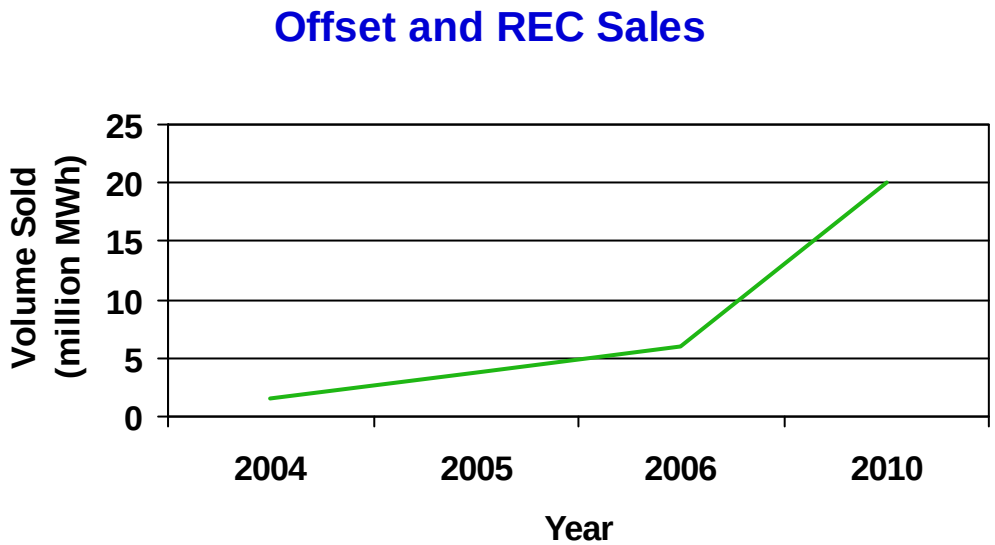
transactions, and sales estimates are not identical. The Chicago Climate Exchange (CCX) estimates that the voluntary market was worth 91 million dollars in 2006.[xxv] Other sources claim sales reached over 100 million dollars, with expectations to double by 2008.[xxvi]

Figure 2. Growth of the voluntary carbon market in terms of number of suppliers of RECs and offsets.



Sources: Taiyab, Nadaa. 2006. *Exploring the Market for Voluntary Carbon Offsets*. (International Institute for Environment and Development, London). www.iied.org/pubs/pdf/full/15502IIED.pdf, viewed 12/15/07; and Thomas, William L. "Growing Pains: The Voluntary Offset Market." *The Business Imperative: The Voluntary Offset Market.* http://www.carbon-business.com/pdfs/The%20voluntary%20offset%20market_summary.pdf, viewed 12/16/07; See also the Appendix in this report.

Figure 3. Growth of the voluntary carbon market in terms of volume sold.



Source: Barcott, Bruce. 2007. "Green Tags: Making Sense of the REC-age." *World Watch*, July 1. http://goliath.ecnext.com/coms2/summary_01996722235_ITM, viewed 12/16/07.

BUYERS

There are five main groups of customers purchasing carbon offsets and renewable energy certificates: businesses, NGOs, government agencies, conferences, and individuals.

Businesses

Increasingly businesses are recognizing the importance of investing in renewable energy technologies, not only for a way to boost their image as an environmentally responsible company, but also in anticipation of future mandatory regulation. Offset and REC purchases help firms reduce corporate emissions, achieve renewable energy goals, boost stakeholder relations, and market environmentally conscious products and brands.[xxvii] Companies such as natural personal care guru, Burt's Bees, purchase offsets to help overcome the challenge of global warming. On Earth Day in 2007 Burt's Bees announced carbon neutrality through its purchase of one hundred percent of its energy in the form of carbon offsets.[xxviii] Other companies, such as Ben and Jerry's, Starbucks, and Whole Foods also purchase offsets in efforts to implement more sustainable practices into their operations. Companies are setting their own renewable energy goals in which they commit to meeting emission reduction targets and/or purchase a percentage of energy from renewable sources by a future date.

However, John Russell of *Ethical Corporation* points out that "anyone who thinks companies regard offsets as the answer to reducing carbon emissions is mistaken. The reason is simple: offsets are a permanent cost for a business, whereas energy efficiency measures are a permanent saving."[xxix] As with any buyer, carbon offsets should be the last piece of the puzzle to meet emissions targets or become carbon neutral. Companies should take a multi-step approach to purchasing renewable energy. First, a company should look for ways to increase its energy efficiency, for instance, replacing conventional light bulbs with compact fluorescent light bulbs. After implementing energy efficient measures, the next step is to purchase green energy directly from the utility, which is not always an option. The third step is to purchase carbon offsets and renewable energy certificates. HSBC became the first carbon neutral bank in 2004, using a similar approach to reduce its emissions.[xxx] Carbon products can provide companies a true "green energy" marketing claim without switching utilities or installing on site equipment. For instance, Aspen Skiing spent $42,000 in 2006 to purchase RECs for about two dollars per MWh and proclaimed they had offset "100% of its electricity use with wind energy credits, keeping a million pounds of pollution out of the air."[xxxi] Even though RECs are a smaller financial investment than some other sustainability efforts, the company still paid a two percent premium on their energy costs, and reported second guessing their purchase decision.[xxxii] Companies should be aware of the commercial, reputational, and legal risks involved with use of RECs or offsets.[13] Until offsets and RECs must meet certain criteria, anyone can enter the market and destroy the little credibility it currently has.

Events

Conference organizers and event planners purchase RECs and offsets in order to neutralize events' carbon emissions. The products offer flexibility by allowing event planners to offset electricity for only special events, rather than requiring long-term contracts.[xxxiii] Environmentally framed events, such as the four annual Green Festivals, support carbon reduction projects to offset event participants' travel emissions. Even non-environment

focused events are seeking ways to reduce their carbon footprints. For instance, in addition to using more efficient snowmaking machines and green buildings, the 2006 Olympic winter games in Turin, Italy offset its greenhouse gases with the purchase of carbon credits.[xxxiv] Carbon offsetting provides an easy and affordable way for events to minimize their environmental impacts.

Governments

Lack of a national renewable portfolio standard (RPS) drives state governments to develop statewide renewable energy goals in which they commit to meeting emission reduction targets and/or purchase a percentage of energy from renewable sources by a future date. As of January 2008, there are 24 states that have RPS policies in place. In addition, other states have made non-binding goals to adopt renewable energy.[xxxv] For instance, the City of Ann Arbor has set a goal to purchase thirty percent of its energy from renewables by the year 2010. They have expressed interest in supporting renewable energy in the state of Michigan, and are searching for a long-term fixed rate contract with a REC supplier.[xxxvi] Statewide energy goals often require business owners and residents to pursue alternative energy sources. Even the Environmental Protection Agency has entered the renewable energy market. In 2004, the EPA agreed to purchase 7.7 million kilowatt-hours of RECs annually for three of its laboratories in Minnesota, Michigan, and Nevada.[xxxvii] Government institutions' motivations for purchasing RECs differ from individuals in part because of the difference in quantity needed to offset current electricity use. For this reason, price is typically a large factor in the decision making process for such large organizations. Another factor state governments consider is the location of the renewable energy facilities. By supporting in-state projects the government is also supporting sustainable economic growth.

Individuals

The principle reason individuals offset carbon is for a sense of personal responsibility.[xxxviii] Sure they may receive a bumper sticker to boast "zero emission" travel, but there is not much of an incentive for household consumers to purchase offsets other than to meet personal environmental and sustainability goals. Celebrities can purchase offsets to improve public reactions, and bands have been known to offset their tours. For instance, in 2003 Rolling Stones donated money to two forestry projects in Scotland, making their international tour carbon neutral. They sold 160,000 tickets, produced 2,080 tons of CO_2, but planted a tree for every 60 fans, yielding a total of 2,800 trees planted at a cost of $37,700.[xxxix] Individuals purchase both carbon offsets and renewable energy certificates, again depending on their purchasing motivation.

NGOs

NGOs invest in renewable energy projects in support of their mission. Their purchase of voluntary offsets is more about taking personal responsibility for the impact of their actions on the climate, rather than trying to differentiate a brand or make environmental claims.[xl] For instance, environmental organizations view carbon offsets and renewable energy certificates as a means to practice what they preach, and encourage others to act likewise.

REASONS TO BUY

There are several benefits to purchase renewable energy certificates and carbon offsets. The environmental benefits are the most obvious. Renewable electricity has lower to zero air emissions and does not produce waste. Sources of renewable energy are readily available and naturally replenished. From an energy security viewpoint, a greater use of renewable energy reduces United States' dependence on foreign oil. Renewable generators also support domestic economies and create jobs. When looking to purchase renewable energy certificates or carbon offsets, purchasers should identify their motivation for the purchase and rank the importance of various benefits. That will help narrow down which renewable energy product to purchase. For instance, the City of Ann Arbor identified "a preference for wind in Michigan," as criteria for their purchase, primarily because of its ability to be an economic stimulus for the state.[xli] Different consumers have different reasons for purchasing RECs or offsets. It is up to buyers to define their motivation in order to find the product that best suits their needs.

The voluntary carbon market is not a magic bullet solution to climate change, but it does offer several advantages in tilting the balance toward renewables when questioning whether new energy production will come from renewables or fossil fuels. These financial instruments help make renewable energy generators more competitive against fossil fuel electricity generations and provide the additional cash flow required for renewable energy projects to be financially viable over its lifetime. RECs allow organizations to choose renewable power even if their local utility does not offer green power because RECs are sold independently from electricity.[xlii]

DISADVANTAGES

The most notable disadvantage of the voluntary carbon market is its lack of regulation, standards, and uniformity. The precise nature of each REC or offset can vary from one supplier to another because there are no common defined standards.[xliii] The range of data available and varying renewable energy products make the reliability of the market questionable. The lack of conformity in the market makes it even more difficult for interested purchasers to decide on a source. Sellers can easily lead consumers to believe their product is credible when in fact it may not be, and it only takes one bad transaction for the whole market to be considered a complete joke.

There is also controversy about whether the money spent on RECs and offsets is enough to make a substantial difference in deciding whether or not to generate renewable energy. Projects differ in their costs and companies allocate revenue from voluntary offsets differently. Thus, it is important for purchasers to investigate suppliers and their projects prior to committing to buy.

Furthermore, purchasing RECs or offsets still allows people to emit tons of carbon dioxide. For this reason, it is advisable to first reduce emissions through implementing energy efficient and conservation practices lifestyle and business choices, and then purchasing voluntary offsets for the remaining unavoidable emissions.

VARIABLES TO CONSIDER

Once a decision to purchase renewable energy certificates or carbon offsets has been made, ideally after reducing direct emissions, there are several factors to consider when deciding on a specific product. Each buyer places different importance on the various factors, as some seem more important than others. John Schilling of Amerex Energy makes a valid point when he says, "the more open you are to varying stipulations, the cheaper the renewable energy becomes, as you make yourself open to a larger pool of potential sellers. The more specific, the more expensive; rule of thumb."[xliv] This section of the report describes the main variables to consider: Project type; project location; additionality; certificate retirement; certification; double counting; percentage of revenue allocated to project; permanence of reduction; price; project location; project type; transparency; and vintage.

Additionality

Additionality is by far the most debated issue surrounding the voluntary carbon market. When determining whether or not a project is additional or "business as usual" a consumer must question whether or not the project would have happened without the sale of the RECs or carbon offsets. If the answer is "yes," the project would have operated without the carbon credit sales and the project fails the additionality test. On the other hand, if the answer is "no," the only way the project can operate is with the additional cash flow from the sale of carbon credits, and the project is considered to be additional. It seems like a simple concept, except for the fact that no one agrees on what could have happened without the sale of carbon instruments. For additional projects, the anticipated benefits of the carbon offsets must be a decisive factor for pursuing the project.[xlv] If the project was going to happen anyways because of production tax credits, falling costs of technology, or the rising cost of gas, for instance, project managers are not counting any value from the money received in exchange for RECs or carbon offsets, when deciding to build the project. The bottom line being, if the renewable energy generated or carbon reduced is not additional to what is already being done, there are no extra environmental benefits to be claimed.

Buyers concerned with additionality may consider purchasing RECs using the "subscription method." In this type of transaction a client buys "future RECs," to be generated in the future by a new renewable facility. The advantage to this approach is that it promotes new renewable facilities, eliminating the fear of investing money in an existing and financially strong project. Likewise, carbon offsets can be purchased prior to the actual emission reduction project implementation, in order to support future reductions. However, there are tradeoffs when using this method. Clients risk investing in a project that might not be implemented. In this case buyers should discover how the seller plans to compensate purchasers if the facility is not built.[xlvi]

Certificate Retirement

Certificate retirement occurs when an owner uses the purchased RECs. For instance, use of a REC may include using it by an end-use customer, marketer, generator, or utility to comply with a regulatory requirement; a public claim associated with a purchase of RECs by the customer; or the sale of the attributes of a REC.[xlvii] Once retired, a REC may not be sold, donated, or transferred to another user, and no one other than the end-user can make claims associated with retired RECs.[xlviii] Some companies retire sold RECs for its customers. This helps to ensure

customers that RECs are not sold to multiple consumers, a concept known as double counting, covered later in the report.

Certification

There is no uniform standard to evaluate voluntary carbon market providers. The lack of standard presents a huge risk to the market as a whole and makes it less credible and clear to consumers. Various organizations are attempting to fill the void as a respected voluntary standard for emissions reduction and renewable energy projects. Although there is some overlap among certifiers, each organization defines quantitative and qualitative criteria and charges clients different fees for certification. This section of the report introduces different standards and their evaluative criteria: Chicago Climate Exchange (CCX); Clean Development Mechanism; Community and Biodiversity Standards (CCB); Environmental Resource Trust; Green-e; Voluntary Carbon Standard (VCS); Voluntary Gold Standard.

Chicago Climate Exchange (CCX). The Chicago Climate Exchange is a voluntary cap and trade emission trading system whose members commit to reduce their emissions by a certain amount each year. They developed their own certification and verification process for projects, but do not clearly define nor expose criteria.[xlix] Their projects include offset projects in North America and Brazil.[l]

Clean Development Mechanism (CDM). The Clean Development Mechanism combines on-site inspections with clear project documentation to evaluate projects. It performs an additionality analysis, calculations of energy generated, and a monitoring plan for evaluated projects. The CDM charges high transaction costs, so most of the projects registered under its certification label are larger scale projects.[li]

Community and Biodiversity Standards (CCB). The CCB focuses solely on forestry projects, which must meet criteria categorized into four sections in order to receive certification: General Section; Climate Section; Community Section; Biodiversity Section. The General Section criteria measures general information such as the original conditions at the project site, the project design and goals, baseline emission reduction projections, and legal status of the company. The Climate Section inspects the net positive climate impacts of the project, the leakage of the project, as well as the monitoring system in place to track climate impact. Likewise the Community and Biodiversity Sections review the net positive community and biodiversity impacts and monitoring systems. Projects can obtain three different levels of certification: Approved, Silver, or Gold, Gold being the highest attainable certification.[lii]

Environmental Resource Trust (ERT). ERT is a non-profit organization that was founded in 1996 to build "markets that encourage private parties to serve their own best interests and the best interests of the environment." It is a greenhouse gas registry that creates procedures and provides third party oversight. As described on their website, ERT has three main programs to support its mission. Their Greenhouse Gas (GHG) Registry records validated GHG emission profiles in order to track emission reductions. This program provides an independent verification and tracking system to enable "market participants to track and trade emissions reductions with confidence."[liii] The EcoPower Program markets power from renewable sources of energy. The EcoLands Program encourages landowners to make environmentally conscious land use

decisions.[liv] ERT's programs support the growth and success of the voluntary carbon market primarily through their GHG registry which provides a way to track greenhouse gas reductions and eliminate double counting issues.

Green-e. Green-e is the leader among independent certification labels and has certified many renewable energy and greenhouse gas mitigation projects. It is a division of the Center for Resource Solutions (CRS), a national non-profit that supports renewable energy, greenhouse gas reductions, and energy efficiency programs that contribute to sustainable growth in global markets.[lv]

Green-e has two certification programs related to the voluntary carbon market: Green-e Energy, Green-e Climate.

Green-e Energy focuses on electricity products, green energy pricing programs, and RECs. Green-e certified RECs must come from renewable energy plans that were built after 1997 and cannot be counted to fulfill any legal mandates.[lvi] Green-e ensures projects are high quality, are not double counted, and meet strict additionality standards. Certified projects include only "measured, permanent, verified, and beyond business-as-usual GHG emission reductions."[lvii] They charge an annual fee ranging from $1,000 to $4,000 with an additional volume related charge to REC suppliers. RECs also must meet high expectations, annual audits, and follow a code of conduct. However, in exchange, Green-e offers REC providers the boast the well-known Green-e logo as well as other benefits.[lviii]

In 2007, Green-e established the Green-e Climate program to certify greenhouse gas emission reductions and carbon offsets sold in the voluntary market. This program uses four steps to verify and certify offsets. In particular, the Green-e Climate program assesses the additionality of greenhouse gas reduction projects by requiring offsets to pass strict standards. It also ensures offset sellers sell the equivalent amount of offsets they are generating. It eliminates risk of double counting by retiring sold certificates. Offset project details must be laid out for customers. Green-e requires sellers to list the type of project, location, and quantify its emission reductions.[lix] Green-e's strict regulations signal to customers that Green-e certified RECs and offsets are of high quality.

Voluntary Carbon Standard (VCS). VCS guarantees the quality of voluntary offset projects in attempt to "give users confidence that voluntary project-based greenhouse gas emission reductions are real, measurable, permanent, additional, and independently verified."[lx] VCS certified offsets have environmental benefits and will document the information on every VCS-approved project.[28]

Voluntary Gold Standard. The Voluntary Gold Standard requires projects to pass three screens: 1) The project must be a renewable energy or energy efficiency project; 2) The project must be additional and meet baseline requirements; 3) The project must consider sustainable development by analyzing the cost and benefits associated with the project's environmental, economic, and social impacts. This requires the project implementation to consult local stakeholders before constructing the project. Its socially considerate criteria make its certified projects of interest to purchasers seeking to support socially responsible projects. However,

its higher transaction costs discourage clients from seeking Voluntary Gold Standard certification.[lxi]

With no mandatory carbon emission reduction regulation independent certifiers' power is subdued.[lxii] However, a single certification scheme is critical for the success of the market. The standard must be strict enough to ensure credible emissions reductions, but also be simple enough to provide a cost effective and easy to implement scheme.[lxiii] As the market grows, reliable certification programs become increasingly necessary to ensure long-term market sustainability and credibility. Buyers searching for credible products should search for RECs and carbon offsets that have been certified by an independent third-party, such as those listed above. The price of project certification should also be taken into account though, as smaller projects may be more credible than larger-scale projects, yet unable to afford obtaining third-party certification. Thus, investigating companies' operations is the best way to distinguish credible voluntary offsets from phony products.

Double Counting

Double counting occurs when RECs are ultimately sold to more than one customer. Double counting occurs when the same RECs are sold to more than one party; when more than one party claims ownership of the same MWh of attributes; when a REC is sold to represent 'renewable electricity' to one party, and sold as attributes to another; when the same REC is used by a utility to meet an environmental mandate and also sold to consumers.[lxiv] An internal registry is necessary to minimizing double counting issues.[lxv] However, there is no official registry to track transactions, so it is up to the REC and offset providers to ensure double counting to their customers. Offset companies can retire their offsets once they sell them so that they can only be sold once. They must also ensure that carbon offsets are not also sold as RECs.[lxvi] Buyers concerned with issues of double counting should consider suppliers who track RECs or offsets sold through either an internal or external registry. Certificates sent to customers to confirm their purchase should have a unique tracking number to ensure the attributes have not been double sold.

Percentage of Revenue Spent on Project

It is important to consider how much of your dollar is actually allocated to the project itself. If a large percentage of what you are paying for a REC or offset is used for transaction fees or marketing materials then you may not have as large an impact as retailers claim. As suppliers achieve greater economies of scale, the proportion of revenues spent directly on projects relative to other costs will increase.[lxvii] Providers who are most transparent in terms of their allocation of revenues come across as more credible than others who refuse to disclose their profit margins.

Permanence of the Reduction

Not all emissions reductions should be treated the same, in the sense that not all reductions are equally permanent. Purchasers interested in buying carbon offsets in particular, should consider the permanence of the carbon reduction from the offset project. Buyers should be sensitive to the project type and location, as both factors can affect the permanence of reductions. For instance, offsets in support of tree-planting projects may not yield the carbon reductions expected. When trees are planted they can reduce the carbon in the atmosphere over a period of time, but once they die, carbon is released as they decay, resulting in no long-term carbon

reductions. Trees are also vulnerable to natural disasters, so may not live long enough to reduce the full amount intended. Some emission reduction projects also take more time to yield actual reductions than others. Many carbon offset suppliers remove purchased offsets from the market to prevent subsequent transaction and to ensure the reductions are permanent. Thus, buyers can also investigate suppliers' methods to remove purchased offsets from the market as a way to assess the permanence of emission reductions. Some of the best examples of permanent reductions are those from renewable energy and methane capture projects.

Price

The price of RECs typically equate to at least the difference between the market price for commodity power and the revenue required per MWh for the renewable power project to be financially viable for the owners.[lxviii] In the current market, prices vary from five dollars to thirty-five dollars or more, per ton of carbon dioxide equivalent (CO_2e). The variation in prices is largely a factor of the quality and location of the project, as well as the provider's markup.[lxix] Prices also vary depending on whether or not the company is for profit or non-profit. For profit organizations try to maximize revenues and minimize costs, thus typically charge higher prices and spend less on the projects than their non-profit counterparts.[lxx] Most buyers are willing to pay a higher price for higher quality offsets, especially if they value sustainable development benefits associated with them. The popular saying "you get what you pay for" applies to the voluntary carbon market in most, but not all, cases.

Project

Projects will vary depending on their geographic location and supplier as well as by the nature of the carbon product. This section of the report addresses three factors to consider in relation to voluntary offset projects: location, size, and type.

Location

One factor to consider when determining what to buy is the location of the project. Some consumers prefer projects located in their home country, or even their home state, to support the domestic economy. This is a critical factor city and state governments consider when making a purchasing decision. According to research conducted by Tufts Climate Initiative, domestic projects are likely to incur high upfront costs and must overcome political obstacles. They are also usually small and do not create the change necessary to drive policy.[lxxi] However, there are economic benefits, such as job creation, when investing in local renewable energy. Some buyers visit the project to witness its operations and ensure its credibility. International projects are another option for customers. Some examples of international projects include implementing energy efficiency measures in small communities or installing solar panels in rural areas. Thus, international projects in developing countries appeal to buyers with a desire to also support the area's economic growth.

Size

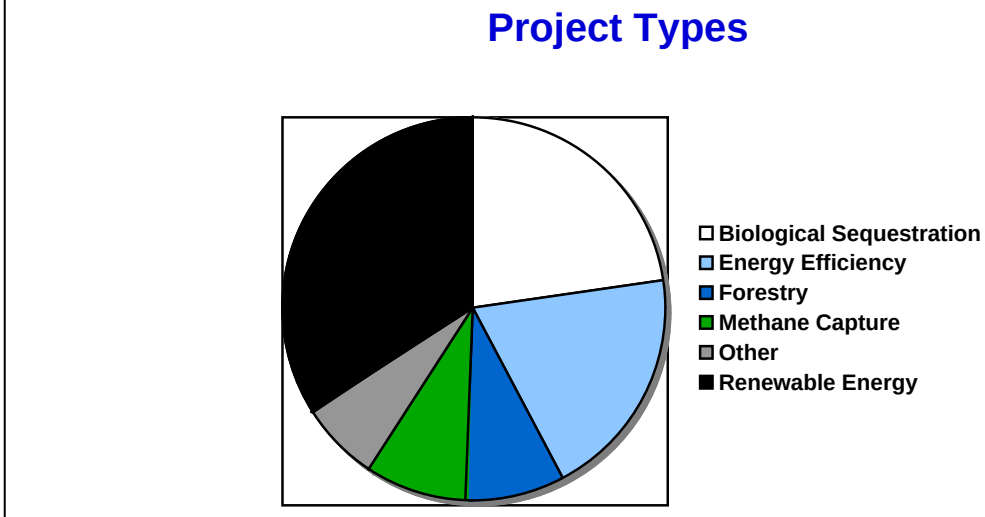
When deciding on a specific supplier and project, a buyer should consider both the company and project size. A smaller project may not sell as many offsets, nor be as well known, but could offer transparency and credibility that larger scale providers may not. As mentioned earlier, smaller companies often do not have the revenue to purchase third-party certification, but still

support credible projects. Therefore, the size of a company and its projects does not tend to lead into specific insight on the credibility of its voluntary offsets.

Type

Projects vary depending on their geographic location and supplier. The kind of project is also largely determined by whether or not its producing RECs or carbon offsets. Suppliers who sell RECs typically fund renewable energy projects, whereas carbon offset suppliers support a broader range of projects. Project types usually fall into one of five categories: biological sequestration, energy efficiency, forestry, methane capture, or renewable energy. Biological sequestration projects only yield carbon offsets. Investing in carbon sequestration projects is risky because the amount of carbon sequestered depends on factors including the age of trees, growth rate, and local climate and soil conditions. As temperatures and atmospheric concentrations change with global warming, carbon intake is likely to change over time also.[lxxii] These kinds of projects generally do not take a long time to net true emission reductions. They are not considered as permanent as renewable energy or energy efficiency projects, making your purchase more or less likely to bring about any true net carbon reductions. It is also important to consider that forestry programs do not actually create RECs. Rather, they are more important as carbon sinks and to protect biodiversity.[lxxiii] Energy efficiency projects are designed to improve communities' energy usage. For instance, helping a rural town redesign cooking stoves, or changing a town's light bulbs to compact fluorescent bulbs. Energy efficiency projects have higher transition costs than renewable energy projects on a per unit of energy basis because they are small and decentralized.[lxxiv] A common argument against energy efficiency projects is that such measures should be taken anyway, in absence of the voluntary offset market. Forestry projects include planting trees to offset carbon emissions. Methane capture projects include landfill gas collection projects and anaerobic digesters. These kinds of projects generally do not take a long time to net true emission reductions. Methane projects have the added benefit of eliminating methane, which is a more potent greenhouse gas than carbon dioxide. They also reduce odors and generate energy by excess exhaust heat.[lxxv] Renewable energy projects are the most common (see Figure 4) and include wind, biomass, and solar technologies.

Figure 4. Distribution of types of projects supported through offsets and RECs.



Source: Appendix.

Transparency
Some providers are more transparent than others. Most information about providers is available online, but some providers do not have comprehensive websites, nor do they reveal all relevant information about their company. However, determined consumers can email providers for more information about the product, although cannot always expect immediate response or response at all. Some providers even send automated response emails without answering consumers' questions. Contacting suppliers is often the best way to learn how they address important concerns, such as additionality and double counting. Direct contact also helps consumers gain insight on the credibility and trustworthiness of a company. For instance, several companies refuse to share the percentage of the revenue that is used in support of the actual projects. Failure to inform potential buyers of its operations may deter customers from purchasing, in fear that the money they are spending is not actually supporting renewable energy projects.

Vintage
The vintage of a REC is the date that the electric generation associated with the REC was measured by the system operator or utility meter at the generator site. The vintage of a generator or generating facility on the other hand, is the date that the facility was placed into service. Information about the date the facility was established leads to insight about the additionality of the energy project. An old facility that has been operating for a while probably does not need to sell RECs in order to be financially viable. However, a project that is newly established may have a greater use for an additional cash flow.

ALTERNATIVES

Some consumers prefer to employ other means, rather than purchasing RECs or carbon offsets, to decrease their negative environmental impact. For instance, some companies build on-site renewable energy projects.[19] Kettle Foods, producer of all natural potato chips and other snacks, had eighteen wind turbines installed on the roof of their Wisconsin manufacturing facility.[lxxvi] By choosing materials wisely, businesses could earn more. Companies who employ energy efficient practices into their operations, or install on-site renewable energy generators, will see a fall in expenses, ultimately improving their bottom line. Individuals alternatively decide to save money to purchase a fuel-efficient vehicle or buy energy saving appliances, both great ways to reduce carbon usage.

THE FUTURE OF THE MARKET

With a surplus of choices and a lack of universally accepted standards, the voluntary carbon market is definitely a "buyer beware" market.

In order to succeed the market needs increased awareness and increased credibility. Uniformity and standards will be a key to its credibility. As more information about the available providers and projects becomes available, buyers should have more confidence and clarity of their purchasing decisions. Providers need to be more transparent, especially in terms of the money specifically allocated to the projects and the additionality of projects. A standard needs to be

simple enough to provide a cost efficient and easy way to implement, while still being strict enough to provide credibility.[lxxvii] The market's existence may be temporary due to mandatory regulations requiring companies, utilities, and cities to reduce and track their emissions. In such a scenario, voluntary offsets will only exist for individuals with a desire to offset personal emissions. The overall effect of a properly designed cap-and-trade system would yield a large benefit to renewable energy and the future of carbon emission reduction success. A research paper prepared for the Renewable Energy Policy Project in 2002 estimated that revenues from such a program could net the renewable energy industry 1.3 billion dollars per year by 2010.[lxxviii] Clearly the market is growing. Peter Fusaro, chairman and founder of Global Change Associates Inc., an international energy and environmental consulting firm predicts that growing demand and rising values will create a $3 trillion commodity market over the next twenty years.[lxxix] With numbers that large, a combination of credible compliance emission reductions and voluntary offsets could make a large dent in global emissions.

CONCLUSION

Voluntary offsets increase consumer awareness of greenhouse gas emissions as well as different avenues to reduce those emissions. However, voluntary offsets are not the magic bullet solution to addressing issues surrounding global warming and energy independence, but rather a baby step leading the market. According to scientists, seven billion tons of carbon dioxide need to be prevented from entering the atmosphere over the next fifty years in order to address global warming. The voluntary market can only deliver about 0.01% of those reductions.[lxxx] Johnson and Johnson's senior director of global energy, Dennis Canavan, argues that RECs are not the perfect solution for emission reductions, but says "for the time being, this is the system available to us to offset carbon dioxide."[lxxxi]

Decisions regarding which product to purchase should depend on the motivation behind the purchase. Purchasing voluntary carbon offsets does not give buyers an excuse to consume more. Rather, it provides a means to consider the emissions they cannot avoid. After reducing direct emissions, potential buyers should ask themselves the following questions in order to inform their purchasing decisions:

1. For what reason am I buying voluntary carbon offsets? (e.g. To offset the emissions of an event, vacation, or home electricity use)
2. What variables do I consider most important? Why? List each variable in order of importance.

After answering these questions, interested buyers should use the database in the Appendix of this report. This tool helps interested purchasers narrow down supplier choices. Take steps to ensure your criteria are met. Narrow the choices to your top ten, five, then three. Consider the length of time you are willing to spend researching chosen vendors and the pros and cons of each one. Buyers must beware because no required definition or criteria exists for suppliers to comply with. However, educated buyers and rigorous investigation of offset suppliers will yield well-informed purchases that will benefit buyers and the planet.

APPENDIX

This purpose of this spreadsheet is to provide a tool for consumers to use to filter through voluntary carbon offset and renewable energy certificate products and suppliers. It is meant as a supplement the report. Consider the variables addressed in the body of the report, and use this spreadsheet to ensure your criteria are met. A separate file is an interactive spreadsheet. An abridged one is attached to this report.

How to Use

After determining the motivation behind a purchase, interested buyers should rank covered variables in order of their importance in influencing the purchasing decision. All variables are listed as columns at the top of the spreadsheet, and each row represents a supplier. Please note that some variables covered in the spreadsheet, such as company location and year founded, are not covered in detail in the body of the report. To choose a particular supplier, first narrow the choices to your top ten. Continue to eliminate suppliers until the top three contenders remain. It is recommended to visit top companies' websites for more information about their product offerings.

Supplier Attributes

The spreadsheet includes data categorized into eighteen attributes. The abridged version contains selective attributes noted in parenthesis.

Name. The "Name" category refers to the name of the company supplying the voluntary carbon product.

Website. The website listed is the website of the company. Visit company websites in order to learn about their operations beyond what is covered in the spreadsheet. Company contact information can be found on websites also.

Company Location. This location refers to the location of the companies' headquarters.

Year Founded. This is the date the company originated. Note that some companies were established prior to introducing carbon offsets or renewable energy certificates to their product line. Such cases will be noted in parenthesis.

Product Type (Product). This category specifies whether the company sells carbon offsets (CO), renewable energy certificates (RECs), green tags (GT), certified emission reductions (CERs), or voluntary emission reductions (VERs). Some companies provide other products or services (O), such as consulting services, renewable energy funds, or energy cooperatives.

Additionality (ADD). Since there are no standard evaluative criteria to assess additionality, this column specifies whether or not the company address additionality on their website. Please note that a blank cell in this category does not necessarily mean projects are not additional. It simply reflects companies' clarity in specifically addressing issues surrounding additionality. Some companies address issues of additionality (X), but do not necessarily specify whether its projects are 100% additional (A), business as usual (BU), or some combination of both (A,BU).

Companies may or may not evaluate and document additionality, or hire third party certifiers or other organizations to perform similar tasks (E/D, NE/D). Such factors provide valuable information to buyers interested in supporting projects that would not have happened without the sale of RECs or carbon offsets. Visit the company's website for a closer look of how each company addresses additionality or how they evaluate and document additionality.

Non-Profit/For Profit Status (Status). This column denotes whether the company is registered as a for profit (F) or for non-profit (N) company.

Project Type (Project). This column specifies the kind of projects the voluntary offsets support. Projects are categorized into six categories: biological sequestration (BS), energy efficiency (EE), forestry (F), methane capture (MC), renewable energy (RE), or other (O). Forestry projects include tree-planting schemes. Please note that most companies invest in more than one type of project.

Project Choice (Choice). This column indicates whether or not buyers can choose to support a specific available project with their purchase (Y/N). In some cases, project choice depends on various factors including renewable energy certificate and carbon offset availability, renewable energy production, and other factors (D).

Project Location (Location). The project location refers to the location of the existing projects the company supports. Statewide projects are noted by the state's abbreviation. Broadly defined project locations include international projects (I), domestic projects (US), projects in developing (D) and developed countries (DC). Other project locations (O) include categories such as developing communities or rural areas. Visit company websites to learn more about a company's projects.

Buyers (Buyers). This column specifies the type of consumers the company sells carbon offsets or RECs to. Buyer categories include businesses (B), individuals (I), government (G), events (E), offsets and RECs to qualify for LEED points (L), organizations (Or), travel offset purchasers (T), utilities (U), wholesales (W), and other (O). Please note that the majority of companies sell to more than one category of customers, and may sell to customers not listed if inquired.

Certification (Certification). This notes if the suppliers' offsets and/or RECs are certified by an independent third party, and if so, the name of the verification agency. Most notable certifiers include: Green-e (G), the Chicago Climate Exchange (CCX), Clean Development Mechanism (CDM), Community and Biodiversity Standards (CCB), the Climate Neutral Network (CNN), the Center for Resources Solutions (CRS), Environmental Resource Trust (ERT), Voluntary Carbon Standard (CS), and the Voluntary Gold Standard (GS). Some suppliers choose other organizations (O) in addition to or instead of notable agencies, or have an independent advisory committee (I) to assess the validity of its offerings. Other organizations may include statewide certifiers, such as the California Climate Action Registry, or less known organizations, such as EcoLogo. Some companies claim to sell certified carbon offsets or RECs, but do not note the specific organization involved in the certification process (C). The percentage of projects certified may also vary and is noted accordingly. For example, '100C' means 100% of a company's projects are certified, whereas '50C' means only 50% are certified. Some

companies do not specify the exact percentage of certified projects, except that not all of them are certified (N100C), or may not have any certified projects (NC). An entry such as 33C(G), 100C(CRS), CCX means 33% of its products are certified by Green-E, 100% of its offerings are certified by the Center for Resource Solutions, and are certified under the Chicago Climate Exchange. Visit a company's website to learn more about its certification process and requirements.

Double Counting (DC). Since there is no standard evaluative criteria to assess double counting, this column specifies whether or not the company address double counting on their website (X). Some companies assign products serial numbers (N), list them on a registry (R), audit products (A), or retire sold offsets (T). Please note that a blank cell in this category does not necessarily mean voluntary offsets and/or RECs are double counted. It simply reflects companies' clarity in specifically addressing issues surrounding double counting.

Price ($/Metric Ton CO_2) (Price). Unless otherwise noted, prices are listed in U.S. dollars in terms of dollars per metric ton of carbon dioxide equivalent offset. Companies offering both RECs and carbon offsets often price each differently. For instance, 10/MW(REC), 20/MT(CO) means the company sells its RECs for 10 dollars per megawatt, and its carbon offsets for 20 dollars per metric ton. Several companies price their products in terms of short tons (ST). Metric tons can be converted into short tons by multiplying metric tons by 1.10231131, the number of metric tons in a short ton. To compare metric tons to carbon dioxide equivalents, short tons are multiplied by the global warming potential (GWP) of the greenhouse gas offset. For instance, the GWP of carbon dioxide is one, and the GWP of methane is 23, so 2,500 metric tons of methane is equivalent to 63,382.94 short tons of CO2e.[lxxxii] Monthly fees are expressed in dollars per month ($/M), and companies offering volume discounts (V) are noted also. Please note that some companies offer flat rates (F) or other complex pricing schemes (O) that are not addressed in the spreadsheet. For more information on such pricing, please visit the relevant companies' websites.

Tufts Climate Initiative (TCI). The Tufts Climate Initiative compiled a report in December 2006, "Voluntary Offsets For Air-Travel Carbon Emissions: Evaluations and Recommendations of Voluntary Offset Companies," and evaluated various air-travel carbon emission offset providers. This column indicates their recommendation based on their research. Evaluated suppliers were either recommended (Y), recommended with reservations (R), or not recommended (N). Please note this column is not applicable to all suppliers, as only a selected number of companies were evaluated. For more information on the Tufts Climate Initiative, see the sources listed at the conclusion of the appendix.

Percent Toward Project (%). This attribute indicates the amount of revenue received from the sales of carbon offsets and RECs that is allocated to the projects. Some percentages vary (V) depending on overhead costs, type of project, or other factors. For more information about how companies spend their revenue, visit their websites or contact them directly. Please note that some companies will not disclose their specific spending on projects or profit margins (N/A).

What Buyer Receives (Receive). Most companies send purchasers a paper certificate (C) or electronic certificate (EC) to document their purchase or other memorabilia (M) such as

stickers or magnets. Some companies send purchasers welcome kits (K), newsletters (N), and other information (O). A few companies offer purchasers services (S) such as marketing, public relations, and support. This column identifies what purchasers can expect to receive with their purchase of carbon offsets or RECs from each company. Please note that some companies may provide customers with more or less depending on the nature of the purchase.

Notable Buyers. This column lists any large and well-known customers that the supplier has sold carbon offsets or RECs to.

Additional Notes

Information for each supplier is not uniform due to the lack of standards requiring suppliers to disclose certain information. As more regulation ensues, each supplier will provide more consistent data. Please also be aware that this spreadsheet has not been verified by an independent third-party and available data is subject to change.

Sources

In addition to the company websites, the following sources were used to assemble the spreadsheet:

2004. "Biodiesel Moves You Can Make Right Now," *GoodNewsIndia*, September 9. http://www.goodnewsindia.com/index.php/Supplement/article/bio-diesel-moves-you-can-make-right-now/P0/ viewed 12/10/07.

"3 Phases in the News." 3 Phases Energy Services. http://3phases.com/news/pdf/3_phases_in_the_news-1.pdf, viewed 12/10/07.

Aquila. 2005. "EPA Renewable Energy Goals Furthered; Aquila Green Credits Provided For Facilities In Kansas And Colorado. January 11, " http://phx.corporate-ir.net/phoenix.zhtml?c=78213&p=irol-newsArticle&ID=661639&highlight=, viewed 12/10/07.

Bowell, Benjamin and Anja Kollmuss. "Voluntary Offsets For Air-Travel Carbon Emissions: Evaluations and Recommendations of Voluntary Offset Companies." *Tufts Climate Initiative*, December 2006, http://www.tufts.edu/tie/tci/pdf/TCI_Carbon_Offsets_Paper_April-2-07.pdf, viewed 12/17/07.

See: EcoBusinessLinks, http://www.ecobusinesslinks.com/carbon_offset_wind_credits_carbon_reduction.htm, viewed 12/10/07.

Name	Product	ADD.	Status	Project	Choice	Location	Buyers	Certification	DC	Price	TCI	%	Receive
3C Climate Change Consulting	CO, O		F	EE, RE			B, G						
3 Degrees				RE						12.50/MWH			K, C, M, N, S, O
3 Phases Energy Services	CO, RECs	X	F	RE, EE, BS, MC, F	N	D, DC	B, I	G, GS, CCX, CCB, CDM, O	N	6-12		65%, V	K, M, C, N, S, O
Aquila	CO		N	RE	N	KS	W	G		F		V	
Action Carbone	CO		F	BS, EE, RE			B, I, Or						
AgCert / Driving Green	CO	E/D	F	RE, MC			B, I	C	N	8		N/A	C
Amerex Brokers, LLC	RECs		F										
AtmosClear Climate Club	CO, VERs			MC	N	IL	I, T	ERT		3.56-25.00			C, M, O
Atmosfair	CO		N	EE, BS, RE		I	B, I	CDM, GS		17	Y	80%	
Australian Carbon Traders	CO		F	BS			B, In, I, O						
Baseline Emissions Management Inc.	CO, RECs	E/D	F	RE, O		D, DC	B, In, O	O	R	10/MW(REC) 20/MT(CO)		N/A	
Basin Electric Power Cooperative	GT									5/GT			
Better World Club	CO		N	EE		US	I	N/A		11/ST	N	N/A	
Big Blue Carbon			F										
Bioclimate Research and Development	CO		N	BS, RE			B, I						

Biodiesel India	O			O	N	I		O					
Blue Source			F	BS, EE, RE, MC			B						
Bonneville Environmental Foundation	RECs, CO	X	N	RE	N	DC, OR, WY, WA, MT	B, I, T, E	100C, G, CNN	A	29		89%	C, M, O
BP Australia (Global Choice)	CO		F	EE, MC			B						
BP Energy Company	CO		N	RE, EE		I	T	I		6			M
c4c ltd (concepts for carbon)	CO		F	BS, RE			B						
Calpine Corporation													
C Level	CO		F	BS, RE, EE			B, I						
Carbon Aided		X		EE			B, I, G	CDM					
Carbon Counter	CO	X	N	RE, EE, O	N	OR, WA, I	B, T, I	O		12		92%	C, O
Carbon Bank USA			F	F	N	NC		NC		12		100%	EC
Carbon Clear	CO	X	F	BS, RE, EE, F	N	D, DC	B, I, T	N/A		14		V	C
Carbon Counter			N	RE, EE, BS		I, US		O		10/ST	R	90%	
Carbon Fund	CO		N	RE, EE, BS, F	Y	I, US	B, I, T, E	G, ERT, CCX, CCB, O		4.30-5.50	R	93%	C
Carbon Neutral	CO		N	BS			I						
The Carbon Neutral Company	CO	E/D	F	RE, EE, BS, F, MC, O	Y	I, US	B, I, T	100C, CS, GS, CDM, I	R	14-18	R	40-60%	C, M
Carbon Planet	CO		F	BS, EE, F		I	B					30%	O
Carbon Passport	CERs		F	RE, MC	N		I, T, B	CDM		36			
Carbon Footprint	CO			F, BS, RE, EE, O									

CarbonPositive	CO		F	BS, RE, EE			B, I, Or						
Carbon Solutions Group	O			RE		US	I, B, L, Or	G		N/A			S
CATapult - Carbon Asset Trading	O												
Centennial Energy Resources													
Certified Clean Car	CO		F	RE			B, I						
Choose Renewables	RECs			RE, MC				G		2.5-20/M			
CleanairPass	CO		F	RE, EE, BS		I, US	I	CCX		8	N	25%	
Clean and Green	CO		N	RE	N	I, US	B, I	G		0.11/MWH		35%	M
Cleaner and Greener	CO		N	RE, EE			B, I						
Clean Currents							L						
Clean Energy Partnership/Sterling Planet	GT			RE		I	B, I, Or, G, U, L	G, ERT		0.5-0.75/KWH		V	
Cleaner Climate	CERs		F	EE, RE	N	O	I, T, B	CDM, GS		15-18			EC
Clear	CO		F	O	N		T, I, B	CDM		37			
Clear Sky Power													
ClimatMundi	CO		F	RE, EE			B, I						
Climate Care	CO	E/D	F	RE, EE, BS		I	B, I	CNN, CS, GS	X	12.57, 7.50(CO)	R	60%	C
Climate Friendly	CO	X	F	RE	N	I, US	B, I, T	GS, O		16-19	Y	66%	
Climate Neutral Group	CO		F	BS, RE, EE			B, G, I						
Climate Positive	CO		N	BS			B, I						

Climate Save	CO		N	RE			B, I						
Climate Smart			F	BS, MC		CA	I, B			O		100%	
Climate Stewards	CO		N	BS			B, Or, I						
The Climate Trust	CO		N	RE, EE, BS, MC			B, I	N100C		10		92%	
Climate Wedge	CO		F	N/A			B, Or						
Climos	CO	A	F	O	N								
CO2 Balance	CO	X	F	RE, BS, EE			B, I						
CO2 Logic	CO		F	RE, O			B, I						
CO2 Solidaire	CO		N	RE, EE			B, I						
ComEd													
Community Energy, Inc.	CO, RECs	X	F	RE	N	DC, NE, NY, PA	B, I, W	N100C, G	X	0.02-0.025/KWH, 25/MWH, V		80%	C, M
Conservation Fund: Go Zero	CO		N	BS			B, I						
Conservation International	CO	E/D	N	BS, F		DC	B, I	NC	R, T	10		75%	C
Conservation Services Group						KS, NY				0.0165-0.0175/KWH			
Constellation NewEnergy		A, BU	F	RE	D	I	B	G		5-7		N/A	C
Consumers Energy								G		13.33/MWH			
coolAction.com Inc.	CO		F	RE			I						
DTE Green Currents				RE, MC				G		20/MWH, 20.35/MT			
Drive Neutral	CO	E/D	N	RE, EE, BS, F, O	N	D, DC	I, T	CCX, O	R	7.5		N/A	C
Driving Green	CO		F	RE, MC			B, I, T, E	O		6.93			
Easy Being Green	CO		F	EE			B, I						

e-BlueHorizons	CO	A	F	RE, F, BS, O	N	MA, NH	B, I, T, Or	CCX, ERT		5		N/A	C
The Edinburg Center for Carbon Management	CO	X	N	F, RE		I	Or, I, B			13			
Element Markets													
Elementree	CO		F	BS			B, I						
Empire District Electric Company													
Endless Energy Corporation				RE		ME, VT							
Environmental Resources Trust													
Environmental Transport Assoication	CO		F	EE, RE, BS			I						
EnviroTrade - Plan Vivo	CO		F	BS			I						
Exelon Power Team													
First Solar													
Futuro Forestal	CO		F	BS			In						
Future Climate Australia	CO		F	BS, MC			B, I, G						
Global Cool	CO		N	RE, EE	N		n/a	CDM		41.29			
GoCarbonFree.com												50%	
Greenfleet	CO	X	N	BS, F	N	I	B, I, G	NC		40/17 trees			
Green Mountain Energy Company	CO, RECs			RE, EE, BS, O		DC		50+C, G, CCX, O		10/MWH(REC)14/MT(CO)		.	C
GreenSeat			F	F, RE			T					75%	C
Grow a Forest	CO		N	BS, RE, F, O			I			9-20(TP)			
Hess Energy													

Horizon Wind Energy													
Invenergy	RECs			RE				G		23.94/MWH			
Juniper Consultancy Services Ltd													
Leonardo Academy	CO		N	EE			B, I, Or						
Maine Interfaith Power and Light/BEF	GT, CO	X	N	RE	Y	ME	A	G		20/REC		50%	EC
Mainstay Energy	O						L, G, Or			O			
Mass Energy Consumers Alliance	O		N	RE		US				0.05/KWH			
MidAmerican Energy				RE, MC		I, US							
myclimate-the Climate Protection Partnership	CO		N	EE, RE		I	B, I	GS		18	Y		
MyClimate	CO	E/D	N	RE, EE	Y	D, DC	T, E, B	GS, O	R	33-99		N/A	
MyClimate			N					CDM, GS		18		80%	
Native Energy	CO, RECs	E/D	F	RE, MC	Y	D, DC, SD, PA, MN, ND, VT, NY, AK	B, I, E, T	75+C, CNN, G, CCX, CDM, GS	A	12/ST, 10/MWH (RECs), 13.23/MT (CO), V	Y	N/A	C, M
Natsource/Dupont: BlueSource	CO		F	RE, O			I						
The Nature Conservancy	CO		N	BS			B, G						
NECO	CO		F	EE			I						
NoCarbons4U		A	F	F, RE	N	PA	A	NC		5		90%	EC, O
Offsetters	CO	E/D	N	RE, BS, EE		I	B, I	75+C	A	13.03-18	R	65%	C

Origin	CO		F	BS, EE, MC			B, I						
Orbitz							T						
Pacific Renewables				F, O				CDM, O					
Pembina Institute for Appropriate Development	CO		F	RE			B, I						
Planktos	CO	NE/D	F	BS, O		D, DC	I, T, E, B, G	O	R	F		N/A	C
Point Carbon													
PowerTree Carbon Company LLC	CO		F	BS			U, MO Member only						
PPM Energy				RE				G					
Premier Energy	RECs							G					C, M
PRIMAKLIMA - weltweir - e.V.	CO		N	BS			B, I, G						
PURE	CO		N	RE, EE			B, I						
Qvinta	RECs			MC									
Rainforest2Reef	CO		N	F						1			
Reforest the Tropics	CO		N	BS			B, I						
Renewable Choice Energy	REC	NE/D		RE		DC		100C, G	A	0.025/KWH, 20/MWH		N/A	C
Renewable Ventures	RECs			RE		CA		G		0.033/KWH			
Sempra Solutions	RECs												
Shell Trading								G					
SKY Energy, Inc	RECs		F	RE		US	B, I, Or	G		0.024/KWH, V		65-75%, V	O
Solar Electric Light Fund (SELF)	CO		N	RE	N	I	I	N/A		10	N		

Sterling Planet	CO, RECs, VERs			RE, EE, F, MC, BS		US	L, B, E, I, U, Or	G, CCX, CS, GS, ERT		0.015/KWH			
Stichting Face													
Standard Carbon	CO		F	RE, EE, MC, BS	N		E, T, O	CCX, O	N, A	15			
Strategic Energy				RE		US	B	N100C, G					
Sustainable Travel International	CO, RECs	E/D	N	RE, EE, BS	N	D, DC	T, I, B, E, G	100C, G, GS, O	X	20/MWH(REC)15.25-18/MT(CO), 11.50(F)			C
targetneutral	CO		N	RE, MC			I						
TFS Energy	RECs		F				G, B						
Terrapass	CO	A	F	RE, EE, MC	N	MN, US	B, I, T, E	33C(G), 100C(CRS), CCX		8.26-11	R	N/A	C, M
TheCompensators	CO		F	O			B, I						
TIST-International Small Group & Tree Planting Service	CO		F	BS			B, I						
Tree Canada	CO		N	BS			Or, I						
Treeflights.com			F	F	Y	I	T			£10		65%	EC, O
Trees for Cities	CO		N	BS			B, I						
Trees for Life													
Trees for Travel	CO		F	BS			B, I						
Treesmart	CO		F	BS			B, I						
Uncook the Planet	CO		F	EE	N		I, B, T	O		19			
VisionQuestWind													
Waverly Light and Power	GT			RE		IA				0.02/KWH			
WindCurrent	GT	X	F	RE	D	WV, MD	B, Or, G, I	G		0.025/KWH, V		V	C, M

The Woodland Trust	CO		N	BS			B						
World Land Trust	CO		N	BS			I						
Zero Carbon Footprint	CO		F	EE			I						

ENDNOTES

[i] RenewableEnergyAccess.com. 2007. "AeroVironment Installs Wind Turbines on Roof of Potato Chip Factory." October 29. http://www.renewableenergyaccess.com/rea/news/story?id=50403, viewed 12/16/07.
[ii] Ibid., RenewableEnergyAccess.com (2007).
[iii] See: www.dictionary.com, viewed 12/15/07.
[iv] Ellsworth, Amy. "What the Heck is a REC? And Why You Should Care." Conservation Magazine, Fall/Winter 2007, http://www.conservationcenter.org/assets/docs/WhatTheHeckIsAREC.pdf, viewed 12/16/07.
[v] See: Standard Carbon, http://standardcarbon.com, viewed 12/16/07.
[vi] See: Carbon Finance at the World Bank: Glossary of Terms, http://carbonfinance.org/Router.cfm?Page=Glossary, viewed 12/16/07.
[vii] Op. cite., Ellsworth (2007).
[viii] See: Green-e, green-e.org, viewed 12/13/07.
[ix] See: NativeEnergy, www.nativenergy.com, viewed 12/13/07.
[x] Op. cite., Standard Carbon (2007).
[xi] Rosner, Hillary. "Carbon Offsets: One Small Step for Man..." In LIME. Cited 13 July 2006. Available from http://www.lime.com/planet/story/3581/carbon_offsets_one_small_step_for_man, viewed 12/16/07.
[xii] See: Ann Arbor Energy, www.a2gov.org/energy, viewed 12/15/07.
[xiii] Bowell, Benjamin and Anja Kollmuss. 2006. "Voluntary Offsets For Air-Travel Carbon Emissions: Evaluations and Recommendations of Voluntary Offset Companies." *Tufts Climate Initiative*, December 2006, http://www.tufts.edu/tie/tci/pdf/TCI_Carbon_Offsets_Paper_April-2-07.pdf, viewed 12/17/07.
[xiv] Ibid., Bowell (2006).
[xv] Op. cite., Standard Carbon (2007).
[xvi] Op. cite., Carbon Finance at the World Bank: Glossary of Terms (2007).
[xvii] Taiyab, Nadaa. 2006. *Exploring the Market for Voluntary Carbon Offsets*. (International Institute for Environment and Development, London). www.iied.org/pubs/pdf/full/15502IIED.pdf, viewed 12/15/07.
[xviii] Ibid., Taiyab (2006).
[xix] Ibid., Taiyab (2006).
[xx] Holt, Ed and Meredith Wingate. 2004. "Design Guide for Renewable Energy Certificate Tracking Systems." February 12. www.nationalwind.org/publications/rec/rec_guide.pdf, viewed 12/16/07.
[xxi] Thomas, William L. "Growing Pains: The Voluntary Offset Market." *The Business Imperative: The Voluntary Offset Market.* http://www.carbon-business.com/pdfs/The%20voluntary%20offset%20market_summary.pdf, viewed 12/16/07.
[xxii] Op. cite., Taiyab (2006).
[xxiii] Ritchie, Ed. 2004. "Renewable Energy Credits: Free Money for DE Generators?" *Distributed Energy: The Journal for Onsite Power Solutions.* http://www.gradingandexcavation.com/de_0411_renewable.html, viewed 12/8/07.
[xxiv] Barcott, Bruce. 2007. "Green Tags: Making Sense of the REC-age." *World Watch*, July 1. http://goliath.ecnext.com/coms2/summary_0199-6722235_ITM, viewed 12/16/07.
[xxv] Op. cite., Thomas (2007).
[xxvi] Kenny, Alice. 2007. "Voluntary Carbon Offsets: Boon or Boondoggle?" *Ecosystem Marketplace,* October 24. www.greenbiz.com/news/reviews_third.cfm?NewID=34705, viewed 10/25/07.
[xxvii] Op. cite., Ritchie (2004).
[xxviii] Burt's Bees. 2007. *A Message from Burt's Bees for Earth Day 2007*, www.burtsbees.com/wcsstore/Bee2C/upload/pdf/Burt's%20Bees%20Earth%20Day%202007%20Message.pdf, viewed 12/16/07.
[xxix] Russell, John. "Are Emissions Offsets a Carbon Con?" *Ethical Corporation*, http://www.greenbiz.com/news/reviews_third.cfm?NewsID=34804, viewed 12/16/07.
[xxx] Op. cite., Taiyab (2006).
[xxxi] Elgin, Ben. 2007. "Little Green Lies." *BusinessWeek*, October 29. http://www.businessweek.com/print/magazine/content/07_44/b4056001.htm?chan=gl, viewed 12/16/07.
[xxxii] Ibid., Elgin (2007).
[xxxiii] *Guide to Purchasing Green Power*. September 2004. http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf, viewed 12/15/07.

[xxxiv] Gordon, Jacob. 2005. "Turin Winter Olympics to go Carbon Neutral." November 11. http://www.treehugger.com/files/2005/11/turin_winter_ol.php, viewed 12/15/07.
[xxxv] US Department of Energy: Energy Efficiency and Renewable Energy. 2007. *States with Renewable Portfolio Standards*. September 12. http://www.eere.energy.gov/states/maps/renewable_portfolio_states.cfm, viewed 1/21/08.
[xxxvi] Brix, Andrew. Interviewed by Mary Lemmer. 15 November 2007.
[xxxvii] Op. cite., Ritchie (2004).
[xxxviii] Op. cite., Taiyab (2006).
[xxxix] Ibid., Taiyab (2006).
[xl] Ibid., Taiyab (2006).
[xli] Op. cite., Brix (2007).
[xlii] Op. cite., *Guide to Purchasing Green Power* (2004).
[xliii] Op. cite., Thomas (2007).
[xliv] Schilling, John. Interviewed by Mary Lemmer. 20 November 2007.
[xlv] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[xlvi] Op. cite., *Guide to Purchasing Green Power* (2004).
[xlvii] Op. cite., Green-e (2007).
[xlviii] Ibid., Green-e (2007).
[xlix] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[l] Op. cite., Ritchie (2004).
[li] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lii] CCBA. 2005. Climate, Community and Biodiversity Project Design Standards (First Edition). CCBA, Washington DC. May 2005. At: www.climate-standards.org, viewed 12/16/07.
[liii] See: Environmental Resource Trust, www.ert.net, viewed 12/13/07.
[liv] See: Center for Resource Solutions, www.resource-solutions.org, viewed 12/15/07.
[lv] Climatebiz.com. 2007. "New Carbon Standard Brings Integrity and Transparency to Carbon Offsets." November 20. http://www.greenbiz.com/news/news_third.cfm?NewsID=36288, viewed 12/16/07.
[lvi] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lvii] Op. cite., Green-e (2007).
[lviii] Ibid., Green-e (2007).
[lix] Ibid., Green-e (2007).
[lx] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lxi] Ibid., Bowell, Benjamin and Anja Kollmuss (2006).
[lxii] Gies, Erica. 2006. "On Your Mark, Offset, Go!" *Grist Magazine*, October 10. http://www.grist.org/news/maindish/2006/10/10/gies/index.html?source=friend, viewed 12/16/07.
[lxiii] Op. cite., Taiyab (2006).
[lxiv] Op. cite., Green-e (2007).
[lxv] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lxvi] Ibid., Bowell, Benjamin and Anja Kollmuss (2006).
[lxvii] 2007. "UK Carbon Offset Retail Market: Truths and Lies." January 1. http://carbonsms.com/uk-carbon-offset-retail-market-truths-and-lies, viewed 12/16/07.
[lxviii] Op. cite., *Guide to Purchasing Green Power* (2004).
[lxix] Op. cite., Taiyab (2006).
[lxx] Ibid., Taiyab (2006).
[lxxi] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lxxii] Ibid., Bowell, Benjamin and Anja Kollmuss (2006).
[lxxiii] Dinshaw, Ayesha. Interviewed by Mary Lemmer. 17 January 2008.
[lxxiv] Op. cite., Bowell, Benjamin and Anja Kollmuss (2006).
[lxxv] Op. cite., Dinshaw (2008).
[lxxvi] Op. cite., Taiyab (2006).
[lxxvii] Ibid., Taiyab (2006).
[lxxviii] Leahy, Alden and Patrick Hathaway. 2004. "Renewable Energy Certiicates and Air Emissions Benefits: Developing an Appropriate Definition for a REC." *Environmental Resources Trust*, April 2004. www.eere.energy.gov/greenpower/resources/pdfs/0404_ert_rec_position.pdf, viewed 12/16/07.
[lxxix] Op. cite., Ritchie (2004).

[lxxx] Op. cite., Kenny (2007).
[lxxxi] Op. cite., Elgin (2007).
[lxxxii] See: The Climate Trust: 2007 RFP Conversion Metrics, http://www.climatetrust.org/solicitations_2007_Metrics.php, viewed 1/21/08.