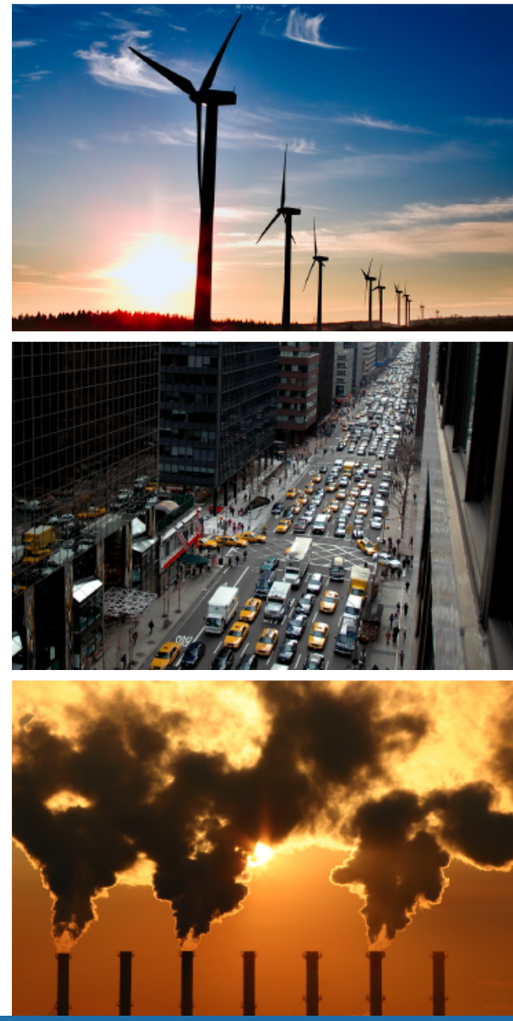
Going Carbon Neutral

How the Retail Carbon Offsets Market Can Further Global Warming Mitigation Goals



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1,978.58 lbs atmospheric emissions eliminated
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Savings derived from using windpower:

279.65 lbs air emissions (C02, SO2 and NOX) not generated

This amount of wind energy is equivalent to:

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not traveling **311.99 miles** in an average automobile

Environmental benefits determined by Mohawk Paper Environmental Savings Calculator

Going Carbon Neutral: How the Retail Carbon Offsets Market Can Further Global Warming Mitigation Goals

by Mark C. Trexler, Laura H. Kosloff, Kyle Silon[1]

In 1992, two environmentally minded entrepreneurs developed and circulated a business plan to establish a company that would bundle carbon offsets with consumer items to make consumer purchases "green," tapping into what was perceived to be a rapidly growing market segment.[2] The business plan was premature, and the company did not get far off the ground. However, the foundation was laid for what has since become a long line of efforts to encourage individuals and companies to go partially or entirely "carbon neutral."[3]

Today, an increasing number of organizations offer to help consumers and businesses calculate their climate change footprint—often through user-friendly on-line calculators—and to sell them offsets, or greenhouse gas (GHG) emissions reductions, to neutralize that footprint.[4] More and more products and services also are being sold with these carbon offsets built in, although relatively few are characterized as entirely carbon neutral.

With global emissions currently exceeding 25 billion tons of CO_2 per year and likely to double by 2100 [5], we need to make significant changes in the global emissions trajectory to avoid "dangerous anthropogenic interference" with the climate system.[6] Retail carbon offsets markets, which rely on voluntary consumer action, are not likely to substantially reduce global GHG emissions by themselves. But these markets may significantly encourage corporate action and promote long-term public policy on climate change—which could, in turn, begin to address climate change. The environmental integrity of the retail offsets market is crucial to the achievement of any of these objectives. If consumers conclude that retail offsets don't truly advance climate change mitigation objectives, it would undercut a functioning voluntary offsets market.

The goal of this article is to illustrate what needs to happen in the market to assure consumers that they are receiving a quality product, and thus build a secure and larger market. Based on these premises, this paper profiles the retail carbon offsets market and explores key technical challenges facing the market. We then pose several questions in order to examine the extent to which the retail carbon offsets market contributes to climate change mitigation objectives[7]:

- *Is there a successful business model that demonstrates consumers are willing to pay for products and services that provide climate change mitigation benefits?* A successful business model could lead GHG emitters to pay more attention to their climate change footprints and to strive for significant emissions reductions to make their products more attractive to consumers. What starts as a small retail offsets market could,

in principle, leverage larger corporate emissions reductions as companies integrate corporate and/or product carbon neutrality into their branding and marketing efforts.

- *Does the retail offsets market educate the public about climate change, and thus contribute to policy development?* It is reasonable to assume that people's willingness to pay for offsets is, in large part, a function of their concern about the environmental threat that global warming poses. Thus, purveyors of offsets have an interest in educating consumers about climate change. In turn, a better-educated public can influence long-term climate change policy at the national and international levels. Again, a modestly sized retail offsets market could, in principle, leverage larger policy outcomes.

- *What do purveyors of carbon neutrality sell when they offer to offset consumers' climate footprints or individual products and services, and is the environmental integrity of the market being protected?* In the absence of standards, what are consumers and companies actually purchasing when they're promised carbon neutrality? Are consumers able to differentiate between "good" and "bad" retail offsets?

We will discuss these questions and ask what makes a "good" carbon offset for purposes of carbon neutral products and services. This paper also suggests ways in which the retail offsets market could become more effective by advancing consumer willingness to pay, public education, and standards for environmental integrity of offsets.

Profiling the Retail Offsets Market

The retail offsets market addressed in this paper differs from the regulatory offset market developing as a result of domestic and international emissions reduction mandates like the Kyoto Protocol. It also differs from the voluntary corporate offset market in which companies purchase offsets as part of voluntary emissions reduction commitments. For this paper, "retail offsets" are defined as offsets sold on the basis of rendering individuals, households, corporations or events carbon neutral, or to otherwise directly influence consumer purchasing decisions by portraying specific products and services as carbon neutral.

The idea of helping consumers offset their GHG emissions has expanded significantly in the past decade. Terms such as "Climate Neutral™," "carbon neutral," "climate friendly," "footprint neutral," "Climate Cool™," and other terms are now widely used.

A growing number of companies and websites offer retail offsets as a means of rendering consumers or products and services partially or entirely carbon neutral (see Box 1).[8] These and other websites encourage consumers and companies to offset their entire personal or small-business climate change footprints, or to offset specific activities (e.g., airline flights, conferences, or other events). Based on an average figure of $10/ton, consumers would pay $10 to offset a typical cross-country airline trip, $60 to offset annual emissions from a typical car, and $120 to offset annual energy-based emissions for a typical U.S. household. To help consumers better understand how many offsets they might need, GHG calculators have proliferated as well (see Box 2).

Many event organizers now announce that their conferences, concerts, and other events are entirely or partially carbon neutral. The Salt Lake City 2002 Winter Olympics received certification by the Climate Neutral Network as Climate Cool™, as did the Dave Matthews Band, a rock band, for its 2002 tour.[9] The 2006 NFL Super Bowl[10] and the 2006 FIFA World Cup[11] committed to being carbon neutral. Even movie productions have jumped on the carbon-friendly bandwagon, with the 2004 global warming disaster movie "The Day After Tomorrow" announcing that tree planting and energy efficiency loans were used to offset the CO_2 emitted during the film's production.[12]

Box 1: Companies and Organizations Offering Carbon Neutrality

AgCert/Driving Green	Dublin, Ireland	www.agcert.ie
American Forests	Washington, DC, USA	www.americanforests.org
AtmosClear	Massachusetts, USA	www.atmosclear.org
Atmosfair	Bonn, Germany	www.atmosfair.de
Bonneville Environmental Foundation	Oregon, USA	www.b-e-f.org
Carbon Clear	Richmond, UK	www.carbon-clear.com
Carbonfund.org	Maryland, USA	www.carbonfund.org
The CarbonNeutral Company	London, UK	www.carbonneutral.com
Carbon Planet	Adelaide, Australia	www.carbonplanet.com
Certified Clean Car/PVUSA solar	California, USA	www.certifiedcleancar.com
Climate Care	Oxford, UK	www.climatecare.org
Climate Friendly	Sydney, Australia	www.climatefriendly.com
ClimateNeutral Group	Arnhem, Netherlands	www.businessforclimate.nl
ClimateSAVE	Massachusetts, USA	www.climatesave.com
Climate Trust /Mercy Trust /Mercy Corp	Oregon, USA	www.climatetrust.org
CO2 Balance	Taunton, UK	www.co2balance.com
Conservation Fund: Go Zero	Virginia, USA	www.conservationfund.org
Drive Neutral	California, USA	www.driveneutral.com
e-BlueHorizons	Massachusetts, USA	www.e-bluehorizons.com
Envirotrade	London, UK	www.envirotrade.co.uk
Green Fleet	Koonwarra, Australia	www.greenfleet.com.au
Leonardo Academy	Wisconsin, USA	www.leonardoacademy.org
Men of the Trees/Carbon Neutral Program	Guildford, Australia	www.menofthetrees.com.au
*Native*Energy	Vermont, USA	www.nativeenergy.com
Natsource/Dupont & BlueSource	New York, USA	www.natsource.com
Offsetters	Vancouver, BC, Canada	www.offsetters.ca
SELF - Solar Electric Light Fund	Washington, DC, USA	www.self.org
Sustainable Travel Int'l/My Climate/500ppm	Colorado, USA	www.sustainabletravelinternational.org
Target Neutral/BP	London, UK	www.targetneutral.com
TerraPass	California, USA	www.terrapass.com
TIST – Int'l Small Group & Tree Planting Service	Oklahoma, USA	www.tist.org

Government-sponsored meetings and related events are following this trend. The 2004 Democratic National Convention organizers reported that offsets were used to render the meeting carbon neutral.[13] The G8 has pursued offsets for all meetings during the UK's presidency of that group.[14] And appropriately, the last Conference of the Parties to the Climate Convention and the Kyoto Protocol was declared carbon neutral.[15]

Some companies have packaged carbon offsets with products and services, either as an element of corporate environmental branding or with the specific intent of influencing consumers' buying decisions. In Australia, BP's Global Choice™ program bundles offsets into its premium gasoline product.[16] Interface has a Cool Carpet™ line, for which all GHG emissions have been offset.[17] The Better World Club offers customers its Travel Cool program, with packaged offsets to compensate for carbon emissions generated by air travel.[18]

Box 2: Carbon Calculators on the Web

AtmosClear	www.atmosclear.org/calculator_tran.php
Atmosfair	www.atmosfair.de
Bonneville Environmental Foundation	www.greentagsusa.org/GreenTags/calculator_intro.cfm
Carbonfund.org	http://carbonfund.org/site/pages/calculator
The CarbonNeutral Company	www.carbonneutral.com/calculators/index_shop_calculator.asp
Certified Clean Car	www.certifiedcleancar.com/menu/cleannow/foryou/index.htm
Climate Care	www.climatecare.org/living/calculator_info/index.cfm
Climate Friendly	www.climatefriendly.com/calc.php
Climate Neutral Group	www.climateneutralgroup.com/site/calculator/232.html?clienttype=cons
Climate Trust / Mercy Trust / Mercy Corp	www.carboncounter.org
Drive Neutral	http://driveneutral.com/calculator.php
Men of the Trees	www.carbonneutral.com.au/default.aspx
*Native*Energy	www.nativeenergy.com/carbon_calculator_both.htm
Offsetters	www.offsetters.ca/calculators_flights.htm
Sustainable Travel Int'l/MyClimate	www.sustainabletravelinternational.org/documents/op_carbonoffsets_busadv.html
Target Neutral/ BP	www.targetneutral.com/TONIC/carbon.do?method=init
TerraPass	www.terrapass.com/road/carboncalc.php
Tree Canada	www.treecanada.ca/cleanairpass/index.htm
World Land Trust	www.carbonbalanced.org/personal/pcboffset.htm

Describing the retail offsets market that encompasses these widely ranging activities is not easy. The dozens of organizations involved often provide extremely disparate marketing and consumer messages. No one knows how many offsets have been purchased, donated, or otherwise placed through the retail offsets market. And retail offsets marketers generally provide little information about where the money is being spent or what criteria are used to select the reductions.

Prices of retail offsets vary widely. Carbon neutral websites sell offsets that range from $5 to $25[19] per ton, averaging about $10/ton in their offerings. Price competition in the retail offsets market is starting to appear, with some suppliers advertising that their offsets cost less than their competitors. Price variety and competition might appear to be a good thing both for consumers and for market expansion; as we explore later, however, low offset prices can be a double-edged sword from the standpoint of environmental integrity.

Moreover, companies purchasing offsets to bundle with products and services can spend quite a bit less per ton than consumers do at retail websites, since they can purchase offsets directly from projects and sellers. A significant fraction of offsets used in the retail offsets market, particularly in rendering events carbon neutral, have been donated rather than purchased. This situation complicates attempts to characterize the retail offsets market in general terms.

Finally, a review of offset sources available in the retail market and of offset claims associated with products and events indicates that no common practices exist regarding how the retail offsets business is conducted. Companies take a variety of approaches to describe their retail offsets approach and explain how money from offset purchases will be spent:

- Some say they are funding specific offsets projects, but do not explain the criteria they use to select projects.
- Some specify the funded sectors (e.g., renewable energy or energy efficiency), but do not specify project selection criteria or list specific projects.
- Some convert other commodities (such as renewable energy credits) into a CO_2 equivalent and sell them as offsets.
- Some have reductions "certified" by oversight groups such as the Climate Neutral Network or the World Wildlife Fund.[20]
- Some have projects validated or verified by third parties groups such as Det Norske Veritas (DNV), although in the absence of standards, the meaning of "verification" can vary.
- Some point to the intermediary source of the credits (e.g., the Chicago Climate Exchange) as evidence of their validity, usually without further explaining the criteria and process behind the creation of the offsets.
- Some say they purchase formally recognized credits, such as Certified Emissions Reductions (CERs) under the Kyoto Protocol.

Perceptions of the Carbon Neutral Market

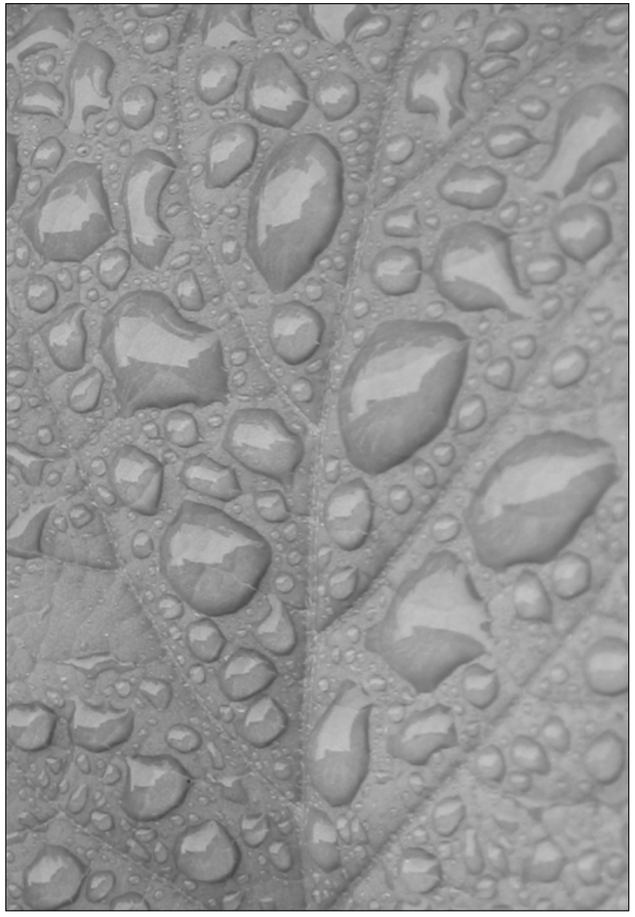
The carbon neutral market has benefited from overwhelmingly positive media attention during the last several years. Dozens of newspaper articles have offered up carbon neutrality as a way for consumers to feel better about the pollution they cause.[21] But there have been exceptions. In 2004, environmentalists charged the UK-based CarbonNeutral Company and Climate Care with false advertising, claiming that the firms' advertisements were misleading since they did not acknowledge the scientific controversy surrounding the capacity of tree-planting and other projects to offset carbon emissions.[22] The complaint against the CarbonNeutral Company was dismissed on a technicality, and the Advertising Standards Authority ultimately sided with Climate Care, concluding that "because Climate Care had shown that, so far as it was possible to measure CO_2 offsets, they were on course to achieve the offsets bought by the Phone Co-op, they had justified the claim 'for every £10 you spend on calls we will offset 100kg of CO_2.'"[23]

Many environmentalists, however, are suspicious of retail offsets—indeed, of offsets in general—as a means of mitigating global warming.[24] For whatever reason, this suspicion has not fueled much press coverage, partially, perhaps, because it is easy to present the subject as a "good news" story. But there is no guarantee that press coverage will continue to be so favorable, particularly as the perceived significance of the retail offsets market increases.

Key Challenges in Carbon Neutrality Programs

Experience with the retail offsets market during the last decade points to two fundamental challenges to success: 1) defining criteria and identifying emission reduction projects that are sufficiently "additional" (in other words, projects that would not have happened anyway); and 2) financing offset projects for the retail offsets market in the face of consumers' unwillingness to make multi-year project funding commitments. These two challenges lie at the heart of being able to deliver the environmental benefits advertised by purveyors of carbon neutrality in the retail offsets market.

Finding offsets that successfully satisfy these two conditions is difficult. It would be easier if purchasers were willing to pay top dollar for offsets—say, $30/ton of offset CO_2, or 30 cents per gallon of gasoline. Currently, consumers pay $5-10/ton or less. At this level, it is much more challenging to deliver offsets to the retail offsets market that can overcome the two barriers introduced above. The reasons for this are further explored below.



Challenge #1: Ensuring the additionality of retail offsets

Retail offset sellers generally tell consumers that their offset purchase will offset or neutralize the GHG emissions of a particular activity or product for a given period of time. For this to be true, the offsets need to represent reductions that are "additional" to what would have happened in the absence of the retail offsets market. For example, if the offset funding is used to pay for the collection and destruction of methane from a landfill, this could result in emission reductions relative to a "no collection" baseline. If, in the absence of the offset program, the collection and destruction of methane would have happened anyway (perhaps because it is required by law or is standard business practice), then the offset funding is not resulting in new environmental benefit. If that's the case, the reductions in question simply aren't able to render an individual (or anything else) carbon neutral. For the retail offsets market to live up to its purpose, namely the sale of carbon neutrality in one form or another, the offsets need to be "additional."

The concept of additionality is relatively easy to understand, but it has proven vexingly difficult to translate into practice.[25] Defining additionality standards has frustrated project-based emissions trading efforts for years. The Kyoto Protocol's Clean Development Mechanism (CDM)[26] continues to be mired in controversy about how to establish the additionality of projects that will be allowed to generate Carbon Emission Reductions (CERs) for the CDM.

What is there about differentiating between "additional" and "non-additional"[27] projects that has troubled offset-based emissions trading efforts for so many years?[28] For offset purposes, the determination of additionality boils down to what has driven the undertaking of a project with asserted GHG benefits. There are many potential reasons for implementing projects that may reduce GHG emissions. For the retail offsets market, the question is whether the existence of the market, and the associated value attributed to emissions reductions, is a primary motivation (although not necessarily the only motivation) for pursuing a project that leads to such reductions. The question boils down to a thought experiment: holding everything else constant, would a project have happened in the absence of the retail offsets market? If it would have happened anyway, then the project is not "additional"; if it wouldn't, then the project is "additional."

Unfortunately, this question has no definitive answer. Even if we could read the minds of project developers, they themselves may not know what they would have done under different circumstances. We are forced to seek a second-best solution—namely, designing questions that are answerable. For additionality, these questions have taken the form of what are generally called "additionality tests."

The evaluation of additionality can become highly subjective, and requires assumptions about the conditions under which a project was developed. Even with the best of efforts to screen out non-additional projects, no additionality standard can be perfect. There will always be an error rate: some non-additional credits (false positives) will be allowed into the market and some credits that actually are "additional" (false negatives) will be excluded from the market.[29]

> "Even with the best of efforts to screen out non-additional projects, no additionality standard can be perfect."

These complications lead some observers to argue that we should forget about additionality altogether and just focus on funding "good" projects. However, recognizing that many "good" projects are pursued for reasons having little to do with climate change, this would effectively turn purchasing carbon neutrality or carbon neutral products and services into a philanthropic activity, rather than a mitigation activity. Offsets would be funded primarily on their public relations appeal, rather than their delivery of real reductions. Promises of carbon neutrality would be misleading at best.

In this context, the challenge facing the retail offsets market can clearly be seen. The supply of potential emissions reductions is very large; however, the demand for retail offsets currently is quite small. Even a small percentage of the very large pool of non-additional reductions available to the market could supply most of the demand in the retail offsets market. And since retail offsets market sellers do not necessarily apply a rigorous approach to additionality, the proportion of false positives in the market could be very large.

"Additional" offsets will generally be more expensive than non-additional offsets; thus, there is a significant incentive to bring non-additional tons into the offsets market. This leads into the next challenge facing the development of high-quality offset projects for the retail offsets market: namely, the characteristics of consumers' purchasing decisions.

Challenge #2: Matching "additional" offsets with buyers' willingness to pay

Assuming that "additional" emissions reductions projects can be identified, can they be delivered to the market within consumers' willingness to pay? For the retail offsets market, getting a functioning market up and running has been a stumbling block, since it requires a minimum volume of projects and credits to prime the

pump for the market. Project developers are reluctant to pursue truly "additional" GHG offset projects if they have no guarantee of selling the offsets. Conversely, companies looking to buy offsets would like to know that those offsets are "additional," but they do not want to wait for new projects to get started and usually cannot fund a project's entire costs. To understand what the market is up against, consider these two characteristics of the voluntary retail market:

- *Carbon neutrality is usually sold on a year-to-year basis.* This cautionary approach makes sense, given the nature of consumer purchasing. There is no guarantee that any given offset purchaser will continue to purchase offsets into the future, and few consumers are willing to purchase carbon neutrality for multiple years up front.

- *Offset projects generally result in a stream of emissions reductions over a project's life (typically 10 or more years).* This multi-year credit stream usually makes an "additional" project's reductions cost-effective. If a project's entire cost had to be covered by just the first year of offset revenues, those offsets usually look very expensive to the consumer.

As a result, finding cost-effective quality offsets on a year-to-year basis is challenging at best, and buyers face a distinct incentive to accept fewer "additional"—and hence lower quality—offsets, since non-additional offsets are easy to make available year-to-year and at a low cost.

One reaction to the buyer's dilemma created by these characteristics of the offsets market has been to rely upon donated offsets. Particularly in the case of carbon neutral events like conferences, sports competitions, and political events, cash-strapped organizers have appealed to corporations and others to donate offsets for their use. Such donations have been subject to little or no quality review, creating significant questions about their environmental integrity. Although counter-examples exist (see Box 3), even those examples help illustrate the challenges of pursuing a high-transaction cost approach to the task.

Box 3: Positive Examples of Carbon Neutral Event Planning

When the William J. Clinton Foundation launched the Clinton Global Initiative (CGI), the foundation committed to making its 2005 inaugural meeting carbon neutral. Organizers estimated that the event would result in emissions of some 4,000 tons of CO_2. Instead of relying on donated offsets, organizers raised $50,000 to purchase offsets from suppliers Native Energy and the Solar Electric Light Fund. Baker & McKenzie, a leading law firm in the field, negotiated the purchase and worked with third party auditors to verify the reductions, which occurred through a combination of a new 65kW wind turbine and solar rural electrification efforts in Nigeria.

The 2006 FIFA World Cup, with its Green Goal™ initiative, was the first "carbon neutral" World Cup. Organizers intended to offset an estimated 100,000 tons of CO_2, and reportedly set aside $600,000 to purchase an initial 30,000 tons of CO_2 offsets that would comply with the Gold Standard, a World Wildlife Fund standard tailored for the voluntary market. FIFA organizers engaged the Öko-Institut in Germany to conduct an RFP for potential projects. The process encountered a number of challenges given the complexity of the CDM process for project validation and approval.

The affirmative efforts of the CGI to achieve carbon neutrality at its inaugural meeting and organizers' efforts towards a carbon neutral World Cup demonstrate that event organizers can do more than solicit donated offsets. The enlistment of independent and reputable third parties to support the offset transactions is also an excellent step. At the same time, it is clear that transaction costs are significant.

Another reaction to this dilemma, discussed further below, is to front-load the reductions from a project, letting most or all of a project's reductions to be counted and sold up front. Many observers frown upon the sale of offsets before the reductions have occurred, arguing that it raises the risk that the offsets won't actually occur and largely eliminates the incentive to monitor and verify offset performance. However, we see it as environmentally preferable to fund a project that is expected to result in truly "additional" emissions reductions—even if there is a risk of non-delivery—rather than purchase existing reductions that aren't "additional."

Assessing the Current Retail Offsets Market

Having established the context within which the retail offsets market operates and why observers have legitimate cause to worry about the market's environmental integrity, this paper returns to the questions posed earlier to examine how the current retail offsets market performs against the objectives of climate change mitigation.

Has the business model behind the retail offsets market been successfully demonstrated?

A central premise of the retail offsets market is that consumers are willing to pay more for climate-friendly products and services, or at the very least are willing to change their buying behavior to favor these products and services. For consumers who purchase retail offsets for airline trips or household emissions directly, willingness to pay is not really in question. However, direct purchase is just one element of the retail offsets market. The sale of carbon neutral products and services has the potential to be a much larger market.

But the market needs to provide better information before it can expand. Relatively little information is available regarding the retail offsets market, the volume of reductions in the market, and the composition of that volume by project type or quality. Even less information is available regarding the business success of companies involved in the market, whether as aggregators and sellers of offsets, as purveyors of products and services with bundled offsets, or as companies using offsets as part of environmental branding efforts or in an effort to sway consumer purchasing decisions. The experiences of several companies provide examples of these different approaches:

- In 1996, Stonyfield Farm was one of the first companies to become carbon neutral. Stonyfield continues to implement a carbon neutral commitment and views its environmental branding strategy as an essential element of its business success.[30]

- In 2001, AES Power Direct, an early independent provider of electricity to the retail market and a subsidiary of AES Corp., created Clear Blue, a retail electricity product that bundled SOx, NOx, and CO_2 offsets to create an emissions-neutral electricity product. AES hoped to use Clear Blue as a branding tool, establishing itself as the environmentally preferred provider in the retail electricity market (providing an alternative to green energy at significantly lower cost). Unfortunately, AES Power Direct collapsed (along with much of the retail electricity market) before gaining adequate market experience with Clear Blue.

- In the late 1990s, the launch of the Climate Neutral Network allowed companies, products and services to be certified as Climate Neutral™ (later Climate Cool™).[31] Several companies have gone through the certification process, including Shaklee Corp. (the first Climate Neutral™ enterprise), Interface (with its Cool Carpet™ recycled carpet line), and Saunders Hotel Group (which has Climate Neutral™ accommodations at several of its hotels). Through Interface's program, consumers can offset the CO_2 emissions associated with their carpet purchase. Since 2002, Interface has purchased more than 190,000 tons of offsets for its Cool

Carpet™ program, 3,500 tons of offsets for its Cool Fuel™ gas card for Interface employees, and 24,000 tons for its Cool Commute™ program.[32]

- The CarbonNeutral Company (previously Future Forests)[33] offers to make companies CarbonNeutral® through forestry and other offsets. The company has worked in 80 forests in the United Kingdom, Mexico, India, Germany, and Canada.[34] Company officials say the company has offset more than 750,000 tons of CO_2 equivalent since 1997.[35]

"It is not possible to say with any confidence that the retail offsets market has proved consumers' willingness to pay for climate-friendly products and services."

- Climate Care[36] offers retail-level offsets for individuals, events, and air travel. Its 2005 annual report states that Climate Care sold 99,000 tons of CO_2 offsets to the retail market, more than doubling its 2004 total of 48,000.[37]

- British Petroleum's Global Choice™ gasoline product in Australia is commonly referred to as a leading example of a carbon neutral product. Consumers specify the percentage of reductions they want to offset and receive a bill for the offsets at the end of each month based on the amount of gasoline purchased. BP, which co-funds the offsets program, says it has sold millions of gallons of Global Choice™ gasoline and funded more than 1.6 million tons of offsets through projects including reforestation, landfill gas, and renewable energy. BP has also recently launched a Target Neutral program in the UK, urging drivers to purchase GHG offsets for their vehicles through its **www.targetneutral.com** website.

Consumers' willingness to pay for offsets bundled into carbon neutral products and services—or at least consumers' willingness to purchase those products and services based on the bundled offsets—is crucial to the business model underlying this aspect of the retail offsets market. There is some anecdotal evidence of consumer willingness to pay: BP's Global Choice™ gasoline may be the best example. But even anecdotal evidence is scarce. As a result, it is not possible to say with any confidence that the retail offsets market has proved consumers' willingness to pay for climate-friendly products and services.

Are retail offset providers educating the public about climate change?

Educating the public about climate change presents an important opportunity to leverage the benefits of the retail offsets market. Unlike the regulatory market, in which offsets become a cost of environmental compliance, the retail offsets market requires direct communication with the public. Indeed, without an educated public it seems unlikely the market for retail offsets will grow significantly.[38] With an educated public, however, the prospects for effective climate change policy also increase.

A review of the websites of the offset providers listed in Box 1 reveals a good deal of information related to climate change and how individuals can reduce their personal impact by purchasing offsets. However, the reach of this information is generally limited to consumers visiting the websites; these consumers are already knowledgeable about the issue, or at least about the existence of websites selling offsets.

A greater educational role can be played by event organizers as well as environmentally conscious companies that have purchased offsets themselves, or which offer carbon neutral products and services to consumers. These organizers and companies have the opportunity to educate larger segments of the public that may be relatively uninformed about climate change. Unfortunately, there is no systematic information available regarding how carbon neutral event organizers and companies participating in the retail offsets market educate consumers and, as a result, how they advance public education and ultimately public policy objectives.

Several examples show the variety of approaches in consumer education:

"A greater educational role can be played by event organizers as well as environmentally conscious companies."

- Patagonia supports the Stop Global Warming virtual march on Washington, D.C.,[39] and encourages its customers to take action to reduce global warming. Patagonia's website has several articles from Patagonia's catalog with extensive information on living an "eco-friendly" life. The website offers limited information on the effects of climate change and provides individuals with links to other sites to find out what steps they can take.

- The personal care products company Aveda has committed to initiating consumer campaigns aimed at reducing global warming, although the company's website does not make clear what this entails.[40] The site provides a great deal of information related to the impacts of climate change,[41] as well as what individuals can do to contribute to mitigation efforts.[42]

- Clif Bar notes it offsets all carbon emissions related to its operations by supporting the development of new wind farms through Native Energy.[43] Its website encourages customers to do the same through the purchase of Cool Tags™. The website offers a small amount of information on global warming[44] and what consumers can do to live a more "sustainable" lifestyle.[45]

- Le Ski asserts that it is the first ski operator to offset the emissions from all of its clients' flights.[46] The company's website, however, does not provide any information about climate change or specifics of company offset activities.

- Avis Group's European operation asserts that it offsets all operational CO_2 emissions and offers offsets to customers for its rental cars.[47] The website, however, does not contain information on climate change or suggest other actions an individual can take.

With respect to carbon neutral events, the situation is not much better. Although more and more events are being characterized as carbon neutral, most participants at such events are probably unaware of the claim, nor are they asked to support it in any explicit way. These events miss an important opportunity to educate large numbers of people, an opportunity that has arguably more long-term environmental importance than the offsets themselves.

No common standard exists for the conveyance of climate change content through the retail offsets market. Many players in the retail offsets market don't mention their climate change mitigation efforts at all. Dozens of Climate Care's corporate clients, for example, sport the Climate Care logo on their websites, but provide no other information about climate change. Some companies do provide information to consumers, but it can

be as fundamentally misleading as it is helpful. Some specific examples of statements at retail offset sites include:

- "Good News: you can help slow global warming. More than any other environmental challenge, people and businesses have the ability to easily take steps that make a real and immediate difference."[48]

- "It is important to note that by purchasing the credits on your behalf, TerraPass prevents another company from purchasing this credit and consequently forces them to reduce their emissions."[49]

Such assertions mischaracterize the role of voluntary retail carbon offsets in promoting climate change mitigation. The retail offsets market has (at best!) a marginal ability to make a real and immediate difference in climate change. And in a voluntary market (as opposed to the regulated U.S. market for sulfur dioxide credits), purchasing credits has no effect in forcing other companies to reduce their emissions.

Overall, the educational role played by the retail carbon offsets market appears limited. The retail offsets market needs to undertake a fundamental change in how it approaches the issue of consumer and corporate education about the problem of climate change and climate change mitigation, if its educational potential is to be achieved.

> "With no accepted standard, any company can announce that it is carbon neutral."

What do purveyors of carbon neutrality really sell?

The non-standardized nature of the retail offsets market often results in relatively little available information about either the nature of offsets sold to consumers, or what companies are doing when they use retail offsets in branding. Particularly in light of our previous discussion of additionality, what is really being sold when you purchase carbon neutrality, and how are purchasers using this carbon neutral label?

With no accepted standard, any company can announce that it is carbon neutral. And this announcement can mean many things. Some companies offset 100% of their emissions. Others offset just a fraction of their emissions. Others offset the emissions associated with specific products.

Interface has taken the latter approach as part of its Climate Cool™ Carpet certification. The company comprehensively calculates upstream and downstream emissions associated with producing this particular carpet line and then seeks to purchase that quantity of offsets from Climate Cool™–certified projects.

Not all companies that purchase offsets make this kind of commitment. The several dozen organizations in the Climate Care network all reportedly bundle offsets with their products and services (e.g., airline trips to visit ski resorts, mortgages, or ecotourism packages). Yet in many cases, the bundling is modest: one ton per year with a mortgage product, or perhaps one ton as part of an ecotourism vacation. For example:

- The Co-operative Bank in the United Kingdom offsets one-fifth of a homeowner's anticipated household emissions through Climate Care every year for the lifetime of each mortgage purchased from the bank. The bank also says it will offset 20% of a vehicle's CO_2 emissions each year for the lifetime of each auto loan it offers.[50]

- The Phone Co-op, also in the UK, claims to offset all its carbon emissions, as well as those of its telecom suppliers, through the purchase of carbon offsets.[51]

- Greentours, a UK-based tour company, gives 35 pence (about 66 cents) per hour of air travel to Climate Care for offsets projects.[52] The company says this figure has been calculated by Climate Care to significantly reduce the impact of one's flight, though it does not indicate the quantity of offsets that will result.

Visiting the websites of many of Climate Care's partners does not provide any indication (other than the presence of the Climate Care logo) that the partner company has engaged in climate change mitigation effort at all. In reviewing information provided on the websites of these companies, we found no clear pattern in the degree of carbon neutrality claimed by each company.

In terms of the quality of the reductions the market offers, the situation is little better. We reviewed a select number of retail offset providers' websites to determine what conclusions can be drawn regarding their product offerings:

- Climate Care funds a portfolio of projects in the sustainable energy and reforestation sectors.[53] It states that it addresses additionality by refusing to support projects that are financially viable without the aid of offset sales, or that are required by legislation. The website does not clarify how financial viability is defined. The site lists several projects it has funded, from clean stoves in Honduras to restoring rainforests in Uganda. Each project requires verification of reductions, and if the expected amount of offsets was underestimated, Climate Care makes up this shortfall with other investments. However, these verification reports are not made available to the public.

- The CarbonNeutral Company funds a portfolio encompassing a wide range of projects in the renewable energy, energy efficiency and reforestation sectors. Like Climate Care, it focuses on projects not mandated by law or financially viable without the support of the offsets market. Like Climate Care, the CarbonNeutral Company does not clearly define financial viability. The website provides links to CarbonNeutral's funded projects worldwide,[54] and to a CarbonNeutral® Protocol that requires the quantification and verification of offsets.[55]

- The Carbonfund.org supports renewable energy, energy efficiency, and reforestation projects that reduce carbon emissions. It claims to seek cost-effective offsets throughout the world, though featured projects are all within the United States.[56] It says that its criteria for selecting projects include price, quality, certification, and other social benefits. However, it does not publish greater detail on additionality or any other selection criteria, nor does it offer much information related to the selected projects.

- TerraPass states that it supports clean energy projects in the wind energy, biomass, and industrial efficiency sectors within the United States that result in renewable energy credits (RECs) or carbon offsets.[57] TerraPass also purchases offset credits from the Chicago Climate Exchange. The RECs are verified annually by the Center for Resource Solutions. TerraPass does not publish greater detail on project selection criteria or additionality, nor does it offer much information related to its projects. Project verification reports are not available on the website.

We have not sought to comprehensively assess the portfolios of retail offset providers, but based on our limited review, we offer several observations:

- Some purveyors of carbon neutrality are trying to pursue credible offset projects, although they have had widely divergent levels of success in overcoming the key challenges in the retail offsets market.

- Some retail offset suppliers offer no evidence that their reductions would pass a thorough quality evaluation.

- Many retail market suppliers sell carbon neutrality with offsets that are front-loaded. Reforestation projects, for example, may not generate the anticipated reductions for decades into the future. Energy-based offsets may also count reductions many years into the future (particularly in the case of small renewable energy projects, which may generate just a small number of offsets each year). Front-loading may be perfectly appropriate in a voluntary offsets market, but this issue should be addressed more transparently so that consumers can understand what they are purchasing.

- Some retail market suppliers purchase reductions from renewable energy or energy efficiency projects as offsets. In most cases, this funding occurs through the purchase of RECs (see Box 4). However, RECs are issued purely on the basis of a project's technology and vintage (the year the project was installed); renewable energy projects do not need to pass an additionality screen to generate RECs. The main argument in favor of RECs as CO_2 mitigation is that the purchase of RECs may help expand deployment of renewable energy supplies. The REC market is seen as an investment in the future, rather than a market resulting in direct environmental benefits today. With more and more renewable energy projects becoming "business as usual" through higher energy prices and federal tax credits, however, it is not clear that all RECs should be assumed to be "additional" for retail offset purposes.

- Offset suppliers often leverage their limited funding. In extreme cases, an offset purchaser may claim 100% of a project's potential CO_2 reductions, while only financing 1% or less of the project's cost. This is not inherently inappropriate, if that 1% is pivotal to making the project happen. A credible project can lack "just that last bit" of funding, or face another barrier that may not be financial, but which climate mitigation and carbon market concerns can help overcome. Unfortunately, this kind of leveraging can easily be misused to generate low-cost credits without materially contributing to the project's viability. In other words, non-additional reductions can often be the result.

Box 4: Offsetting GHG Emissions with RECs

Renewable energy credits (RECs) increasingly are a key source of offsets in carbon neutral products and services. What constitutes an REC is a matter of some debate. We know that an REC represents the production of one MWh of electricity from a renewable generation source. This renewable generation presumably displaces electricity from conventional fossil fuel sources. Some REC sellers claim that environmental attributes, including emissions reductions, are part of the REC. However, the links between RECs and CO_2 emissions reductions are not straightforward:

1. RECs usually generate indirect emissions reductions, meaning that reductions occur at a power plant located elsewhere. It can be difficult for an REC generator to establish a legal claim to the reductions; without an effective legal claim, there is a risk that GHG benefits will be double-counted.

2. The indirect nature of the emissions reductions delays quantification of the CO_2 benefit associated with RECs. Since reductions occur in the power grid at large, accurately identifying the CO_2 generation displaced by the REC requires modeling the power system. Results are not available until the end of a given year. Many REC sellers use a system average instead, which may or may not be accurate.

3. There is generally no additionality test for RECs. Any renewable generation meeting technology, legal, and vintage criteria can generate RECs. It is not clear if RECs influence decisions whether to build new renewable energy facilities. As a result, the eligibility criteria commonly applied to RECs may not be sufficient for establishing the additionality of emissions reductions as defined or understood in the retail offsets market.

The absence of a clear quality standard in the retail offsets market is an invitation for offset suppliers to rely on lower-quality offsets to attract more customers by providing a lower-cost product. The bottom line is that consumers face a "buyer beware" market that is not conducive to long-term consumer confidence or market growth.

"The absence of a clear quality standard in the retail offsets market is an invitation for offset suppliers to rely on lower-quality offsets to attract more customers by providing a lower-cost product."

Developing a Common Carbon Offset Standard

As more sources of retail-level offsets enter the market, the absence of a common and appropriate offset standard will become a larger problem for consumers seeking to fund quality offsets. With little (if any) required validation of marketing statements that a particular offset represents truly "additional" emissions reductions, the pressure to procure low-priced offsets will often result in the purchase of non-additional tons. The environmental integrity of the market could easily be further eroded, and the market could eventually collapse if disillusioned consumers cease to participate.

Efforts are underway to bring some order to the market (see Box 5). But results to date are mixed, and future performance is hard to predict. In addition, some observers question the need for quality standards in the context of retail offsets. After all, aren't we dealing with a commodity? What's wrong with letting buyers and sellers do what they want to do? Why weigh down a voluntary market with all these complications?

What's wrong with caveat emptor?

There are several reasons why we shouldn't expect the principle of *caveat emptor* to lead to desirable market outcomes in the retail offsets market. First, consumers have no way to judge the veracity of claims or the quality of the offset commodity. With no other clearly discernible difference among offsets, consumers will be inclined to select lower-priced offsets. The absence of a common standard will almost certainly lead to poor-quality offsets driving out high-quality offsets.

Secondly, if poor-quality offsets dominate the retail offsets market, offset prices will remain low. At first, this might seem desirable. Corporate offset buyers, interested in marketing carbon neutral products and services, may be content to pay the lower price and earn the desired recognition. Offset providers might be happy to avoid the burden of additionality tests. Yet the net effect of extremely low prices would be that the retail offsets market will not be able to promote the environmentally beneficial projects consumers implicitly expect the market to provide.

Finally, if retail offsets ultimately are viewed as environmentally suspect, the retail market could disappear. Consumer willingness to pay could diminish at a time when willingness to pay is already quite low, perhaps

BOX 5: The Search for Voluntary Market Standards

Most purveyors of retail offsets operate under their own rules; however, attempts to develop standards for offsets offered into the retail offsets market date back a number of years. The Climate Neutral Network in the United States was the first such effort in the late 1990s. Although the Network's Climate Cool™ brand still exists and is used by companies like Interface, it has not resulted in significant market penetration.

In 2002, the World Wildlife Fund launched its Gold Standard. This standard was originally applied to projects intended for trading as part of the Kyoto Protocol's market mechanisms, but has now been tailored for credits traded in the voluntary market in an effort to develop a standardized approach. It is a simpler metric than the one developed by the Climate Neutral Network. It allows only renewable energy and energy efficiency projects, and only projects that have been approved by the Kyoto Protocol's Clean Development Mechanism. Project developers meeting these conditions must go through an additional process to document projects under the Gold Standard. Although this is the most restrictive voluntary standard in the market today, it faces critical challenges since renewable energy and energy efficiency are expensive and CDM approval involves high transaction costs.

The voluntary carbon offsets market is witnessing a proliferation of efforts to develop or promote consistent quality standards. Recent efforts include:

- The Climate Group and the International Emissions Trading Association released their draft Voluntary Carbon Standard (VCS) in early 2006 with the goal of developing a standardized approach to the treatment of voluntary carbon offsets. A notable characteristic of the VCS is that it takes many elements of mandatory GHG markets and simply moves them over into the voluntary market.
- The Leonardo Academy recently announced it would develop an ANSI standard for carbon offsets; it is not clear what this standard will include.
- The Center for Resource Solutions, originator of the Green E certification for renewable energy projects, has announced its intent to develop a certification process for carbon offsets.
- The Rocky Mountain Institute has announced an initiative to promote offset quality.

Whether any of these efforts will make it easier for consumers to reliably become carbon neutral remains to be seen. Several of these initiatives are trying to develop generally applicable "quality standards" for voluntary carbon offsets. However, past efforts have generally ended up with a "we'll know it when we see it" approach. While such a method can be effective if applied objectively, it's not really a standard. Unless these new initiatives recognize and build upon lessons previously learned, and the characteristics of offsets as described in this paper, they will likely end up in a similar position.

too low to support a viable market. Any further erosion would be disastrous for the environmental integrity of this market. Corporate motivation to build emissions reduction efforts into ordinary corporate activities would be undercut. Indeed, a great opportunity to leverage larger corporate actions to develop and market carbon neutral products would be lost.

Even if offsets in the retail market are unlikely to materially affect atmospheric concentrations of greenhouse gases, we believe that offsets still need to be "real." If offsets being sold in the retail market come to be seen as empty or meaningless, it is much less likely that a serious market will develop.

Why not look to mandatory markets for a solution to these challenges?

One approach to a common standard would be to require retail-level offsets to comply with the same requirements as mandatory offsets. For example, retail offsets could be required to come from the growing pool of CDM projects under the Kyoto Protocol. The World Wildlife Fund uses a variant on this approach in its CDM-based Gold Standard.

But differences exist between the developing mandatory and voluntary offsets markets. Compliance-oriented markets tend to require that the reduction must occur in the same year that the credit is sold; these markets focus heavily on precise credit quantification, clear ownership, and in-depth monitoring and verification (M&V) protocols. Compliance markets are charged with implementing specific policy mandates toward an environmental objective, which can dramatically constrain the scope of qualifying activities and raise transaction costs. We do not believe that simply relying on CDM credits is the best available approach to the voluntary retail offsets market.

Voluntary markets do not implement any particular policy mandates; rather, they tend to be a response to a perceived need or opportunity by various market constituencies. Voluntary markets can maintain environmental integrity without the precise quantification, unambiguous ownership requirements, and in-depth M&V protocols required of compliance markets. In addition, voluntary markets have the flexibility to address the interests of potential purchasers, who may want local offsets, offsets in particular sectors, or offsets with specific public relations benefits.

"The voluntary market encourages innovation; it may be able to provide the most benefit to small-scale projects and technologies that the regulatory market tends to overlook."

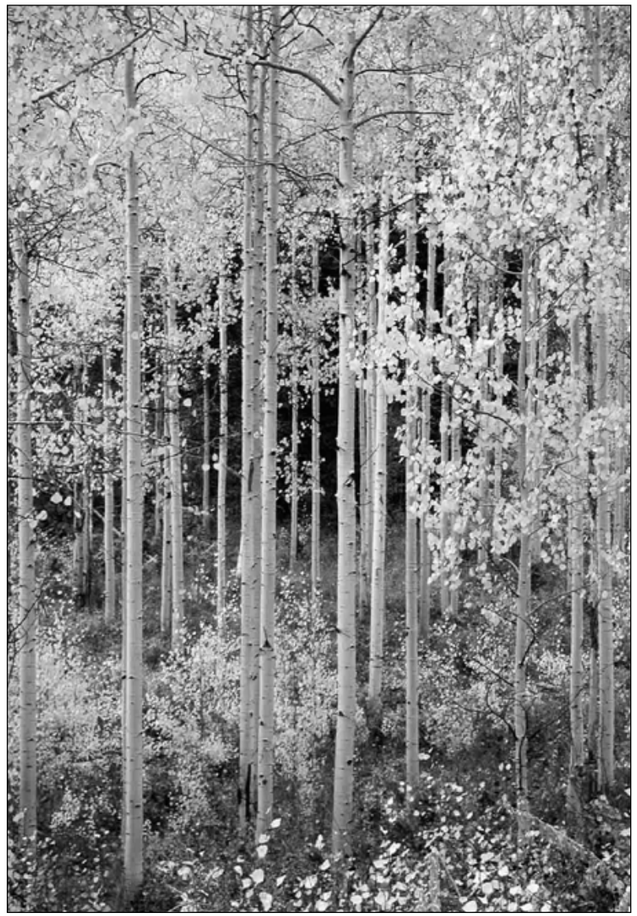
The voluntary market encourages innovation; it may be able to provide the most benefit to small-scale projects and technologies that the regulatory market tends to overlook (either because the projects fail to meet a required threshold or because they are too small to bear the high transaction costs often associated with regulatory offsets). For example, one could include hard-to-quantify sectors, such as energy efficiency, or credits for which it is more difficult to demonstrate ownership, such as renewable energy. A voluntary market also allows credits to be front-loaded, making it much easier to fund truly "additional" projects. As long as there is transparency in how these issues are addressed, voluntary markets offer much more flexibility in program design than compliance markets. There is no reason to replicate regulatory emissions trading in designing a voluntary retail offsets market.

Promoting a credible standard and market for retail offsets

Although the retail offsets market clearly presents challenges, it should be possible to preserve its environmental integrity and advance environmental and policy objectives. We introduce several approaches to overcoming these barriers here:

Additionality. Additionality issues create a challenging, but surmountable, impediment. To transparently address additionality, projects can be carefully selected in specific sectors or sub-sectors known to be suf-

ficiently "additional" to advance the retail offsets market's policy objectives. Pre-approved offset project types could include certain projects in small-scale landfill gas recovery, coalmine methane, energy efficiency, and renewable energy. Projects in these pre-approved categories would be subject to minimal screening, thus keeping transaction costs low. Although some business-as-usual projects would inevitably find their way into the credit pool, it should not have to be a large fraction of available credits. The available supply from selected sectors should reasonably match anticipated demand; this can further reduce the risk of high quantities of non-additional offsets finding their way into the market as false positives.



Valuing credit streams in a spot market. Efforts to limit carbon neutral credit purchases to reductions that have already occurred virtually ensures a high proportion of non-additional reductions, since so few truly "additional" and already accomplished reductions are available.

There are several ways this barrier can be credibly overcome:

1. We can force offset purchasers to buy longer-term streams of reductions. This might be a difficult sell for most consumers.

2. Someone could fund the creation of a pool of credible offsets to prime the retail offsets market. Ideally, this pool would become self-sustaining. But its establishment requires an initial act of faith or economic speculation, a step that market participants have shown no appetite for during the last decade.

3. Market managers can allow front-loading for voluntary retail offsets, letting most or all of a project's reductions be counted and sold up front. Truly "additional" offset projects often require up-front funding to make a project happen; this, in turn, yields a stream of reductions over time.

In order to build a viable yet credible retail offsets market, options two and three offer the most promise. Although many observers object to the concept of forward-selling emissions reductions, front-loading additional reductions is certainly environmentally preferable to restricting the market to current (and often non-additional) reductions.

Consumer education. As we have shown, current retail offsets markets have not capitalized on the opportunity to inform the public of the importance of climate change. This educational component can potentially play a larger role in climate change mitigation than the actual offset process by elevating the issue in the public arena and fostering proactive policy outcomes. Using tools such as employee education, workshops, and displays at carbon neutral conferences and events, steps should be taken to increase consumer knowledge about climate change, how their activities can both contribute to and help lessen the effects of global warming, and the importance of public policy aimed at the problem.

Any voluntary offset standard will reflect compromises across the variables of cost-effectiveness, environmental integrity, and practicality. Perfection should not become the enemy of the good in promoting the market. Nevertheless, it is vital that the market get beyond its current "buyer beware" status.

Conclusions

The retail carbon offsets market can—and should—play an important role in climate change mitigation efforts. Certain outcomes will need to be achieved in order for the market to live up to its potential:

- *We need to demonstrate the existence of a successful business model that shows consumers' willingness to pay for products and services that provide climate change mitigation benefits.*

- *We need to use the retail offsets market to educate the public about climate change, and thus contribute to effective climate change policy development.*

- *We need to ensure that offsets have environmental integrity and that purveyors of carbon neutrality are selling a quality commodity.*

We have sought to provide an overview of the retail carbon offsets market relative to these three prerequisites. Currently, large parts of this market do not appear to live up to these requirements.

This initial overview of the retail offsets market has demonstrated at least one crucial requirement that must be met before the market can mature: a minimum offset quality standard. By paying attention to the particular individualistic nature of retail consumer markets and the characteristics of the "commodity" of carbon offsets, we can develop a credible and workable approach to ensuring the environmental quality of retail offsets. Moreover, developing this standard requires a commitment to understanding and overcoming the key challenges facing the retail offsets market.

To overcome the additionality barrier, the supply of offsets must be balanced with projected demand. Careful selection of offset supply sectors will prevent too many non-additional tons from slipping into the credit pool. To further promote additionality, these offsets should not be restricted to current reductions. There is a need to fund projects with environmentally beneficial results that will create a stream of offsets over time. Therefore, projects should be allowed to front-load their reductions to enhance funding for projects that qualify as "additional."

Now, we need market research to determine how companies can best capitalize on the opportunities the retail offsets market presents. Companies interested in building competitive advantage based around consumers' growing interest in climate change mitigation should undertake the kind of research normally associated with new product rollouts, rather than jumping into this new market without thinking. Too many companies have taken a simplistic approach to the market, with disappointing results.

Few consumers really understand climate change science or policy, much less the issues surrounding carbon offsets. This is one reason so little market evidence exists regarding the economic viability of the retail offsets market. We do not believe the lack of data suggests these markets are not economically viable; rather, real work is needed to confirm and demonstrate that viability. In addition, proponents of and participants in the retail carbon offsets market should take a comprehensive approach to educating consumers about climate change and climate change mitigation. That work would have dramatic payoffs, both for the companies involved and for the larger goals of climate change mitigation.

The issues of global climate change, and the associated concept of carbon offsets, are too complex to assume that the building blocks for a successful retail offsets market are already in place. A wide variety of companies supply offsets, yet often little information is provided on the approaches used to assure the validity of the offsets. While some companies are clearly making an effort to pursue credible projects and emissions reductions, the lack of a credible standard allows others to be enticed by the availability of cheap offsets.

A consistent approach to protecting offset quality is necessary for the retail offsets market to strengthen its environmental integrity. A credible, market-wide approach to quality would support the continued growth of the voluntary market and achievement of mitigation objectives. It won't be easy. But while the easiest course may be to continue to make the same mistakes in designing and promoting voluntary offsets markets, it's not the best course for the market or the planet.

ENDNOTES

1 Dr. Mark C. Trexler is president of Trexler Climate + Energy Services (TC+ES, **www.climateservices.com**). Laura H. Kosloff is vice president and general counsel at TC+ES. Kyle Silon was an intern at TC+ES at the time the research for this paper was conducted. TC+ES has been actively involved in many aspects of the retail offsets market's development, including taking Stonyfield Farm carbon neutral in 1996, serving as a convening partner in the Climate Neutral Network, representing Shaklee Corp. as the first company to be certified by the Climate Neutral Network, and supporting AES Power Direct's launch of its Clear Blue offset electricity product.

2 According to its business plan, Global Warming Alternatives was established based on consumer research suggesting that the environment was the fastest-growing factor in consumers' purchasing decisions.

3 The terms "climate neutral," "carbon neutral," "climate friendly," and "footprint neutral," among others, are used to represent the idea of neutralizing the global warming impacts of one's lifestyle. In some cases, organizations like the Climate Neutral Network have developed branded terms like Climate Cool™ to designate companies and products that have gone through a specific certification process. In other cases, organizations have simply established a website to sell carbon offsets. This paper uses the term "retail offsets market" to include all such efforts.

4 There is no standardized definition of an individual's or a company's climate change footprint. It usually includes GHG emissions associated with basic energy consumption (e.g., electricity, gasoline, and natural gas). In some cases, companies take more expansive approaches to calculating their footprint and include the upstream GHG emissions associated with their purchases and the downstream GHG emissions associated with shipping and product disposal as well.

5 U.S. Environmental Protection Agency, Global Warming—Climate—Future, **http://yosemite.epa.gov/oar%5Cglobalwarming.nsf/content/ClimateAtmosphericChangeFuture.html** (accessed August 23, 2006)

6 This is required by the United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107, art. 2, 31 I.L.M. 849, 854.

7 It is beyond the scope of this review to evaluate the performance of individual sellers of retail offsets or individual offset projects.

8 The list in Box 1 is not intended to be a complete list of organizations participating in the retail offsets market, but rather focuses on companies specifically selling carbon neutrality. Many other organizations, particularly those selling renewable energy credits (RECs), claim to reduce CO2 emissions reductions with their RECs, but they are not selling carbon neutrality per se. These organizations are not included in Box 1.

9 See **http://climateneutralnetwork.org/cc_cert.php** (accessed August 14, 2006).

10 Associated Press, "NFL Planting Trees in Detroit to Offset Super Bowl Emissions," *USA Today*, March 9, 2005, **www.usatoday.com/sports/football/nfl/2005-03-09-super-bowl-trees_x.htm?csp=34** (accessed August 14, 2006).

11 **http://fifaworldcup.yahoo.com/06/en/030331/4/az.html** (accessed August 14, 2006).

12 Antonio Regalado, "New Lifestyle Option For the Eco-Minded: 'Carbon-Neutral'," *Wall Street Journal*, Page B1, May 14, 2004, **http://online.wsj.com/article/0,,SB108448949822311345,00.html** (accessed August 15, 2006).

13 "CERC Achievements Associated with the Democratic National Convention," August 28, 2004, **http://www.cerc04.org/kit/cerc_dnc_achievemts828.pdf** (accessed August 15, 2006).

14 G8 Gleneagles 2005, "Making the G8 Presidency Environmentally Sustainable," **http://www.g8.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1123953378166** (accessed August 15, 2006).

15 Environment Canada, "United Nations Conference Climate Change: The Greening of a Carbon Neutral Conference," press backgrounder, November 27, 2005, **http://www.ec.gc.ca/press/2005/051127_b_e.htm** (accessed August 15, 2006).

16 BP, Environment and Society—BP Global Choice, **http://www.bp.com.au/globalchoice/** (accessed August 15, 2006).

17 Interface, Inc., "Cool Carpet Takes the "Heat" out of Global Warming," **http://www.interfacesustainability.com/coolcarpet.html** (accessed August 15, 2006).

18 Better World Club, "Fight Global Warming When You Fly or Drive," **http://www.triplee.com/links/offsets.htm** (accessed August 15, 2006).

19 See, for example, Carbonfund.org offset offerings at **http://www.carbonfund.org/carbon/index.php** (accessed August 15, 2006) and AtmosClear Climate Club's™ offering at **https://www111.safesecureweb.com/atmosclearorg/Merchant2/merchant.mvc?Screen=CTGY&Store_Code=ACC&Category_Code=ACCMG** (accessed August 15, 2006).

20 These are self-certification efforts; governments are not yet providing any "stamp of approval" for such activities. See **http://climateneutralnetwork.org/review_group.php** (accessed August 15, 2006) and **http://www.worldwildlife.org/climate/projects/climateSavers.cfm** (accessed August 15, 2006) for a description of two such efforts in certification.

21 See, e.g., Linda Baker, "Drivers Atone for Exhaust with Carbon Offsets," *Christian Science Monitor,* January 5, 2006, **http://search.csmonitor.com/2006/0105/p16s01-sten.html?s=widep** (accessed August 15, 2006); Richard Lofthouse, "Carbon Offsetting: Clear Your Conscience," *Independent*, June 28, 2005.

22 The British Code of Advertising requires that an advertisement reflect any "significant division of scientific opinion" about its claims.

23 The Advertising Standards Authority adjudication in the Climate Care case can be found at: **http://www.asa.org.uk/asa/adjudications/non_broadcast/Adjudication+Details.htm?Adjudication_id=39999** (accessed August 15, 2006).

24 David Doniger, climate policy director at the Natural Resources Defense Council, recently noted: "The problem with these kinds of offsets is that we've never found a way to separate the wheat from the chaff . . . There is a constant tension between quality control and high participation rates, and it's usually quality that goes in the toilet." Quoted in Jeff Goodell, "Capital Pollution Solution?" *New York Times Magazine*, Section 6, page 34, July 30, 2006.

25 For a comprehensive review of the additionality issue, see M.C. Trexler, D.J. Broekhoff, L.H. Kosloff, "A Statistically Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn?" Sustainable Dev. Law & Pol'y J. 6(2):30-40, Special Edition on Climate Law (Winter 2006).

26 Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, U.N. Doc. FCCC/CP/1997/L.7/Add.1 18, 37 I.L.M. 22, 38, **http://unfccc.int/resource/docs/convkp/kpeng.pdf**. The CDM is a mechanism by which nations that must reduce emissions under the Kyoto Protocol can meet these obligations by funding projects in developing nations that are not required to reduce emissions, if these projects result in CERs.

27 Non-additional projects are often referred to as "business as usual" (BAU). This term is useful if it is properly understood to mean projects that would have happened in the absence of an offset crediting mechanism. However, "business as usual" can be interpreted in many different ways, some of which do not comport well with the basic concept of additionality. We use the term "non-additional" instead of "business as usual" to avoid confusion.

28 People often speak of additionality with respect to emissions reductions, as opposed to projects. This may be a distinction without a difference. Conceptually speaking, for emissions reductions to be "additional" they must result from projects that are "additional."

29 Any test devised to "prove" additionality will not be perfect. Inevitably, a test will sometimes falsely indicate that a project is "additional" when the project would have happened anyway (i.e., a false positive). Alternatively, an additionality test may indicate that a proposed project is not "additional" when in fact it is (i.e., a false negative). Any given additionality test will produce both types of errors.

30 See **http://www.stonyfield.com/earthactions/MakingaWorldOfDifference.cfm** (accessed August 15, 2006) for a description of the company's offset program. Stonyfield's CEO, Gary Hirschberg, believes that carbon offsets are unlikely to be a source of competitive advantage in and of themselves; he does, however, think that offsets can contribute to the company's existing environmental brand. Gary Hirschberg, personal communication with Mark Trexler, 2004.

31 See **http://climateneutralnetwork.org**.

32 Erin Kelley, Interface, Inc. analyst, personal communication with Mark Trexler, February 15, 2006.

33 See **http://www.carbonneutral.com** (accessed August 15, 2006).

34 An interactive map of these forests can be found by visiting **http://www.carbonneutral.com/pages/projectlocations.asp** (accessed August 15, 2006).

35 Bill Sneyd, Operations Director, CarbonNeutral Company, email communication with Mark Trexler, October 31, 2005.

36 See **www.climatecare.org** (accessed August 15, 2006).

37 Climate Care Annual Report 2005, **http://www.climatecare.org/_media/documents/pdf/climate_care_annual_report_2005.pdf** (accessed August 15, 2006).

38 Some observers argue that consumer education is not the task of the retail offsets market, but of the government or the educational system. They note that in countries where climate change is a formal component of school curricula (e.g., Canada), most consumers are educated consumers. The level of consumer education is far less clear in the United States. In either case, the retail offsets market offers an additional chance to educate consumers and to focus the power of the advertising industry on advancing climate change mitigation objectives.

39 **http://www.patagonia.com** (accessed August 15, 2006). The virtual march is an Internet movement to discuss the impacts of climate change and potential solutions. See **http://www.stopglobalwarming.org/default.asp** (accessed August 15, 2006).

40 See **http://aveda.aveda.com/protect/we/global.asp** (accessed August 15, 2006).

41 See **http://aveda.aveda.com/protect/you/difference.asp** (accessed August 15, 2006).

42 See **http://aveda.aveda.com/protect/you/actions.asp** (accessed August 15, 2006).

43 See **http://www.clifbar.com/connect/press.cfm?location=sustain** (accessed August 15, 2006).

44 See **http://www.clifbar.com/ourstory/document.cfm?location=environment&websubsection=gw** (accessed August 15, 2006).

45 See **http://www.clifbar.com/ourstory/document.cfm?location=environment&websubsection=action** (accessed August 15, 2006).

46 See the Le Ski brochure, available at **http://www.leski.com/Pages/brochure/leski1.pdf** (accessed August 15, 2006).

47 "Avis Europe Offers World's First Carbon Neutral® Car Rentals," press release, April 1, 2002, **http://www.avis-europe.com/content-153** (accessed August 15, 2006).

48 Climate Friendly, "Global Warming: Causes and Consequences," **http://www.climatefriendly.com/explain-climate.php** (accessed August 15, 2006).

49 TerraPass, The Role of TerraPass in Reducing CO2 Emissions, TerraPass white paper, January 18, 2005, p.15, available at **http://www.terrapass.com/terrapass-white-paper-1.18.05.pdf** (accessed August 15, 2006).

50 **http://www.co-operativebank.co.uk/servlet/Satellite?cid=1076486827777&pagename=CoopBank%2FPage%2FtplPageStandard&c=Page** (accessed August 15, 2006).

51 **http://www.thephone.coop/about/envir_policy.html** (accessed August 15, 2006).

52 **http://www.greentours.co.uk/pages/about_us.html** (accessed August 15, 2006).

53 For more detail on Climate Care projects, see **http://www.climatecare.org/Projects/index.cfm** (accessed August 15, 2006).

54 See **http://www.carbonneutral.com/pages/projectlocations.asp** (accessed August 15, 2006).

55 Future Forest/CarbonNeutral Company, Carbon Neutral® Protocol, May 20, 2003, available at **http://www.carbonneutral.com/pdfs/FFCN001%20CarbonNeutral%20Protocol%20v1.7.pdf** (accessed August 15, 2006).

56 **http://carbonfund.org/site/pages/our_offset_projects** (accessed August 15, 2006).

57 See **http://www.terrapass.com/portfolio.html** (accessed August 15, 2006).