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Carbon Offsets and Renewable Energy Certificates (RECs)

The purpose of this brief is to provide a general understanding of carbon offsets and renewable energy certificates (RECs). In addition, information is presented regarding how RECs and offsets are used in the paper and printing industries. Paper buyers can use this information to make informed decisions regarding suppliers and claims about their products and performance. They may also choose to use these instruments for achieving company-specific goals related to energy and greenhouse gas emissions.

The information provided herein is based on Sappi's knowledge and expertise and is supported by the studies and documents included in the reference section.

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Overview

Carbon offsets and RECs are environmental commodities used by businesses and individuals to reduce greenhouse gas (GHG) emissions and support higher levels of renewable energy generation. These mechanisms have been developed as a means for sharing the financial burden of financing renewable energy and emissions-reducing projects.

RECs and carbon offsets are measured in different units, traded in different markets, have different end uses and can be generated from different project types. In addition, the standards for evaluating RECs are different than those applied to carbon offsets. A REC is an environmental commodity representing the renewable attributes of one megawatt-hour (MWh) of renewable electricity generation. A carbon offset is an environmental commodity representing the reduction of a specific quantity of GHG emissions (in units of carbon dioxide equivalent, CO_2e). The boundaries of a REC market are only as large as a contiguous electricity grid (for example, North America). The carbon market is global.

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Introduction to carbon offsets

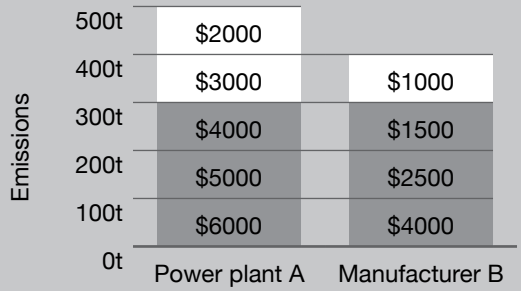
To help mitigate the environmental and economic impacts of climate change, many governments and other organizations have taken action to reduce the levels of GHG emissions re-

leased by human activity (1). To achieve reductions in a timely manner and ease the financial burden[a] on businesses, "cap and trade" systems were developed where organizations can buy or sell carbon allowances[b] to meet their regulated cap, instead of making large investments to reduce their own carbon emissions.

In a cap and trade scenario, the required reduction in GHG emissions is still reached compared to a "command and control"[c] regulation, but at a total lower cost and a lower cost per regulated facility (1). Figures 1 and 2 illustrate the economic benefits of cap and trade.

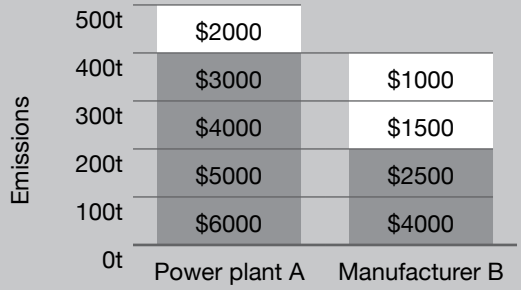
Initial emissions:	900 tons
Emissions goal:	600 tons
Total reduction:	300 tons

Command & Control Figure 1



Total cost: $6000 Cost per ton: **$20**

Cap & Trade Figure 2



Total cost: $4500 Cost per ton: **$15**

The success of environmental commodity trading is well exemplified by the U.S. Acid Rain program for sulfur dioxide (SO_2), a cap-and-trade program that began in 1995 to curb the environmental impacts of acid rain due to SO_2 emissions from electric power plants. It is estimated that the program achieved its pollution reduction goals at approximately half the cost of traditional regulation (savings estimated at $20 billion) and enabled many firms to reduce emissions more quickly than required by law (1,2).

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Emitter A (a power plant) and Emitter B (a manufacturing facility) emit a combined total of 900 tons of CO_2 a year. The government decides that these total emissions must not exceed 600 tons a year. As can be seen in Figure 1, the cost of reducing a given amount of emissions for Emitter A is greater than the cost for Emitter B (Emitter A's first 100 tons of reductions cost $2,000, while Emitter B's first 100 tons of reductions cost $1,000, etc.). Under traditional environmental regulation, regulators might direct each facility to cut its respective emissions to 300 tons. Emitter A would spend $5,000, while Emitter B would spend $1,000; the 600 ton goal would be reached at a total of $6,000, or $20 per ton reduced.

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Alternatively, the government could establish a cap-and-trade system, setting an overall emissions cap of 600 tons and then issuing 600 emissions allowances. If allowances were evenly distributed, both emitters would have an incentive to trade because emission reduction costs are higher for A than for B (Figure 2). Emitter B might cut emissions by 200 tons and sell its excess allowances to Emitter A for less than it would have cost Emitter A to make the reductions itself (for example, $2,500 for 100 allowances). In this scenario, the desired level of emissions is reached at a lower total cost of $4,500 and a lower cost per ton of $15. The total cost is lower, as is the cost for each regulated facility.

Source: Pew Center on Global Climate Change (1).

a. Reducing GHG emissions for a pulp and paper company can require large capital investments. For example, it could mean building a new energy generation facility that uses renewable fuels (biomass) at a cost of over $50 million per mill site.

b. A government-issued authorization to emit a certain amount of CO_2e. In GHG markets, an allowance is commonly denominated as one ton of CO_2e per year.

c. The traditional system of regulation that prescribes emission limits on a facility-by-facility or source-by-source basis.

3

The role of carbon offsets

The term "carbon offsets" is commonly used to define the "currency" for carbon offsetting. Carbon offsets are quantified and sold in metric tons of carbon dioxide equivalent (CO_2e). This is the unit of measurement used to compare the relative climate impact of the different GHGs. The CO_2e quantity of any GHG is the amount of carbon dioxide that would produce the equivalent global warming potential. For example, the global warming potential for methane (a potent GHG) over 100 years is 25. This means that emissions of one ton of methane are equivalent to emissions of 25 tons of carbon dioxide (3).

Carbon offsets are a mechanism to help companies manage the cost of GHG reductions in a cap-and-trade program. Offsets are GHG emission reduction projects undertaken at sources outside of a cap-and-trade program, such as energy efficiency projects, wind farms, biomass and solar energy projects, the capture of landfill methane, and afforestation projects. By paying third parties to develop such projects, companies can "offset" the impact of carbon emissions created by their own actions or operations.

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Voluntary and compliance markets for offsets

Carbon offset markets exist both under compliance schemes and as voluntary programs. Compliance markets are created and regulated by mandatory regional, national, and international carbon reduction regimes, such as the Clean Development Mechanism (CDM) of the Kyoto Protocol, where developed countries can use offset projects in developing countries to comply with their targets (4). Voluntary offset markets function outside of the compliance markets and enable companies, individuals and other entities to purchase carbon offsets to mitigate their own GHG emissions from transportation, electricity use, and other sources (5). For example, an individual might purchase carbon offsets to compensate for the GHG emissions caused by personal air travel.

The European Union Emission Trading System (EUETS) is the cap-and-trade market for European companies that are required to reduce GHGs as per Annex 1 of the Kyoto Protocol. In the U.S., there are currently four compliance carbon markets operating or in development: the Regional Greenhouse Gas Initiative, the Western Climate Initiative, the Midwestern Regional Greenhouse Gas Reduction Accord, and one in development for California and the West (1).

In 2009, the total value of the global carbon market was US$144 billion with 8.7 billion metric tons of CO_2e traded (6). The EUETS remained the engine of the carbon market with a total of US$119 billion worth of allowances and derivatives traded. The trading volume for carbon offsets via the Kyoto CDM was about one billion tons of CO_2e worth US$2.7 billion. The Regional Greenhouse Gas Initiative (RGGI), the first mandatory cap-and-trade system in the U.S., had a 2009 value of US$2.18 billion. The voluntary carbon market in the U.S. was estimated at a value of $338 million in 2009 (6). Both compliance and voluntary carbon markets are substantial economic forces and will likely grow considerably over the coming years.

5

Carbon neutrality

Carbon neutrality refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered, avoided or offset (7). If an organization reduces its own GHG emissions and purchases carbon offsets to offset the remaining emissions, it could claim "carbon neutrality." In principle, a product (or service) can be considered carbon neutral if the carbon footprint is accounted for and offset over the life cycle of the product (i.e., raw materials, manufacturing, transportation, disposal).

Clean Air-Cool Planet[d] uses the following definition of corporate carbon neutrality (8):

"True corporate carbon neutrality means there is no net increase of atmospheric greenhouse gases from the existence of the company–or from a clearly-defined part of the company that accounts for a significant portion of the company's overall climate impact. If a company makes a claim regarding a specific product, then there should be no net increase of atmospheric greenhouse gases from the existence of that product."

Canadian printer goes carbon-neutral

In May 2011, the Lowe-Martin Group's Mississauga, Ontario, commercial printing plant achieved carbon-neutral status. Working with Carbonzero as the offset provider, the plant was officially recognized as a Carbonzero Certified operation upon completion of its 2010 fiscal year.

Prior to purchasing offsets, Lowe-Martin identified a number of ways to reduce their emissions including initiatives such as purchasing RECs for their operations through Bullfrog Power, installing energy efficient lighting technologies and introducing lean manufacturing processes to save energy.

Source: Press release, Ottawa, May 2011, www.lmgroup.com.

For more information readers can visit: www.carbonzero.ca and www.bullfrogpower.com.

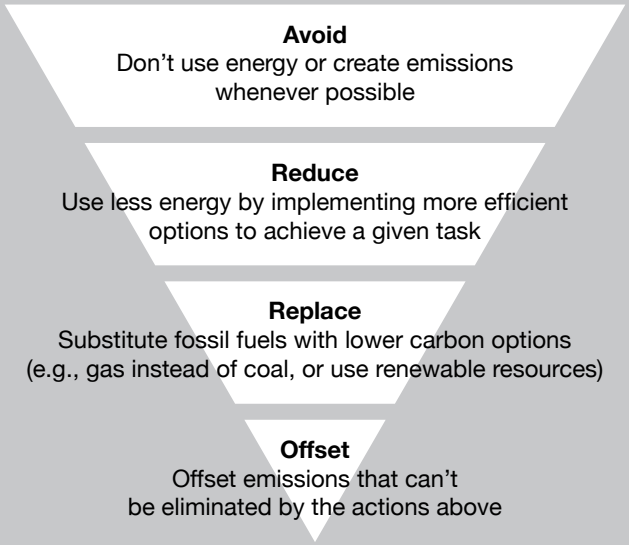
d. Clean Air–Cool Planet (CA–CP) is a 501(c)3 nonprofit organization in the U.S. dedicated to finding and promoting solutions to global warming by partnering with companies, campuses, communities and science centers to help reduce their carbon emissions.

6

Challenges and best practices: Offsets

Carbon offsets on their own will not reduce global GHG emissions but they do play a large role in the overall approach to carbon management. In order for businesses to achieve significant emissions reductions, a carbon management plan is recommended that focuses on internal reductions as recommended by the Carbon Management Hierarchy (Figure 3). Clean Air–Cool Planet (8) recommends that for companies to gain public support about carbon neutrality, they must engage in directly reducing their own emissions, and use offsetting only as a final step. Similarly the World Wildlife Fund views offsets as a "second-best" alternative and suggests that offsets should only be used after "all reasonable efforts have been made by investors to reduce their primary emissions" (9).

The Carbon Management Hierarchy Figure 3



To ensure that the GHG emission reductions from carbon offsets are credible, they should meet the following conditions (10,11):

- Be "real." The quantified GHG reductions must represent actual emission reductions that have already occurred.
- Be "additional." The GHG reductions must be in addition to reductions required by regulation and beyond what would have happened without the GHG reduction project or in a business-as-usual scenario.
- Be "permanent." The GHG reductions must be permanent.
- Be "verifiable." The GHG reductions must result from projects whose performance can be readily and accurately quantified, monitored and verified.
- Avoid "leakage." The GHG reduction in one area must not cause an increase in GHG emissions somewhere else.
- Ownership of the carbon offsets must be clear and the offsets must be retired from the carbon market so they are not double counted.

Voluntary carbon offsetting has been subject to the following criticism (11):

- Some carbon offsets were coming from projects that would have been implemented anyway (i.e., non-additional).
- Carbon offsetting enabled developed nations to perpetuate unsustainable lifestyles by funding carbon projects in developing countries (i.e., lack of equality and fairness).
- Projects were rarely leading to benefits for the host community.
- Inconsistent protocols for measuring scope of GHG inventory were used to support claims of carbon neutrality.
- Lack of transparency, quality assurance and third-party standards in the voluntary carbon market.

To address these shortcomings, various standards, certification processes, and emissions registry services have been developed within the unregulated voluntary carbon markets and each has a different set of requirements depending on its focus and scope (11). There is no universally accepted standard for what constitutes an offset; however, the standards listed below appear to be recognized as credible:

- The Gold Standard (12)
- The Verified Carbon Standard 2007 (13)
- The Voluntary Offset Standard (14)
- Chicago Climate Exchange (15)
- The Climate, Community & Biodiversity Standards (16)
- GHG Protocol for Project Accounting (17)
- Green-e® Climate Protocol for Renewable Energy (18)
- Climate Action Reserve (19)

Carbon neutrality has also been surrounded by controversy for the reasons listed above as well as boundary issues (i.e., how to define the boundaries of activities). Carbon neutral paper claims may be met with high levels of skepticism and programs by some stakeholders (20). To address the integrity and quality of carbon neutral certification program and allow businesses to be certified CarbonNeutral®, The Carbon Neutral Company has developed a standard (The Carbon Neutral Protocol) and program that relies on recognized offset standards, third-party registries and independent auditing (21).

7

Introduction to renewable energy certificates (RECs)

Much of the information below is from a World Resources Institute fact sheet that summarizes RECs and their use in the U.S. (22).

RECs are a tradable environmental commodities in the U.S. which represent proof that one megawatt-hour (MWh) of electricity was generated from a renewable energy resource. RECs are also known as "green tags," "green certificates" and "renewable energy credits."

8

REC markets

Like offset markets, the REC markets exist under both regulatory compliance schemes and as voluntary programs. As of September 2011, 29 states plus Washington DC and Puerto Rico have adopted policies (the Renewable Portfolio Standard or RPS) that reduce emissions from electricity generation by requiring that utilities generate a specified share of power from renewable sources (23). Electricity generators can meet their set percentage of renewable generation either by building renewable capacity, or by purchasing the requisite number of RECs on the REC market. In states that have a REC program, a renewable energy provider is credited with one REC for every 1,000 kWh or one MWh of electricity it produces. A certifying agency gives each REC a unique identification number to make sure it doesn't get double-counted.

Voluntary markets for RECs, while not mandated by law, have developed in response to energy user preferences for renewable electricity and provide a mechanism to help fund new renewable energy projects that would not otherwise be cost competitive as compared to electricity generated from fossil fuels.

Over the period of 2004-2009, the voluntary and compliance markets were nearly the same volume and both grew from roughly six million to 30 million MWh annually (24).

9

The role of RECs

Retail, commercial and industrial energy users can meet voluntary renewable energy goals and support the deployment of renewable power through the purchase of RECs. By purchasing RECs, businesses do not need to alter existing power contracts to obtain renewable power. Furthermore, voluntary RECs are not limited by geographic boundaries or transmission constraints. For corporations with facilities in multiple states or energy grids, a consolidated REC procurement can be part of a strategy to meet overall clean energy goals (25).

The U.S. EPA Green Power Partners Program lists the top 20 U.S. renewable power purchasers in various segments including printers (26).

Sappi's Westbrook Mill is qualified to generate and sell compliance RECs

The state of Maine has one of the most aggressive renewable portfolio standard targets of any state. Starting at 30% renewable energy in 2007, the Maine standard requires an additional 1% per year to reach a target of 40% by 2017.

Sappi operates a multi-fuel boiler at our mill in Westbrook, ME. This facility has met the requirements of Maine Class I RECs based on the combustion of biomass and construction and demolition wood. As such, we are eligible to sell RECs that support the renewable portfolio standards in New England.

For more information on RPS policies, readers are encouraged to visit the Database of State Incentives for Renewables & Efficiency at www.dsireusa.org.

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Challenges and best practices: RECs

The best way to ensure the credibility of voluntary RECs is to purchase those certified by an independent third party such as the Center for Resource Solutions, a U.S. non-profit organization that administers Green-e® Energy, a nationally recognized certification standard that certifies renewable electricity products generated from solar electric, wind, low-impact hydropower, biomass, fuel cells using renewable fuels, and geothermal (25).

Sappi offers paper made with 100% Green-e® renewable electricity

Sappi's mills in Cloquet, MN, and Skowhegan, ME, both generate electricity in compliance with the Green-e® certification program. As such, certified RECs are generated on-site and subsequently consumed by Sappi, allowing us to make product level claims that "100% of the electricity used to manufacture our product is certified Green-e® renewable electricity." Paper buyers that select certified papers and use a printer that is also using certified electricity are now able to apply a logo to printed pieces reflecting their responsible choice. For more information visit www.green-e.org.

Renewable energy projects can qualify as carbon offset projects when their additionality is proven and ownership claims to their associated emissions reductions are uncontested and clear (27). It is important to note that since not all renewable energy facilities are additional, not all renewable energy facilities can generate offsets. Different offset project methodologies and protocols for renewable energy specify the criteria that must be met for a facility to be additional (e.g., the Green-e® Climate Protocol, the Gold Standard, the Clean Development Mechanism, and the Voluntary Carbon Standard) (27).

Both RECs and offsets include a carbon benefit, but RECs are limited in terms of the carbon impact that they are designed to address, and to which they can be applied, namely electricity usage. Carbon impacts (emissions) are classified into emissions categories or "scopes" as per the commonly used Greenhouse Gas Protocol (17). RECs can address Scope 2 emissions, those associated with the consumption of electricity, by giving the owner of the REC the claim to zero-emissions electricity use. Carbon offsets can be used to negate or diminish all scopes (1, 2, or 3) of emissions (25).

One of the challenges in the U.S. compliance REC market is that there are many states with RPS standards, and every state has its own set of unique standards (28). For example, current Washington state RPS criteria disqualifies electricity generated with black liquor, a by-product of Kraft pulp production, yet that same electricity can qualify as RPS-eligible in other states. These differences can complicate REC transactions between States. The State-Federal RPS Collaborative was established to advance dialogue and cooperation among a broad network of state government officials and NGO experts (29). This group is also working to keep the states informed of development of a national program that would complement the state RPS efforts.

(11)

Summary

Trading schemes for environmental commodities such as carbon offsets and RECs can help reduce GHG emissions and have been promoted as an important part of the solution to climate change because of their economic and environmental efficiency. They provide businesses with an alternative that can often be rapidly implemented at a lower cost than internal GHG reduction measures, and allows financing for renewable energy and emissions-reducing projects throughout the world.

Motivated mostly by mandatory reduction requirements, international trade in GHG reductions is now a multi-billion dollar market. The voluntary carbon market has been comparatively very small, but is growing rapidly.

Carbon emissions trading programs promote low-carbon technologies by attaching a cost for emitting greenhouse gases. RECs provide an incentive for renewable energy investments by providing a production subsidy to electricity generated from renewable sources.

(12)

References

All web links validated as of April 8, 2011

1. Pew Center on Global Climate Change, Climate Change 101: Cap and Trade, January 2011, www.pewclimate.org/docUploads/Cap-Trade-101-02-2008.pdf.

2. APX, Cap and Trade: From All Sides Now, 2008, www.emaccount.com/downloads/APX-Cap-and-Trade-Overview.pdf.

3. Foster, P. et al., Changes in Atmospheric Constituents and in Radiative Forcing, Chapter 2. In: Solomon, S. et al., Climate Change 2007: *The Physical Science Basis,* Intergovernmental Panel on Climate Change 2007, Cambridge University Press, NY, www.ipcc-wg1.unibe.ch/publications/wg1-ar4/ar4-wg1-chapter2.pdf.

4. United Nations Framework Convention on Climate Change, Fact sheet: The Kyoto Protocol, February 2011, http://unfccc.int/files/press/backgrounders/application/pdf/fact_sheet_the_kyoto_protocol.pdf.

5. Clean Air-Cool Planet, *A Consumer's Guide to Retail Carbon Offset Providers,* 2006, www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf.

6. Kossoy, A. and P. Ambrosi, *State and Trends of the Carbon Market 2010,* May 2010, http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2010_low_res.pdf.

7. The Carbon Neutral Company, Carbon Glossary, www.carbonneutral.com/knowledge-centre/carbon-glossary.

8. Clean Air-Cool Planet and Forum for the Future, *Getting to Zero: Defining Corporate Carbon Neutrality,* 2008, www.cleanair-coolplanet.org/documents/zero.pdf.

9. The World Wildlife Fund (WWF), *Users Manual: WWF Check Your Paper,* 2010, http://checkyourpaper.panda.org/files/dl/CYP_manual_FINAL_050411.pdf.

10. U.S. EPA, Climate Protection Partnerships Division, Climate Leaders Greenhouse Gas Inventory Protocol Optional Modules Methodology for Project Type: Green Power and Renewable Energy Certificates (RECs), November 2008, Version 2.1, www.epa.gov/climateleaders/documents/greenpower_guidance.pdf.

11. Kollmuss, A. et al., *Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards,* March 2008, http://wwf.panda.org/about_our_earth/all_publications/?126700/A-Comparison-of-Carbon-Offset-Standards-Making-Sense-of-the-Voluntary-Carbon-Market.

12. The Gold Standard, www.cdmgoldstandard.org.

13. Verified Carbon Standard, www.v-c-s.org.

14. The International Carbon Investors & Services, Voluntary Offset Standard, 2007, www.carboninvestors.org/ECISVoluntaryOffsetStandardFINALJune.pdf.

15. Chicago Climate Exchange (CCX), www.chicagoclimatex.com/.

16. The Climate, Community & Biodiversity Alliance, Standards, CCB www.climate-standards.org/index.html.

17. The GHG Protocol Initiative, http://www.ghgprotocol.org/standards.

18. Center for Resource Solutions, The Green-e Climate Standard, Version 1.1, 2010, www.green-e.org/docs/climate/Green-eClimateStandard_V1-1.pdf.

19. The Climate Action Reserve, www.climateactionreserve.org.

20. Environmental Paper Network, *Carbon Neutral Paper: Fact or Fiction,* 2009, www.environmentalpaper.org/documents/carbon-neutral-paper.pdf

21. The Carbon Neutral Company, The CarbonNeutral Protocol, August 2010, www.carbonneutral.com/interface/files/aboutus/qualityassurance/The%20CarbonNeutral%20Protocol.pdf.

22. World Resources Institute, The Bottom Line on Renewable Energy Certificates, November 2008, http://pdf.wri.org/bottom_line_renewable_energy_certs.pdf.

23. Pew Center on Global Climate Change, Climate Change 101 – Science and Impacts, January 2011, www.pewclimate.org/docUploads/climate101-science.pdf.

24. L. Bird, Voluntary Green Power Market Overview, Presented at Renewable Energy Markets 2010: Green Power 101, Portland , OR, October 2010.

25. Green-e, www.green-e.org.

26. U.S. Environmental Protection Agency, Green Power Partnership – Partner List, www.epa.gov/greenpower/partners/index.htm.

27. The Carbon Neutral Company, Position Paper on the Use of Renewable Energy Credits as Offsets.

28. U.S. Department of Energy, Interstate Renewable Energy Council, North Carolina Solar Center, Database of State Incentives for Renewables and Efficiency, www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1.

29. The Clean Energy States Alliance, www.cleanenergystates.org/projects/state-federal-rps-collaborative.

We invite you to share your thoughts so that we can all benefit from innovative thinking and best practices. For questions and comments on this document, please email us at eQ@sappi.com.