Offsetting Emissions: A Business Brief on the Voluntary Carbon Market

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About This Report

The Ecosystem Marketplace (EM) and Business for Social Responsibility (BSR) have partnered to produce this business brief for companies considering engagement with voluntary carbon markets. The brief was written by Katherine Hamilton, Emma Stewart, Ph.D., and Sissel Waage, Ph.D., with contributions from Alexander Rau, Ricardo Bayon and Amanda Hawn. Please direct comments or questions to Emma Stewart (estewart@bsr.org) or Katherine Hamilton (khamilton@ecosystemmarketplace.com).

For those interested in more information on the current market structure and trends in the voluntary carbon market, we suggest:

Bayon, Ricardo, Amanda Hawn and Katherine Hamilton (2006). *Voluntary Carbon Markets: An International Business Guide to What They Are and How They Work*. London, UK: Earthscan. Available from http://shop.earthscan.co.uk.

For those interested in designing corporate climate strategies, please see:

BSR (2006). "A Three-Pronged Approach to Corporate Climate Strategy." Available at http://www.bsr.org/meta/BSR_Climate-Change-Report.pdf.

About the Ecosystem Marketplace (EM)

The Ecosystem Marketplace (www.ecosystemmarketplace.com) is the world's leading source of information on markets and payment schemes for ecosystem services, such as water quality, carbon sequestration and biodiversity. The EM believes that by providing solid and trust-worthy information on prices, regulation, science and other market-relevant issues, markets for ecosystem services will one day become a fundamental part of our economic and environmental system, helping give value to environmental services that have, for too long, been taken for granted.

About Business for Social Responsibility (BSR)

Since 1992, BSR (www.bsr.org) has been a leading provider of innovative business solutions to many of the world's leading companies. Headquartered in San Francisco and with offices in Paris and Guangzhou, China, BSR is a nonprofit business association that serves its 250 member companies and other Global 1000 enterprises. Through advisory services, convenings and research, BSR works with companies and concerned stakeholders of all types to create a more just and sustainable global economy. BSR maintains a policy of not acting as a representative of its membership, nor does it endorse specific policies or standards. The views expressed in this publication are those of its authors and do not necessarily represent the views of BSR or its member companies.

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Executive Summary:
An Overview of the Voluntary Carbon Market

Global carbon markets have doubled in size over the past year.[1] Current estimates place regulated markets at US$21.5 billion and voluntary markets at about US$100 million for the first three quarters of 2006.[2] And the prospects for continued growth in carbon markets are strong.

The reason is simple: companies are increasingly entering the voluntary carbon market. American Electric Power, Ford Motor Company, HSBC, Google and DuPont are all engaging in voluntary markets to offset their emissions. A recent survey of 92 companies by The Conference Board found that about 75 percent of respondents are actively measuring their carbon footprint, which includes greenhouse gas emissions from both their direct and indirect operations.[3] Over two thirds of the corporate boards covered by the survey have carbon on their agenda. While only 50 percent of surveyed companies have programs in place to reduce or offset emissions, the rapid increase in company carbon inventories (entity level registries) points to a growing pool of potential market players. Only 15 percent of companies surveyed currently engage in voluntary emissions trading, but an additional 40 percent are considering voluntary engagement.

To meet rising interest, the number of voluntary carbon offset providers has grown dramatically in the past two years. Providers such as The Climate Trust invest in renewable energy sources, methane capture and technology retrofits to offset their corporate buyers' emissions. The diversity of offset projects is constantly growing, from reforestation to soil tillage to carbon capture.

Offsets are designed to ensure that emissions do not continue to rise. They do not, however, decrease emissions, which is essential to addressing climate change drivers. When offsets are coupled with corporate efforts to concurrently decrease total emissions, they can become an essential part of corporate climate strategy.

Today, the motivations for companies engaging in voluntary carbon markets are as diverse as the players and include:

- **Fulfilling corporate greenhouse gas reduction targets,** especially when internal reductions are not feasible or cost-effective;
- **Gaining carbon market experience** in order to increase authority and influence in policy discussions about climate change and greenhouse gas regulation;

1 The World Bank & International Emissions Trading Association (2006). "State and Trends of the Carbon Market 2006," Washington D.C.
2 Bayon, R. (2006). Ecosystem Marketplace.
3 The Conference Board (October 18, 2006). "'Carbon Footprint' an Increasing Management Concern," *Executive Action,* No. 213.

- **Preparing for potential regulatory requirements** that may include a range of offset approaches and partnerships;
- **Enhancing brands and/or differentiating products**, including being able to offer products that are carbon neutral at a price premium; and
- **Attracting investors**, particularly in light of increasing investor awareness of risks associated with greenhouse gas emissions in a carbon constrained future.

Despite the growing interest in voluntary carbon markets, companies are finding a difficult playing field. The voluntary carbon market is fragmented with complex carbon "supply chains" and a lack of consistent standards. Carbon offset providers source from projects that range from planting trees in India to capturing methane in U.S. landfills. Assessing the benefits and drawbacks of each provider is challenging, especially as historical data is limited. Some offset projects are independently verified to agreed-upon standards, but others are not. These standards are numerous and overlapping, but not using them runs the risk of having your project come under scrutiny in the future. As with many emerging markets, transaction costs can be high.

However, engagement in voluntary carbon markets may also offer rewards, such as a set of "training wheels" for better understanding the intricacies of carbon markets. In addition, purchasing offsets can benefit public relations and employee pride. And offsets represent an immediate, potentially lower cost step towards reaching corporate climate change strategy goals.

This business brief is intended for companies considering the purchase of voluntary offsets for their greenhouse gas emissions. It offers clear steps that guide early assessments and enable corporate decision makers to become educated consumers within voluntary carbon markets.

> In December 2004 HSBC, one of the world's largest banks, decided to make its operations carbon neutral. As a dry run, HSBC put out a tender for projects that would offset 170,000 tons of CO2 emitted by the bank during the last quarter of 2005. More than 100 offset providers responded to HSBC's request. The company was able to short-list 17 providers based on criteria related to project size, technology employed, country and vintage. When all was said and done, the company spent some US$750,000 buying offsets from a handful of projects in Germany, India, Australia and New Zealand.
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> -HSBC, "Carbon Neutral Pilot Project," 2004

Engaging in the Voluntary Carbon Market

A number of steps can assist a company considering the voluntary carbon market in assessing whether or not—and how—to purchase offsets. These steps, discussed in detail here, include:

1. **Make Internal Reductions**
2. **Set Offset Goals within a Climate Change Strategy**
3. **Explore the Range of Market Opportunities**
4. **Assess Risks**
5. **Select Decision Criteria and Evaluate Offset Projects**
6. **Evaluate Costs and Sellers**
7. **Communicate Your Actions**

1. Make Internal Reductions

The first step for any company prior to launching into voluntary carbon markets is to maximize energy efficiency within operations and across all forms of transport. The less energy used, the fewer carbon offsets will be needed, and the lower the long-term costs of operations.

Maximizing energy efficiency can lead to significant cost savings, so having a handle on current energy usage, making energy efficiency efforts and taking other immediate efficiency-focused actions are important starting points.

A number of online tools can assist in identifying relatively easy efficiency actions. Business decision makers should ask:

- What is the current status of efficiency throughout the company?
- Is there "low-hanging fruit," such as switching to energy efficient light bulbs, installing motion sensors on lights or changing the types of paper used?
- Are current levels of travel, transportation or logistics emissions from business operations and supply/distribution chains as low as possible?

The Business Energy Analyzer provides a comprehensive analysis of a companies' energy use along with customized energy efficiency improvement recommendations. The calculator prepares a report based on information submitted by the user that shows the investments with the greatest savings and those with the fastest payback. Information on multiple buildings may be stored and updated for future use. Visit www.energyguide.com to learn more.

The Paper Calculator enables a company to enter the grade of paper used and compare its impacts to using less paper, increasing recycled content or making other changes that can reduce impacts. Visit the calculator at www.environmentaldefense.org/papercalculator/.

2. Set Offset Goals within a Climate Change Strategy

As with any initiative, companies should clearly define their goals for purchasing offsets. Is the focus on managing regulatory uncertainty? Assuring investors? Protecting brand and reputation? Meeting stakeholder expectations? Or a mix?

A few key questions to consider when setting offset goals include:

- What is the company's environmental strategy on climate change?
- What is the level of risk climate change represents for the industry in general and for the company in particular?
- What are the results of a greenhouse gas **abatement cost analysis**, which compares the marginal cost of additional internal reductions versus purchasing offsets?
- What is the level of **stakeholder and customer interest** in offsetting greenhouse gases emitted and in engaging in the voluntary carbon market? Are there stakeholder or customer concerns that should be considered?

In 2005, Avis Europe achieved its goal of carbon neutrality for its entire operations by investing in energy efficient buildings, recycling more end-of-life products and offsetting non-reducible emissions from energy use and non-recycled waste via clean technology and forestry offset projects.

-Avis Europe, "Annual Report and Accounts," 2005, www.Avis-Europe.com

Nike and Delta Air Lines' "Eco-Class" fund was established in 2001 to give Nike employees the option of allocating a portion of their ticket price to a fund that mitigates the annual climate impact of Nike's air travel. The fund first invested in local offsets, including the conversion of a middle school near Nike headquarters to natural gas. In 2003, Nike decided to invest in the fund through The Climate Trust.

-Nike Environment, "Eco-Class Program," 2006, www.Nikebiz.com

Climate Leaders is an industry–government partnership that enables companies to work with the U.S. EPA to develop long-term comprehensive climate change strategies. Companies set a corporate-wide greenhouse gas reduction goal and inventory their emissions to measure progress.

By reporting inventory data to the EPA, Climate Leaders companies identify themselves as corporate environmental leaders and strategically position themselves as climate change policy continues to unfold.

-www.epa.gov/stateply/

Inter-related with setting climate strategy goals is the process of determining the scope of activities to offset. The options span the gamut and include offsets for:

- **Direct emissions,** which are emissions generated during operations;
- **Product life-cycle emissions,** which offset all the emissions related to a product from "cradle to grave"; and
- **Emissions arising from a specific activity,** such as business travel, commuting, events, products and suppliers.

A company's final decision on the scope of its voluntary offsets is a mix of strategic and pragmatic considerations.

Even if a company decides to offset only a small subset of emissions, many companies still want to assess their full GHG emissions. While a range of online calculators have been created to determine individuals' emissions, one has been created specially for business at www.safeclimate.net. All of these calculators reflect a compromise between accuracy and cost (*i.e.* time). Corporate decision-makers may want to explore the calculators, but if precision is important, hiring a specialist to calculate emissions is preferable.

Another valuable tool is the Greenhouse Gas Protocol Initiative (www.ghgprotocol.org). The protocol is a corporate accounting and reporting standard that provides a step-by-step guide for companies to use in quantifying and reporting their GHG emissions. It is increasingly becoming the *de facto* tool for corporations managing their emissions.

3. Explore the Range of Market Opportunities

Greenhouse gas emissions can be offset in a wide range of ways. The table on the following pages offers a snapshot of common offset projects in the U.S. and globally.

Table 1: Common Types of Offset Projects

Project Type	Advantages	Disadvantages
Methane Capture & Destruction from Landfills	• Efficient means of reducing emissions • Captured methane can be used as fuel • Somewhat reduced odors • Reduced risk of ground water contamination • Relatively inexpensive • Easy to measure and monitor	• Potential project based concerns about complete *additionality*, or whether the project reduces emissions beyond those that would occur under "business as usual" conditions
Methane Capture & Destruction from Livestock	• Efficient means of reducing emissions • Captured methane can be used as fuel • Reduced odors and co-pollutants • Reduced risk of ground water contamination • Relatively inexpensive	• Concerns about complete, project-based additionality
Methane Capture & Destruction from Coal Mines	• Efficient means of reducing emissions • Captured methane can be used as fuel • Few leakage concerns • Can improve safety for mine workers • Relatively inexpensive	• Concerns about complete, project-based additionality; others highly additional (*e.g.* abandoned mines) • Fewer co-benefits than other methane capture methods
Industrial Gas Destruction	• Very efficient • Highly additional • Relatively inexpensive • Easy to reliably measure and monitor	• Potential supply is limited • May not provide the PR benefits of other offset forms
Direct Fossil Fuel Reduction	• Supports clean technology • Cost savings • Reduces co-pollutants such as SOx, PM and VOCs • Reduces fossil fuel dependency • Potential social benefits	• Relatively inefficient means of reducing greenhouse gases

Project Type	Advantages	Disadvantages
Indirect Fossil Fuel Reduction (RECs)	• Already established market with certification and verification systems • Supporting on-grid renewable energy important for decreasing reliance on fossil fuels • Reduces co-pollutants from fossil fuels such as SOx, PM and VOCs	• Compatibility issues between markets for RECs and carbon offsets (*i.e.* double counting of reductions) • Best for offsetting electricity use only
Reforestation–Afforestation of Native Tree Species	• Large number of potential social co-benefits • Contributes to biodiversity conservation • Addresses deforestation, an important part of the climate change problem • High potential PR value	• Lack of permanence • Uncertain science for quantifying reductions • Relatively inefficient means of reducing greenhouse gases • Less efficient than many mono-crop projects • Relatively expensive
Avoided Deforestation of Native Tree Species	• Large number of potential social co-benefits • Contributes to biodiversity conservation • Addresses deforestation, an important part of the climate change problem • Potentially less expensive than reforestation • High potential PR value	• Lack of permanence • Relatively inefficient means of reducing greenhouse gases • Major concerns about leakage (*i.e.* protecting forests in one area shifts deforestation elsewhere) • Difficult to measure additionality • No accepted methodology under CDM
Reforestation–Afforestation Monoculture Forestry	• Some potential for social co-benefits • Trees with high sequestration rates can be selected • Often lower cost	• Lack of permanence • Relatively inefficient means of reducing greenhouse gases • Concerns about water consumption • Reduced social and environmental co-benefits compared to projects that use native tree species • Can backfire in PR terms
Soil Sequestration	• Reduced erosion • Large number of potential social co-benefits • Improved water quality • Relatively inexpensive	• Questions of additionality and permanence should be carefully considered • Science unclear on measuring and quantifying reductions
Geological Sequestration	• Huge potential for storage	• Few co-benefits • Technology still evolving • Long term risks; effectiveness uncertain

In addition to choosing from a variety of project types, companies can also choose to purchase credits from:

- specific providers (the general market);
- established regulated markets, such as the Kyoto Protocol's Clean Development Mechanism (CDM); or
- the Chicago Climate Exchange (CCX).

Companies not interested in joining a formalized cap-and-trade system can purchase from the general voluntary market. Within this market purchases can be made in a variety of ways, such as buying directly from the project developer, utilizing a broker or engaging in the quickly evolving retail market. Buyers should consider how the project location, size and type connect with their offset goals.

Credits from the Kyoto Protocol's CDM can be expensive, but they are also the most transposable at this stage. Their rigorous (and bureaucratic) verification brings credibility and may provide considerable public relations coverage.

CCX is a voluntary registry, reduction and trading system for six greenhouse gases and has been expanding beyond North America to build bridges with other trading platforms. The platform is self-regulated by members, who make a voluntary but legally binding commitment to reduce GHG emissions by 1 percent per year.[4]

4. Assess Risks

There are risks to entering voluntary markets. While these markets are growing rapidly, they are not yet mature.

Once corporate goals are set and the range of prospective offset options are understood, an educated process of assessing risks can be undertaken.

The major concerns are whether purchasing credits will actually result in permanent, equivalent offsets, and if credits will be recognized by customers and other stakeholders. These risks, however, may be balanced for some companies by the benefits associated with taking a leadership position on climate change.

A growing selection of verification standards is evolving to address these concerns, as detailed in Table 2.

4 CCX (2006). "About CCX," www.chicagoclimatex.com.

Table 2: Major Verification Standards for the Voluntary Carbon Offset Market

	Gold Standard	The Voluntary Carbon Standard	Climate Neutral Network	Green-e	Climate, Community, Biodiversity Standard	Chicago Climate Exchange	ISO 14064
Focus on Environmental and Social Co- Benefits							
Requires Monitoring							
Reporting/ Registration							
Uses WRI/ WBCSD GHG Protocol							
Certification Outside U.S.							
Compatible with Other Standards							
Sequestration Projects							
Off-Grid Renewables							
Energy Efficiency							
Methane							
Renewable Energy Credits							

The Voluntary Carbon Standard is rapidly gaining prominence in the voluntary market. This independent standard was launched in 2006 by The Climate Group, the World Economic Forum and the International Emissions Trading Association. The Standard borrows heavily from regulated carbon markets on issues like additionality, documentation and monitoring. The current draft examines the balance between being prescriptive and rigorous and the need to encourage innovation and flexibility in the market. The standard currently does not accept forestry projects.

The Climate, Community and Biodiversity Alliance's (CCBA) voluntary standard helps to design and identify land management projects that mitigate greenhouse gases while supporting biodiversity and community development. Without this kind of standard, reforestation can easily lead to biodiversity loss as monocultures of the same species and age tree are planted. The location of voluntary forestry projects can raise questions about project longevity in regions where forestry is rife with corruption. It is important for

companies considering forestry projects to explore both the additional benefits and risks of taking on these projects.

Lastly, companies must be aware that offsetting has its critics, who say that emissions must be reduced rather than offset. Some critics feel that companies are simply throwing money at a problem, rather than considering new management practices with longer-term impacts: in essence, offsetting is a form of "green wash." These criticisms are yet another reason why offsets should be seen as only one part of a corporate climate strategy and should be selected only when reducing emissions is not feasible.

> BP's move to encourage motorists to pay £20 a year to offset their driving emissions followed closely behind similar initiatives by Honda and Ford. BP's scheme was criticized by some environmentalists on the grounds that it would lead motorists to salve their consciences instead of taking steps to cut emissions from driving, such as buying a smaller car. Robin Oakley of Greenpeace states that "So-called offsetting is better than doing nothing but only just. It's like smoking 20 cigarettes then going for a run to feel less guilty. As long as British vehicles are pumping tens of millions of tons of CO2 into the atmosphere every year, no amount of investment in clean energy projects built thousands of miles away will reduce the effect that our emissions are having on the climate."
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> -Harvey, F., "BP Wants £20 from Motorists to Make Amends for CO2 Emissions," *The Financial Times*, August 23, 2006

5. Select Decision Criteria and Evaluate Offset Projects

After a decision to move forward with voluntary offsets is made based on corporate goals and due consideration of risks, the process of selecting a specific offset begins. Establishing clear decision criteria can enable companies to focus on non-negotiable values that can act as an initial filter. Clear criteria will also allow decision makers to compare and contrast the benefits of a selected set of options.

A list of recommended criteria is presented in Table 3.

Table 3: Recommended Decision Criteria for Evaluating Offset Projects

Criteria Category	Criteria
Offset Matched to Emissions	• Rigorous and conservative baseline calculations of current and projected emissions at designated boundary level (*e.g.* all operations, single region, headquarters) • Accurate estimation of emissions reductions feasible in time allotted • Renewable energy credits (RECs) are considered only to offset electricity use
Offset Is Additional to Business as Usual	• Emissions are tracked and registered to avoid double counting and to clearly demonstrate ownership • Beyond regulatory/industry/common practice standards • Clear timeframes • Offsets do not cause leakage, or additional emissions elsewhere
Offset Is High Quality	• Likely to be successful, using conservative estimates • Registered to avoid double counting and ensure future acknowledgement by regulators • Certified by a credible third party with experience in verifying GHG projects for measurable results and durability
Offset Provides Cascading Benefits	**Social** • Improved local quality of life • Recreation and sustainable tourism revenues **Environmental** • Reduction of associated pollutants in air and water • Biodiversity benefits, such as using native species in forestry
Offset Has Stakeholder Appeal	• Easily communicated to stakeholders and media • Emotional appeal • Creates brand loyalty among potential customers within local communities • Meets any specific expectations of key stakeholders (*e.g.* emphasis on particular developing country) • Has potential for opening access to new capital streams
Offset Satisfies Organizational Needs	• Seller is credit-worthy and reputable among stakeholders • Offers potential for future purchases or project expansion • Helps foster loyal relationships with selected on-the-ground partners • Provides educational opportunity and boosts morale among employees

6. Evaluate Costs and Sellers

The range of carbon prices on the voluntary market is significant. From the wholesale to the retail level, offsets range from less than US$5.00 to around US$35.00 (per metric ton of CO2 equivalent). Prices can be compared at two levels:

- **Cost of the offset project**, which includes technical reduction costs that are influenced by project type, size, location, upfront costs versus payback time, transaction and administration costs, and the offset seller's profit.
- **Market price of the credit sold**, which is influenced by broker commissions, certification costs, market liquidity and information availability, and of course, overall demand.

Prices may also depend on the level at which companies decide to purchase offsets, such as investing directly in a project or working with a broker to purchase credits on the voluntary market. When investing, sellers should consider the risks and benefits relative to prices and offset quality.

Table 4 on the following page outlines some examples of voluntary offset providers.

Table 4: Examples of Voluntary Carbon Offset Providers

Name	Function	Project Type	Project Location	Organization Type	Website
The Climate Trust	Retailer based in U.S.	Mix	Americas	Nonprofit	www.climatetrust.org
Native Energy	Retailer based in U.S.	Mix	U.S. (Sioux reservations)	For profit	www.nativeenergy.com
Green Fleet	Retailer based in Australia	Forestry	Australia	Nonprofit	www.greenfleet.com.au
Reforest the Tropics	Wholesaler based in North America	Forestry	Costa Rica	Nonprofit	www.reforestthetropics.org
Futoro Forestal	Retailer based in Germany/Panama	Forestry	Panama	For profit	www.futuroforestal.com
The Nature Conservancy	Wholesaler (international)	Forestry	Global	Nonprofit	www.nature.org
Conservation International	Wholesaler (international)	Forestry	Global	Nonprofit	www.conservation.org
SELF	Wholesaler (international)	Solar	Global	Nonprofit	www.self.org
Plan Vivo/ ECCM	Wholesaler based in UK	Forestry	Global	Nonprofit	www.planvivo.org
Climate Wedge	Wholesaler (international)	Mix	Global	For profit	www.climatewedge.com
Myclimate	Retailer based in Switzerland	Mix	Global	Nonprofit	www.myclimate.org
Climate Neutral Group	Retailer based in Netherlands	Mix	Global	Nonprofit	www.businessforclimate.nl
Carbon Neutral Company	Retailer based in UK	Mix	Global	For profit	www.carbonneutral.com
Climate Care	Retailer based in UK	Mix	Global	For profit	www.co2.org

7. Communicate Your Actions

A company can both enhance its brand and address emerging stakeholder concerns by embedding climate change goals and targets into communications with employees, customers and shareholders. The Conference Board found that about 50 percent of companies report on carbon and greenhouse gas issues publicly, while the other 50 percent plan to report in the near future.

Corporate communications on carbon emissions have increased substantially due to demands from The Carbon Disclosure Project (CDP) (www.cdproject.net), a secretariat for the world's largest institutional investor collaboration on the business implications of climate change. CDP represents a process whereby many institutional investors collectively sign a single global request for disclosure of information on GHG emissions. CDP has historically sent this request to the FT500 but in 2006 expanded its sendout to 2180 companies, with over 950 responses.

Whether or not a company responds to the CDP, public discussion of carbon and greenhouse gas emissions is on the rise. Approaches to reporting carbon-related efforts can span the gamut and include sustainability or corporate citizenship reports, websites, press releases and annual reports.

In October 2006, Wells Fargo committed to purchasing 550 million KwH of Green-e certified wind energy each year for three years. This commitment accounts for only 40 percent of Wells Fargo's consumption, but it moved the company to the top of the EPA's Green Power Partners list ahead of Whole Foods, which famously purchases 100 percent of its electricity from renewable sources. Wells Fargo received a good deal of positive, and free, press.

-Wells Fargo, "Wells Fargo Commits to Largest-Ever Corporate Purchase of Renewable Energy in U.S.," 2006, WellsFargo.com

California Climate Action Registry (CCAR), developed by California statute as a non-profit voluntary registry for greenhouse gases, has developed a General Protocol and additional industry-specific protocols with guidance on how to inventory emissions in the Registry, including what to measure, how to measure, the back-up data required and certification requirements. Participants agree to register their gross greenhouse gas emissions and efficiency metrics for all operations in California and are encouraged to report nationwide.

- www.climateregistry.org

Conclusion

Whether or not a company decides to engage in the voluntary market, it is increasingly a wise strategy for businesses to consider calculating their emission footprint and registering the emissions with a recognized entity level registry.[5] Entity level registries include the California Climate Action Registry in the U.S., numerous European national registries reporting to the European Registry, and Japanese, Canadian and Russian registries reporting to the International Registry.[6]

Registering emissions will position companies to anticipate emerging regulations across different regions while accruing the benefits of gathering and formalizing emissions data. Registering will also allow employees to learn more about the nuances of the production process, identify waste and inform new efficiency metrics.

5 These should not be confused with registries for carbon credits, such as the Bank of New York custodial registry service for voluntary carbon credits. This includes a secure and robust platform for documenting carbon offset credits that ensure ownership chains and double-counting.

6 Carbon Registry Services (2006). "Managing an Emission Portfolio and Transacting across Multiple Registries."