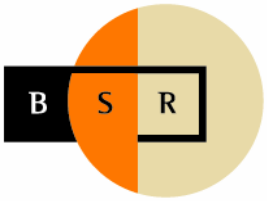

Business for Social Responsibility

Environmental Markets: Opportunities and Risks for Business

July 2006

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Since 1992, non-profit Business for Social Responsibility (BSR) has been a leading provider of innovative business solutions to many of the world's leading corporations. 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, convening and research, BSR works with corporations and their stakeholders to create a more just and sustainable global economy. For more information, visit www.bsr.org.

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This report was prepared based upon in-house research, interviews and roundtable discussions. Please direct comments or questions to Emma Stewart, Ph.D., Research Manager at BSR (estewart@bsr.org).

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1. Executive Summary

> *We have become increasingly aware of an inescapable and disturbing fact: We will not be able to sustain our businesses over the long haul because they are based on two assumptions that no longer hold. One is that cheap, unlimited supply of hydrocarbons and other renewable sources will always be available. The other is that the earth's ecosystems will indefinitely absorb the waste and emissions of our production and consumption.*
>
> –Chad Holliday, CEO, DuPont (2001)[i]

Over the past five years, 1,300 scientists the world over have undertaken the Millenium Ecosystem Assessment, a comprehensive global assessment of the health of the "services" provided to mankind by the natural environment—the world's "environmental services." These are **society's life support systems, and they provide critical functions such as flood control, climate regulation and water purification[ii].** The scientific findings, published last year from this work, conclude that **60 to 70 percent of these functions are being degraded faster than they can recover[iii]**.

How much are healthy, well-functioning environmental systems worth to your company's bottom line? Most of these services are currently provided free of charge and would be prohibitively expensive or impossible to replicate with technology. If they are worth so much in their natural state, how should companies invest in environmental services to assure their continuity for sustained business operations now and into the future? The work here provides a guide to how companies can and are beginning to think about the environmental services issues critical to business success.

Companies rely on environmental services for the most fundamental aspects of their operations, including raw materials, predictable flows of clean water and carbon sequestration. The environment also provides other less noted, free services such as pest control and protection from severe storms and disease. Up until now, most enterprises have taken these services for granted as simply fixtures of the operating environment. We expect that there will be sufficient clean water for operations, that raw materials will continue to flow in predictable patterns, that transport will not be unduly interrupted by increases extreme weather and that our workers will have healthy air to breathe.

Indeed, to date, much of the focus of corporate environmental management has been on an input/output model. Companies report regularly on their material and energy usage and their environmental impacts. How business operations impact the functioning of environmental services is rarely, if ever, mentioned. Yet it is these life-supporting services that create the basis upon which all economies rely.

The role of environmental services in business can no longer be taken for granted. Denuded forest lands have increased the potential of flooding and affect not only water availability during the course of year, but also water quality. The atmosphere's ability to

absorb society's greenhouse gas emissions is overtaxed, leading to climate change and the severe storms that come with it.

The emergence of market mechanisms to protect environmental services promises new business approaches to these issues. Efforts already underway are pricing environmental services, based upon the value they represent to corporations, communities and individuals. Environmental market mechanisms, already a success story in the U.S. in the 1990s, are evolving and are now trading in environmental services.

Already, multi-million dollar markets exist in greenhouse gases, wetlands, water pollution, and even in endangered species. Reductions in carbon emissions now trade at $30/ton in Europe; in the U.S., water pollution abatement trades at $45/ton; management of wetlands trades between $5,000-$250,000/acre; while management of real estate to preserve biodiversity goes for $3,000-$150,000/acre. **In fact, the carbon market is projected to be the largest commodity market in the world[iv].** There is growing consensus among the scientific and environmental communities that these market mechanisms are the "way of the future."

These markets represent new opportunities for both sellers and buyers of environmental services. The most efficient users are able to sell surplus services to buyers in need of high levels of the same service to operate their business. As these markets expand, companies must understand this changed terrain and decide whether, when and how to engage.

As hard, tangible value is assigned to environmental services, companies will be well served by exploring potential investments, as well as their exposures associated with them. Some companies are beginning to see increased value for their real estate, a new ability to ensure consistent and high-quality supplies of raw materials, more cost-effective environmental management, cheaper cost of compliance and regulatory "goodwill." It is likely that in the foreseeable future, attention to these services will become similar to the attention companies give to other corporate assets, such as infrastructure. In this case, the "infrastructure" is the environmental services upon which the company relies.

In order to help companies understand the environmental services on which they rely and the value these services represent, BSR has designed a multi-year initiative for BSR companies.

We have already convened a number of multi-sector dialogues among policy makers, researchers, market brokers and companies (including Shell, Abbott, PG&E, Brown-Forman and others), and conducted a survey of companies such as BP, Chevron, Unilever, McDonald's and Rio Tinto regarding their approaches to these emerging market opportunities.

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II. Introduction: The Business of Environmental Services

In the Panama Canal, millions of gallons of freshwater are required to raise and lower boats. Deforestation in the areas surrounding the canal have increased erosion rates, making freshwater supplies more erratic and silting up the canal itself, which requires constant dredging.

The chairman of ForestRe, John Forgach, realized that insurance companies were charging users of the canal large premiums due to the risks of business interruption from silting or water shortages. Companies were paying these premiums because the alternative of shipping around the tip of South America would cause enormous losses.

As an alternative that addressed the core issue, Forgach proposed to the insurance companies that they help finance the cost of a 25-year bond to restore a healthy forest ecosystem in order to reduce their risk of having to pay out damages. Since this would lead to reduced premiums, he also asked the major shippers to pay a portion of those savings in the form of recurring cash flows to pay down the bond.

Now companies that rely heavily on the canal, namely Wal-Mart and Japanese automakers, are helping to pay for the bond and experiencing lower insurance premiums. It falls to ForestRe to ensure that the canal will remain healthy[v].

The situation in the Panama Canal is not unique. Increasingly, businesses are experiencing disruptions due to ecosystems that are not functioning as they have in the past. The costs are adding up.

In response, markets and payments for environmental services are emerging. These markets are growing in the same way that any market does: as people recognize a need for a good or a service. The services around which these markets are emerging are ones on which we have always relied, to the point that they are almost invisible to businesses.

Water filtration, climate regulation, pollination, pest control and disease regulation are just some of the many services that wetlands, forests, grasslands and oceans provide to people and businesses around the world. Table 1 below provides an overview of industry sectors and the environmental goods and services each sector utilizes.

Table 1. Examples of Environmental Goods and Services for Different Industry Sectors

Industry Sector	Environmental Good	Environmental Service
Agriculture	Food, fiber	Pollination
Pharmaceuticals	High quality freshwater	Water purification
Extractives & Utilities	Hydrocarbons	Decomposition of organic matter
Consumer Products	Waxes, oils, rubber, fragrances, latex	Creation & maintenance of genetic diversity

While environmental goods traditionally have been assigned value in the global market, environmental services have not. The current system of valuing nature leads to economic decisions that favor the consumption of environmental goods over the conservation of environmental services. It also favors economic and real estate development that degrades environmental services at a net cost to communities and society.

An alternative is documented in the cases presented below.

Mitigating Carbon Risk through Developing Countries

American Electric Power Corporation, Chevron-Texaco and General Motors have paid $18.4 million for climate credits with the Guaraqueçaba Climate Action Project in Brazil. The GCAP has sought to regenerate and restore natural forest and pastureland, and it sells carbon emission offset credits for the 8.4 million metric tons of carbon dioxide the restoration project is expected to sequester in its lifetime. Thus far, the project is demonstrating ecological and economic benefits locally while helping the companies to mitigate their carbon risk.

Source: The Nature Conservancy (1999)

Chevron-Texaco's Wetlands Mitigation Bank in Paradis, Louisiana

Paradis was once a highly-productive drilling site, but by 2001 it was entirely tapped out. Rather than build homes or sell the land, Chevron planted trees and dug ditches to allow the area to naturally restore itself to wetlands. The investment was minimal, and due to the sparse supply of mitigation credits in this watershed, the acre/credits sell for $20,000-$25,000. With 7100 acres, Chevron stands to earn $150 million in revenue.

The local drainage board remains responsible for preserving the land, and at $20 per acre, it makes for a pretty attractive bargain. The restored wetlands will also benefit the drainage board, since they will retain water and take pressure off of the pumping stations.

Source: *Ecosystem Marketplace* (2006)

Of course, much like any market, environmental markets in environmental services need iterative transactions between sufficient numbers of buyers and sellers, timely and credible information, fair competition and trust. In order for the emerging markets to come to scale, oversight and regulation will be important early ingredients to ensure credibility in the market and to prevent unintended consequences. Unique to these markets, biological and economic sciences must provide the fundamental building blocks of any given transaction.

> "Wall Street likes huge markets," says Mark Tercek, Managing Director at Goldman Sachs, "and the carbon market could shape up to be the largest commodity market in the world."
>
> Goldman Sachs' comprehensive Environmental Policy acknowledges the degradation of "ecosystems services" and commits the firm to investment research and market building in these services.
>
> Source: Managing Director, Goldman Sachs (2006)

III. Background: The Science of Environmental Services

The Millennium Ecosystem Assessment, completed last year, was the most comprehensive survey ever undertaken of the earth's ecological health as it pertains to human well-being[vi]. It brought together 1,300 scientists from 95 countries over four years. The Assessment, which was fully subject to peer review, synthesized information from the scientific literature, datasets and models, and it includes knowledge held by the private sector, practitioners, local communities and indigenous peoples. It concluded that 60 to 70 percent of environmental services—functions such as flood control, climate regulation, crop pollination and water purification—are being degraded faster than they can recover. These services are currently provided to us free of charge and would be prohibitively expensive or impossible to replicate with technology. In other words, we are depleting our environmental assets faster than we are preserving or replacing them.

These trends will affect the cost of doing business. If they continue, environmental services that are freely available could become significantly more expensive. Depending on the product/service lines and on the competitive position of the firm, some of these costs may be internalized by industry and then passed through the value chain.

As we see in the wake of Hurricane Katrina and predictions of even more fierce and frequent storms to come, more than a dozen small insurers have recently pulled out of Florida, and big insurers like Allstate are declining to renew policies in many coastal areas, such as New York. Those still offering insurance are increasing deductibles, setting tighter limits on coverage, and pushing for rate increases of 79 percent or more.

In addition, several oil companies have been sued for contributing to ecological degradation across 1 million acres of wetlands in Southwest Louisiana—wetlands that would have acted as natural buffers against storm surge. In the short-term, these legal costs represent a very real price that is being paid for damaging environmental services.

Source: *Business Wire* (2005) and *U.S. News & World Report* (2006)

Today, however, relatively few companies are considering environmental service issues. Few show cognizance that businesses could be affected by shifting insurance rates, regulatory frameworks, shareholder expectations, access to capital and employee satisfaction. We have seen challenges to companies' license to operate in agricultural biotechnology, water bottling and tuna fishing practices. Access to natural resources may also become constrained, from extraction in sensitive habitat to clean water in increasingly arid areas.

These trends will also have disproportionate impacts on the emerging markets of the world, access to which is increasingly important to multinational companies seeking new

markets[vii]. As *The Economist* stated last year, "Natural capital makes up a big part of the wealth of the poorest, but not the richest countries, making it all the more important for poor countries to manage their natural resources wisely."[viii] We are already seeing armed conflicts over fresh water for irrigation and drinking needs[ix], and it is predicted that such disputes will become more and more common, especially in some of the most unstable regions such as southern Asia, Africa and the Middle East. For many companies, such conflicts portend a future of uncertainty for both access and cost, as well as political risks associated with contested control of the resources. For some of these situations, ecosystems markets are an instrument that can bring efficiency, transparency and certainty. These advantages may be achieved if equity considerations are embedded in whatever market structures may emerge.

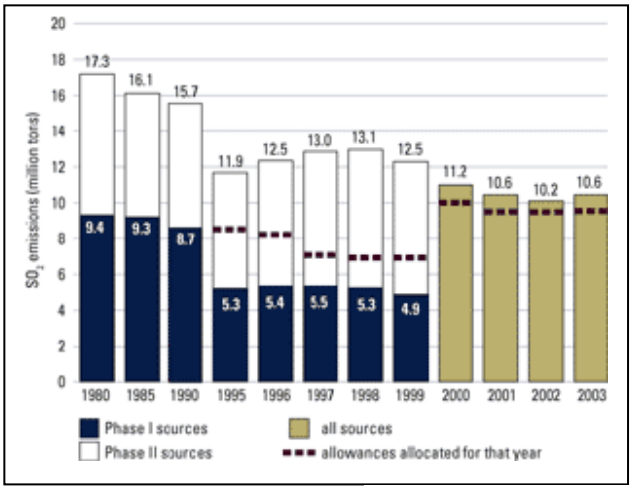
IV. Market Mechanisms and the Environment

We are entering a new era in which environmental concerns are integrated fully into economic market regulation.

–Achim Steiner, UN Environment Programme, 2006[x]

The idea of applying market mechanisms to environmental problems began in the U.S. in the early 1990s. A cap-and-trade system was set up under the U.S. Clean Air Act that allowed for trading in pollutant allowances of sulfur dioxide, one of the gases responsible for acid rain. Under this Acid Rain Program, the largest utilities in the U.S. reduced their sulfur dioxide emissions more than 50 percent from 1980 levels. The real breakthrough was that the trading generated a jump in reductions and was responsible for the most cost-effective reductions. Resources for the Future calculated that allowance trading saved $700-$800 million per year, compared to uniform emission rate standards[xi].

Figure 1. SO2 Reductions (Cap-and-Trade in 1990)



Source: EPA (2004)[1]

Government and market mechanisms worked in synchrony: the government maintained property rights and set clear limits on emissions, while the market determined the lowest price at which these limits could be achieved[xii]. Sulfur dioxide levels in the atmosphere fell by more than 40 percent, and signs of recovery were evident in previously acidified lakes and streams throughout the most heavily affected regions. In the language of ecosystems services, clean air and clean water were enhanced by creating a market and allocating emissions rights where neither formerly existed.

This early model demonstrated how markets bring the advantage of creating value for improvements, even at the margin. Compare this with traditional command-and-control regulation, which creates value for getting to a certain point (*e.g.* 20% reduction in emissions) but no incentives for going beyond that point. In other words, you can't reduce your way to greatness[xiii]. Market mechanisms must be more affirmative about enhancing the environment. When designed appropriately, markets will reward continuously better, beyond-compliance behavior.

Today, an array of policy tools has been developed to harness the power of markets and the global economy toward the conservation of environmental services. "Payments for

environmental services" (PES) is an umbrella term for the entire range of economic incentive schemes for conservation, from global markets trading a fungible commodity (like carbon credits) to highly localized efforts to conserve a native species like the ivory-billed woodpecker. As a means of understanding the divergent types of PES schemes, it is useful to break them into three broad groups, discussed below: public payment schemes, self-organized deals and open trading schemes.

Payment and Trading Schemes

Public Payment Schemes

A. **Government payments to property-owners** who agree to adopt land management practices associated with the production of environmental services are currently the most widespread form of direct environmental service payment in the world. For example, the Conservation Reserve Program in the United States pays an average of $1.4 billion to farmers each year to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips or riparian buffers[xiv].

B. **Governments tax breaks** to provide incentives for the conservation of environmental services are also common. For example, tax credits for so-called "conservation easements" (the selling off of the rights to develop a piece of property in a certain way) are designed to protect the environment and the services it provides.

C. **Philanthropic conservation programs** have been set up around the world according to a direct PES model. The Nature Conservancy, the world's largest environmental organization, often pays landowners for the development rights to their land in order to protect the environmental services associated with undeveloped habitat.

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Self-Organized Deals

Self-organized deals, in which individual beneficiaries of environmental services contract directly with providers of these services, are becoming increasingly common. This type of transaction between two or more private actors (such as NGOs or companies) is likely to increase as environmental services degrade, grow scarce and begin to impact the supply chains of companies. These schemes provide mutual benefits to all parties without the need for an extensive market structure.

Perrier Vittel, a bottled water company in France, has been sponsoring watershed maintenance upstream of their operations since the late 1980s. Concerned that fertilizers and pesticides were contaminating their high-quality water sources, the company entered into long-term contracts with upstream farmers over 1600 hectares of land. The farmers used the money to invest in clean technologies and organic fertilizers.

Source: Ellison & Hawn (2005)

A study by the International Institute for Environment and Development[xv] of 72 cases of markets for forest biodiversity protection services in 33 countries found that the main buyers of biodiversity services were (in order of prevalence) private corporations, international NGOs and research institutes, donors, governments and private individuals. The most prevalent sellers were communities, public agencies and private individuals. Most of these cases took place in Latin America, Asia and the Pacific. Only four cases were identified in Europe and Russia, and one was identified in the U.S.

Open Trading Schemes

Open-trading schemes are also beginning to emerge around the world. These PES schemes, which are the logical extension of self-organized deals, require the normal necessities of functional markets, including sufficient liquidity and transferability, low transaction costs and good access to information. There are two kinds of open-trading schemes: voluntary markets and compliance markets.

A. **Voluntary markets** for environmental services are often driven by philanthropic or public relations motivations, but they benefit companies by identifying inefficiencies, reaping early mover advantage and anticipating regulation. According to ongoing research by the Ecosystem Marketplace, the volume for voluntary carbon trading will reach approximately $150 million a year in 2006-2007.

   Voluntary transactions are useful to companies because they can provide first mover advantage, especially where large technological investments in asset-intensive industries are concerned. Voluntary transactions often have lower **bureaucratic costs**, thus making credits cheaper to produce. However, voluntary transactions and credits may be **harder to guarantee**, since the projects that produce them go through fewer hoops. Numerous companies are engaging in voluntary transactions in the hoping of gaining a **seat at the public policy table** or being rewarded by future regulation for their actions. The Acid Rain Program in the 1990s did not recognize early action, but there are signs that regulators now consider this a mistake.

Chicago Climate Exchange (CCX) is a greenhouse gas emission reduction and trading pilot program for emission sources and offset projects in the United States, Canada and Mexico. CCX is a self-regulated exchange designed and governed by corporate, university, trade association and NGO members who have made a voluntary commitment to reduce their emissions of greenhouse gases by four percent below the average of their 1998-2001 baseline by the year 2006.

Source: Chicago Climate Exchange (2006)

At present, high transaction costs have prevented numerous voluntary environmental services deals and have represented a serious impediment to carbon trading. As markets mature, these transaction costs should diminish and fundamentally alter the calculus. The question now simply relates to the speed of market maturity.

One major failing of voluntary transactions is their scalability and impact: **voluntary transactions alone are likely not sufficient** to reach the ecological targets necessary for restoring and maintaining earth's life support systems.

A report by the Climate Group, an organization of companies and government members, reviewed the efforts of 72 companies from 18 industries in 11 countries that have committed to cutting greenhouse gas emissions. Thus far, these commitments have reaped $11.6 billion in savings, with four firms—Bayer, BT, DuPont and Norske Canada—accounting for $4 billion of that.

Source: Climate Group (2004)

B. **Compliance markets** for environmental services are driven by regulatory requirements that often take the form of a cap on environmental degradation. The European Union Emissions Trading Scheme and the Kyoto Protocol both launched in 2005 as global compliance carbon markets. In the U.S., wetlands mitigation banking is estimated to be worth $1 billion per annum—with more than 400 established banks in 40 states—and is predicted to experience rapid growth[xvi].

Brazil stands to earn nearly $500 million a year from selling carbon credits through Kyoto's Clean Development Mechanism for developing countries. Now tropical countries are gaining traction in international circles to develop credits for "avoided deforestation"—perhaps the most cost-effective approach to climate change—and a way to set voluntary targets for developing countries, which are now exempt from Kyoto's emissions caps.

Source: *The Economist* (2006)

For companies, market-based policy mechanisms tend to **lead to cheaper regulatory compliance** than technology-focused or other prescriptive regulations. Management practices that are developed to comply with such regulations have the **benefit of certainty**, since there is very little risk that these practices will be overlooked in future regulatory targets or actions. However, new policy mechanisms do **require that government oversee a functioning market**.

The U.S. Environmental Protection Agency requires most states to develop water pollutant control strategies, known as Total Maximum Daily Loads, which determine the maximum amount of a particular pollutant that a water body may receive and still meet required pollutant limits. Pollutant trading programs have developed as a way to minimize the cost of achieving water quality goals. Central bodies that act as pollutant banks or exchanges may be established anywhere in the U.S., but their service area is based on individual watersheds. Currently, municipal and industrial dischargers are the primary traders, and many look to farms and animal feed operations for low cost pollution reduction credits.

Source: U.S. Department of Agriculture (2003)

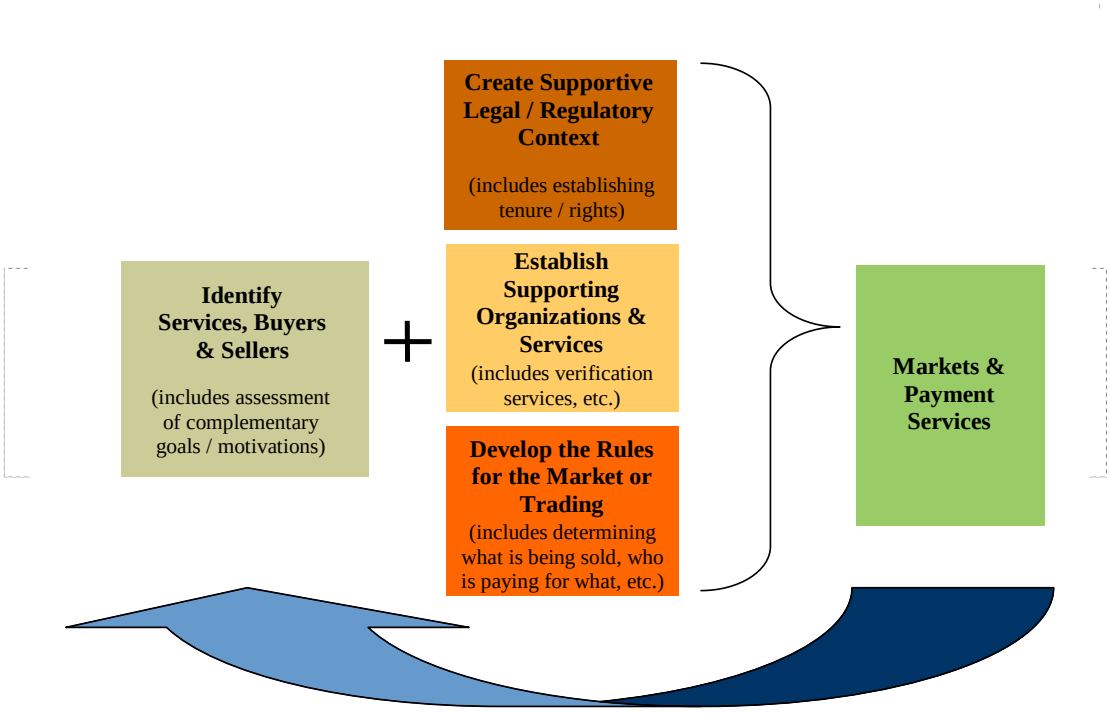
The Emergence of Market Players

So how do these markets come about? Through a combination of entrepreneurship, voluntary action to mitigate risk, regulatory frameworks and efficient pricing mechanisms. The typical market shapers are already in the game…

Private equity firms, hedge funds and speculators are taking early positions in carbon, water and biodiversity markets. These companies create liquidity in the market and then sell to institutional investors, often at a handsome profit, as these environmental assets and the businesses controlling them are revealed. Institutional capital then bulks up the market and replicates business models as price signals emerge. Meanwhile, companies with substantial environmental externalities and impacts become less profitable as their margins are eroded to pay for their impacts. Investment allocations shift, and new businesses exposed to environmental markets gain value and market share, and outperform the status quo.

–David Brand, Ph.D., Chairman, New Forests Pty Limited, Australia, 2006[xvii]

Figure 2. The Phases for Environmental Services Payment and Market Creation



Source: Waage, Sissel, Sara Scherr, Mira Inbar and Michael Jenkins. 2005. "A Guide to Conducting Country-Level Inventories of Current Ecosystem Service Payments, Markets, and Capacity Building." Washington, D.C.: Forest Trends. (http://www.katoombagroup.org/africa/documents/inventories/National%20Inventory%20Framework.doc)

Table 2. Status of Selected Payments for Environmental Services

Commodity	Type of Market	Name of Market (start date)	Size of market	Current trading price
Sulfur Dioxide emissions	Regulatory (U.S.)	Regional Clean Air Incentives Market (1994)	$600,000	$2,000 per ton
Nitrous Oxide emissions	Regulatory (U.S.)	Regional Clean Air Incentives Market (1994)	$20,700,000	$4,000 per ton
Wetlands	Regulatory (U.S.)	Wetland Mitigation Banking (1995)	$289,659,866	$5000 to $250,000 per acre
Biodiversity	Voluntary Biodiversity Deals (international)	--	$331,257,678	
	Regulatory (U.S.)	Conservation Banking (2003)	$40,773,590	$3000 to $150,000 per acre
	Voluntary, pilot for future regulation (Australia)	National Market-based Instruments Pilots Program (2003)	$3,877,531	N/A
Water	Voluntary (Costa Rica)	Water-Based Ecosystem Services Markets (1996)	$8,944,943	$40 to $100 per hectare of forest
	Voluntary (Mexico)	Payment for Hydrological Services (2003)	$23,133,980	$33 per hectare
	Regulatory (U.S.)	Water Pollutant Trading and Offset (2003)	$11,293,926	$2.37 per pound sediment/nutrients
Mercury emissions	Regulatory (U.S.)	Clean Air Mercury Rule (2005)	Begins in 2010	Begins in 2010
Greenhouse Gas emissions	Regulatory (EU)	European Union Emissions Trading Scheme (2005)	250,000,000 tons ($ figure not available)	$12 per ton of CO2 equivalent (from recent average of $35/ton)
	Regulatory (international)	Kyoto Protocol (Joint Implementation & Clean Development Mechanism)	$7,630,000	$0.58 per ton of CO2 equivalent
	Regulatory (Australia)	New South Wales Greenhouse Gas Abatement Scheme		$15 per ton of CO2 equivalent
	Voluntary	Chicago Climate Exchange (national/linked to EU) (2000)	2,948,400 tons ($ figure not available)	$4.00 per ton of CO2 equivalent
	Regulatory	Regional Greenhouse Gas Initiative (New England)	Begins in 2009	Begins in 2009
		California, Oregon, Washington	Pending	Pending

Sources: EU ETS, Ecosystem Marketplace, EPRI Solutions, RECLAIM, Point Carbon

IV. Risks Associated with Engagement

While businesses have a number of opportunities associated with engaging in environmental markets, there are also a number of risks.

Specific potential risks are as follows:

1. **High Transaction Costs:** Currently, trading environmental services is time and money-intensive. Transaction costs are high, and the science is not absolute. In order for companies to consider environmental service trading, they should conduct a cost–benefit analysis to determine if there are other less costly options for environmental protection and compliance.

2. **Increased Regulatory Scrutiny:** Some companies fear revealing the environmental services they manage, such as endangered species habitat, because they believe that this exposes them to regulations and scrutiny. In some instances, this fear is ungrounded, because in a trade of endangered species habitat, the seller is absolved of all responsibility once the transaction has occurred. In wetlands banking, brokers are beginning to take on regulatory liability as part of the deal. However, in some instances, the answer is less clear. For example, Shell Oil has invested in a carbon sequestration project in Indonesia but worries that it will now be held accountable for the fate of the orangutan population that lives there[xviii].

> Shell Oil is currently engaged in a biodiversity offset project in Qatar. While Qatar has no environmental regulatory framework, Shell plans to offset the biodiversity impacts of its $6 billion natural gas facility by offsetting nearby. "Impact mitigation can only take us so far," says Sachin Kapila, Group Biodiversity Advisory for Shell. "We may need to look beyond our footprint and address residual impacts better than industry has in the past." Of course, not everything is straightforward. "Is [our offset] a like-for-like replacement? I don't know." The science underpinning biodiversity offsets is still early in its market development.
>
> Source: Ness (2006)

3. **Real Estate-Related Risks:** Many believe that revealing the presence of a protected habitat on their land (*e.g.* wetlands) will decrease their property value or access to agricultural subsidies. However, with environmental services markets, as long as companies are willing to commit the land to sustainable management practices (which introduces some limitations on what can be done), this property value could increase instead.

4. **Long-Term Value Proposition:** The sale value of certain environmental services trades, such as biodiversity, often increases on time horizons much longer than the typical business cycle (10–20 years versus quarterly). Others, such as greenhouse gas emissions, wetlands mitigation or water quality, will have more immediate benefits.

5. **Lack of Guarantee:** If a company pays a landowner to manage the land in a sustainable manner, the company needs a guarantee that this will indeed happen, and that the ecological benefits are manifested. Risk can be minimized by building the guarantee into the contractual agreement, but given the difficulty in proving ecological benefits, breeches of contract may be harder to prove than in other types of transactions. In regions with poor governance, companies may find it harder to reap the benefits of transactions due to a lack of clear property rights, transparent interaction and government accountability.

> "With public safety, the public gets some form of feedback on the quality of its investment when the crime rates rise and fall. With environmental services, the feedback…is much more ambiguous. Was trout fishing better this year than last? Is property better protected from flooding?"
>
> Source: Resources for the Future (2006)

> The European Union is currently considering plans to extend its trading scheme (a cap-and-trade system) to airlines. Before doing so, it has a few kinks to work out. Its initial allocation of allowances was distributed free to existing polluters. Many of these polluters were able to pocket the credits and buy cheap credits from developing countries under the Clean Development Mechanism. A second problem was a lack of baseline information for the five industries covered by the scheme. It turns out that they were not emitting as much as originally thought, causing the price of carbon to fall drastically in May 2006 based on the news. Lastly, the timeframe of the current allowance distribution is only three years, and payback periods for clean technology are currently at least five years. This means that there is no incentive to invest in such technologies until the new allowance levels are published.
>
> Source: *The Economist* (2006)

6. **Newness of Regulated Markets vs. Slowness of Regulators:** Since governments tend to move more slowly than the private sector, approving compliance-driven transactions can take time. For example, species trading in the U.S. has taken an average of 2.5 years.[xix] During this lag time, corporate personnel may change or internal support may erode in a company. Due to these issues, government may have to remove itself from day-to-day trades and oversee the structure of regulation-driven markets instead.

7. **Market Fungibility for Locally-Specific Commodities:** Certain environmental services will be less fungible than others in a given area. For example, endangered species habitat is very fungible in California compared to other states, due to the number of endangered species. This difference across different areas will make it

tricky for companies to implement company-wide policies for environmental services.

8. **Public Misinterpretation:** Some argue that environmental services represent an attempt to translate every living thing into an "own-able" commodity. To be clear, one cannot buy environmental services themselves—one can only pay for other humans to manage an environmental service in such as way as to enhance its function and thereby provide value to a company. Another risk of public perception involves trust. If a company is seen as untrustworthy, stakeholders may push for the company to simply fix the damage for which it is responsible rather than compensate through trading. As is often the case with new models, the early movers tend to experience increased scrutiny.

V. Opportunities Associated with Engagement

Companies have the opportunity to make smarter investments to preserve the natural capital needed to sustain business as well as the societies upon which sales depend. While the opportunities vary across sectors and different sized companies, a high level overview can be summarized in the following way:

Figure 3. Benefits of Investing in Natural Capital

In the short term:	**In the medium term:**	**In the long term:**
Boost public relations and reduce compliance costs	Anticipate new regulation and increase land value	Sell eco-assets and enhance supply chain performance

Specific potential opportunities are as follows:

1. **Achieve Cost-Effective Environmental Management:** Addressing environmental issues on a project-by-project basis is very time consuming, while addressing environmental problems at the systemic level—the level of ecosystems—can have long-lasting and more cost-effective results. However, a systemic approach requires cross-functional and multi-disciplinary teams, which are often tricky to accomplish within large, complex organizations. Market mechanisms also offer companies an opportunity to achieve more cost-effective regulatory compliance. For example, rather than reintroducing an endangered species lost to development, a company can choose to protect that species' habitat elsewhere, thus greatly reducing the cost of compliance and even allowing the company to go beyond compliance.

> Leah Haygood of Waste Management claims that best practice on biodiversity issues "helped demonstrate to regulators that we did more than just minimum compliance. Obviously, we could never get permit writers to say this explicitly, but we received feedback from managers that our policy was very helpful in demonstrating goodwill and in helping to secure future permits."
>
> Source: IUCN & Insight Investment (2004)

2. **Obtain "Regulatory Goodwill":** Protecting environmental services can greatly reduce the burden on local, regional and national governments to conserve environmental quality and prevent health risks. Proving to regulators that your company is taking such measures could be reciprocated with a sense of regulatory goodwill, such as faster time-to-permitting, or favored partner status in future investments.

When the United States' first multi-species conservation bank was formed in 1995, credits started at $1,200 per acre and zoomed to $30,000. Now there are about 70 conservation banks nationwide.

After realizing the Preble meadow jumping mouse was costing the state of Colorado $1 million a year in work stoppages, Colorado started its own conservation bank. Now, when the state's bulldozers run up against the mouse, the department measures the acreage and sets aside that much land in its bank for permanent protection.

Source: *The Wall Street Journal* (2006)

3. **Achieve Regulatory Certainty:** Managing real estate and inputs to protect and enhance environmental services can help a company to avoid liabilities associated with new environmental laws. As markets for environmental services evolve over the long term, prescriptive environmental regulations that change with each political transition will become increasingly less common.

4. **Transfer Liability:** Brokers in environmental markets increasingly include regulatory liability in their package to clients. A company mitigating its wetlands impacts through a broker would also make a clean break from their liabilities under the Clean Water Act. These issues can be particularly important in the context of mergers and acquisitions.

5. **Increase Real Estate Value:** Corporate real estate provides numerous environmental services. Rather than consider the land simply a sunk cost of doing business, companies can generate income through the sale of wetlands or biodiversity offsets. This is no doubt a particularly attractive opportunity for large land-owning companies, such as forestry and utility companies[xx], but it could also be structured to bring financial benefits to companies that lease land, such as oil and gas or mining companies.

6. **Avoid Project Delays & Work Stoppages:** Regulations such as the Endangered Species Act in the U.S. can cause significant project delays and work stoppages. Taking advantage of the flexibility for biodiversity offsets can circumvent these delays while staying in compliance. Additionally, work stoppages due to local protests can be minimized by contributing to a healthy environment surrounding company operations.

Core to the success of any company that needs access to land is the need to gain permission from local authorities and communities. "If you don't have a good reputation," said Steve Botts of the Antamina mining project, "you won't get concessions. You won't get a foot in the door. We need to keep stakeholders satisfied that they are deriving benefits or they could write letters, stop work, or encourage NGOs to create negative publicity against us. If we do things right, this opens doors elsewhere. The most important driver for us is to build relationships with countries."

Source: IUCN & Insight Investment (2004)

7. **Ensure Consistent Supply:** By managing for environmental services, you make natural systems "do the work for you" when it comes to maintaining a consistent supply of natural resources such as fresh water or rich soil. Managing for greenhouse gas emissions can also help you learn where inefficiencies lie in your operations or supply chain and eliminate them to the extent possible, thus reducing fuel and transport costs.

In India, after the government of Kerala province forced Coca-Cola to end operations there, the company installed 220 rainwater harvesting structures for recharging aquifers which input to select processing functions. The company has also taken corporate-wide measures by undertaking comprehensive assessment of water risks facing 811 bottling plants worldwide and reducing the water use ratio per product by 4% in one year.

Source: Coca-Cola Environmental Report (2006)

8. **Improve Stakeholder Relations & Enhance Branding:** A number of companies have encountered a souring of local stakeholder relations as a result of ecological shortages attributed to company operations. By protecting the long-term supply of environmental goods and services, companies can maintain more positive relationships with local stakeholders. Being perceived as a good steward of environmental services and associated public health benefits brings the potential for a public relations boost, which can win new customers and increase customer/investor loyalty.[xxi]

9. **Expand/maintain access to capital:** With numerous financing institutions signing on to sustainability principles such as the Equator Principles[1] and the IFC and export credit agencies developing their own sustainability lending criteria[2], companies with

[1] The Equator Principles were drafted by ABN Amro, Barclays, Citigroup and WestLB in collaboration with the International Finance Corporation of the World Bank. Approximately 40 major banks have now committed to the principles. An article published in 2005 in a *Euromoney* handbook estimated that such "Equator" banks represented about 75% of the project-finance market in 2003.

[2] The IFC has updated its Safeguard Policies and proposed nine Performance Standards that deal with social and environmental impacts. One Performance Standard ensures that "clients will not significantly convert or degrade natural habitats unless: there are no technically and economically feasible alternatives; the overall benefits of the project substantially outweigh the social and environmental costs; and any conversion is appropriately mitigated." Mitigation measures "acceptable to the IFC include, minimizing habitat loss (*e.g.* strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area." This final point will work to bolster markets in mitigation and restoration.

strong environmental management programs will have competitive advantages in access to financing.

> In 2005, HSBC became the first global commercial bank to provide guidance on its willingness to finance projects located in critical natural habitats. The Freshwater Infrastructure Sector Guideline shows a preference for projects that operate within international environmental standards.
>
> Source: HSBC (2005)

10. **Contribute to economic development in emerging markets:** Payments for environmental services have the potential to become a significant poverty alleviation tool, if structured appropriately. Given that much of the biodiversity and carbon sequestering forests lie in developing countries, and given that a majority of the populations in developing countries rely directly on the land itself, companies have an opportunity to simultaneously offset their impacts or improve the services upon which they rely while also contributing to economic development.

> Tetrapak has purchased about $100,000 worth of carbon emissions credits that pay individual farmers in the Bushenyi district of Uganda to plant indigenous tree species. The payments are channeled through carbon broker Bioclimatic Research and Development and a Ugandan national conservation trust. Thus far, over 100 farmers have been paid to participate.
>
> Source: *GreenBiz* (2005)

VI. Industry-Specific Assessments

BSR has convened representatives from four industries—agriculture, energy and extractives, utilities and pharmaceuticals—to explore the question, "What industry challenges might be addressed with an environmental services approach?" Findings from these meetings are discussed below.

AGRICULTURE

> *Increases in population will lead to a doubling in the demand for environmental services, particularly those that support food production.*
>
> *Agriculture must deliver more food and environmental services to more people using less water, land and energy.*
>
> –Andrew Bennett, Director, Syngenta Foundation for Sustainable Agriculture, 2005[xxii]

Relevant environmental services:

- Water provision & filtration
- Biodiversity (beneficial insects and pollinators, germplasm)
- Soil renewal
- Carbon sequestration
- Climate regulation

The agriculture industry faces a number of **challenges** relevant to environmental services, including:

- Agriculture competes with nature for water. Every shift of rainfall, river or groundwater from ecosystems to rained or irrigated agriculture represents a trade-off between other environmental services and food or livelihood benefits.[xxiii] Water scarcity is leading to higher input and infrastructure costs.
- Intensive systems of production and the overuse of marginal and fragile ecosystems have already led to the degradation of soil quality and productivity.
- Increasing pressure on land availability, especially due to urbanization and sprawl, is leading to higher costs of land and transport.
- Pollution of surface water and land is contaminating crops and can affect health.
- Management practices are strongly influenced by external drivers such as land tenure, production subsidies, market and consumer preferences and access to technologies, inputs and credit.

A range of possible environmental services-based **solutions** are emerging, such as:

- With the help of valuation experts, company accountants could evaluate the benefits of the environmental services provided by their land. Companies can use this

information to show agricultural insurers that good soil management and water use reduce liabilities.

- In some counties, such as Marin County, California, there are specific permits on development and agricultural use that work to preserve the integrity of the land and avoid fragmentation. Such permits and tax benefits could be established for good environmental services management.
- In the timber industry, "TIMOs" are private equity groups that now control numerous private forest lands. Rather than just selling off the land for development, they are pricing out the costs of environmental services. There may be a similar application in the agricultural sector.
- Consumer concerns are increasing the pressures on agri-business to use production systems that are less damaging to ecosystems and deliver produce containing less unwanted residues. Managing for environmental services can have reputation and brand benefits.
- Managing to enhance environmental services may also have cascading benefits of efficiency (water and energy), drought and salinity tolerance, pest and disease resistance, reduction of waste, higher yields and more nutritious food.[xxiv]

> UNEP estimates that well-directed investments in the environment, such as terracing hilly agricultural land to prevent erosion, often have a payback rate of three or more dollars for every dollar invested.
>
> Source: *The Economist* (2005)

ENERGY AND EXTRACTIVES

> *In this industry, access to assets is a key performance driver. Companies may find it increasingly difficult to secure access to land, energy and water resources, which may discourage new project development or make existing operations untenable. As extreme weather events increase in frequency and intensity, operations in remote areas will be increasingly at risk of disruptions to production. Similarly, regional economic and political competition over natural resources and environmental services may affect the security costs of protecting employees.*
>
> –David Richards, EH&S, Rio Tinto Ltd., 2005[xxv]

Relevant environmental services:

- Carbon sequestration
- Water provision & filtration
- Climate regulation
- Biodiversity

The energy and extractives industry faces a number of **challenges** relevant to environmental services, including:

- Production requires intensive fresh water use, at a rate of thousands of tons per day at most facilities.

- Production typically contributes to the degradation of the local water supply, so the industry is increasingly seeing its rights to water access challenged, which drives up costs.
- Three-quarters of active mines and exploratory sites overlap with areas of high conservation value, from desert to rainforest, tundra to oceans[xxvi]. However, many energy and extractives companies lease the land they develop and have little incentive to protect it over the long term.
- There is a perceived lack of employee awareness about sustainable development, partially due to the industry's narrow engineering training and high average employee age.

The International Council on Mining and Metals (ICMM) was formed in 2001 to advance the recommendations in the 2000 Mining, Minerals and Sustainable Development report. The ICMM has since published a Sustainable Development Framework that will act as a differentiator in the sector, allowing investors and the public to identify leading and lagging companies. Specific policy commitments and management tools have been dedicated to biodiversity protection by Anglo American, BHP Billiton, Rio Tinto, RMC, BG Group, BP and Shell. By engaging in these markets early, says Rio Tinto's David Richards, companies "can gain experience and develop best practice fast in an evolutionary process, so that when regulation catches up, there are examples and case studies—and probably horror stories—to use to guide us in making choices."

In the oil and gas sector, the International Association of Oil and Gas Producers (OGP) and the International Petroleum Industry Environmental Conservation Association (IPIECA) have produced best practice guidelines for operations in areas of high conservation value.

Source: ten Kate (2004) & IPIECA (2006)

A range of possible environmental services-based **solutions** are emerging, such as:

- Use environmental services as an educational framing tool.
- Use environmental service valuation to estimate the costs of your company's environmental impact.
- Pay local communities to work to enhance the environmental services upon which companies rely (*e.g.* water filtration).
- Lobby for the inclusion of environmental services protection in Environmental Impact Assessments.
- Take the opportunity to clarify property rights and what they include (*e.g.* underground land, services, a combination of the two).
- Support governments or communities in local planning processes to ensure that investments are sound. Facilities layout and design are key.
- Expand investment in new technologies and practices that require minimal ecological disturbance and minimize water use.
- Establish a record of sound environmental performance that will help you stand out from the rest in an industry tarnished by its environmental impacts.

UTILITIES

Large land-holding companies such as AEP have found a new business opportunity and are developing new core competencies through biodiversity and wetlands offsets.

–Dale Heydlauff, SVP, American Electric Power, 2004[xxvii]

Relevant environmental services:

- Slow & consistent water flow (*e.g.* from mountain snow packs, agriculture, streambeds)
- Water storage and flood avoidance
- Carbon cycling, both locally and globally to assimilate emissions
- Upstream land management to prevent sedimentation and protect water quality
- Wetlands storm water and wastewater treatment

The utilities industry faces a number of **challenges** relevant to environmental services, including:

- Electricity generation requires access to large amounts of clean water for cooling or driving turbines.
- Wastewater disposal is becoming an increasing challenge, especially due to growing populations and sprawl, limiting land available for spraying sludge.
- Energy costs of transporting water are already high and increasing.
- Energy costs of desalinating water are becoming more prevalent.
- Poor hillside management and deforestation are leading to sedimentation of dams.

A range of possible environmental services-based **solutions** are emerging, such as:

- Co-site wastewater treatment plants with desalination plants to reuse excess energy for pushing water through desalination membranes.
- Use constructed wetlands for storm water and wastewater management and treatment, thus avoiding traditional infrastructure costs.
- Provide carbon storage on company property through reforestation or forest maintenance. Partner with an NGO to measure and monitor the carbon stored by company land.
- Manage major land holdings (right-of-way and buffer zones) to optimize wildlife protection (right-of-way lands and buffer zones provide migratory corridors). Opt for integrated vegetation management to avoid herbicides harmful to human and animal health. Offer multiple services by opening land to local agencies for recreational use.[xxviii]

PHARMACEUTICALS

Pharmaceuticals have been detected in surface, ground and drinking waters…this has raised concerns about potential impacts on people, animals and the environment, e.g.: contributing to antibiotic resistance; feminization by estrogens; the effects of highly potent drugs on environmental organisms; the presence of anti-depressants in drinking water; and the effects on wildlife of veterinary drugs such as pain killers.

–James Hagan, VP, GlaxoSmithKline[xxix]

Relevant environmental services:

- Water filtration (especially in developing countries, for customers to take pills)
- Waste assimilation (especially as it pertains to bioactive waste)
- Biodiversity (but decreasingly so as large pharmaceutical companies rely more on molecular-level work)

The pharmaceutical industry faces a number of **challenges** relevant to environmental services, including:

- Active pharmaceutical ingredients (APIs) in medicines can be released into the environment from patient excretion and makes their way into sewage treatment plants or septic systems, from sludge application to land, from disposal of unused products and from farms, domestic animals or manufacturing operations.
- Increasing societal expectations for companies to take on new responsibilities. These calls have been particularly focused on water effluent and access to drugs.
- Traditionally, the majority of medical compounds originate from natural products, often in high-biodiversity regions of the world, but maintaining access to these regions becomes increasingly difficult, especially due to accusations of "biopiracy" from developing countries.

In the U.S., the pharmaceutical industry trade association PhRMA (Pharmaceutical Research and Manufacturers of America) developed a watershed-specific model to predict environmental concentrations from patient use. This is a watershed level, geographically explicit model to gain a deeper understanding of potential environmental distribution of pharmaceuticals at a local or regional level.

Source: PhRMA (2006)

A range of possible environmental services-based **solutions** are emerging, such as:

- Ensure that water supplies are of the highest quality possible, with potential cost-savings associated with water filtration and purification processes and maintenance.
- Partner with local land and resource owners to avoid access restrictions and gain knowledge of indigenous flora and fauna with potential medical benefits.
- Focus on environmental service quality as a poverty alleviation tool, since the breakdown in environmental services is closely coupled with poverty.

VII. What Your Company Can Do

How should a company assess environmental markets and determine a strategy for action? Start by asking a few questions:

Scoping

- On which environmental services does our company depend, both directly and indirectly? To what extent? Build a matrix, with varying degrees of dependence marked.

- Which ecosystems are providing the services on which we rely? Where are the ecosystems? Are they in "ecological hotspots" known for high degrees of biodiversity?

- What environmental services do our suppliers and business partners rely on?

- Do our operations have an impact on environmental services? How? Where?

- Have we assessed our reliance on these environmental services and considered alternatives that would have less impact?

- What is the current and projected state of these environmental services over time frames relevant to our company?

- Have we considered the possibility of sudden and radical (non-linear) changes in these services? How we might adapt or prevent such shifts?

Designing

- What programs do we have in place to minimize further degradation of these services?

- Do we have the in-house capacity to manage environment service issues? Do we have sufficient risk to need in-house capacity?

- What regulatory changes are predicted with regards to these services?

- What benchmarking can we do of our competitors?

- What metrics can we develop to measure our past and current impacts, and what metrics will we need to measure improvements from today's baseline?

- When it comes to biodiversity and water quality, is a policy of "minimizing impacts," "no net loss" (*e.g.* Waste Management) or "net positive effect" (*e.g.* Rio Tinto, Shell) most appropriate for our company?

Implementing

- What opportunities exist for our company to "ground proof" these ideas through a pilot project?

- How shall we communicate our experiences with shareholders, employees, regulators, customers and peers?

- Should we support the economic and ecological research necessary to create guaranteed returns on investments in carbon, water or biodiversity trading schemes? If so, how?

Get Involved in A New BSR Initiative:

"Emerging Environmental Markets: Opportunities & Risks for Business"

BSR is pleased to announce a new initiative that will work with companies to assess the risks and opportunities of emerging environmental markets. We invite you to join us!

This 2-year initiative will facilitate dialogue between business leaders, policy-makers, economists and environmental scientists in order to:

- Conduct industry-specific analyses of the business risks and opportunities of new environmental market mechanisms
- Develop guides and implementation tools for member companies to access environmental markets
- Create a mechanism for business input into the future design of environmental market mechanisms

Benefits for Your Company

1. **Engage with key innovators and architects** of environmental markets to shape a growing area of concern for businesses in the 21st century
2. Determine whether and how environmental markets could become a **key strategic component for meeting business goals**
3. Increase the **value of real estate**
4. Ensure a **consistent and high-quality supply of inputs** (*e.g.* water, raw materials) for both products and processes
5. Achieve **cost-effective environmental management** through systems-level approaches and innovative technologies
6. **Boost your brand** in the marketplace and with stakeholders
7. Enjoy **"regulatory goodwill"**—such as shorter permitting time—and ensuring that efforts are recognized under any future regulation
8. Achieve compliance across a patchwork of regulatory frameworks and **anticipate new regulation**

Join The Initiative

BSR has already convened a number of multi-sector dialogues among policy makers, researchers, market brokers and companies—including **Shell, Abbott, PG&E** and **Brown-Forman**—and administered a survey of companies such as **BP, Chevron, Unilever, McDonald's** and **Rio Tinto** in order to understand what tools and resources

managers most need to leverage environmental market opportunities. Their feedback helped us to design the initiative.

Together with our partners at Ecosystem Marketplace, Stanford University, the United Nations Environment Program and the U.S. Environmental Protection Agency, BSR will produce the following tools and analyses:

BUSINESS EDUCATION & TOOLS
Manager's Resource Guide A guide to internal planning, strategy and partnership opportunities
Business Web Portal A searchable database of business-relevant case studies (successes *and* failures), an overview of voluntary and regulatory markets, real-time market information and an analysis of different strategies for company involvement (*e.g.* which voluntary markets are the most promising)
Market Overview A compendium of all relevant transactions and market snapshot of real-time information
INDUSTRY-SPECIFIC ANALYSES (FOCUS: WATER, CARBON & BIODIVERSITY)
Industry-Specific "Deep Dive" Analyses An in-depth analysis to objectively assess the "business case" by sector
Industry-Specific Working Groups (stand-alone or sub-set of existing groups) A peer learning network to share best practices and identify information needs
BUSINESS AND POLICY DIALOGUE
Three Multistakeholder Roundtables on Market Design Facilitated dialogue between representatives from business, research, NGOs and government on smart policy design for environmental services protection

Interested companies can select the activities in which they would like to participate. To find out more, please contact:

Emma Stewart, Ph.D., BSR Research Manager, at 415-984-3248 or estewart@bsr.org.

Annex 1. Clarifying Terms

Cap-and-trade: A program that caps the total amount of a given pollutant (*e.g.* sulfur dioxide or greenhouse gases) to meet a specific environmental target. Emissions allowances are allocated to individual countries or companies. The total number of emission allowances (also known as permits) allocated adds up to the total emissions cap for the region. These allowances can then be traded between countries or companies, providing flexibility to those with differing abilities to reduce emissions in a cost-effective manner. For example, if Company A has a variety of low-cost emissions reduction opportunities, it may have surplus permits available to sell. Company B, however, may not have enough permits to account for its expected emissions. Company B may choose to purchase surplus permits on the market to cover excess emissions instead of paying fines. At the end of the year, permits are submitted to the government. The requirement to reduce emissions creates a demand for permits. Cap-and-trade regulation is increasingly popular because greater compliance can be achieved at less cost to companies.

Conservation banking: The term most commonly used in the U.S. to refer to offsets aimed at complying with the U.S. Endangered Species Act. This act allows an "incidental take" of listed species as long as "a landowner provides long-term commitment to species conservation through development of a Habitat Conservation Plan." This has enabled new market-based transactions, known as "conservation banking," which permits land containing habitat of an endangered species to be used to offset impacts occurring elsewhere to the same habitat. A landowner can request an incidental take permit and mitigate it by purchasing "species credits" from conservation banks of credits. These credits are generally currency of breeding pairs, individual animals, acres, nesting sites or family units.

Of the conservation banks surveyed in Fox & Nino-Murcia's comprehensive U.S. survey, only three reported conservation as their foremost objective; financial objectives were the impetus for 91% of banks. The two primary financial reasons for establishing banks were to sell credits at a profit or to use credits internally to reduce permitting costs. While financial returns on conservation banks are proprietary information, sixty percent of for-profit bank owners reported breaking even or better.

Source: Fox & Nino-Murcia (2005)

In Australia, new property rights are created for private landowners who conserve biodiversity values on their land. Landowners can then sell resulting credits to a common pool. The law also creates obligations for land developers and others to purchase these credits.[xxx]

Tradable biodiversity credits, or biodiversity "offsets": These are credits given for conservation actions designed to compensate for the unavoidable residual impact on biodiversity caused by development projects, in order to comply with regulatory or corporate policies of "no net loss" of biodiversity.

Offset vs. mitigation: The term "mitigation" is used in the U.S. to mean compensating for unavoidable environmental damage, usually spurred by regulation. However, in Europe, the term "mitigate" means only to "minimize harm." Thus, "offset" as used in Europe is distinctive from "mitigate." One might consider the two terms as related steps in a process: "mitigate" to minimize harm and "offset" to compensate for residual harm that was unavoidable. However, the terms are still frequently confused in the literature.

Wetlands banking: As a byproduct of the federal Clean Water Act, the U.S. has operated a wetlands mitigation program since the early 1980s in which developers seeking to destroy a wetland must offset that by buying wetland banks conserved or developed elsewhere.

Tradable wetland mitigation credits are credits from wetlands conservation or restoration that can be used to offset obligations of developers to maintain a minimum area of natural wetlands in a defined region[xxxi].

There are now approximately 450 U.S. wetlands mitigation banks approved by the Army Corps of Engineers and 198 in the proposal stage. The corporations at this early stage tend to be energy or pipeline companies such as Chevron, corporations that are financially secure and are looking to diversify.

Source: Ecosystem Marketplace (2006)

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