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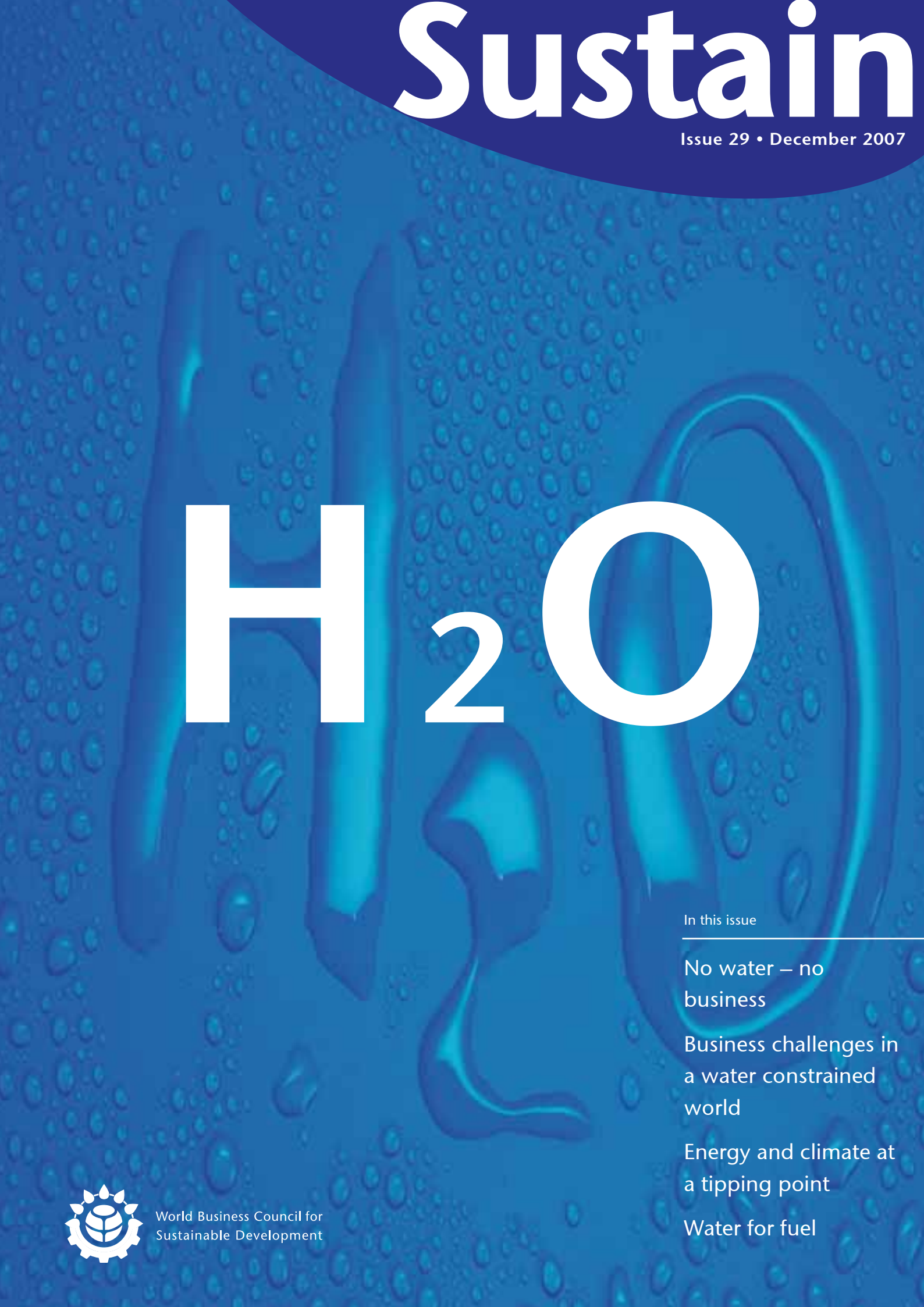

H_2O

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World Business Council for Sustainable Development

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About the WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 200 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a global network of about 60 national and regional business councils and partner organizations.

Our mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our objectives include:

Business Leadership – to be a leading business advocate on sustainable development;

Policy Development – to help develop policies that create framework conditions for the business contribution to sustainable development;

The Business Case – to develop and promote the business case for sustainable development;

Best Practice – to demonstrate the business contribution to sustainable development and share best practices among members;

Global Outreach – to contribute to a sustainable future for developing nations and nations in transition.

www.wbcsd.org

No water no business

Ten years ago the water project began with a small group of companies worried about water. Today it has a water tool that can help any company or organization better assess its water situation.

"Is the world running out of freshwater? The answer is a resounding no."

To manage your water globally, you need to know the water situation locally.

Creating and maintaining linkages between water and energy and water supply and sanitation efforts.

But it is a challenge to explain how the companies kept the momentum going. It was partly the mantra they kept repeating: almost everything the Council and its members care about – whether livelihoods, energy sources, ecosystems or products – depends on water.

"No water = no business."

The WBCSD's involvement in water began in the fall of 1997 under the coaching of the late Al Fry, who touched everyone he met with his enthusiasm and coaxed the members toward the first report in 1998, which has two clear messages: "the situation is not hopeless" and "Is the world running out of freshwater? The answer is a resounding no."

The concept of companies working on water inside and outside their factory fencelines has been used since the beginning of the water project. A company getting its house in order by getting more value per drop of water (i.e., more efficient use, reuse and recycling) represents efforts made inside the fenceline.

Many companies venture beyond their individual enterprises through partnering with others and bringing specific skills and capacities to local communities (like training, appropriate solutions and technologies). Case studies on such work beyond the fencelines were assembled in a 2000 report on partnerships in practice.

This was followed by *Water for the Poor*, which makes the link between access to clean water, poverty alleviation and better public health. It urges governance reform and the creation of an enabling environment. These are issues the project is still tackling today as the world struggles to reach its Millennium Development Goals (MDG) on water and sanitation.

In 2004, the Water Working Group's second wind mobilized companies from many different sectors. The group first produced a report on water facts and trends, to clarify the boundaries of the challenges. Then it published a range of case studies describing *Collaborative Actions for Sustainable Water Management* (2005), distinguishing between times when business can take the lead, when they

The WBCSD's involvement in water began in the fall of 1997.

must work as a group with others, and when the government is the leader and business can help. These collaborative actions were the basis of an ongoing discussion that included an event at the 13th session of the UN Commission on Sustainable Development in April 2005.

However, focusing on water shortage statistics can be depressing. The group sought a way to start framing the "world of water" so that businesses could plan strategically.

Joppe Cramwinckel from Shell and Jack Moss from Suez, recognizing that there are many different business sectors in the WBCSD that are involved in different ways, developed a proposal for a scenario process.

Water involves many different stakeholders who have different points of view, understanding and objectives. They use different language and interpret the forces for change in different ways. Thus the scenario project aimed to develop common ground and a common understanding that could be translated into action by businesses working alone, as a group, and/or with other sectors of society.

Jürg Gerber from Alcan joined Cramwinckel and Moss to form the management team of the Water Scenario Project, a 2.5-year process involving 200 participants and five workshops around the world. The outcome focuses on efficiency, security and inter-connectivity through three stories leading to 2025 that facilitate communication with non-business stakeholders and also test the robustness of a company's strategy.

The Water Scenarios H2O stories consolidate many points that had already been made in the past – the story of H (called "Hydro") is all about companies being more efficient, taking the lead, and occurs largely within the fenceline; the story of 2 (called "Rivers" because there are two sides to a river) is about taking that step outside the fenceline and working with others because ultimately business' water security depends on the security of others; and the story of O (called "Ocean") looks at the bigger picture, including ecosystems, governance, measuring and reporting. The Scenarios highlight how every aspect of the world of water is interlinked – water security, food, energy and health.

Measuring your water use, discharge, recycling... How can companies do this? The importance of developing a simple, easy-to-use tool for companies to assess and map their water risks and impacts had emerged to the top of the group's agenda. The question was not only how much water companies are using, but where? To manage your water globally, you need to know the water situation locally.

Jan Dell from CH2M HILL spearheaded the development of the Global Water Tool. She recognized the lack of accessible, up-to-date data about local water conditions around the world. Gathering data about water from many far-flung operations can be more complex than analyzing something like greenhouse gas emissions, which can be difficult enough.

Water scarcity may mean that even the most efficient operation may be too heavy a burden on local conditions, while if water is locally plentiful, expensive conservation methods are not cost effective. So companies must understand the local situation to make intelligent decisions.

CH2M Hill chairman and CEO Ralph R. Peterson encouraged Dell to donate a great deal of time in partnership with the WBCSD and its member companies to develop a tool to simplify the data-gathering and analysis process and to make it free to all users.

The goal of the effort is for companies to take action, "not just to collect data and make charts," as Dell put it. But action follows measurement, which makes the Global Water Tool an essential part of any big company's efforts to manage its thirst for water in ways that are sustainable economically, environmentally and socially.

The Global Water Tool is meant to encourage companies to revisit the Water Scenarios to 2025 to get a bigger picture of the implications, challenges, exposure and opportunities for their company.

The WBCSD water project has come a long way: it has moved water up the business agenda; it is seen as the "business voice" by many partners and in many international venues; it has linked water into other key sustainable development issues; and it has developed tools and frameworks to help others to share the project's learnings.

The work of the Water Project continues, focusing on advocating and communicating key messages, marketing and maintaining the Global Water Tool, and creating and maintaining linkages between water and energy and water supply and sanitation efforts.

Water for fuel

Energy fuels economic growth, but what fuels energy? Water is an essential, but rarely thought of, input for fuel manufacturing, including biofuel production.

As demand for biofuels increases, industry will face additional questions: How can the water be equitably shared? Is biofuel a practical energy solution? What are the options? These questions and others at the water and energy nexus will be the focus of a new WBCSD water and energy workstream of the Council's Water Project.

In developed countries, agriculture accounts for about 30% of total water use, but this share rises dramatically to 82% in developing countries. Current biofuel crops need a lot of water to grow, and as the focus shifts to biofuels water demand will rise, placing additional stress on an already limited resource.

In developed countries, **agriculture** accounts for about **30% of total water use**, but this share rises dramatically to **82%** in developing countries.

This year the United States set a target for domestic ethanol production to reach 130 billion liters annually by 2017, equivalent to 15% of US liquid transportation fuels. How this will be attained is a topic of much discussion in industry and government. The US is no anomaly. The EU directive on biofuel use calls for the substitution of 5.75% (energy equivalent) of overall fossil fuel demand by 2010, and proposes a 10% substitution by 2020. China is planning to blend 2 million tonnes of ethanol into gasoline each year by 2010. These targets, and others, will demand substantial amounts of water for ethanol and biodiesel production.

Water use in biofuel production can be discussed from two angles: quantity and quality. First, the amount of water needed depends on crop type and location. For instance, corn in the US Pacific and Mountain regions needs less water than soybeans, on average. In the Northern and Southern Plains, however, the opposite is true, according to the National Research Council of the US National Academies of Science.

Although growing the **feedstock** is the most **water-intensive** aspect of biofuel production, it is certainly **not the only aspect** requiring water.

Although growing the feedstock is the most water-intensive aspect of biofuel production, it is certainly not the only aspect requiring water. Bio-refineries also use water to convert feedstock to fuel. The amount of water needed for processing varies with the type of feedstock.

Second, various stages of biofuel production can affect water quality, beginning with chemical applications to agriculture. When fertilizers and pesticides containing phosphorus and nitrogen enter bodies of water, they deplete it of oxygen, thus creating a more difficult environment for aquatic species to survive in. Soil erosion can also threaten water quality as soil and chemicals are washed into local streams and lakes. Bio-refineries also release wastewater, potentially high in biochemical oxygen demand, into local water sources.

Current production of biofuels is almost entirely limited to crops, such as corn and soy, which have a high value as a foodstuff or ingredient. This adds to the economic and social pressures to look for alternatives such as cellulosic ethanol, which has issues of its own. The topic is complex, the potential solutions myriad, and the opportunities unbounded.

Water footprint

Lexicon

water footprint /'wôtər foot, print/ - The water footprint of an individual or community is defined as the total volume of freshwater that is used to produce the foods and services consumed by the individual or community. A water footprint can be calculated for any well-defined group of consumers, including a family, business, village, city, province, state or nation. A water footprint is generally expressed in terms of the volume of water use per year. It does not take into account where the water came from (scarce area or not), but helps raise awareness of just how essential water is to every product worldwide.

Source of all statistics and definition: www.waterfootprint.org; the WBCSD recognizes that these are estimates and does not endorse them as official.

What does this mean for me?

The copy of Sustain that you are holding in your hands took nearly 260 liters of water just to produce the paper on which it is printed (it takes 10 liters of water for one 80 gram A4-sheet of paper. Sustain is printed on 115-gram paper).

It took 2,400 liters of water to produce the 150 gram hamburger patty you had for lunch. Not to mention the wheat bun that went with the burger! It took 40 liters of water per slice of bread. Producing wheat takes 1,300 liters of water per kilogram (global average). One slice of bread has a weight of about 30 grams, which implies a water footprint of 40 liters.

And if you had a beer with that burger, it took 75 liters of water for one 250 milliliter glass of it. Most of the water behind the beer is for producing the barley, at 1,300 liters per kilogram. Barley production worldwide consumes about 190 billion cubic meters of water annually, which is 3% of global water use for crop production.

The cup of coffee that you had with your dessert took 140 liters of water to make. Drinking tea instead of coffee would save a lot of water: a standard 250 milliliter cup of tea requires a "mere" 30 liters of water.

The apple on the corner of your desk took 70 liters of water to grow, and the 200 milliliter bottle of apple juice on the shelf took 190 liters of water to make.

If you feed your family beef for dinner tonight, 1 kilogram will take 16,000 liters of water to make. Why not feed them chicken instead? Count 3,900 liters of water for 1 kilogram of chicken meat.

And lastly, that cotton shirt on your back took some 2,700 liters to make. Of this total water volume, 45% is irrigation water; 41% is rainwater that fell on the cotton field during the growing period; and 14% is water required to dilute the wastewater flows that result from the use of fertilizers in the field and the use of chemicals in the textile industry. Globally, annual cotton production uses 210 billion cubic meters of water and pollutes 50 billion cubic meters of water. This is 3.5 % of global water use for crop production.

Business challenges in a *water-constrained* world

Everyone understands that water is essential to life. But many are only just now beginning to grasp how essential it is to everything in life – food, energy, transportation, nature, leisure, identity, culture, social norms, and virtually all the products used on a daily basis. But with population, per capita demand and, in many places, water pollution all growing rapidly, it is clear that water, already a critical issue, will become increasingly critical in the coming decades.

This fact challenges different businesses in different ways. But some general trends, observable today, suggest what more and more businesses will face in the future.

Scarcity usually encourages better management of resources. Water resources are getting scarcer due to both increasing demand and decreasing reserves, such as the melting of glaciers. It is inevitable that water use by all sectors will come under closer scrutiny as governments from local to national levels strengthen their water resource management. This will require companies to manage water better.

Businesses will need to measure all the dimensions of their water footprint, looking beyond the direct consumption of their own operations to the water dependency and impact of their supply chains, as well as those of the users of their products. In a water-constrained world, managing water-related risks becomes an imperative. Knowing the water footprint of the business is a first step toward identifying and quantifying those risks.

Knowing their water footprint can also help companies position products and services in response to the expectations of consumers, who are hearing more and more about water issues. And efforts are underway to give them the information they need to make "water wise" choices. The US Environmental Protection Agency recently launched its "WaterSense" program to promote water-efficiency through the market. Based on a labeling scheme, it helps consumers identify products and services that use less water while performing as well as or better than their less-efficient counterparts. The European Union, which has had an eco-label scheme in place since 1993, is studying a new approach to make water ratings as explicit as energy ratings.

Water is everybody's business, and the principles of water management being promoted today reflect this. European water policy, for example, calls for the extension of public participation in river basin management to balance the interests of various groups.

In this context, businesses need to be prepared to engage with other stakeholders, whether business or non-business, including those who speak for ecosystems. To be credible and constructive participants in the setting of water policy, businesses need to thoroughly understand not only their own water footprint, but also the needs and priorities of others.

Another principle of water management that is receiving much attention is that of full cost recovery. While this is most often discussed in relation to water services, the concept applies to any water use, including industrial and agricultural. How should costs be calculated and who decides? How should the opportunity cost of specific uses be counted? For businesses that have located their operations to take advantage of cheap, abundant water, the emergence of such questions can have significant implications. Recognizing the economic value of water in an age when

Scarcity usually encourages **better management** of resources.

In a water-constrained world, managing **water-related risks** becomes an **imperative.**

the balance between supply and demand is shifting will force many companies to reassess their models.

When it comes to water, businesses and all other sectors of society face the challenge of dealing with uncertainty, but some things are certain. One is climate change and the observed impacts on water resources. Martin Parry, co-chairman of the Intergovernmental Panel on Climate Change Working Group II, said in referring to the effect of climate change on animals, plants and water: "For the first time, we are no longer arm-waving with models; this is empirical data, we can actually measure it." But considerable uncertainty remains about where and when further water impacts will occur.

There is also a great deal of uncertainty about the capacity of various affected populations, as well as global systems, to adapt to changes in water availability and quality. Will we see significant changes in values and lifestyles? To what extent will global trade in virtual water compensate for local deficiencies in real water resources? How will human migration patterns change as water availability decreases in regions supplied by meltwater, where more than one-sixth of the world's population currently lives?

There are a number of things besides climate change that are certain. One is that virtually all businesses will be affected either directly or indirectly by water-related issues over the next few decades. But how does a company effectively communicate this to get water higher up on its agenda? The WBCSD's Water Project will be focusing more on advocacy and communications to help do exactly that.

Alcan

Reducing water consumption and release

Fine alumina particles, or micrograins, are used to produce white-fused alumina. Located in the French Alps, Alcan's La Bathie plant (now Rio Tinto Alcan) produces these specialized micrograins for use in abrasive grinding wheels, high-tension insulators, tiles and laminate floors.

Until 2005, the micrograin workshop consumed over 350,000 m³ of local well-water annually to wash and sort micrograins. The volume of water consumption became a concern given the possibility of future regulatory limits being imposed on annual well-water withdrawals. Also, the possibility that local authorities might charge for the use of well-water in La Bathie's industrial zone could affect the site's profitability.

Thus the company launched a project to reduce water use and improve the operations of its wastewater treatment station and other manufacturing processes. Agence de L'Eau Rhône Méditerranée & Corse, the state agency responsible for monitoring and regulating water consumption and water quality, helped the company explain the importance of the initiative to employees and the challenges associated with water use and quality in the area.

In the first phase, the project team developed a detailed understanding of the entire process and the different variables, including suppliers, inputs and outputs. Based on this, the project team was able to move into the measurement phase, using 2005 water consumption figures of 357,850 m³ as the baseline for measuring improvements. Their first objective was to reduce use by at least 20%, but a company executive challenged the team to increase this to 45%.

Over the following months, the project team drew up an action plan focused on making adjustments such as adding electronic valves and flow meters, in addition to reprogramming washers and adjusting water flow during the process of grinding wet particles into a fine powder.

There has already been dramatic improvement. The first six months of 2007 indicated that water consumption (pro-rated to forecast the full year) has been reduced to less than 173,000 m³ annually – a 52% reduction.

The plant identified other process improvement opportunities beyond reduced water consumption. It discovered that some micrograins could be produced faster and at less cost, thereby representing a future project for consideration.

With minimum investment, this project has created significant value for the company, including increased productivity through less process variation, increased material use efficiency, and a reduced environmental footprint. It has also enhanced the company's image and reputation within the community and reduced future financial risk due to higher water prices, water use and output limits.

This reduces the need for regional authorities to spend public funds on water quality management and conserves natural resources through reduced industrial consumption and release of industrial effluents into the environment.

Water vats used to sort fine particles (micrograins) by size through suspension under a constant water flow in a process known as levigation.

Energy and climate at *a tipping point*

WBCSD President Björn Stigson opened the energy & climate session at the Council's Brussels' meeting by noting that the debate in this area seems to be at a tipping point, with carbon emissions reductions of 50% or more by 2050 being seriously discussed.

"To meet such targets, both society and business must change with some urgency and on a huge scale," he added. "Governments and business are increasingly working together, giving us a window of opportunity to influence framework conditions through concrete proposals." The debate is converging on actions that align with WBCSD messages in *Policy Directions to 2050* as we move towards Bali, the UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) in December 2007.

UNFCCC Executive Secretary Yvo de Boer told the participating CEOs that the biggest challenge will be to make the business case for developing countries. Teruaki Masumoto, director of Tokyo Electric Power Company, argued that the biggest challenge will be private sector engagement, while Jim Rogers, president and CEO of Duke Energy, maintained that it will be the technology needed as a bridge to a low-carbon world.

Mutsuyoshi Nishimura, former representative of the government of Japan to climate change meetings and ambassador for Global Environment, said that the biggest challenge will be getting big emitting, rich countries like the US on board to encourage big emitting developing countries also to commit to an international framework. He believes this will happen if the US shows leadership.

Business is asking for a framework that is "long, loud and legal."

Success in Bali, where the WBCSD was planning the first-ever "Business Day" associated with a COP, depends on business being out in front asking for a framework that is "long, loud and legal", de Boer said. He added that the significance of Bali lies in its insignificance. The only outcome that is truly necessary is a roadmap, and the business community must give input.

Nishimura responded that "we cannot afford to see Bali fail"; we need a good, successful launch of new negotiations, with US participation.

If governments do not give business a clear sense of where markets are heading, how can business make major investments?

The session opened with voting by the audience. Responding to the question, "are you optimistic or pessimistic about society's ability to address climate change", 43.6% were optimists and 40.7% were pessimists; the rest pronounced themselves "neither; just confused". Yet asked "Do you see your company as a winner or loser in dealing with the consequences of climate change?", 65.3% chose "winner", while only 13.2% chose "loser". The group was also asked whether they thought there would be an agreement on a new energy and climate framework after the Kyoto Protocol expires in 2012; 32.6% voted yes and 51.4% voted no.

This allowed Rogers to describe the audience as "bipolar" on energy and climate, while he pronounced himself optimistic, even though "we know that as a country [US] we are not leading on this". But the US government has heard business calling for change. There was a cap-and-trade bill in the Senate. He added that everybody had to step up and take responsibility, and US businesses are going to push hard to make the country's commitments.

Masumoto offered a Japanese perspective, saying that he did not understand why business is asking governments for caps. The Japanese business voluntary action plan has been in place for nine years and has achieved very good results. In Japan, voluntary action equals commitment, he said, while in Europe and the US, voluntary action means do whatever you want, it's not binding. He wondered who should be leading in cutting emissions: governments or the businesses and consumers that create them.

Yvo de Boer asked that if governments do not give business a clear sense of where markets are heading, how can business make major investments? Governments will be drawing up the frameworks, but they do not necessarily know what makes good business sense. Therefore, business has an important contribution to make through investment and through dialogue.

WBCSD Chairman Travis Engen asked in what venues business should be working, and de Boer responded: "In every venue, by every means," emphasizing that every country will need a coherent plan and a strong voice.

Responding to a question about whether business should have a spot at the negotiating table, de Boer said that he was not in favor of an equal place for business in intergovernmental negotiations on climate as governments alone have the responsibility to put in place policy directions. However, they must take into account the business voice.

Stigson noted that some governments included knowledgeable business people in national delegations to climate talks, and called for a spreading of this practice.

One commenter from the floor worried that climate change policies coming from the top down might be too slow. Consumers, given the right signals, will move things forward; therefore, top-down and bottom-up approaches in parallel would be effective. Building on this, Rogers said that Duke Energy is signaling to consumers by putting all of their customers into their energy efficiency program, compelling those who do not agree to "opt out" rather than trying to encourage customers to "opt in".

The discussion seemed to change people's minds. At the end of the session, 9% more people pronounced themselves optimistic, 2.3% fewer were pessimistic and the "confused" category had fallen 5.3%. And the voting on whether there would be a serious post-Kyoto framework had equalized to a dead heat of 44.3% yes and 44.3% no.

Dow Chemical

Innovative solutions to managing wastewater

More people will soon live in cities than in rural areas, and 18 of the 23 mega cities worldwide will be in a river delta or on the coast. As a result, water safety risks will increase, pressure on water systems will grow, and the amount of sewage water will swell.

Dow Chemical's Terneuzen manufacturing site in the Netherlands has shown that an innovative approach to wastewater can benefit the company, the community and the environment.

In the past, Dow used water from the local river as its primary source for generating steam and feeding its manufacturing plants. This water was purified and discharged after use. In collaboration with local authorities and a local water producer, the site now accepts more than 9,800 cubic meters of municipal household wastewater every day. The local water producer removes residual contaminants, and Dow then uses more than 70% of this water to generate steam.

"With the new approach, Dow uses household wastewater from the municipality of Terneuzen, which is directed to the sewage water purification plant and converted into industrial water for Dow," explained Lambert Paping, water specialist for Dow Terneuzen. "The water is then used as feed water for several Dow plants and in turn, wastewater from these processes is treated and used as feed water for the cooling tower. This way, the water can actually be reused and recycled multiple times, minimizing the amount of water discharged into the river, preserving the environment," Paping added.

Water from the cooling towers eventually evaporates into the atmosphere. Three million tonnes of water per year that were previously discharged into the North Sea after one use is now used two more times. This effort results in 90% less energy use at this facility compared to desalinating this amount of seawater and a reduced need for water treatment chemicals.

There are additional benefits. "Compared to the brackish river water, household wastewater can be purified under lower pressure," noted Niels Groot, Dow Terneuzen wastewater specialist. "This reduces our energy consumption substantially, and saves approximately 500 tonnes of chemicals per year. Consequently, our CO_2 emissions are cut by 1,850 tonnes annually."

This water project demonstrates Dow's commitment to the local community and the environment, while showing industry a way to go beyond regulation. It also overcomes the huge prejudice against reusing treated sewage water. The project is innovative in that this is the first time that municipal wastewater is being reused on such a large scale in the industry.

Petro-Canada

What is reused...

In order to reduce the sulfur content of its refined diesel fuel to 15 parts per million and be in line with new federal regulations, Petro-Canada's Edmonton refinery, located in Strathcona County, Alberta, needed additional hydrogen and steam.

Making more hydrogen and steam would have required the withdrawal of up to five million more liters of water per day from the North Saskatchewan River. Plans to convert the refinery to process bitumen and heavy oil feedstocks would require up to ten million more liters per day from the river. To minimize impacts to the river and the river bank, Petro-Canada looked at other ways to get water without directly withdrawing more from the North Saskatchewan River.

"The city of Edmonton's Gold Bar Wastewater Treatment Plant had been investigating ways to improve treated water quality as well as find alternative uses for the final effluent," said Petro-Canada oil sands' infrastructure director, Ed Wittstock.

"Alberta Environment was also encouraging opportunities to minimize the stress on the North Saskatchewan River by reducing pollutant loading and river water withdrawals, and minimizing riverbank disturbances. The refinery and the water treatment plant are less than six kilometers apart, and it seemed like there should be a way to create an environmental synergy," said Wittstock.

Gold Bar's treated water already met provincial requirements for return to the river when the city and Petro-Canada first discussed opportunities. But using "recycled water" for industrial purposes was another matter. Industrial processes may be upset by trace contaminants. Cooling towers are susceptible to the low-level organic content that tends to persist in treated water.

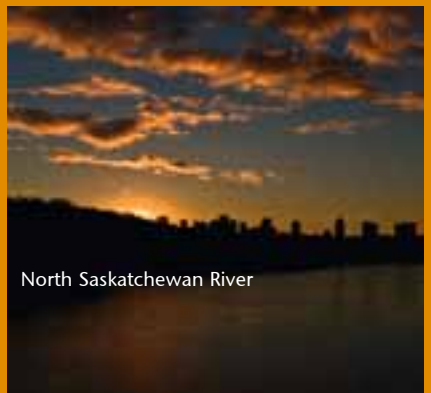
Gold Bar technologists understood the issue and were convinced that adding membrane filtration to existing treatment processes could be the key to meeting industry needs. They required an industrial partner willing to participate in a commercial application of membrane technology.

Petro-Canada funded a membrane filtration plant that the city of Edmonton, with Petro-Canada's input, designed and built to fit within the Gold Bar facility. Petro-Canada designed and built the 5.5-km pipeline, which is managed by Strathcona County, to deliver filtered water to the refinery. Both were completed to meet the needs of the diesel desulfurization project, delivering up to five million liters of water per day. A ten-million liter-per-day expansion is nearing completion to provide for continuing modifications to the refinery, which are to be completed by the end of 2008.

The project has received a large amount of recognition, including the provincial Emerald Award and a national award from the Canadian Council for Ministers of the Environment.

For the proposed Fort Hills Sturgeon Upgrader, Petro-Canada Oil Sands Inc. is pursuing a similar scheme of using treated wastewater to upgrade bitumen into synthetic crude oil.

Petro-Canada's Edmonton refinery



North Saskatchewan River

Low-carbon options

To manage the challenge of climate change, governments, business and civil society must make electricity generation and consumption more efficient and less carbon-intensive. Cooperation among sectors and innovation is crucial, as is the basic service of ensuring reliable and affordable electricity supplies to consumers.

The WBCSD Electricity Utilities Sector Project involves 10 utilities that are working together to address the many and diverse sustainability challenges facing the sector.

The first two phases of the project highlighted principles and best practices within the sector. This led to an "agenda for concerted action" outlining the key sustainability issues, trends and technological options for powering a more sustainable future. The project's work is now focused on ways to harness the full potential of low-carbon options for both power generation and consumption.

At the Council's Brussels meeting, the companies discussed the key policy messages that they planned to deliver collectively to the United Nations Framework Convention on Climate Change (UNFCCC) in Bali in December. These messages aim to provide detailed guidance to policy-makers as they develop the future international climate change regime. The UNFCCC has identified technologies as a key enabling factor to achieving carbon reductions worldwide, and business has been clearly identified as a key player in driving the development and deployment of these technological solutions.

The electricity sector is committed to investing in the development of innovative technologies, working to reduce the carbon intensity of electricity generation and improving operational efficiency, collaborating with governments and stakeholders to drive R&D, and engaging to improve end-use energy efficiency of their customer base. However, their contribution could be further enhanced with the development of a supportive framework of policies and measures for the sector.

In an interim report released for the Bali meeting, the companies outlined the key features of this "policies and measures" framework that will enhance the sector's contribution to addressing the global climate change challenge.

It is critical to customize policy interventions to ensure that they account for national needs and objectives, as well as technological maturity. For example some mature technologies require regulations that build public acceptance and foster successful implementation (such as hydro and nuclear), while technologies that are promising but not yet mature require specific polices or public-private partnerships to encourage accelerated research and development. The quick identification and support of some large demonstration and deployment projects could push technologies down the development curve, reducing their cost and accelerating their uptake.

A wide variety of different policies and measures exist, including market-based mechanisms, command-and-control regulations, direct incentives and voluntary programs. It is important that options be implemented in such a way that they work in harmony to achieve their overarching objective of CO_2 mitigation. This principle also extends to how policies and measures interact with national and in some cases international policies.

In order to ensure that there is a continued flow of breakthrough technologies to address climate change, innovation and research and development efforts must be supported across a wide range of technologies. These innovations must not only focus on greenhouse gas emissions management, but also consider other environmental impacts such as local air pollution and ecosystem degradation.

The companies recognize the importance of energy efficiency along the entire electricity supply chain, from production to end-use by consumers. Different policies and

Powering Sustainable Solutions: Policies and measures

Powering a Sustainable Future: Policies and measures to make it happen

measures will be required to improve energy efficiency, including awareness raising, performance standards, and national targets with financial incentives, among others.

Policies are needed to assure the required investment in transmission and distribution infrastructure. This will enable the development of low-loss power grid infrastructure and grid-to-grid interconnections to allow the integration of remote renewable energy schemes.

Utilities rely on natural resources and are vulnerable to the negative impacts of climate change given that operations are generally geographically widespread and particularly sensitive to meteorological situations (i.e., temperature and rainfall). Policy environments that promote integrated infrastructure planning and coordinated disaster recovery plans and mechanisms will be required. Research and innovation into new technologies and predictive capabilities are also key.

These points outline the areas that require focused policy attention, but the devil is in the details. For this reason, the project has also undertaken a thorough analysis of the suite of technology options available today and with potential in the future. Specific and targeted policy options have been outlined in the *Powering Sustainable Solutions: Policies and measures* brief.

The companies expressed the confidence that, in an enabling policy environment that sets the right framework conditions, they could optimize efforts for the collective good, working with all governments and other stakeholders to find the solutions.

DuPont

Global change brings local action

Each person in the US state of Florida uses about 1,720-2,160 liters of water per day, and with thousands of people moving to the state each month, public water supply needs near DuPont's plant are expected to double by 2025.

Drinking water comes from two sources: surface water and groundwater. Supplying drinking water to a growing state like Florida is a challenge because 90% of the state's drinking water supply comes from groundwater, ranking Florida second in the United States for groundwater use. Because groundwater is unlikely to meet the needs of the growing population without causing harm to natural systems, DuPont knew it was time for cooperative programs to ensure a sustainable water supply and find alternative supplies.

DuPont's Florida plant is a surface mining operation that supplies three main products:

- Titanium ore used to manufacture titanium dioxide
- Zircon used in ceramics such as china and by foundries for casting molds when pouring molten metal
- Staurolite®, a sand-blasting material that is recyclable and has low dusting properties.

Groundwater, a vital part of factory processes, serves as the primary method to transport the product in slurry form and to clean the products prior to separation and shipment. DuPont has long realized this water is a precious natural resource critical to a sustainable operation and to the nearby communities. An aggressive water conservation program launched in 1996 limited the plant to consuming 7.87 million cubic meters of groundwater per year for process needs. Since then, the plant has reduced its groundwater use by 5.68 million cubic meters per year (75%). The facility's approach comprised three key measures: water conservation initiatives, performance tracking and community engagement.

It all began with a complete site assessment, the development of a site water balance and installation of water consumption flow meters in strategic areas. Based on the data collected, the company initiated several projects. Water conservation projects included the replacement of groundwater with clean effluent water to areas of the operation that could operate on recycled water. Projects also included upgrading piping and valuing schemes to improve efficiency and eliminate losses. Since 1996, DuPont has invested approximately US$ 800,000 to achieve the 75% reduction.

The facility also tracks weekly and monthly water consumption, giving a weekly snapshot of consumption trends. This trend data is communicated to all personnel through the site's Safety Health and Environment Climate Index and serves as a key metric in the site's operating "dashboard."

The opportunity for water conservation was leveraged when a Six Sigma project and associated methodology was used in a high water use operating area. The Six Sigma project achieved significant reductions, and the control plan continues to sustain the gains.

The Florida plant has taken a leadership role in a local Keystone Height Lakes Advisory Council, made up of concerned citizens, governmental and regulatory agencies, elected officials and industry. The group's goal is to collaborate in identifying actions that could enhance watershed drainage to local lakes that are low due to drought and increased water demands.

The site has been very active in dealing with low lake levels by funding and participating in drainage improvement projects and redirecting over 1.9 million liters per day of the site's treated final effluent to the watershed of the low-level lakes. The company had to first confirm that the redirection of effluent from one watershed to another would not cause any adverse impact to the ecosystems involved.

The lakes the council has focused on are part of the recharge system for the Floridian Aquifer, the major groundwater source for the state. Only 15% of the state is considered a recharge area for the Floridian Aquifer; thus, work to replenish lake levels in the region also has a positive impact on a natural resource for the entire state of Florida.

Floridian Aquifer

The reality of renewables

In the 1970s they were called "new and renewable energies" a grouping that allowed energy planners to lump nuclear energy (relatively new) in with hydro, solar, wind and biomass.

A WBCSD Learning by Sharing session at our October meeting in Brussels focused on new and renewable energies in Europe and some of the barriers to realizing the high official hopes for them there.

The very name renewable has great appeal, as it promises unlimited sources of relatively clean energy daily, such as sunlight or a breeze. But today, when we need them to greatly reduce greenhouse gas (GHG) emissions, they are not ready because they were never able to overcome the marketplace muscle of cheap coal and oil. This market strength makes targets for renewable energy use, such as the 20% mandatory target set by the European Union, either overly ambitious or overly naïve.

Participants in the Brussels session heard that the share of traditional renewables, especially hydro, in the overall mix of energy sources has declined and is lower than it was 30 years ago. Hydro will still be in first position among all renewables in 2050, approaching 50% of total renewables production.

Biomass accounts for 10-11% of all primary energy, but this is mostly the cooking fires of the developing world, with their devastating effects on health through indoor air pollution.

Wind is the largest second-generation technology available today, with 25% growth in 2006 and a global market value of 8 billion Euros and costing 4-8 Euro cents per kWh for onshore production. Key issues surrounding it are wind variability and forecasting.

Solar is the next largest second generation technology It has huge potential, but at 12-20 Euro cents per kWh it also has huge costs. Installed capacity is increasing 40% per year, while costs are decreasing by 18-20% for every doubling of installed capacity.

Solar is more effective in areas with lots of sun, and it requires state-of-the-art batteries to store the electricity. It is good for off-grid solutions, but as more people move into cities, there are fewer in the countryside who need such solutions.

In order to make the picture a bit rosier for renewables, some European companies are calling for harmonized government certificates for CO_2 emissions, rather than the 30-some different support systems currently in place. For example, the UK's Renewables Obligation Certificate (ROC) is issued to an accredited generator for eligible renewable electricity generated within the UK and supplied to customers within the country by a licensed electricity provider. It places an obligation on UK electricity suppliers to source an increasing proportion of their electricity from renewable sources.

Harmonizing these certificate programs throughout Europe would put governments and business in a win-win situation, lowering emissions and growing the marketplace for renewables. Business would also like to see the removal of national feed-in tariff systems (a regulated rate paid by the utility to a private electricity producer) that arguably stymie innovation in that the regulators pick the technology and set the price.

A common market would be more efficient, making the transport and sharing of resources (such as biomass) easier. It would create a European arena for innovation where technology is crucial and can benefit from active research, common development policies and public support.

However, the relatively low historic price of fossil fuels has slowed innovation in renewables, and participants felt that the price of oil would have to stay well over US$ 60 per barrel to encourage companies and governments to embrace renewables.

Politicians who want to see more use of renewables will have to subsidize more. The average price of electricity will need to go up in order meet the EU's 2020 target, an increase that would have to be covered by subsidies, carbon taxes and green certificates.

Nuclear energy works well in many parts of the world but has enjoyed high government subsidies and legal protection. Nuclear is currently a lot cheaper than renewables, at 4 Euro cents per kWh as opposed to 6 on average for renewables, because of those subsidies.

The discussion concluded that getting anywhere close to Europe's goals will require a clever patchwork of solutions to overcome present technological, economic and policy barriers.

Making markets for ecosystem services

Ecosystems thinking is slowly changing from concern about losing species to concern about losing the services that keep our own species – and its civilization – thriving.

The rate of **ecosystem degradation** has been **swifter** in the last 50 years than in the **150 years previously.**

People will be more inclined to **conserve** something that has an **economic value.**

5 steps to becoming a good trader

1. Know that you are selling ecosystem services at full cost
2. Know that you are buying ecosystem services at full cost
3. Ensure clear ownership of the ecosystems services that are to be traded
4. Ensure clear and transparent accountability of the ecological value accruing to the owner as a result of the sale
5. Create competition among buyers and sellers

The 2005 Millennium Ecosystem Assessment (MA), the largest and most comprehensive multi-stakeholder review of ecosystems and their services, concluded that some two-thirds of the ecosystems assessed and their services were being degraded or used unsustainably. The rate of ecosystem degradation has been swifter in the last 50 years than in the 150 years previously.

The report introduced new ways of looking at ecosystems and of quantifying the services they provide. In a departure from previous thinking on ecosystems, it added human beings into the equation. It offered new incentives and impetus for sustainable use and mooted the idea of ecosystems and their services as fungible assets. This survey has encouraged all sectors of society, and particularly business, to view ecosystems with a greater sense of urgency and to seek out new mechanisms for their sustainable use.

The MA divided ecosystem services into four categories: supporting (nutrient cycling, soil formation), provisioning (food, freshwater, wood, fiber), regulating (climate regulation, flood control, water purification), and cultural (aesthetic, spiritual, educational).

Efforts to protect ecosystems have been hampered by the fact that in most cases no one owns them. Thus the focus has been on setting ecosystems aside, through the creation of national parks and the like, or passing anti-pollution laws that are hard to enforce, or through other voluntary measures – all good, but insufficient.

Recently another mechanism has been gaining currency: the creation of markets for ecosystem services. Underlying this is the belief that people will be more inclined to conserve something that has an economic value. Creating markets for ecosystems services offers a chance to capitalize on the strengths of business and the power of markets; to address existing weaknesses in markets that have led to degradation and loss of ecosystems resources; and to provide an opportunity to improve livelihoods in impoverished rural landscapes.

In fact, such markets have existed for a long time. Ecotourism is probably the most obvious example of the monetarization of ecosystem services. Now other market mechanisms are being considered as complementary tools that could be used to deliver environmental benefits; and business models are being developed that reflect this.

Roughly three types of market approaches exist. All can be voluntary or mandatory. Direct payments can be made for the delivery of specific ecosystem services or for adopting land uses that are thought to provide such services. Paying for watershed protection can result in reducing pollutant loads in run-off from upland areas and

providing clean water for irrigation, for example. Governments in a number of countries provide subsidies and tax incentives to encourage resource conservation.

Another market-based mechanism rests in creating new rights and liabilities for the use of natural resources and then opening them up to trade. Examples include the growing market for wetland banking in the United States and the increasing trade in biodiversity offsets. The burgeoning trade in carbon credits based on government - allocated emissions allowances is another illustration. Global carbon trade was worth more than US$ 30 billion in 2006 alone.

The use of certification and eco-labeling offers another business opportunity. The certification of wood and non-timber forest products, fisheries and agricultural produce are already well-established, and signs indicate that they too are set to grow.

Using market mechanisms offers new business opportunities and the chance to use ecosystems and their services to tap into previously unrealized assets. However, these mechanisms are not without their limitations. Weak institutions and poor governance in some – often biodiversity-rich – areas can make it difficult to exploit market mechanisms equitably and sustainably. A lack of experience with market-based approaches to ecosystem management may result in further harm to ecosystems and their services. Finally, some of the most vital ecosystem services, such as regulating and supporting services, are actually the most difficult to "bring to market".

Market mechanisms clearly offer opportunities to use ecosystems sustainably and deliver environmental dividends, provided they are carefully and equitably implemented. Ensuring this will require partnerships between governments (to provide the regulatory frameworks) civil society (for the knowledge surrounding ecosystems and their services) and business (for their capital and technology). Partnerships for sustainable use will enable all stakeholders to better understand ecosystems and their services, assess their dependence and impacts, reduce their negative impacts and scale-up solutions, and to explore and pursue new business opportunities.

This article is based upon a new publication by the WBCSD and The World Conservation Union (IUCN), *Making Markets for Ecosystem Services: New challenges and opportunities for business and the environment.*

Rio Tinto

Valuing water in northern Australia

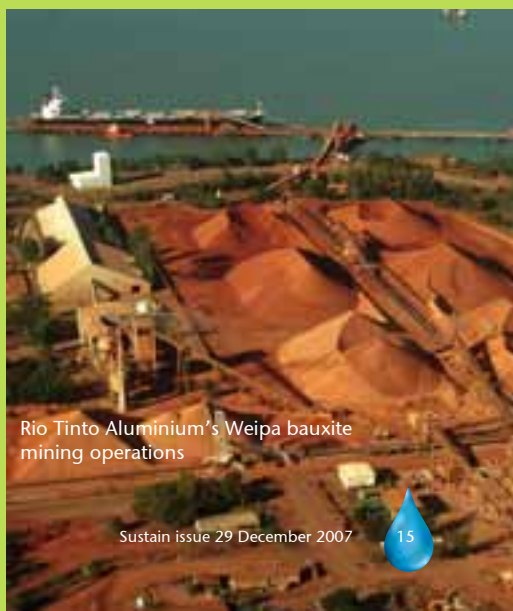
Due to its tropical and monsoonal climate, northern Australia often experiences an excess of water that occurs less frequently in southern Australia.

Rio Tinto Aluminium's Weipa bauxite mining operations in the region have multiple sources of water, each of which has its own associated costs and additional values. The four main sources are (1) decant water (recycled or reused water) from the tailings dam; (2) site rainfall run-off captured in "slots" (like small wells) and other small storage sites across the mining lease; (3) shallow aquifers underlying the area; and (4) the deeper aquifers of the Great Artesian Basin. Availability of the different sources can vary during the year, particularly the first two.

Rio Tinto identified the level of sensitivity of the shallow aquifers and the Great Artesian Basin during normal environmental risk management processes. This has been reinforced by engagement with key stakeholders, including the Great Artesian Basin Coordinating Committee and non-governmental organizations. The latter have focused on the connectivity that can occur between the shallow aquifers and local rivers. These processes have aided the establishment of a formal hierarchy of sources, directing the operation to source first from tailings dams, then "slots", then the shallow aquifers, and finally the Great Artesian Basin aquifers.

In general, the costs associated with sourcing from tailings dams and slots are less than those arising from operating borefields fed by underground aquifers. However, due to the large area of the mining lease, there are situations where it could be both cheaper and more convenient to source from one of the latter.

The establishment of the sourcing hierarchy effectively places an implicit value on the natural sources of water. In the case of the Great Artesian basin, the focus is on the long-term sustainability of the resource, as it has the slowest rate of recharge. The shallow aquifers recharge very quickly due to the climate; their shallow depth, though, can be linked more closely to the river ecosystems.



Rio Tinto Aluminium's Weipa bauxite mining operations

ITT

Quick response to Asian tsunami

The tsunami that struck southern Asia on 26 December 2004 was one of the worst natural disasters in recent history. Besides leaving thousands killed and injured, the wave left many more in danger of contaminated water supplies and waterborne diseases.

Just a few hours after the tsunami hit, ITT began preparing for the delivery of 58 portable water treatment units. Combined, these portable membrane filtration systems are capable of treating more than 380,000 liters of water every hour, or enough safe water for more than 500,000 people. The units are diesel powered – enabling them to operate in areas without electricity – and simple to operate and maintain. They provide the level of treatment necessary to combat waterborne diseases such as cholera and giardiasis, a diarrheal illness caused by a one-celled parasite.

The company targeted Sri Lanka as a place where water filtration systems would be most effective. Working through the US Agency for International Development (USAID) and the Industrial Services Bureau (ISB), a local non-governmental organization, ITT got volunteers to the scene quickly. ISB got the local assistance needed, helping to quickly install the filtration systems.

"In the wake of the devastation, it was important for us to put together a US-Sri Lanka partnership that could deploy with speed and supply the equipment that best met the needs of tsunami survivors," said Dr. Ananda Mallawatantri, country director of the US-Asia Environmental Partnership Program of USAID.

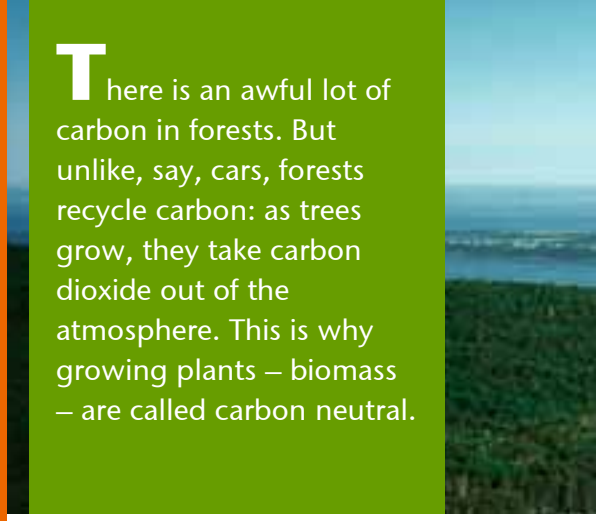
According to a UN study, freshwater supplies in countries hit by the tsunami were immediately under serious threat. Drinking water sources had been contaminated by saltwater, sewage, toxic waste and asbestos from buildings, and every well on the coast of Sri Lanka may have been affected. It added that shallow wells and groundwater supplies, especially on small islands, were contaminated with saltwater.

Agricultural land has also been damaged by saltwater, which the study said would affect crops in the short term.

Four product experts from ITT spent more than two weeks in Sri Lanka teaching local people, including the Sri Lankan army and navy, to install, operate and redeploy the equipment, which will remain in Sri Lanka to provide ongoing relief.

In addition to the membrane filtration units, ITT also shipped gas-fed chlorinators to relief organizers in the region. The equipment allows people without electricity to treat contaminated water supplies with chlorine and provide safe, drinkable water. The Sri Lankan navy and ISB are overseeing the equipment and its continuous deployment.

Credit: Digital Globe



There is an awful lot of carbon in forests. But unlike, say, cars, forests recycle carbon: as trees grow, they take carbon dioxide out of the atmosphere. This is why growing plants – biomass – are called carbon neutral.

With this basic truth as a starting point, the CEOs of the WBCSD's Sustainable Forest Products Industry (SFPI) working group drafted advice for policy-makers on how their sector could help society control carbon emissions (*The Sustainable Forest Products Industry, Carbon and Climate Change – Key messages for policy-makers*).

The member companies have already committed to a set of *Membership Principles and Responsibilities* that include efficient and innovative use of fiber, energy and new technologies; promoting the recyclability, recovery and appropriate reuse of fiber; improving energy efficiency and use of renewable energy; tracking, managing and reporting on carbon dioxide emissions; and promoting sustainable forest management and use of forest products as important climate mitigation strategies. The report notes that forestry companies start out with several advantages. Their products are made of renewable raw materials, require lower fossil energy inputs during their life cycle than most alternative non-wood products, are highly recyclable, and store carbon. The industry is energy intensive, but meets much of its energy needs with carbon-neutral biomass.

But with some breakthrough technologies, the industry could reduce energy consumption even further. One example would be the development of forest-based bio-refineries to convert forest biomass into gaseous and liquid fuels and other commercial products. Even without new technologies, the industry – their leaders argue – could help reduce total energy use and greenhouse gas (GHG) emissions by

For policy-makers:

Messages from the forests

Membership Principles and Responsibilities

The SFPI, Carbon and Climate Change – Key messages for policy-makers

becoming even more energy efficient and increasing its own use of biomass in energy production. It can also supply society and industry with increasing amounts of sustainably produced wood and fiber for use as raw materials and for bio-energy.

But the industry faces several challenges, including the complex relationship between itself and the global carbon cycle, the capital-intense and long-term nature of the business, and the fact that it operates in a world marketplace, forcing it to think in terms of global solutions to business and environmental problems. It also faces rapidly growing interest in using wood and other types of biomass for fuels and bio-based products, which creates competition for its primary raw material and the land on which it grows.

Thus the group is calling on policy-makers to "support public policies that promote faster turnover of capital stock depreciation so improvements in energy- and carbon-intensity can be accelerated." It asks them to "promote the efficient use of biomass through the value chain including recycling, extraction of energy and wise use of limited land resources."

Given that biomass energy is an important component of policies to control atmospheric CO_2, policy-makers should encourage an increase in the recovery of used wood and fiber, as well as adequate supplies of fresh fiber and other biomass for industry and society.

They add that "public policies and carbon crediting schemes should recognize all activities that accomplish real and verifiable reductions in atmospheric greenhouse gases – forest-based reductions especially."

Public policies should also be carefully evaluated for unintended consequences, particularly those adverse to the goals of achieving reductions in atmospheric concentrations of carbon and supporting a sustainable forest products industry.

"Expanded efforts to bring more of the world's forests under sustainable management could reduce carbon emissions caused by deforestation, fire, disease and insects, and conversion to agriculture," the group concludes.

Summing up the CEOs messages, James Griffiths, director of the SFPI working group said: "While the forest products industry is ready to further contribute to meeting the world's climate goals, its contribution will be most effective when long-term framework conditions on international and national levels support its efforts."

Mark Watkins, senior vice president at MeadWestvaco and co-chair of WBCSD's SFPI working group, added: "By becoming even more energy efficient and increasing our use of biomass in energy production, we can help our companies, society and the planet. But we need policies in place that create a favorable environment for this to happen. The best way to achieve this is by pushing our messages to policy-makers and helping them to understand why our best interests are also theirs and the planet's."

The industry is **energy intensive**, but meets much of its energy needs with **carbon-neutral biomass.**

Policy-makers should **encourage** an increase in the **recovery** of used **wood** and **fiber.**

By becoming even more **energy efficient** and increasing our use of **biomass** in energy production, we can help our companies, society and the **planet.**

Making agriculture sustainable

Agriculture is possibly the most important sector of global activity. It is a source of foods, fibers and, increasingly, fuel. It provides livelihoods and subsistence for the largest number of people worldwide. It is vital to rural development and therefore critical to poverty alleviation. Up to 40% of the land's surface is used for agriculture, along with 70% of the world's fresh water supply. Today, agriculture accounts for 38.7% of total global employment.

Population growth and increasing affluence in some countries are increasing demand for food and changing the types of food in demand – from grain to meat, for example, a change that requires more farmland. More land is being used to grow fuel crops, and climate change and water scarcity are compromising the ability of agricultural lands to deliver quality produce.

The last 150 years have witnessed large-scale conversion of land to make way for agricultural and other activities. Land-use change has both positive and negative impacts on biodiversity. Making land productive often helps to attract greater biodiversity, while conversion of land for agro-forestry also encourages greater levels of biodiversity.

Farming needs biodiversity and healthy ecosystems: for pollination, the creation of genetically diverse plant and crop species, the development of robust, insect-resistant strains, crop protection and watershed control.

Thus biodiversity loss hurts business. Farming and its downstream value chain – food, biochemistry, and the pharmaceutical and textile industries – are particularly vulnerable. They face diminishing supplies or rising costs of key resources and inputs, such as raw materials and water.

Land-use change has both positive and negative impacts on biodiversity.

The major challenge today therefore is to secure and increase agricultural yield while at the same time conserving biodiversity, ecosystems and resources, as well as maintaining a healthy base for those who rely on agriculture for their livelihoods. In other words, balancing agricultural needs with those of ecosystems and biodiversity to ensure both are able to deliver their services in a sustainable manner.

The key to achieving this lies in the implementation of sustainable agriculture. This more holistic and systemic approach integrates the three pillars of sustainability: profitability, environmental protection and social equity. It includes the premise that agriculture needs to be managed while supporting biodiversity and ecosystem health.

Agriculture needs to be managed while supporting biodiversity and ecosystem health.

The agricultural sector possesses a wealth of biodiversity-relevant knowledge and therefore has tremendous scope for effective management of ecosystems and biodiversity resources. Agricultural producers and consumers should act as stewards of ecosystems and biodiversity.

During WBCSD meetings in Brussels in October, members of the WBCSD Ecosystem Focus Area met for the first time to discuss their work program. Given the importance of agriculture and the enormity of the challenges it faces, members of the Focus Area Core Team decided to adopt agriculture as one of their key workstreams, collaborating with agricultural partners from member companies and partner organizations toward achieving sustainable agriculture.

As both an agricultural producer and consumer, business has a vital role to play in achieving sustainability. Business, particularly those companies in the bio-crop and agricultural sectors, can deliver technology for improved agricultural yields.

WBCSD Member Companies Syngenta and Bayer (and its subsidiary BayerCropScience) have been working to develop technologies that enhance agriculture while respecting biodiversity. They are developing more selective herbicides and pesticides, energy- and water-efficient irrigation techniques and energy-efficient harvesting mechanisms. Soil protection technologies and crop rotation techniques can also help.

Market mechanisms may provide both incentives and tools, particularly for companies further down the value chain that rely indirectly on agriculture and agriculture products. Such market instruments could consist of direct payments to farmers for the supply of ecosystem services, especially biodiversity conservation. These could include paying farmers for watershed protection or planting crops for erosion prevention.

Trading environmental liabilities such as carbon emissions, wetland mitigation credits or even biodiversity restoration credits may provide other incentives. Certification for organically produced, fair trade or biodiversity-friendly produce could also result in biodiversity and ecosystem gains, as well as offer profitable business opportunities. Many of the environmental standards and mechanisms for certification are already in place.

The technology largely exists to make farming both profitable and sustainable. But it will not be used without the necessary regulatory frameworks. Many companies are willing to make the investments to contribute to sustainable agriculture as witnessed by the number of business-led initiatives established to standardize certification procedures and environmental standards. However, they need guarantees related to energy use and funding risks. They also need to gain an economic return on investment. Governments need to set targets and provide the necessary guarantees. Business is ready to work with governments and civil society to achieve these objectives.

Borealis and Borouge

Water for the world

The plastics industry can make a difference in many of the challenges facing our world – whether climate protection, energy conservation or access to water and food – not only in the way it operates but also how it provides sustainable solutions to global challenges. In the fields of water and sanitation, Borealis and Borouge advanced plastics materials are shaping sustainable solutions across the entire water value chain, from source to network, for food protection, water supply and sewage systems.

For Borealis and Borouge, the 2006 report, *Business in the World of Water – WBCSD water scenarios to 2025*, was a further call for action. "We consider that water and sanitation are the most vital of the challenges facing our world," said Borealis Chief Executive John Taylor. Billions of people around the world lack access to safe water and sanitation, and climate change, urbanization and population growth are deepening the global water crisis.

The challenge is about better managing the resources we have. In rich or poor countries alike, inefficient water systems and unsustainable practices are widespread. The pace of transferring best practices remains slow across value chains and communities, and awareness is too often raised only when a crisis occurs.

To help manage the challenge, Borealis and Borouge have created *Water for the World*™, a pioneering program that fosters local knowledge and partnerships throughout the value chain to provide sustainable solutions for the availability of safe water and sanitation.

Water for the World develops five strands of activities:

1. Bringing expertise to community field projects in partnership with Water and Sanitation for the Urban Poor
2. Advancing science and rewarding best practices, notably as co-founders of the Stockholm Water Prize
3. Further engaging all stakeholders to encourage sustainable practices and to develop training programs and standards, such as in the Middle East with the Gulf Plastics Pipe Academy
4. Leveraging the companies' expertise to innovate and increase the offering of sustainable solutions to address local challenges
5. Enhancing operational water efficiency and mobilizing employees and local communities by raising awareness and adopting sustainable practices.

"*Water for the World* not only builds upon our market leadership, it goes beyond business," said Borouge Pte CEO Harald Hammer. "By bridging expertise, competencies and resources across the value chain, we can deliver better solutions and make a difference."

The program therefore sets a platform for partnerships that is open to the ideas, comments and projects of all stakeholders. Launched in October, the web site, www.waterfortheworld.net will regularly report on partnerships, knowledge and sustainable solutions in action.

Sustainable cardboard and boardroom chairs

Forests offer the full range of ecosystem services. They provide support through nutrient cycling and by helping soil formation. They are sources of food, wood, fuel and fiber. They help regulate the climate. They are aesthetically, culturally and recreationally valuable. Forests provide livelihoods for people and critical habitats for animals and plant species.

Sustainable Procurement of Wood and Paper-based Products: An introduction

The forestry industry sector was one of the first to understand the importance of sustainable resource use and development.

Given forests' many values, it is worth considering how we purchase the forest products our companies use.

These include furniture, paper, building materials, resins; the list is endless. Threats to the planet's forests and their biodiversity compromise their ability to act as providers. The largest single cause of deforestation is land use change for agriculture. But rising energy demands too are affecting forest ecosystems. Massive deforestation for the cultivation of palm oil or sugar for ethanol as an alternative fuel is becoming a serious cause of deforestation in some regions.

Thus there is an urgent need to conserve forests and their products and ensure their sustainable use. The forestry industry sector was one of the first to understand the importance of sustainable resource use and development. A huge body of research exists to support this and a large number of industry standards have been developed. But what of groups not directly involved in the forest sector?

One area that offers considerable scope for sustainable management is procurement, specifically of wood and paper-based products. The WBCSD and the World Resources Institute (WRI) have developed a resource kit and guidelines to assist corporate procurement managers to identify resources from sustainably managed forests.

Entitled *Sustainable Procurement of Wood and Paper-based Products*, the guide targets "business-to-business" customers who are significant purchasers of pulp, paper, packaging, timber and wood-based products; who want to source on a responsible and sustainable basis; and who do not necessarily have "in house" forestry expertise. These customers are increasingly looking for guidance to help them understand and use the many existing approaches and standards purporting to support the "responsible" procurement of "sustainable" forest products.

The guide has two key objectives, to help customers understand, select and use existing approaches on the one hand, and on the other to help expand the market for sustainable forest products. It provides impartial, simple and credible information on key issues and existing approaches to help procurement managers articulate and implement procurement policies and requirements.

The guide highlights 10 key issues for consideration when sourcing wood and paper-based products. These are organized into three categories. The first of these concerns the origin of the products. A supply chain for wood and paper products can be very long and involve materials from a large variety of sources. Seeking clarification and documentation from suppliers about the origin of the materials helps to determine whether they are from sustainable sources.

The second issue concerns accuracy. Some regions suffer poor forest management and weak governance. In such cases, companies may need to apply a greater degree of due diligence – such as third-party verification of forest management standards – when sourcing products from these regions. Finally, questioning the legality of wood product sources is vital. Illegal logging activities have increased in recent years and are believed to account for 8-10% of global wood production.

The second category deals with environmental aspects. Key issues here center on questions of sustainability, whether the forests from which the products and their different components in the supply chain have been sourced are sustainably managed. Closely related to this is whether special places, such as sensitive ecosystems or biodiversity hotspots, have been protected.

Similarly, have climate change issues been addressed? Forests tread a fine line between mitigating climate change and contributing to it. On the one hand, growing forests remove carbon from the atmosphere and sequester it. On the other hand, the forest industry is energy intensive. While many of the energy needs are met by the use of biomass, forestry still relies heavily on fossil fuels for transport and other activities. Balancing carbon sequestration versus release requires ensuring that forests are not being logged or destroyed faster than they can grow back.

Other issues include whether the appropriate environmental controls are in place. For example, although many paper manufacturers have ceased to use chlorine for bleaching paper, chemicals are still used in many parts of the industry. It is imperative to ensure the effective recovery of chemicals and appropriate recycling of waste material.

Finally, wood fibers cannot be recycled indefinitely as they usually wear out after five to seven cycles. Therefore a constant supply of virgin fiber is required. Ensuring that fiber is recycled appropriately, using environmentally friendly technologies, is key to ensuring sustainable sourcing and procurement. Similarly, given the energy-intensity of the industry, ensuring that other resources, especially energy, are used efficiently is also an important part of the sustainability equation.

The final category of key issues is societal, and deals with the impacts of forest product procurement activities on local communities and indigenous people. It is estimated that forests are home to around 800 million people and provide employment for 13 million people worldwide. It is crucial to protect the habitats and livelihoods of forest-based communities.

The authors of the report tested these issues through an analysis of 22 initiatives developed by different organizations to support the sustainable procurement of wood and paper-based products. The conclusions of these analyses are grouped around three categories of product – solid wood products, paper products and wood-based products in general – and presented in the Guide in tabular form.

Copies of the *Guide and Resource Kit* are available at www.wbcsd.org/web/forestry.htm or www.wri.org/publications

For further information, see also: www.sustainableforestprods.org

PepsiCo

Positive water balance

When PepsiCo launched its business in India 18 years ago, it pioneered several major agricultural initiatives, partnering with thousands of farmers and Punjab Agriculture University to raise productivity and thus improve farmers' incomes and quality of life.

Over the years, PepsiCo India's efforts helped more than double tomato yields, introduced "processing quality" potato varieties, initiated contract farming for the export of basmati rice and introduced critical food processing technology. This grass-roots capability and expertise in agriculture are helping the company achieve its vision of *Positive Water Balance by 2009.*

The beverage and bottled water industries are popular targets for critics who portray them as major factors in water depletion, but actual water use data reveal a very different picture.

In India, all industry accounts for about 6% of total water use. Within that 6%, the bottled water and soft drinks industry accounts for about four-hundredths of 1%. In comparison, agriculture accounts for over 80% of total water use. Given these facts, it became obvious that to have a significant impact on water conservation at the macro level, farming must use water more efficiently.

In 2003, PepsiCo began its efforts to achieve *Positive Water Balance by 2009.*

Positive Water Balance was defined as:

In-plant water recharge and harvesting + Water recharged through community programs + Savings through agricultural interventions	≥	Total water used in manufacturing process
CREDITS ▼ Launch Interventions	≥	DEBITS ▼ In-process improvements

It "revalued" water as a resource across the organization. This caused a comprehensive movement to conserve and optimize water usage within the manufacturing process (or the debit side of the water balance equation).

The multi-pronged approach across manufacturing plants included innovative reuse and recycling initiatives in the manufacturing process that focused on the reduction of water use. In the last five years, these initiatives have enabled PepsiCo India to reduce water use in manufacturing plants by over 60%, and in the last two years alone the company has saved over 2 billion liters of water.

Having significantly reduced the "debit" side of the equation, PepsiCo turned its attention to earning the "credits" needed to achieve *Positive Water Balance*. Across its network of manufacturing facilities the company constructed rain and roof water harvesting structures. It initiated a variety of community water projects, and partnered with The Energy Resources Institute (TERI) of India to launch comprehensive watershed management programs in geographically diverse locations. Then PepsiCo began exploring the untapped potential for significant water reductions through interventions in agriculture.

Coincidentally, at the same time the Punjab State Government approached PepsiCo to jointly establish the largest citrus propagation nursery in the world. The project was consistent with Punjab's desire to convert fields from rice and wheat cycles to horticulture, which can reduce water consumption by 1.5 million liters/hectare, while raising farm incomes. Clearly the government was also concerned about water use in agriculture.

PepsiCo was already engaged in contract farming of basmati and other paddy-grown grains. However, a serendipitous delay in the arrival of seed three years ago led the company to recognize a huge water-saving opportunity.

Generally, rice and various other grains are grown by first cultivating the seed in a nursery and then manually transplanting it to a field "puddled" with three to four inches of water. The late seed meant that there was no time for the nursery stage. Hence the company decided to sow the seeds directly in the fields, recognizing that while the yield might be low, it would be sufficient for undertaking trials the following year. In fact, the yield was *higher* as the density of seeding was higher. The expected problems with germination did not occur, though weeding had to be increased.

Over the last three years, PepsiCo India has conducted trials of various rice varieties in farmers' fields to validate the technology. A seeding machine which can sow at a specified gap and at a uniform depth has also been developed. Repeated direct seeding trials have demonstrated water savings of 30%. Traditional field irrigation helps in stunting weed growth, and this was alternatively achieved by pre-treatment with select weedicides.

PepsiCo is working to share the results of the direct seeding trials with more farmers. The water saved by this "small change" of converting just 1,800 hectares of paddy to direct seeding cultivation would exceed the quantity of water PepsiCo uses to manufacture its beverages and snacks in the country. In other words, this *single* initiative has the potential to deliver *Positive Water Balance* for PepsiCo India – and provide vast water savings for a nation in which this natural resource is scarce.

The next four billion

It is a strange new world in which an NGO would undertake a global market survey for business and then make it freely available to any company that wants it.

But that is what the World Resources Institute (WRI) did with its publication *The Next 4 Billion: Market Size and Business Strategy at the Base of the Pyramid*. Bill Kramer, one of the report's authors, shared its key findings with a WBCSD audience at our Brussels meeting in October.

Much has been written about doing business with poorer people at the base of the economic pyramid (BOP), and the WBCSD's Sustainable Livelihoods project focused on this type of business before it became the Development Focus Area. Kramer and his colleagues reckon that 4 billion people, more than two-thirds of the planet's population, can safely be labeled as poor.

They did the report because "the data on the 'customers' was largely missing from poverty alleviation calculations – by business (for investment, market development and innovation) or by governments and multi-lateral institutions (to inform policy and practice)," Kramer said. The report is "based on official data from national household surveys in 110 countries, publicly available for the first time."

"As a market, the aggregated buying power of the 4 billion is a 5 trillion dollar market," Kramer said. The report breaks this down by region, country and by income bands within countries. It also breaks down spending by sectors: food, energy, housing, water, etc. It then breaks down the sectors, letting the reader know, for example, that 59% of health spending in Asia is on pharmaceuticals; the figure for Africa is 47%.

The cuts are ever finer. For example, people in Sierra Leone earning between US$ 2,500 and US$ 3,000 a year (the top of the BOP) spend 12.1% of their income on healthcare.

His messages for business were similar to those contained in WBCSD reports: there is a large underserved market that can be reached profitably; poor people are willing to pay for quality service and products; but reaching them requires the right strategy, local knowledge and the right partners.

His message for the development community – the development banks, UN Development Programme, Oxfam, etc. – was that "the poor are already consumers, and private sector strategies can lower prices, raise quality, increase access and create jobs. Only the private sector approach can scale to meet the needs of 4 billion people, and smart development approaches and the BOP market approaches are complementary."

In fact, some WBCSD member companies are already working with the development community. The Inter-American Development Bank stepped in to provide Guatemalan farmers with credit so they could buy the inexpensive, gravity irrigation systems developed by GrupoNueva, and Procter & Gamble developed its children's drink to fight micro-malnutrition in the developing world with the help of UNICEF.

Bill Kramer has become so excited by the business potential to promote the sustainable development of the poor – and to help manage other global challenges – that he is leaving WRI to form a company to teach business executives how to do it (www.globalchallengenetwork.com). The report can be found at www.wri.org/thenext4billion.

4 billion people, more than two-thirds of the planet's population, can safely be labeled as poor.

As a market, the aggregated buying power of the 4 billion is a 5 trillion dollar market.

Development: The "just do it" focus area

By 2050 some 7 billion people will be living in what today we refer to as the developing world. These are the high-growth markets of today and tomorrow, and companies would be foolish not to take a look.

By Julio Moura,
Chair and CEO, GrupoNueva;
Co-chair, Development Focus Area

In the Development Focus Area, we want to find innovative ways to put business leadership into action to capture this huge opportunity. We want to achieve this by promoting new, innovative, inclusive business approaches that are good for both business and development.

Thus, the challenge we set ourselves is to find new ways to bring the low-income segment into our value chain – as employees, suppliers and/or service providers, or as consumers of affordable products and services that improve their overall quality of life. We call this "doing business with the world", but really it is all about creating more winners from globalization.

Find innovative ways to put **business leadership** into action to capture this **huge opportunity.**

We like to think of ourselves as the "just do it" focus area. Our partnership with SNV Netherlands Development Organization in Latin America has so far led to the establishment of eight supply chains creating 8,000 new jobs in Ecuador. Our efforts encouraged the government to make "inclusive business" part of the Ecuadorian public policy agenda with a target to create a quarter of a million new jobs and a commitment of some US$ 90 million in public funds to co-finance projects. In Honduras, a partnership between GE and a local company is investigating the creation of 40,000 new, low-cost homes. And there is more to come.

Roughly **75% of WBCSD** members are involved in **inclusive business** one way or another.

Overall, the WBCSD-SNV coalition has been so successful that it just signed a Memorandum of Understanding with the Inter-American Development Bank (IDB) to grow and spread our work. On signing the memo, IDB President Luis Alberto Moreno noted that the agreement could help improve the living conditions of the more than 300 million people in the region (over 70% of the population) that are trapped in poverty. He added: "We will be joining forces to catalyze and scale-up inclusive business opportunities that will benefit the majority."

This is all about doing business. In the Statement of Intent the members of our Core Team signed last year we pledged to:

- Develop a deeper understanding of how global issues such as poverty affect our individual companies and sectors

- Use our understanding of these issues to search for more inclusive business solutions that help to address them at both a local and global scale
- Align our core business strategies with the solutions that we have identified
- Incorporate long-term measures into our definition of success.

We also invited governments to join with us to create better framework conditions. We want to continue to influence government policies to promote enterprise development. We aim to do this through our major advocacy document, *Doing Business with World.*

Roughly 75% of WBCSD members are involved in inclusive business one way or another, with more than one-quarter having made it part of their core business strategies. Documenting, exploring and promoting these business models remain the core of the Focus Area work, and we have collected some 70 examples of such approaches.

But we are also finding ways of measuring effectiveness. We hope to be able to assess the contribution of business activities to specific development goals. In doing so we aim to provide the tools to improve the quality of stakeholder engagement and to help companies make smarter operational and longer term investment decisions that benefit both their business and the societies where they operate.

We are working on the challenges of making mobility sustainable in emerging economies by focusing on two things:

1. Raising awareness of the importance of mobility and infrastructure investment to enable economic growth and social progress
2. Examining mobility needs in the world's rapidly growing cities where infrastructure investment is not keeping up with population growth, let alone the even more rapid growth in motorized vehicle ownership.

Our energy for development work is slowly picking up speed as we all realize the desperate need for energy in the developing world.

Our work in Latin America has been successful because we have had the support of our Regional Network partners. We are having a hard time moving into Africa, because we have few such partners there. Thus we are seeking corporate leaders to guide our work on the continent.

The Development Focus Area has the involvement of some 60 Council Members and a very engaged Focus Area Core Team. This commitment has led to some heated and creative conference calls.

In them, we often discuss a single burning question: Are we simply a group of companies each doing interesting things, but a group in which 1+1 equals 2, or are we one catalyzing agent of a powerful and growing movement, where the sum of the whole is much greater than the sum of the individual parts? We tend to take the latter view.

Doing Business with World

The agreement could help **improve the living** conditions of the more than **300 million people** in the region (over 70% of the population) that are trapped in poverty.

Our **energy for development** work is slowly picking up speed as we all realize the desperate **need for energy** in the developing world.

The sanitation challenge:
What does it mean for business?

If you think healthy populations are good for business, then you should be pleased to notice signs that the world is starting to think about sanitation. One of those signs is that 2008 has been designated the "International Year of Sanitation" and, if all goes well, sanitation will finally start to get the attention and resources that the sector desperately needs.

Poor sanitation is one of three major factors contributing to water-related death and disease. The other two are lack of access to safe drinking water and inadequate hygiene. The three factors are inseparable; if just one is neglected, then it becomes very difficult to control water-related sickness.

Relatively speaking, sanitation and hygiene have been neglected in much of the world. Only about half of the population in developing countries has access to improved sanitation facilities, compared to close to 100% for developed countries. The least developed countries average about 36%, according to a 2007 World Health Organization and UNICEF report. Altogether, some 2.6 billion people, or 40% of the world's population, do not have decent sanitation.

As a result, in 2002, "around 1.7 million deaths were attributable to unsafe WSH [water, sanitation and hygiene], among which 90% were children under five years old. Indeed, unsafe WSH is the world's biggest child killer after malnutrition," according to the Organisation for Economic Co-operation and Development.

To help put these numbers in perspective, that is the equivalent of 10 Boeing 747 crashes per day, every day of the year, with no survivors and most of the seats filled with children. For the same year, tuberculosis and malaria are estimated to have caused 1.6 and 1.3 million deaths, respectively.

But the mortality statistics show only the tip of the iceberg. Many economic costs arise from poor sanitation and hygiene, ranging from direct healthcare costs to lost school and work days for the ill and their caregivers, losses in worker productivity and time spent gaining access to sanitary facilities.

The Millennium Development Goal (MDG) target for water supply and sanitation is to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. It is interesting to compare the estimated benefits associated with achieving both of these targets to those of achieving the water supply target alone. Total economic benefits increase by a factor of nearly five when improved sanitation is provided in addition to improved water supply.

People in wealthy countries take good sanitation facilities for granted. The global challenge now is to extend that privilege to everybody else in the world. But while the world is still on track for meeting the MDG drinking water target, if current trends continue it will miss the sanitation target by more than half a billion people, according to UN estimates.

A small number of WBCSD member companies are active in the sanitation sector as providers of enabling technology, equipment, products and services, but the role of the broader business community is not so obvious. The scale of the sanitation problem is big enough, however, that it is worth taking a close look at the question.

To what extent do populations lacking basic sanitation overlap with the markets, operations and supply chains of WBCSD member companies? What is the impact of water-related disease on companies' activities? How should the global business community respond to the challenge of improving global sanitation? How can businesses at all levels work effectively with governments and civil society to achieve progress in sanitation?

WBCSD members do not have a collective response to these questions today, which is why the Water Project has decided to launch a Sanitation workstream. One of the first steps will be to gain a clearer picture of where companies may be affected by sanitation issues. To do this, the group is encouraging companies to use the Global Water Tool to map their activities in relation to areas that are underserved in sanitation.

A second major component will be to seek examples of business action for improved sanitation and hygiene. This will involve gathering and sharing information on the experience of individual companies, including, for example, employee education programs or participation in community-based projects to improve sanitation and hygiene.

As it has done in the past in its work on water, the Water Working Group intends to bring its members' experience and perspectives to the global dialogue on sanitation and to make an active and positive contribution to the International Year of Sanitation.

The Coca-Cola Company

Schools for change

Thirteen-year-old Jacqueline used to constantly miss school due to the crippling effects of diarrhea, cholera and typhoid. "We were drinking river and well water that was untreated," she explained matter-of-factly. "I was always vomiting, shivering. I didn't have any appetite."

Today, thanks to an innovative school-based water purification and hygiene education program, Jacqueline is a regular attendee at Kasimba Primary School in Nyanza Province, western Kenya. "Now everybody in our house has safe water, and nobody is complaining about this typhoid any more," she said with a broad smile.

According to UNICEF, more than half the world's schools lack clean toilets and drinking water, contributing to the waterborne diseases that take two million lives a year, 90% of them children. Young girls lose education and economic opportunity, as female school attendance drops dramatically when clean, safe toilets are unavailable.

Kenya is among the hardest hit countries, with more than half the rural population living without safe water supplies. Schools breed disease due to lack of latrines, inadequate water supplies, and water storage in containers easily contaminated by hand.

In 2006, The Coca-Cola Company's East and Central Africa Division funded one of the country's first schools-based efforts to reduce diarrheal diseases and improve pupil attendance by implementing the Safe Water System developed jointly by the World Health Organization, US Centers for Disease Control and Prevention and the Pan American Health Organization. The pilot project was implemented by the development charity CARE. Coke provided funding, project strategy development and technical expertise, supported development and production of new bottle molds for WaterGuard, the locally manufactured chlorine disinfectant, and acted as liaison to the provincial and national water, health and education ministries.

Two teachers in each of 45 public primary schools were shown how to treat water with a chlorine-based disinfectant, store the water safely and promote proper hand-washing practices. They then formed safe water clubs for pupils, instructing them in water purification and hygiene techniques and encouraging them to pass the message on to parents. Each school also received locally made clay pots, modified for safe storage with a narrow mouth, lid and spigot, and disinfectant solution, soap and hand-washing water tanks.

In less than a year, an estimated 12,250 students were receiving treated water, and nine in ten schools were storing treated supplies in safe containers. The impact on attendance was impressive, with absenteeism falling by 29%. An estimated 1,258 families of students in the project became users of WaterGuard during the project time period.

Coke funded an in-depth expert evaluation of the project by Emory University in Atlanta and the US Centers for Disease Control and Prevention. This enabled the company and its partners to promote schools-based safe water programs to government officials and international donors. As a result, CARE is implementing a scaled-up program, SWASH+, which will cover 1,500 schools throughout Nyanza Province, funded by the Bill and Melinda Gates Foundation and the Global Water Challenge. The Challenge is a coalition of leading organizations joining forces to catalyze change in the water and sanitation sector. The Coca-Cola Company is a founding member.

"We have more than 70 community water stewardship projects in 40 countries, and the Kenya program exemplifies our approach of seeding initiatives that can be sustained by communities and scaled by other agencies," said Karen Flanders, The Coca-Cola Company's director of corporate responsibility. "We also try to bring added value beyond philanthropy. In Kenya, our public affairs and communications team were actively involved in promoting the project to a wide audience including Kenyan ministries, potential donors and, through a video, an internal audience of Coca-Cola managers."

Jacqueline with sister and mother fetching water

More than half the world's schools lack clean toilets and drinking water.

Reduce diarrheal diseases and improve pupil attendance by implementing the Safe Water System.

"I will if you will"

There are many ways to Go Green. Think "green" laundry detergent; energy-efficient freezers, refrigerators and washing machines; low-emissions cars; hydrogen-powered buses; sustainable wood products; fair trade coffee, chocolate and bananas; dolphin-friendly tuna and sustainable cod fish.

But the markets for green products are fickle at best, incomprehensible at worst. Some 30% of people claim to buy their products based on sustainability criteria, but only 3% consistently do so. At the same time, business leaders argue that even though companies are greening products, buyers are unwilling to pay a green premium. They expect business to address the issues without any consequences for the shopper.

Some 30% of people claim to buy their products based on sustainability criteria, but only 3% consistently do so.

Consumers, on the other hand, claim that businesses are just in it for the money. They are much more skeptical about the role business is playing on sustainable development issues, especially the "evil off-setters" – those companies perceived as bad but which are doing something good.

To compound the problem, consumers are also faced with a paradox of choice, where the more choices people are given, the less likely they are to choose anything at all, Trevor Hardy from BBDO Lunar Advertising told a Learning by Sharing session on the topic of consumers and sustainable development at the WBCSD Brussels meeting. The many options available in European or US supermarkets can actually make people unhappy, as they compare the article they bought with all the similar articles they did not buy and wonder if they made the right choice.

To confuse consumers even more, there are some 80 "trust" marks in the average supermarket, from sustainability labels, to "eat right" to "healthy choice". Again, with so many, consumers end up not trusting any. And because there is no commonality between the different marks, people cannot compare and contrast them.

Sustainability thinking – "less is more" – is contrary to that of marketing professionals and consumers in today's consumption-driven society.

Sustainability thinking – "less is more" – is contrary to that of marketing professionals and consumers in today's consumption-driven society. And marketers are largely seen as part of the problem. But they could be part of the solution if they could simplify the symbols and unify the language to help consumers make the right choices.

Health campaigns, sustainable development campaigns, etc. tend to use words like "stop", "less", "reduce", "don't". But a simple change from "corporate social responsibility" to "corporate social opportunity" changes a negative thought into a positive one.

Consumers tend to make decisions based on what they want today rather than what will happen tomorrow, Hardy argued. There seems to be little rational pattern in consumer choices. The only standard that can be applied broadly is that a person will buy a product if that same person has recommended it to someone else; or "I will if you will".

After stumbling upon these obstacles for years, leading companies are starting to find solutions. Michelin, for example, has had mixed success marketing "green" tires. While the business-to-business consumers quickly understood how the new tires would affect their bottom line by reducing fuel consumption by 20%, individuals, who only think from one full tank to the next, had been slower to take them up.

To convince consumers, Michelin has had to communicate to and educate consumers through things like the Frankfurt motor show where they did a demonstration showing how cars roll more efficiently with the "green" tires, and the Challenge Bibendum where they did tests on clean and efficient cars, showing the relationship between fuel usage and tires.

Some 10 years after first trying to sell its "green tires" Michelin is not the only company making them now: ¾ of all passenger tires in Europe are "green". Most companies have taken the "other" kind off of the market.

PepsiCo has started putting a carbon footprint on its snacks in the UK as a pilot to see the reaction from consumers and whether or not this improves sales. The company has found, however, that people are buying the products because they like them, not because of the carbon. However, one product being marketed as coming from a solar-powered factory – Sunchips – has seen sales increases.

PepsiCo also has a "smart spot" to help consumers find the "healthier" Pepsi products, ones that meet nutritional standards.

Participants in the Brussels session agreed that it is the everyday choices, the small choices that make a difference and that companies need to go through the whole learning curve about green marketing and laws in order to not trip themselves up when trying to push their products.

Procter & Gamble

Safe water through a powder

Procter & Gamble's Children's Safe Drinking Water program the signature program for P&G's Live, Learn and Thrive™ corporate cause helps address this critical issue by the use of simple, household-level water treatment technology: PUR™ Purifier of Water.

P&G has committed to long-term, not-for-profit provision of PUR in the developing world in an effort to reduce illness and death, particularly in children. The Children's Safe Drinking Water program provides PUR through sustained social markets and for emergency relief.

A 4-gram packet of PUR treats 10 liters of water. PUR effectively kills bacteria and viruses and removes parasites and solid materials. Five clinical studies show that use of PUR can reduce diarrheal illness in children by an average of 50%.

Working with essential and wide-ranging partners, Children's Safe Drinking Water has provided PUR for emergency relief in nearly every major natural disaster in the last three years, including the Southeast Asia tsunami, hurricanes in the Caribbean, floods in the Philippines and Bangladesh, and earthquakes in Pakistan and Indonesia. Most recently, PUR has been provided to victims of flooding and cholera outbreaks in Ethiopia and Kenya.

In collaboration with Population Services International, the US and UK governments, and others, Children's Safe Drinking Water has established social markets in Kenya, Pakistan, Uganda, Malawi, Ethiopia, Democratic Republic of the Congo, Republic of the Congo, Botswana, Indonesia, Haiti, Dominican Republic, and Nigeria. A key component of these social markets is education about the importance of safe drinking water to bring about long-term behavior change. Educational efforts are currently being focused on local school programs and health clinics.

The two-pronged approach of P&G's Children's Safe Drinking Water program — distribution of PUR in social markets and for emergency relief — has been effective to date. In the last four years, Children's Safe Drinking Water has provided more than 750 million liters of safe drinking water and helped avert more than 30 million days of diarrhea.

Slashing buildings' energy use: Why not?

Buildings are responsible for at least 40% of energy use in most countries. This figure is rising fast as construction booms, especially in countries such as China and India. Knowledge and technology exist today to slash the energy buildings use, while at the same time improving levels of comfort – all for a reasonable cost.

If building site energy consumption in **China and India** grows to current US levels, they will be respectively about **four and seven times greater** than they are today.

Given those basic facts, why isn't more being done?

Because the "building professionals" (architects, agents, developers, engineers, contractors) are not well informed about the basic facts and require increased know-how and leadership to take action.

The WBCSD's Energy Efficiency in Buildings (EEB) project commissioned interviews with 1,423 such professionals in eight countries – developed and developing – from late 2006 through early 2007. Asked what percentage of CO_2 emissions do you think buildings give rise to, participants responded, on average, 19% – less than half the correct answer. Responses from US professionals averaged 12%.

Asked "how much more do you think a certified sustainable building would cost to build relative to a normal building", the average response was 17% more. In fact, the premium is usually under 5% in developed countries. Perhaps the lack of knowledge is not surprising, given that only 13% of the respondents had ever actually been engaged in the building of green buildings.

Other barriers to action include the fragmentation of the buildings sector and the different motivations within it. For example, a developer erecting a building for sale may opt for lower cost and less efficient heating and air conditioning components rather than higher efficiency units that would reduce energy consumption and save the buyer and/or occupier money over time. Developers will change their approaches as end users increase their demand and policy-makers regulate for more green buildings.

The project summarized these findings in its first-year report on facts and trends in the building sector for six global markets representing two-thirds of the world's energy demand and over 100 billion square meters of building floor space. *Energy Efficiency in Buildings: Business realities and opportunities* combines findings from existing research and stakeholder dialogues during hearings, workshops and forums with the survey results. The project will use this baseline knowledge in scenario planning and modeling approaches to assess the actions needed to affect buildings' energy consumption. It will then seek to gain

commitments to actions by the various stakeholders involved with the building sector, including companies involved in the project itself.

These companies, led by United Technologies Corporation (UTC) and LAFARGE, believe that there must be a greater sense of urgency to take action. If building site energy consumption in China and India grows to current US levels, they will be respectively about four and seven times greater than they are today.

"The global construction boom in the developing world has created a tremendous opportunity to build differently and dramatically decrease energy demands," said UTC Chairman and CEO George David. "Existing technologies combined with common sense design can increase energy efficiency by 35% and reduce heating costs by 80% for the average building in industrialized markets."

"The world is undergoing rapid transformation, with strong demographic and economic growth driving a move towards urbanization on an unprecedented scale. We as industry leaders have a responsibility to ensure that this growth is achieved in a sustainable manner," said Bruno Lafont, chairman and CEO of LAFARGE.

Their report calls on governments to provide improved policy frameworks, including better urban planning, more effective building codes to enforce minimum required technical standards, and information and communication to overcome the lack of know-how and to highlight the energy performance of individual buildings. A combination of voluntary and mandatory schemes is already emerging: for example, voluntary labeling schemes such as CASBEE (Japan) and LEED (US) and the mandatory building "passport" under the EU Buildings Directive (EU).

Other policy improvements, such as tax and market incentives, could encourage: the purchase of energy efficient building equipment, materials and occupant consumption; energy pricing to make energy more valued by users and to decouple utilities' revenues from the volume of energy supplied; and enforcement, measurement and verification to make sure policies and regulations (including building codes) are effective and support market measures such as trading.

But consumer behavior must change as well. There are two separate aspects of energy behavior: buying efficient equipment and using energy efficiently. In Europe and the US the market for appliances has changed over the last decade. Despite the price premium for energy-efficient equipment, there was a switch during the 1990s to buying more energy-efficient appliances. The flip-side of this is the trend toward buying more equipment as people become wealthier. This so-called "rebound" effect uses more energy overall.

Changing both consumer and building professionals' behavior could result in substantial energy and emissions reductions, putting the industry on a committed path toward zero net energy buildings in the near future.

We as industry leaders have a **responsibility** to ensure that this growth is achieved in a **sustainable manner**."

EEB Facts and Trends

"The global **construction boom** in the developing world has created a tremendous opportunity to **build differently** and dramatically **decrease energy demands**."

BHP Billiton

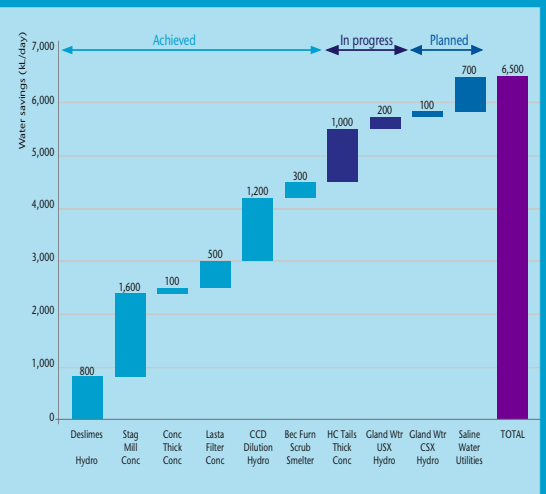
Olympic dam water savings project delivers sustained change

Mining operations need water to extract valuable minerals from hard rock and process them into usable forms. Water use is especially intensive in quarrying, milling (crushing, screening, washing and flotation of mined materials), and reinjecting extracted water for secondary mineral recovery.

South Australia's Great Artesian Basin, known for the diverse endemic invertebrate fauna living in the springs along the margins of the basin, is not immune to the water challenges that mining in the region represents. The distribution of the salt pipewort (*Eriocaulon carsonii*) is restricted to the habitats provided by the springs. The persistence of the aquatic invertebrates and the salt pipewort is linked to the availability of free-flowing water; changes in spring flow and wetland area can affect these populations.

BHP Billiton pumps water from the basin to its Olympic Dam copper/uranium mining operations some 110 kilometers north and 200 kilometers north-east. In order to ease its impacts on this area, the company has developed a project to reduce water consumption by optimizing water recovery and recycling and substituting poor-quality local groundwater in some areas.

Over 90% of the Olympic Dam site's water consumption occurs in three main processing areas: the concentrator (where minerals are "concentrated" into one area, usually by flotation, for extraction), hydromet (a mineral processing technology that uses water-based solutions of chemicals to dissolve valuable metals from their ores or concentrates or intermediate products) and smelter plants. Further processing of the basin's water is carried out at the on-site desalination plant to produce a potable water supply for both the mine site and nearby Roxby Downs and Andamooka townships.



BHP Billiton recognizes that the responsible use of water is essential to protecting the environmental values of the springs, a key concern for stakeholders. Thus the company monitors the rate at which it extracts water from the two well fields to ensure that it is always within prescribed limits and that adverse impacts are not occurring. The company's ongoing challenge is to continue to meet these limits while optimizing plant production rates.

Key to meeting this challenge is improving water use efficiency. To do this, the company created a dedicated team to assess:

- Current industrial water use volumes and purposes
- Particular process streams and plant areas with substantial increases in production-based water consumption
- The potential for reductions through increases in efficiency, recycling and reuse of process streams.

A series of water use maps, including numerical balances and comparisons of both current and historical data, was created for the concentrator, hydromet and smelter plant areas. Water savings projects were then identified through discussions of water map data with area personnel or suggestions from area personnel.

The project confirmed the importance of regular inspection, testing and calibration of process indicators.

Significant water savings have been identified and implemented in the three key production areas:

Concentrator

- 1.6 megaliters (ML) per day savings (or 70% of demand) in the slag milling circuit due to a collaborative project implemented by the Water Savings Initiative team and the concentrator metallurgists
- 0.5 ML/day savings (or 50% of demand) in the concentrate filtration plant following a suggestion by an area technician.

Hydromet

- 1.2 ML/day savings (or 55% of demand) in the counter-current decantation area due to a procedural review and re-education program. Further opportunities for this area are under investigation, including control systems review and further recycling options.

Smelter

- 0.3 ML/day savings (or 65% of demand) in the electric furnace gas scrubbing system due to improved operation of the control valve. Further opportunities to reuse the remaining gas scrubber wastewater in other process areas are under review.

Other Savings

- Other savings – totaling 2.9ML/day have been achieved or are planned in other sub-areas of the plant.

Further water saving initiatives are anticipated from the following ongoing activities:

- The identification and reclamation of reusable or recyclable process streams
- The identification of "leading-practice" use of water for individual plant areas
- Future changes to the operations based on the requirement to maintain or increase water efficiency.

Shell

The Waterbox

Many Shell operations in rural areas have no safe drinking water sources nearby. So Shell sought a water purification unit that would provide safe water, be vandalism proof and be essentially maintenance-free, with low-skilled operators able to carry out the limited maintenance tasks necessary.

Shell developed and installed a pilot unit for the production of freshwater from a contaminated source at a retail station in the Karoo Desert in South Africa. This unit, dubbed the Waterbox, replaced freshwater supplied from a town 80 km away. Apart from a contractor located in this town, no skilled personnel were available on site.

Placed in a six-meter isolated sea container, the Shell water purification unit can provide some 20 m^3 clean drinking water per day (14 liters per minute). The heart of the process consists of novel, low-pressure hollow fiber nano-filtration membranes running in semi-dead-end-mode with an airflush enhanced forward flush with water fed in every 20 minutes to clean the membranes.

Based on the success of this demonstration unit, an improved, low-energy unit will be installed in Morocco, in the small rural village of Ait Chaib, outside the local center town of Afourer, 200 km north of Marrakech, in the Atlas mountain district. This settlement consists of some 500 inhabitants living in about 90 houses. The nearby groundwater sources were less suitable for human consumption due to a high concentration of bacteria.

The unit uses no hazardous chemicals; so its environmental impact is virtually zero, unlike other, state-of-the-art membrane systems, which need considerable amounts of acids and bases to keep the membranes clean and to sterilize the drinking water produced.

Shell intends to build a commercial model to distribute in Morocco. This would require a significant initial investment cost (120,000 –150,000), which has been obtained by partnering with L'heure Joyeuse (a local NGO), Shell du Maroc Social Investment Fund and ONEP (Morocco's Office of Potable Water).

L'heure Joyeuse will pay 20% of the unit cost and will be the formal owner. The local government will work on getting buy-in from the local population and maintain the unit via a local champion who will be trained in its maintenance.

ONEP will perform regular checks on the unit and water analysis, and intends to order more units once the first one demonstrates its success.

Shell has identified some main factors that will help determine how the company moves forward in this area:

- Ensure communication and collaboration with local NGOs and governments
- Healthy people can work, which leads to increased GDP, but to be healthy, they need clean water
- Create curiosity: when one village has the water unit, others follow, demonstrating the importance of getting key people involved, such as teachers, religious figures, government representatives, etc.

- Women's empowerment: in many of these areas, women are the workers and the housekeepers so the focus needs to be on them.

The success of the Waterbox in Morocco will largely depend on the effectiveness of the partnership. If successful, far more will follow via the link with ONEP, and there is a real chance that the program can be extended to Tunisia and Egypt. Shell Africa will play an active role in bringing it to the attention of other African countries.

Water in rural areas can help develop agriculture, encouraging growth and development. If the new business model is successful, it will also be easily replicable worldwide. And because it does not need major maintenance, it overcomes the difficulty of long-distance monitoring.

But there are challenges associated with such a concept, including the inappropriate use of clean water where it is not necessary: for cattle, house cleaning and washing. Staff also need to be trained to maintain and manage the water unit, and this comes with language, cultural and educational barriers.

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