

# The Business Case for an Integrated Approach to Water Management

Canadian Business for Social Responsibility

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# Guide to Integrated Water Management

“In an age when man has forgotten his origins and is blind even to his most essential needs for survival, water along with other resources has become the victim of his indifference”

- Rachel Carson, *Author of Silent Spring*

Although Canada has a seemingly abundant access of water, there is growing stakeholder awareness that access to water should not be assumed. Canadians have the second highest water usage rates per capita in the OECD trailing only the Americans with whom we share access to our lakes and rivers, and since 1980, overall water use in Canada has increased 26% versus the OECD average of 4.5%.<sup>1</sup>

Whether a company manufactures clothing, produces natural gas, or owns and operates commercial real estate assets, there is increasing concern from stakeholders that water is managed in a way that minimizes impact on communities and the natural environment.

The objective of CBSR’s *Guide to Integrated Water Management* is to offer practical insights that will help companies to identify and manage the water-related risks and opportunities that impact their business.

The guide is organized into four main sections:

- A *call to action* that sets the context for water management in Canada,
- An overview of the *business case* to help justify investment in water management including a sector-specific look at challenges and opportunities,
- An *assessment tool* to identify gaps and guide decision-making, and
- A list of *best practice business tools, programs and resources*.

The guide also includes a glossary of terms and bibliography as well as appendices that list web links and relevant industry programs.

## Definition of Integrated Water Management

Integrated water management is a framework for water-related decisions and actions which considers not only company requirements but also the needs and interests of impacted stakeholders and the natural environment.

## Implications for Companies

Companies recognize that effective management of water-related risks and opportunities leads to better business performance in the long term. Specific risks and opportunities that companies should consider when developing an integrated approach to water management, include:

- Ability to access water given *increasing consumption, decreasing supply*,
- Impact on reputation and operations if their ‘*social license to operate*’ is threatened,
- Implications of *government regulation, policies and programs*, and
- Savings potential of more *efficient water usage*

The development of an integrated approach to water management that is in line with the potential business impacts can help companies to deliver on stakeholder expectations by addressing water-related risks and opportunities in a proactive way.

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<sup>1</sup> OECD website <http://www.environmentalindicators.com/htdocs/indicators/6wate.htm>

## Table of Contents

It Makes Cents: A Call to Action on Water	4
The Business Case	
Increasing consumption, decreasing supply	5
Social License to Operate	7
Government regulation, policies and programs	9
Efficient water usage	10
Sector Specific Challenges and Opportunities	10
Integrated Water Management Assessment Tool	17
Best Practice Tools, Programs and Resources	20

## Appendices

Appendix A: Glossary	23
Appendix B: Web Links	24
Appendix C: Bibliography	25
Appendix D: List of Participating/Supporting Organizations	27
Appendix E: Review of Water-Related Programs	28

*\*Additional appendices are available separately including a review of Canadian water policies and programs, a summary of feedback from the stakeholder interviews, and statistics relating to national and global water consumption, demand, and social, economic and environmental trends*

# It Makes Cents: A Call to Action on Water

Canada has a seemingly abundant access of water, but also uses abundant volumes to satisfy its residential and commercial needs. This balance of access and demand is not currently sustainable, as, for instance, while the Great Lakes hold 20% of the planet's fresh water, they renew only 1% annually.<sup>2</sup>

Water risk is closely linked to climate change impacts, but is independently being recognized as an issue that cannot be avoided by people or industry. Water scarcities cause immediate strains, as regions without access to safe water cannot think 'long term'.

The following action steps are recommended for Canadian businesses to move towards an integrated approach to water management:

1. **Evaluate Impacts:** consider the environmental and social impacts of an organization's operations and activities on water resources
2. **Assess Risks:** determine areas where there may be significant short and long terms risks to a company (direct risk) and its key stakeholders (indirect risks)
3. **Identify Opportunities:** discover areas where an organization can minimize its risk, optimize its operations and gain a competitive edge
4. **Manage Approach and Evaluate:** ensure effective management of water issues by applying the Integrated Water Management Framework to evaluate strategic plans and performance and encourage excellence through continual improvement
5. **Engage in public policy and water planning:** at national, provincial, watershed and municipal scales

In addition, those that aim to aspire to a leadership role in water management, and more broadly as socially responsibility companies, should consider the degree to which they embrace creativity, collaboration and sustainability:

**Thinking Creatively.** Think and plan with a desirable future in mind, and work backwards to envision how you, as a business leader, will connect the future with the present. This approach is sometimes referred to as 'backcasting' (popularized by The Natural Step) and helps organizations to think beyond its set of current conditions and trends, in planning for its sustainable future.<sup>3</sup>

**Working Collaboratively.** Gaining long term solutions that meet the needs of businesses can only be achieved effectively by actively engaging with those whose confidence and commitment determine your success or demise. Stakeholders including employees, customers, communities, investors and suppliers can be your gauge, partner and most valuable asset in determining *how* you can reach your desired future.

**Acting Sustainably.** Do 'long term'. Move toward your desired future by having a committed and capable team; a system which allows you to track, evaluate and communicate strategic and performance progress; and a focus on constant learning and continuous organizational improvement – as people and the natural environment change, it is up to us to know when we wish to be the change that we want to see in the world.

It is with these approaches, a supporting framework and a combination of (growing) practical tools, resources, programs and support networks that will bring better business policies, practices and excellence. Should you wish to provide expert insights, or discuss how your organization can take forward steps, using an integrated approach to water management, we welcome your feedback.

“Water is life's mater and matrix, mother and medium. There is no life without water”  
- Albert Szent-Gyorgyi, 1937 Nobel Prize for Medicine

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<sup>2</sup> Maas, T (2009)

<sup>3</sup> Robert, K-H (2002)

# The Business Case

When determining the business case for a responsible response to water management, there are four main issue areas to consider: (i) increasing consumption, decreasing supply, (ii) social license to operate, (iii) government regulation, policies and programs, and (iv) efficient water usage. These are outlined in this chapter and are followed by sector specific overviews.

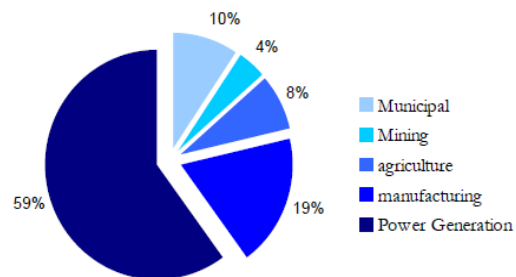
## i) INCREASING CONSUMPTION, DECREASING SUPPLY

Though eco-nature’s water needs are a critical consideration and must also be accounted for to secure often overlooked benefits including hydropower, recreation, food and water purification, this section will focus largely on human consumption and withdrawal, supply and demand.

### A. High Consumption Rates

Research shows that in most cases, higher income countries have higher rates of per capita domestic water consumption than lower income countries. Among high income countries, at 330 litres per day domestically and 1600 m<sup>3</sup>/year (including industrial and agriculture use) Canadians use twice that of the European Union (on average) and quadruple the amount of Sweden, Denmark and the United Kingdom<sup>4</sup>.

According to the Organization for Economic Co-operation and Development (OECD), Canadians are the second highest per capita water users globally.<sup>5</sup> As evident from this chart, Canadian industry uses a significant proportion of water, with water use increasing at an average rate of 23 million litres of water per year.<sup>6</sup>



Source: Environment Canada. (2008). Water Use Surveys and Studies, 2008.

For many industries, the largest share of their water footprint is used to produce raw materials, including food crops, fibres and metals. Because raw material production occurs far upstream from operations, many companies fail to assess water-related risks in their supply chains. For example, it can take 1,000 times more water to produce some inputs than what is used in onsite activities (e.g. manufacturing, retail).<sup>7</sup>

### B. Increasing Demand and Decreasing Supply of Water

Water consumption is constantly increasing; it has more than doubled since World War II and is expected to increase 25% above current levels by 2030.<sup>8</sup> There are several reasons for this increase in demand:

1. Worldwide population is growing and is projected to reach over 9 billion by 2050
2. More people are rising out of poverty which is expected to lead to greater water consumption

<sup>4</sup> Government of Alberta (2005)

<sup>5</sup> OECD (2008)

<sup>6</sup> SDTC (2007)

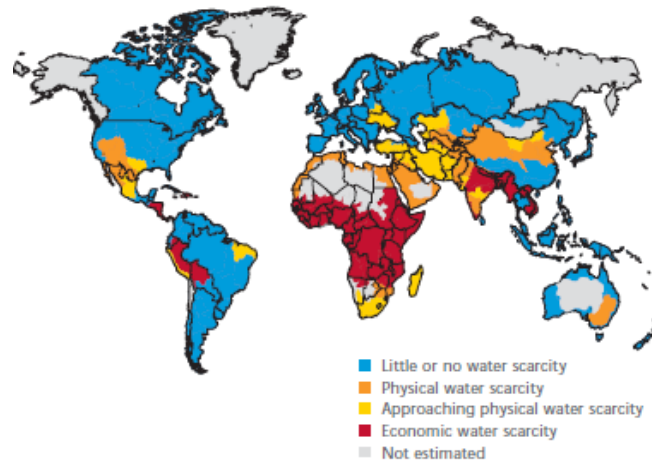
<sup>7</sup> Pacific Institute and Bio Economic Research Associates (2006)

<sup>8</sup> Wild, D et al (2007)

3. Business activity continues to expand and is expected to require increased water services including both supply and treatment.<sup>9</sup>

Unfortunately, supply of this renewable resource is not keeping up to the increasing consumer demand as well as environmental water requirements. As depicted in the following map, there are 1.2 billion people who live in regions experiencing water scarcity, and the situation is expected to worsen for individuals as well as companies (and their suppliers) which operate in many emerging economies.<sup>10</sup>

Areas of physical and economic water scarcity<sup>13</sup>



### C. Impact of Climate Change on Water Supply and Quality

Water is at times referenced as ‘the next carbon’, and though this claim is often intended to highlight the vitality of water issues, there are distinct differences between water and carbon related to the inter-connectedness with people and nature (e.g. water issues are often locally based, and the necessity of water for our survival). Fortunately, a regionalized approach to water management enables us to consider specific actions that can immediately impact local communities, while highlighting the complexity and acuteness by which companies can be encouraged to improve their triple bottom line.

In a recent *Climate Change and Water Technical Paper*, the Intergovernmental Panel on Climate Change (IPCC) concluded that “water and its availability and quality will be the main pressures on, and issues for, societies and the environment under climate change.”<sup>11</sup> Climate change is therefore expected to have a critical impact on water supply in most sectors and regions, and is anticipated to add to the current water stress caused by population growth, economic prosperity and land-use change.

Climate change is expected to impact precipitation, leaving areas such as the Mediterranean and Western Canada and US with less water thereby threatening food security, energy production and health<sup>12</sup>. Climate change poses a series of risks to water availability and management systems, as rainfall may come in the form of storms that lead to flooding; rising temperatures can affect water quality and quantity; and rising sea levels may increase the rate of saline contamination of groundwater<sup>13</sup>. These changes may therefore cause governments to enact policies, such as higher water prices, to deter use and mitigate risk.

<sup>9</sup> WBCSDa (2009)

<sup>10</sup> WBCSDa (2009)

<sup>11</sup> Bates, B et al (2008)

<sup>12</sup> UNEP (2009)

<sup>13</sup> WBCSDa (2009) and UNEP (2009)

## Key Risks and Opportunities for Business

The growing challenges related to water availability may impact businesses in the following ways:

- **Higher costs** for water due to restricted availability and/or increased demand from industry
- **Regulatory caps** impacting access to water resources due to limited availability
- **Pressure on social license to operate** due to conflicts with local communities and other large-scale water users
- **Reductions in operational capacity** due to production delays in areas where drought may occur – also resulting in reduced hydro power supply
- **Political and economic instability** both within and between countries due to water related stresses and competition
- **Reduced consumer demand for water-intensive products and services** due to increasing costs and/or growing awareness of water conservation issues
- **Growing demand** for water efficient products and technologies<sup>14</sup>

### ii) SOCIAL LICENSE TO OPERATE

#### A. Growing Public Expectations

In 2009, GlobeScan conducted an international public opinion survey on attitudes about fresh water sustainability, management and conservation. It discovered that people around the world (including Canadians) view water issues as the planet’s top environmental problem – greater than air pollution, depletion of natural resources, loss of habitat and even climate change. A *Canadian Water Attitudes* study conducted by Ipsos Reid also found that more than 8 in 10 people believe that Canada will have a freshwater shortage problem in the future.



(Source: Circle of Blue *Water Issues Research* study and RBC and Unilever *Canadian Water Attitudes* survey)

#### B. Environmental Concerns

Increased water use has a high environmental cost, including loss of biodiversity and affects on natural surface water systems and groundwater. In the last century, half of the world’s wetlands have disappeared and some rivers no longer reach the sea.<sup>15</sup>

<sup>14</sup> Morrison, J et al (2009)

Globally, fresh water sources such as lakes, rivers and aquifers are being depleted faster than they are naturally replenished<sup>16</sup>. Many water sources are continuously being polluted by industrial, municipal and agricultural pollution as evidenced by the 115,000 tonnes of pollutants that were directly discharged into Canada's surface waters in 2005.<sup>17</sup>

Accidental discharges or spills commonly occur in many industries and can cause both environmental and reputational damage, by rendering a water body temporarily or permanently inadequate for drinking water, recreation and ecosystem – aquatic and land – support. As the cumulative environmental impacts of human water use become increasingly evident, governments are becoming more aware of the minimum volume and timing of flows needed to support ecosystem functions, also termed “Instream Flow Needs” and are making efforts to change water allotments to ensure ecosystem needs are met.<sup>18</sup>

### C. Public/Community Access

With a growing international movement to clearly define peoples' right to water, inequality of access has created tensions between companies and communities. As such, water usage can affect a company's social license to operate; particularly in regions where companies are using large amounts of water, but people's basic needs for water are not being met. Recent research has revealed the following issues:

- There is a correlation between wealth and water access; high-income nations are less likely to suffer from water stress, whereas low-income nations are prone to water scarcity and stress<sup>19</sup>
- Water abundance does not necessarily mean everyone has access to water. Infrastructure is required to treat and distribute water, and many nations do not currently have the infrastructure to supply safe water for human use despite a natural abundance<sup>20</sup>
- Water quality is an issue in First Nations communities in Canada, where more than half the population does not have adequate access to safe drinking water<sup>21</sup>
- Communities in the Canadian north often experience water quality issues, due to lack of supply and inadequate water treatment systems<sup>22</sup>

### Key Risks and Opportunities for Business

Many publicly traded companies are encountering stakeholder initiatives aimed at influencing stronger environmental governance and strategic decision making. Such initiatives and associated shareholder expectations can pressure a company to alter its water-related practices and plans.

However, improved water management can protect a company's social license to operate by managing operational and reputational risks and addressing issues including the following:

- **Reputations** can be damaged or enhanced based on the approaches that companies are taking to address/protect water quality and to use a 'fair share' of water
- **Increased water treatment cost** due to degrading water quality
- **Operational disruption or relocation** due to treatment options or alternative sources are not available or feasible

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<sup>15</sup> World Bank Group (2003)

<sup>16</sup> UNWWAP (2003)

<sup>17</sup> Statistics Canada et al (2007)

<sup>18</sup> Morrison, J et al (2009)

<sup>19</sup> WWF-UK (2009)

<sup>20</sup> WWF-UK (2009)

<sup>21</sup> CMA (2008)

<sup>22</sup> Government of Canada (2006)

- **Limited expansion opportunities** in regions due to contaminated water supplies
- **Community opposition** due to regional shortages, industrial water withdrawals and wastewater discharges – which also presents opportunities to make close connections
- **Restricted access** due to prioritization of municipal versus industrial use where availability to freshwater supplies are limited, and by decisions to cap/reduce overall water use in certain areas

### iii) GOVERNMENT REGULATION, POLICIES AND PROGRAMS

Although most companies are familiar with the government water regulations that apply to their activities, many have yet to fully integrate national, provincial/regional and local policies into their resource management strategy. Incorporating policy, whether domestic or international, should include two layers of consideration:

- I. **Watershed Health:** Are current policies and regulations sufficient in protecting source water?
  - a. Quantity – Is the permit to withdraw water based on sound, current science? How often are lake/river/aquifer water levels being monitored?
  - b. Quality – What is the health of the basin which your operations rely upon? Do local authorities sufficiently monitor water quality?

***Being Proactive:*** In an interview with CBSR, Tom Cooper, Worldwide Water Program Manager for Intel Corporation described its approach to ensuring source water sustainability through continuous monitoring of water quality and quantity. As Intel withdraws water from the same basin as a nearby municipality Intel shares water data with local authorities, to ensure community and ecosystem wellbeing. This builds Intel's value as a trusted community partner.

2. **Future Policy Direction:** large users of water need to be aware of government initiatives regarding water resource management. Awareness can be achieved through ongoing communication with local authorities, or higher branches of government, either directly or with the support of an industry association. *Taking the pulse* of government initiatives and plans concerning water quality and quantity issues is essential due to the often reactive nature of government policy implementation.<sup>23</sup>

In Canada, a number of academic think tanks<sup>24</sup> have all been relaying a similar message: Canada is not immune to water problems. Many of Canada's current water issues stem from insufficient governance, while the global water crisis has also been recognized as a crisis in governance.<sup>25</sup> While the Canadian government, and to some extent provincial governments, have water use and protection policies in place, they are not well integrated; requiring an approach that ensures that water resources are managed in a sustainable manner.

### Key Business Risks Regarding Regulation

With a growing expectation for regulatory reform, future changes to key federal and provincial water policies and programs will increase operational vulnerability:

<sup>23</sup> An example is a \$15 million water rights purchase by the Municipal District of Rocky View from the Western Irrigation District, after an Alberta 2006 moratorium on new water permits in southern Alberta. The Crossiron Mills mega-mall was halted in 2006, with a one year delay in project completion.

<sup>24</sup> Includes, but not limited to the following: Forum for Leadership on Water (FLOW), University of British Columbia Program on Water Governance, University of Toronto Program on Water Issues, and University of Victoria Water Sustainability Project

<sup>25</sup> UN Water (2009)

- **Reactive provincial approach** as experienced through the Ontario Clean Water Act in 2006 in response to the Walkerton tragedy. Although this legislation is specific to drinking water, it points to the reactive nature with which water resources have been governed.
- **Risk to the supply or cost of groundwater withdrawals** in provinces such as British Columbia where there is no current regulation. This can prove risky to companies that currently rely on BC groundwater resources and fixed pricing.
- **Increased cost and complexity** due to competing water rights from community, agriculture and industry (e.g. competition for water resources with power generation, agriculture, community and eco-system demands from Alberta's South Saskatchewan Basin<sup>26</sup>)

### Key Business Opportunities Regarding Regulation

Anticipating and preparing for future oriented policies, which may impact price regimes and allocation requirements, can thereby permit a company to better manage risks while improving its ability to adapt throughout its operations and supply chain. Consider the following action steps:

- **Proactive engagement with federal, regional and local governments** to understand the role of their jurisdictions, engage in new policy discussions and express their intention with respect to managing watershed health
- **Proactive engagement with community stakeholders** to understand and address areas of concern, and reduce the probability of business (and community) disruption
- **Evaluate watershed health** and anticipating future impacts in areas where water withdrawal is critical to operations

The gap in current water policy frameworks does not currently incent companies toward responsible water management – encouraging 'regulatory compliance' can lead to companies losing a competitive advantage. However leading firms are anticipating the need for an integrated approach to water management and are demonstrating best practice as summarized in the next section of this report.

## iv) EFFICIENT WATER USAGE

### A. The Price of Water

The price paid by industry for water currently does not consider externalities such as the services of and risks posed to ecosystems, as well as the costs associated with limited access to key regions. While it is often difficult to calculate the true financial value of risk avoidance, failure to address identified risks may result in business disruptions and undervaluation of operating costs.

Water prices have increased by over 40 % since 2002 in many regions, with Canada experiencing the highest increase at 58 %<sup>27</sup>. However, many leading companies believe that the price of water is too low and that prices will increase in the future. Some companies including Rio Tinto and Molson Coors are making efforts to put a price on water which takes into account social and environmental externalities.<sup>28</sup>

Infrastructure must be taken into consideration when considering the cost of water. As most developed countries have aging water infrastructure, significant investments are often required to maintain current service levels. Trends toward higher water quality standards will require additional investment in water infrastructure. These costs may impact company financials through tariffs, taxes and transfers.

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<sup>26</sup> WWF-Canada a (2009)

<sup>27</sup> Clark, E (2007)

<sup>28</sup> Ethical Corporation (2008)

Water scarcity is driving a shift towards increasing prices to cover the full cost of operating and maintaining water distribution and treatment systems, and to offset environmental impacts. This has created an economic incentive for reduced water use, and in many areas, water prices are rising as subsidies are phased out.

### Key Opportunities for Business

Changes to the cost of water present a number of opportunities for leading companies:

- **Cost savings** due to reduced water use and wastewater discharge across the value chain
- **Energy savings** due to reduced water used for the pumping, treating or heating of water as well as reducing the greenhouse gas emissions associated with that energy use
- **Revenue through unused water rights** where no new permits are being issued and trading water rights is permitted (e.g. Molson Coors selling unused water rights<sup>29</sup>)

## V) SECTOR SPECIFIC CHALLENGES AND OPPORTUNITIES

### A. Commercial Real Estate and Property Owners

Commercial buildings in Canada consume three billion litres of water per day, which is significantly more than those in developed nations such as Australia and the United Kingdom. Factors contributing to this high water usage are: wasteful habits by building occupants, inefficient building infrastructure and HVAC cooling towers. These towers on average use 25-50% of total building water consumption in Canada, while in retail shopping centres this figure can be as high as 60%.<sup>30</sup>

Climate change will change weather systems, in some places increasing precipitation, storm surges, and flash floods. According to the IPCC, climate change is expected to increase flood risk to most river systems in the world. Businesses need to consider increased flood risk during site selection, design and insurance, especially for facilities located on flood plains and low-lying coasts.<sup>31</sup> In particular, storm water will need to be managed more proactively to prevent flooding. Green roofs and rainwater harvesting, restoring urban streams and protecting groundwater features are becoming more common and result in better storm water management.

#### Case Study: Water Conservation Practices at Brookfield Properties

Brookfield Place is a high-rise commercial property in Toronto, owned and operated by Brookfield Properties. The building was retrofitted with automated faucets and low flush toilets, resulting in water savings of over 50% each year.

Brookfield Place also installed variable frequency drive chillers which save over 50% in HVAC energy costs. The building received a BOMA Go Green Plus award for environmental sustainability. Brookfield Properties worked with the Canada Green Building Council to develop accreditation criteria for commercial office buildings through the LEED rating system.<sup>32</sup>

<sup>29</sup> Ethical Corporation (2008)

<sup>30</sup> Corr, K et al (2008)

<sup>31</sup> Bates, B et al (2008)

<sup>32</sup> Greenliving (2008)

## B. Consumer Goods

As water scarcity becomes more common and the price of water increases, the demand for less water-intensive products will grow. Products or services that use a lot of water may be phased out by law, lose market share, or cause reputational damage.<sup>33</sup> Conversely, the development of water-wise products is an area of opportunity in consumer goods, especially for those sectors where the highest water use is with the end user. Consumer goods companies with water-intensive manufacturing facilities in particular will need to enhance efficiencies and minimize their environmental footprint to address financial, regulatory and social license to operate issues.

### **Case Study: A More Environmentally Friendly Way to Do the Laundry**

To address issues related to water scarcity and quality, Xeros developed an eco-friendly approach to clothes washing, using nylon beads. These beads attract and retain dirt and stains – requiring only one cup of water to wash per load. This approach requires less energy and water than conventional laundry products – 90% less water is used and the beads help dry the laundry, requiring less drying time.<sup>34</sup>

### Apparel

Production of cotton is the most water-intensive aspect in the apparel supply chain due to the intense irrigation required in the farming process. Agricultural run-off containing fertilizer, herbicides or insecticide can have significant impacts on local water sources. Many apparel manufacturers and retailers consider cotton production outside their influence, and may not be addressing these issues directly.<sup>35</sup>

Water is also a major input for textile processing, and can also impact local water sources through the discharge or wastewater which often includes dyes and chemicals used in the manufacturing process. Compounding these impacts is water scarcity for many communities surrounding textile manufacturing operations in regions such as Asia.<sup>36</sup>

### **Case Study: Gildan Taking a Leadership Role in Wastewater Management**

In 2003, Gildan adopted strict requirements for the supply of all dyes, chemicals and materials in production, to ensure that they present no adverse effects to health or the environment. Over a three year period Gildan was able to achieve a 48% reduction in water consumption, 48% reduction in effluent loads, and reduction 160 chemicals and dyes to 56 biodegradable substances.

Gildan created a biological and high-efficiency wastewater treatment system at a Honduras textile facility, which does not require any chemicals or any major infrastructure. The wastewater flows from the facility through a series of lagoons where pH is naturally stabilized, using bacteria to ensure chemical degradation and the removal of particles. The treated water subsequently collects in the lagoons. Several species of birds and fish have been spotted in these lagoons and local farmers use the water to irrigate crops.<sup>37</sup>

### Food & Beverage

Beverage manufacturing requires high quality source water, putting the water use of this industry in direct competition with local populations and their drinking water needs. In many countries, beverage companies are facing public opposition to new bottling plants. Consumer demand for bottled water is high in developing countries, but falling in developed countries, possibly due to environmental concerns among consumers.

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<sup>33</sup> Morrison, J et al (2009)

<sup>34</sup> The Economist (2009)

<sup>35</sup> Morrison, J (2009)

<sup>36</sup> Muller et al (2008)

<sup>37</sup> Gildan (2004)

The food sector has a supply chain water footprint that is much larger than the operational water footprint, primarily driven by irrigation and rain water needed to grow and produce food products. In many cases irrigation methods are inefficient, but technologies like drip irrigation can greatly reduce water use. Climate change is expected to place stress on many of the world's croplands, which are already semi-arid, and have shown increased water needs for both crops and livestock.<sup>38</sup> This has also occurred in Canada, in the shipping of hay westward due to moratoria on water undertakings from the Bow and Oldman Rivers in Alberta.<sup>39</sup> Water availability also affects food commodity prices in this sector.

The growth and intensity of global agricultural practices have a significant impact on water quality; run-off from farms that contains fertilizers, pesticides, herbicides and microbes (where there are livestock) adversely affects surface water quality and can lead to eutrophication (excess nutrients in water that can lead to rapid plant growth and eventual decrease in oxygen) such is the case with Lake Winnipeg.

#### **Case Study: Cross Sector Collaboration to Support Supply Chain Effectiveness**

Though representing unique and at time opposing sectors, WWF-UK and SABMiller worked together as members of the Water Footprint Network (WFN), alongside URS Corporation to undertake water footprints of the beer value chain in South Africa and the Czech Republic. This study has allowed SABMiller to focus on its ingredients, and the water used in agriculture crop production, where the South African and Czech facilities produce beer that requires 155 and 451 litres of water per litre of beer respectively. While these numbers may not tell the entire story, they help businesses and other users understand more fully how best to operate within the context of the water environment.

As noted by SABMiller and WWF-UK, “the key test of a water footprint is whether it helps a business to take better operational decisions concerning how it manages its plants, works with suppliers and engages with governments, to reduce [risks] and improve environmental sustainability...by [considering] where water is used, what proportion that water use represents of the total resource in that area, and whether [it] presents risks to the environment, communities, or to business, now or in the future.”<sup>40</sup>

#### High Tech and Electronics

In this sector, the bulk of the water footprint is often associated with the manufacturing activities of suppliers. The manufacture of semi-conductors in particular requires large amounts of high quality water. Many of the largest semi-conductor factories are located in the Asia-Pacific region, where water resources are under stress due to rising populations, a burgeoning middle-class and rapid economic growth. If not handled properly, electronic waste can cause serious contamination of groundwater and local ecosystems, which can lead to health risks, tighter regulatory controls and reputational impacts.<sup>41</sup> Increasing pressure is expected on electronics manufactures, as the impact of their supply chain on world water resources is more broadly understood.

#### **Case Study: Addressing Water Efficiency at Intel Corporation**

Intel manufactures semi-conductors, which is one of the most water intensive processes in the business world and requires that its water supplies are “ultra purified”. In the spirit of reducing areas of risk and demonstrating innovation it recently reduced the water required in manufacturing by 40%.

In 2007, Intel won the Water Efficiency Leader Award, for developing a comprehensive water conservation strategy of its Octocillo Campus in Arizona, based on ‘Design for the Environment’ approach which recycles 75% of its manufacturing wastewater.

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<sup>38</sup> Morrison, J (2009)

<sup>39</sup> Maas, T (2009)

<sup>40</sup> SABMiller and WWF (2008)

<sup>41</sup> Morrison, J et al (2009)

In the past 10 years, Intel has invested over \$100 million into water conservation projects and reclaims over 11 billion litres of wastewater each year. It has also reduced energy consumption and greenhouse gasses – addressing both climate change and water scarcity. To ensure continual improvement, the environmental excellence team meets quarterly and holds public meetings annually. To publicly communicate its goals and progress Intel publishes a quarterly report which is available on its website.<sup>42</sup>

### C. Electricity

According to the World Business Council for Sustainable Development, “The largest single use of water by industry is for cooling in thermal power generation.”<sup>43</sup> The power used in steam turbines, fired by coal, natural gas or nuclear energy plants are dependent on sufficient volumes of cooling water.

There are wide disparities in water use between different types of power production. Wind and solar power typically use very little water, whereas coal, nuclear, hydropower and biofuels use substantially more. Hydropower, which supplies 60% of Canada’s electricity, is most likely to be impacted by climate change because it is affected by rainfall patterns and temperature. Lack of water can reduce hydropower generation, and affect industries that rely on that power. Hydropower generation from the Colorado River and the Great Lakes, for instance, is expected to significantly decrease in the future.<sup>44</sup>

A less common but significant observation is the ‘water-climate-energy nexus’ as water and electricity often compete with each other; as large volumes of water are used to generate electricity, and significant amounts of electricity are required to collect, treat and distribute clean water – thereby generating greenhouse gasses which can contribute to climate change.

Many water-related risks are embedded in the extraction and processing of fossil fuels. Water scarcity could disrupt the fuel supply or increase the cost of fuel for power generation.<sup>45</sup> Other impacts may include the effects of hot water discharge and the impact of hydroelectric dams on terrestrial and aquatic ecosystems. Water sources can also be impacted by particulate matter and noxious emissions from coal and biofuel power plants.

#### Case study: Reducing freshwater consumption at Hydro-Québec

Instrument cooling systems at Hydro-Québec’s Research Institute in Varennes, Québec were modified to operate in a closed loop. As a result water circulates continuously in the systems without increasing its withdrawal of fresh water, saving over 56 million liters of water per year.

Sodium hydrosulphite is an ingredient that poses much lower risks to ecosystems and less stress on water infrastructure. Cascades has been recognized as the first fine papers manufacturer and only tissue producer to be granted the Processed Chlorine Free (PCF) designation, which guarantees that the process used to manufacture its certified products is 100% chlorine free.<sup>46</sup>

### Oil & Gas

Some facets of this industry are water intensive and put pressure on surface and groundwater resources. The relative water intensity of extracting certain petroleum sources, such as oil sands mining, may be a limiting production factor in water constrained areas. Some studies suggest that stream flows in Alberta’s Athabasca River watershed have declined in the last few decades, which could create a critical roadblock for producers if a cap or significant limits are placed on water withdrawal to protect local ecosystems.

<sup>42</sup> Ethical Corporation (2008)

<sup>43</sup> WBCSDa (2009)

<sup>44</sup> Morrison, J et al (2009)

<sup>45</sup> Morrison, J et al (2009)

<sup>46</sup> Cascades (2009)

In some cases, water is pumped into underground formations to assist in production; this is a concern because the water is being removed from the water cycle and will not be available for other purposes. There is a trend toward using brackish groundwater (which is not suitable for drinking or irrigation) and/or water recycling and reuse.

Other impacts of the industry occur from abandonment and the disposal of liquid and solid waste during drilling and production operations. Oil sands mining results in large tailings ponds which are challenging to reclaim; large scale reclamation of these tailings ponds has not yet been demonstrated. Concerns have been raised by local communities and NGOs that the tailings ponds pose a risk to the health of the river and local communities.

In addition, periodic spills or releases of petroleum products or contaminated water occur and cause damage to subsurface aquifers, as well as aquatic and terrestrial ecosystems.

#### **Case Study: Using Non-potable Water for Oil Sands Projects at Devon Canada**

Oil sands production can be a very water intensive process, relying largely on freshwater resources from local aquifers – which are in short supply in northern Alberta. To address limited freshwater access, Devon Canada designed its Jackfish in situ production facility to use water from saline aquifers which are unsuitable for drinking livestock or irrigation.

Devon Canada says the additional costs have proven worthwhile. Their use of saline water was an intentional decision to reduce their environmental impact. Jackfish circulates over 20,000 cubic metres of saline water each day with over 95% of that recycled and reused in the steaming operations. Devon Canada is planning to use saline water for its next in situ operation (Jackfish 2) which is expected to begin production in 2011, and is involved in a variety of research and industry initiatives in an effort to reduce the use of fresh water in the oil sands.<sup>47</sup>

#### Mining

Mining shares some similarities with the oil & gas sector in terms of high water use, potential contamination from tailings, associated ecosystem impacts and community concerns. Mining operations cannot be relocated, which makes the sector especially vulnerable to changing local water availability. Ore mining and refining produce large volumes of wastewater. Also, mining operations can be disrupted by severe rain or flooding events, which climate change is expected to increase in frequency and severity.<sup>48</sup>

#### **D. Financial Services**

While there are opportunities for banks and other financial institutions to reduce their operational water footprint, there has been a recent shift to evaluating the risk levels associated with commercial loans and investments, to reward or punish companies based on the degree to which a company's operations may pose a risk to ecosystems including water resources.

Encouraged by lending policies such as the *Equator Principles* and the *Principles for Responsible Investing* it is expected that a triple bottom line approach to risk evaluation will become more common – which may have many spin off effects, including improved disclosure and accountability. Additionally, as financial service companies serve a broad range of customers, it is critical that their community investment strategies and investment portfolios address the priorities of individuals. As noticed earlier with GlobeScan's recent water survey results, water issues have become a mainstream public concern.

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<sup>47</sup> CAPP (2009)

<sup>48</sup> Morrison, J et al (2009)

### **Case Study: Supporting Capacity Building through RBC's Blue Water Project**

RBC has a vested interest in investing in water as an investor in and lender to companies that build water intensive industrial projects. While it has incorporated aspects of environmental risk into its assessment of loan requests, the Blue Water Project was developed as RBC's signature environmental cause. Through this program it has committed to donating \$50 million in grants over 10 years to support watershed protection and access to clean drinking water; create awareness for employees and clients about the value of water; and support water-tech sector and water services businesses. It aims to provide support for global, regional and local projects relating to watershed preservation, access to safe drinking water, and education and awareness.<sup>49</sup>

### **F. Pharmaceutical and Personal Care Products**

There are growing concerns about the persistence of pharmaceutical products in treated municipal wastewater and the impacts they may have on water sources and ecosystems – this relates to the activities of pharmaceutical and personal care companies and consumers when considering activities including product disposal (e.g. consumers flushing unused medications down the toilet or sink).

Though packaging and liquids posing a risk of contamination are typically captured and disposed of responsibly, there are risks of wastewater leaks from product manufacturing plants which could contain high concentrations of chemicals and microbial organisms, which may impact local water sources and ecosystems.<sup>50</sup>

### **G. Water Utilities**

In many developed countries, the water distribution infrastructure is aging, so repairs and investment will be needed in years to come. In cities around the world, it is common to lose a significant amount of water to leakage. In Montreal, old pipes leak 40% of the water they carry.<sup>51</sup>

Many cities, especially those located near the ocean, release their wastewater with very little treatment, causing environmental impacts to rivers and oceans and deteriorating water quality for others who may use the water source downstream.

Climate change will likely affect the capacity and reliability of water supply infrastructure due to flooding, extreme weather and sea level rise. Most water treatment plants and distribution systems were not built to withstand the rise in sea levels and increased frequency of severe weather that climate change is expected to bring.<sup>52</sup> In particular, as flooding events become more common, storm water management will become more important.

*Note: A more detailed sector-by-sector analysis of water issues can be found in The Pacific Institute's Water Scarcity & Climate Change: Growing Risks for Businesses & Investors; Appendix A: Water Footprint Intensity of Select Sectors and Appendix B: Water Risks of Selected Sectors.*

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<sup>49</sup> Odendahl, S (2009)

<sup>50</sup> Morrison, J et al (2009)

<sup>51</sup> Globescan (2009)

<sup>52</sup> Morrison, J et al (2009)

# Integrated Water Management Assessment Tool

In collaboration with thought leaders and industry practitioners, CBSR has developed framework for organizations to evaluate their current management approach and response to material water issues. The framework supports the identification of risks, opportunities and prioritization of focus areas, by encouraging organizations to better manage water related issues through strong internal governance, stakeholder engagement and communication.

This framework was developed to evaluate an organization's management structure (e.g. whether they have policies, plans, KPIs), while also considering the breadth of their strategic plans, accountability structure and implementation. Additionally, environmental and social issues are included to encourage an integrated approach to water management – in some cases by referencing related criteria from the Global Reporting Initiative's G3.

To evaluate performance in each category of the framework there are three classifications:

- Not addressed and/or planned action that has not yet been implemented
- Partly addressed and/or planned improvements
- Completely addressed and/or demonstrated effectiveness

## I. Stages of Development

These horizontal categories indicate the degree to which water is integrated in the management structure, engagement and communication of a company.

Policy – An effective *policy* answers the 'what' and provides a bridge to specific plans. It is uncommon for Canadian companies to have water policies, though water should be a component of an organization's environmental policy.

Plan – A *plan* answers 'how' a company will address the issues/topics discussed in a policy, by focusing on the implementation of policies by specific departments/divisions which are tasked with the responsibility of achieving company targets.

Key Performance Indicators (KPIs) and Targets – What gets measured gets managed. *KPIs* are a unit of performance while *targets* are specific, quantifiable performance levels and typically include a time horizon by which to achieve this level of performance (e.g. 10% improvement in water productivity by 2011).

Management System and Evaluation – To ensure that companies can track and evaluate performance, it is critical that they have a *management system* with a consistent protocol that determines how (and how often) to measure and evaluate performance. Management systems can also indicate if it may be necessary to make changes to policies, plans, targets and KPIs – to ensure continual improvement.

Stakeholder Engagement – *Engaging* with and addressing the needs and concerns of key internal and external stakeholders is a necessary activity within an integrated water management approach, particularly for those communities whose watersheds are directly affected by a company's operations and supply chain. Stakeholders are listed as A-E to permit customization of the framework based on those stakeholders that are considered high priority. Examples include employees, communities, investors, regulators, suppliers, NGOs and customers.

External Review – Refers to third party organizations reviewing the methodology of a company’s data collection (including its management system) and determining whether its performance data is accurate. An internal review can initially provide helpful insights, though as companies develop external communication with performance data external reviews can ensure public credibility.

Communication and Reporting – As water management practices and projects advance it is critical to communicate stakeholder engagement practices, business risks and opportunities, as well as performance targets and performance in an open and honest way. There is a leadership opportunity for companies to report on water-related risks. Recently, the Judging Panel of the Ceres-ACCA Sustainability Reporting Awards noted “water risk [is] woefully neglected”, and recommended reporting based on physical, reputational and regulatory risks, while focusing on solutions that come from strategic analysis of risks/opportunities from a water footprinting analysis.<sup>53</sup>

## **2. Strategic Planning and Accountability**

These categories assess the level of accountability of water management.

Board – Involvement by executive and non-executive board members in water policy development, with action steps and committee participation/accountability, indicates high-level support for the need to recognize key risks, opportunities and effective practices. This external top-down approach will not only bring credibility to water issues, but will instil greater accountability within the Executive team.

Executive – At this stage difficult and strategic decisions are made on how a company will address and manage complex water issues. Accountability at this level shows a willingness to be actively engaged on an issue while seeking solutions and taking responsibility for a firm’s performance.

Middle Management – At this stage strategic plans are implemented and performance is measured and evaluated for the executive team. Support is provided by developing performance targets, engaging with key stakeholders, and communicating performance to the Executive and Board, who may report publicly.

## **3. Implementation of Business Strategy**

This section assesses plan implementation, while supporting the identification of material issues, including those identified by the Global Reporting Initiative’s G3, which are specified in select categories of the framework. The following are three levels of implementation of strategy within an organization:

Facilities and Operations – A company’s manufacturing, storage, distribution, retail, administration and waste management facilities, and in-house transportation services all impact water usage. Full value chain consideration is recommended, including the *social and environmental impacts* of physical operations.

Products and Services – Understanding the social and economic impacts of products and services on key stakeholders (e.g. impact of a product/service that requires larger withdrawals of water from a community or groundwater source) is recommended. A *life cycle approach* can take into account factors such as materials sourcing, manufacturing, distribution, retail, consumer use and disposal; to ensuring that companies have sound information which helps them understand how to reduce their overall impacts.

Supply Chain and Business Partners – To ensure the integrity of a firm’s integrated water management commitments, key service and supply chain companies are consulted. This can involve developing policies, performance indicators and targets to suppliers, while providing support help meet/exceed compliance.

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<sup>53</sup> Ceres-ACCA (2009)

**Table 1: CBSR Integrated Water Management Assessment Tool**

	STAGES OF DEVELOPMENT										
	POLICY	PLAN	KPIs AND TARGETS	MGMT SYSTEM & EVALUATION	STAKEHOLDER ENGAGEMENT					EXTERNAL REVIEW	COMMUNICATION AND REPORTING
					A	B	C	D	E		
<b>STRATEGIC PLANNING AND ACCOUNTABILITY</b>											
A. BOARD OF DIRECTORS	■	☒	☐								
B. EXECUTIVE TEAM / C-SUITE											
C. MIDDLE MANAGEMENT											
<b>IMPLEMENTATION OF BUSINESS STRATEGY</b>											
A. FACILITIES AND OPERATIONS											
i. Water withdrawal by source – e.g. from groundwater, surface water (EN8)											
ii. Water sources significantly affected by withdrawal of water (EN9)											
iii. Water reuse and recycling – e.g. by percentage and total volume (EN10)											
iv. Water discharge – e.g. by quality and destination (EN21)											
v. Habitats significantly affected by discharges of water and runoff (E25)											
vi. Analysis of the social impacts of physical operations relating to water											
vii. Analysis of energy costs associated with water use											
B. PRODUCTS AND SERVICES (P&S)											
i. Life cycle analysis of environmental impacts of P&S relating to water (PR I)											
ii. Analysis of the social and economic impact of P&S relating to water											
C. SUPPLY CHAIN & BUSINESS PARTNERS											
i. Encouraging effectiveness and collaboration in water stewardship											

## Best Practice Tools, Programs and Resources

### **Alliance for Water Stewardship (AWS) Certification Program**

AWS aims to define water stewardship standards and recognize water users and managers who meet those standards through a certification program that incorporates social, environmental and economic aspects of water management. The program will link to international standards with a focus on direct and indirect water use impacts; encourage external verification; provide a global brand to allow users to demonstrate compliance; and offer training and education to promote water stewardship. The program is expected to be available by 2011. For more information visit [www.allianceforwaterstewardship.org/](http://www.allianceforwaterstewardship.org/)

### **CDP Water Disclosure Initiative**

Understanding that business has an impact and therefore a role to play in “developing and implementing solutions to the water challenge”, the CDP Disclosure Project aims to provide a venue for disclosing corporate water-use and water-related data. Like the Carbon Disclosure Project, the findings will inform large investment firms on risks and opportunities business face in relation to water, while allowing companies to better identify areas of risk, opportunity and effective practice.

The CDP Water Disclosure Initiative will ask companies to disclose their water usage and exposure to water stress in their operations and in supply chains. The questionnaire will also inquire into companies’ water management plans and governance. The ultimate aim of the CDP Water Disclosure Initiative is for the data to be used to mobilize investment towards sustainable water use. The questionnaire will be sent in early 2010 to the world’s 300 largest corporations and findings released in December. To learn more visit: [www.cdproject.net/water-disclosure](http://www.cdproject.net/water-disclosure)

### **United Nations CEO Water Mandate**

Facilitated by the UN Global Compact and the Pacific Institute, the CEO Water Mandate mobilizes businesses by providing a strategic framework that can help companies better manage that water use, while assisting in the development, implementation and disclosure of water sustainability policies and practices based on six key areas: direct operations; supply chain and watershed management; collective action; public policy; community engagement; transparency.

The mandate is a voluntary commitment by CEOs (currently with over 50 signatories, including Bayer, Coca-Cola, Royal Dutch Shell) and has a global and cross-sector focus on operations and supply chain, offers a combination of multi-stakeholder forums, sharing of best practices, development of a transparency framework, and ongoing support to participating CEOs. For more see Appendix D or visit: [www.unglobalcompact.org/Issues/Environment/CEO\\_Water\\_Mandate/](http://www.unglobalcompact.org/Issues/Environment/CEO_Water_Mandate/)

### **Google Fusion Tables**

Developed by Google engineers, Fusion Tables is an online research and data organization tool enabling users to share, navigate and edit large data files. The tool’s main objective is to enable online collaborators to examine and understand complex issues such as freshwater availability. Sample data from The Pacific Institute and Circle of Blue is available and can be viewed in various forms – table, map, chart, etc.

The data can be shared in real time with the public or by a restricted few. Fusion tables can offer companies an online venue to view, share and interpret data with external experts, or internally with company colleagues. For more information visit: [http://bit.ly/Google\\_Fusion\\_Tables](http://bit.ly/Google_Fusion_Tables)

## GRI Water Performance Indicators

Developed by the Global Reporting Initiative, and linked to its G3 sustainability reporting guidelines, a series of assessment indicators were developed for both its standard guidelines and sector supplements, which focus on a company’s responsibility to manage its environmental impacts associated with water.

The G3 is intended to provide a standardized reporting format across sectors that gives guidelines and boundaries to the process of sustainability reporting and improve the comparability and credibility of information disclosed. The specific performance indicators are linked to issues including water withdrawal by source (EN8), water sources significantly affected by withdrawal (EN9), reuse and recycling (EN10), discharge (EN21) and significant affects based on water discharge and run-off (EN25). For more information see Appendix D or visit: [www.globalreporting.org/ReportingFramework/G3Guidelines/](http://www.globalreporting.org/ReportingFramework/G3Guidelines/)

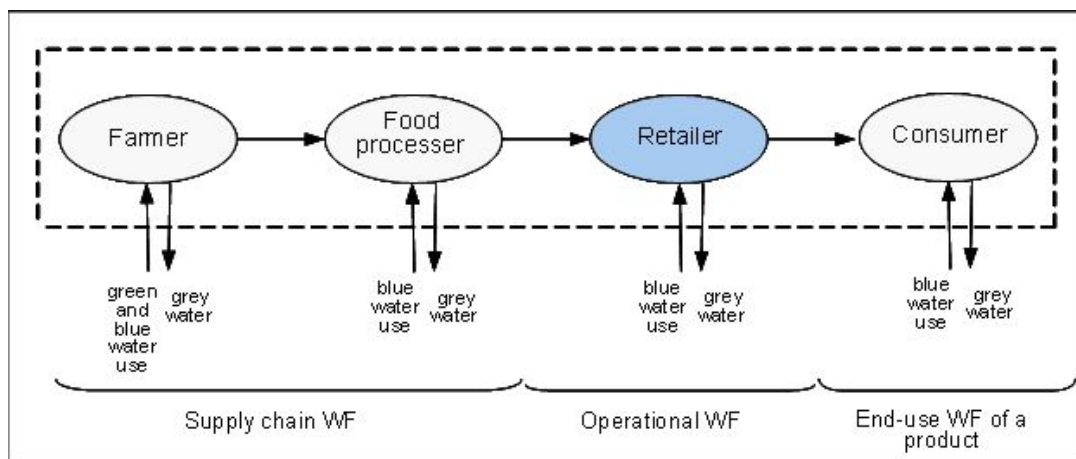
## WBCSD Global Water Tool

This water tools have four objectives: Map a company’s water use and assess water risks relative to global operations and supply chain; establish relative water risks in a company’s portfolio to prioritize action now and in the future; create an effective knowledge base for driving improved water consumption and efficiency; and enable effective communication with internal and external stakeholders.

The cross sector tool is composed of an Excel workbook, an online mapping system that plots site locations with external water data-sets and a spatial viewing via Google Earth interface; it generates automatic outputs including GRI water indicators, inventories (water consumption and efficiency), downloadable metrics charts with combined company and country watershed data and geographic mapping.; and allows the user to enter water-related data for suppliers. For more information visit: <http://www.wbcd.org/web/watertool.htm>

## Water Footprinting

The water footprint of a business refers to the total volume of fresh water that is used directly and indirectly to run and support the business. Therefore, a company’s *operational water footprint* (direct water use by the business’ operations) and *supply-chain water footprint* (water use in the business’s supply chain) are the main focus areas, though the latter may be complex and challenging to track when considering activities such as the sourcing of agriculture raw materials and products – when a company is not involved in agriculture activity. An example of a water footprint assessment is included below:



Water use is measured in terms of water volumes consumed/evaporated and/or polluted over time. Both the operational and supply-chain water footprint are split up into three elements: the *blue water footprint* is the volume of freshwater that evaporated from surface water and ground water; the *green water footprint* is the volume of freshwater evaporated from rainwater stored in the soil as soil moisture; and the *grey water footprint* is the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards.

The ecological or social impact of a water footprint depends not only on the volume of water use, but also around where and when the water is used. Therefore a water footprint not only indicates volumes of water use and pollution, but also the locations and timing. Depending on the comfort level of a company, a footprint can be applied to various levels (e.g. project, division, company).

To encourage a consistent and accepted approach is taken in water footprinting, ISO is collaborating with many expert stakeholders including WBCSD, WFN and the Life Cycle Initiative to develop a standard of accepted principles, guidelines, requirements and communication. For more information on approaches to water footprinting and the Water Footprint Network (WFN) visit: <http://www.waterfootprint.org>

### **Water Neutral Offset Calculator**

The calculator was developed in 2008 to raise awareness and stimulate action to proactively reduce the water footprint of individuals travelling in South Africa. It quantifies the volumes of water used to produce goods by a traveler/tourist visiting South Africa on a daily basis, and is linked to a tool that calculates the offset price necessary for each unit of water footprint. The funds raised are then channeled to initiatives aimed at promoting sustainable water management practices. For more information on the calculator or the Water Neutral Foundation visit <http://www.wateneutral.org/calculator.asp>

## APPENDIX A: Glossary

**Brackish Water** – Water containing salts at a concentration significantly less than that of sea water but in amounts that exceed normally acceptable standards for municipal, domestic and irrigation uses.<sup>54</sup>

**Freshwater** – Naturally occurring water having a low concentration of salts, or generally accepted as suitable for abstraction and treatment to produce potable water.<sup>55</sup>

**Groundwater** – Sub-surface water that moves through or is stored in pipes, cracks or crevices in the earth. It is a source of water for wells and springs, and is often a significant source for lakes and rivers.<sup>56</sup>

**Integrated Water Management** – Making decisions and taking actions which take into consideration the needs and interests of impacted stakeholders and the natural environment.

**Life Cycle Assessment** – Process to evaluate the environmental burdens associated with a product, process, or activity by identifying and quantifying energy and materials used and wastes released to the environment; to assess the impact of those energy and materials used and released to the environment; and to identify and evaluate opportunities to affect environmental improvements. The assessment includes the entire life cycle of the product, process or activity, encompassing, extracting and processing raw materials; manufacturing, transportation and distribution; use, reuse maintenance; recycling and final disposal.<sup>57</sup>

**Wastewater** – Water that is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater.<sup>58</sup>

**Water Footprint** – The total volume of freshwater that is used to produce the goods and services consumed by the individual or community, or produced by the business.<sup>59</sup>

**Water Neutral** – The term relates to reducing and offsetting the impacts of “water footprints”. To achieve “neutrality”, the water footprint of an activity is reduced as much as reasonably possible and offsets are then made to the negative externalities of the remaining water footprint.<sup>60</sup>

**Water Offsets** – Offsetting the negative impacts of a water footprint by investing in a more sustainable and equitable use of water in the hydrological units in which the impacts of the remaining water footprint are located.<sup>61</sup>

**Water Recycling/Reuse** – The act of processing used water/wastewater through another cycle before discharge to final treatment and/or discharge to the environment.<sup>62</sup>

**Water Withdrawal** – Removal of water from any source, either permanently or temporarily.<sup>63</sup>

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<sup>54</sup> WBCSD (2009)

<sup>55</sup> WBCSD (2009)

<sup>56</sup> WWF-Canada (2009)

<sup>57</sup> SETAC (2009)

<sup>58</sup> UNFAO (2009)

<sup>59</sup> WFN (2009)

<sup>60</sup> WBCSD (2009)

<sup>61</sup> WBCSD (2009)

<sup>62</sup> GRI (2006)

<sup>63</sup> WBCSD (2009)

## APPENDIX B: Web Links

Alliance for Water Stewardship

[www.allianceforwaterstewardship.org/](http://www.allianceforwaterstewardship.org/)

Business for Social Responsibility (BSR) Sustainable Water Group

<http://www.bsr.org/consulting/working-groups/sustainable-water.cfm>

Canadian Business for Social Responsibility

<http://www.cbsr.ca>

Centre for Indigenous Environmental Resources: Protecting Lands and Waters

<http://www.cier.ca/protecting-lands-and-water/Default.aspx?id=60&linkidentifier=id&itemid=60>

Circle of Blue / Globescan WaterViews

<http://www.circleofblue.org/waternews/waterviews/>

Go Blue

<http://www.goblue.org/en/>

Intergovernmental Panel on Climate Change (IPCC): Climate Change and Water report

<http://www.ipcc.ch/pdf/technical-papers/climate-change-water-en.pdf>

National Roundtable on the Environment and the Economy (NRTEE): Research Program on Water Sustainability and the Future of Canada's Natural Resource Sectors

<http://nrtee-trnee.ca/eng/issues/programs/water/water.php>

Pacific Institute

<http://www.pacinst.org/>

The Pembina Institute

<http://www.pembina.org/>

POLIS Water Sustainability Project

<http://www.polisproject.org/researchareas/watersustainability>

Real Estate Property Association of Canada: Green Office Lease

[http://www.realtac.ca/s\\_223.asp](http://www.realtac.ca/s_223.asp)

UN: Water for Life

<http://www.un.org/waterforlifedecade/>

WWF: Water Resources

[http://www.panda.org/about\\_our\\_earth/about\\_freshwater/](http://www.panda.org/about_our_earth/about_freshwater/)  
[www.wwf.ca/rivers](http://www.wwf.ca/rivers)

Walter and Duncan Gordon Foundation: Fresh Water Resources

<http://www.gordonfn.org/FreshWater.cfm?cp=55>

Water Footprint Network

<http://www.waterfootprint.org>

Waterkeeper Alliance

<http://www.waterkeeper.org/>

Waterlution

<http://www.waterlution.org/>

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## Appendix D: List of Participating/Supporting Organizations

CBSR would like to thank the following individuals and organizations for their support during the interview process, by helping to identify critical issues, risks, opportunities, tools, resources, and recommendations to provide further support to industry:

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Melissa Whellams, Canadian Business for Social Responsibility  
Michelle McCulloch, TD Bank Financial Group  
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## Appendix E: REVIEW OF WATER-RELATED PROGRAMS

Program/guidelines	Description	Website
<b>CEO Water Mandate</b>	<ul style="list-style-type: none"> <li>• Voluntary call for action and strategic framework, recognizing business has a role in addressing global water challenges.</li> <li>• Launched in 2007 in partnership with the UN Global Compact and the Swedish Ministry of Foreign Affairs.</li> <li>• Designed as a private-public partnership, open to companies of all sizes and sectors.</li> <li>• The Mandate’s structure includes six key areas and is designed to aid companies in the development of a wide-ranging approach to water management:               <ol style="list-style-type: none"> <li>1. Direct Operations;</li> <li>2. Supply Chain and Watershed Management;</li> <li>3. Collective Action;</li> <li>4. Public Policy;</li> <li>5. Community Engagement; and</li> <li>6. Transparency.</li> </ol> </li> <li>• Each year, two working conferences are convened to tackle specific water related issues and aspects of the CEO Water Mandate. The working conferences include water experts, companies, UN agencies, civil society organizations, public authorities, and others.</li> <li>• CEO Water Mandate group produces Key Documents and Research documents the following is a list of publications:               <ul style="list-style-type: none"> <li>○ <b>Key Documents</b> <ul style="list-style-type: none"> <li>* The CEO Water Mandate (Preamble and Core Elements)</li> <li>* Mission statement</li> <li>* Constitution</li> <li>* Transparency Policy</li> <li>* Transparency Framework</li> <li>* Transparency Framework, Phase II: Water Disclosure 2.0</li> </ul> </li> <li>○ <b>Research</b> <ul style="list-style-type: none"> <li>* Letter to the Group of Eight (G8), May 2008</li> <li>* <i>Climate Change and the Global Water Crisis</i> (May 2009)</li> <li>* <i>Water and Human Rights: Exploring the Roles and Responsibilities of Business</i> (March 2009)</li> <li>* <i>From Footprint to Public Policy</i> (March 2009)</li> <li>* <i>Mapping of Global Freshwater Initiatives</i> (March 2008)</li> <li>* <i>Endorser Survey Synthesis Report</i> (March 2008)</li> <li>* <i>High Commissioner for Human Rights on the Right to Water</i> (March 2008)</li> </ul> </li> </ul> </li> </ul>	<p><b>Main site (includes key documents and research briefs):</b></p> <p><a href="http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/">http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/</a></p> <p><b>List of Signatories:</b></p> <p><a href="http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/endorsingCEOs.html">http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/endorsingCEOs.html</a></p> <p><b>Working Conferences</b></p> <p><a href="http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/Working_Conferences.html">http://www.unglobalcompact.org/issues/Environment/CEO_Water_Mandate/Working_Conferences.html</a></p>

<p><b>Global Reporting Initiative (GRI) Guidelines</b></p>	<ul style="list-style-type: none"> <li>• The Global Reporting Initiative's (GRI) is an international standard for corporate disclosure on economic, environmental, and social performance. The GRI's vision is that it becomes as commonplace and comparable as financial reporting, and as important to organizational success.</li> <li>• The GRI's Indicator Protocol (IP) includes Environment as one of nine Aspects or areas of reporting. The Environment indicator includes, among many Water; Environmental indicators 8, 9 and 10 on water disclosure are listed below:</li> </ul> <p>EN8 Total water withdrawal by source (Core, page 14 of IP document):</p> <ul style="list-style-type: none"> <li>○ This core indicator enables an understanding of the overall scale of potential impacts and risks associated with a company's water use. Systematically monitoring and increasing water-use efficiencies can both save costs, as well as risk that can occur due to potential disruption to water supplies.</li> </ul> <p>EN9 Water sources significantly affected by withdrawal of water (Additional, page 15 of IP document):</p> <ul style="list-style-type: none"> <li>○ Large water withdrawals from surface or groundwater system can affect the water levels, reduced water flow and therefore ecosystem health, all at risk of long-term resource viability.</li> </ul> <p>EN10 Percentage and total volume of water recycled and reused (Additional, page 16 of IP document):</p> <ul style="list-style-type: none"> <li>○ Measuring the amount of water reused and recycled is an indicator of efficiency both in terms of water withdrawals and wastewater discharge. Further, the greater efficiency of water through reuse and recycling the better risk aversion related to water availability and costs.</li> </ul> <p>EN21 Total water discharge by quality and destination (Core, page xx of IP document).</p> <p>EN25 Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff (Additional).</p>	<p><b>Main site:</b></p> <p><a href="http://www.globalreporting.org/Home">http://www.globalreporting.org/Home</a></p> <p><b>Indicator Protocol, Environment</b></p> <p><a href="http://www.globalreporting.org/NR/rdonlyres/D2BC0DF8-FF2C-4BAB-B2B4-27DA868C2A5F/2800/smallG3%20IP%20EN%20ENG%20andcov.pdf">http://www.globalreporting.org/NR/rdonlyres/D2BC0DF8-FF2C-4BAB-B2B4-27DA868C2A5F/2800/smallG3 IP EN ENG andcov.pdf</a></p>
<p><b>OECD Guidelines for Multinational Enterprises (MNEs)</b></p>	<ul style="list-style-type: none"> <li>• The Guidelines for Multinational Enterprises (MNEs) is a non-binding code of conduct for business operating in or from adhering countries (the 30 OECD member countries plus 11 non-member countries).</li> <li>• The Guidelines are the only multilaterally endorsed and comprehensive code that governments are committed to promoting, through the operation of National Contact Points (NCP).</li> <li>• The following chapters include provisions of the Guidelines that are applicable to sustainable water management:</li> </ul>	<p><b>Main site</b></p> <p><a href="http://www.oecd.org/daf/investment/guidelines">www.oecd.org/daf/investment/guidelines</a></p> <p><b>Text of the Guidelines (pdf)</b></p> <p><a href="http://www.oecd.org/document/28/0,3343,en_2649_34889_2397532_1_1_1,00.html">http://www.oecd.org/document/28/0,3343,en_2649_34889_2397532_1_1_1,00.html</a></p>

	<p>Chapter II, General Policies, section I: Contribute to economic, social and environmental progress with a view to achieving sustainable development.</p> <p>Chapter V, Environment: Enterprises should... take due account of the need to protect the environment, public health and safety, and generally to conduct their activities in a manner contributing to the wider goal of sustainable development. In particular, enterprises should:</p> <ul style="list-style-type: none"> <li>• Section 1: Establish and maintain environmental management system, which includes data collection and evaluation (i.e. water withdrawals, discharge), establishment of objectives and targets for improvements (i.e. increase water use efficiency, reduce discharge).</li> <li>• Section 3: Decision making should include both evaluation and address foreseeable environmental, health and safety (EHS) related impacts associated with goods and services' full life cycle. For example, incorporating watershed health management in arid areas where supplier factories may be located.</li> <li>• Section 5: Establish and maintain emergency planning, that includes prevention, mitigation and control of serious environmental and health damage from operations such as spills into nearby watersheds.</li> <li>• "Section 6: Continually seek to improve corporate environmental performance – adoption of technologies and operating procedures, development and provision of products or services that have no undue environmental impacts."</li> <li>• Section 7: Provide education and training for employees in EHS, which includes water conservation in operations and day to day functions.</li> <li>• Section 8: "Contribute to the development of environmentally meaningful and economically efficient public policy" such as engagement with stakeholder groups, promoting enhanced water protection legislation.</li> </ul>	<p><b>Canada's National Contact Point (NCP) for the OECD Guidelines for MNEs</b></p> <p><a href="http://www.international.gc.ca/trade-agreements-accords-commerciaux/ncp-pcn/index.aspx?lang=eng&amp;menu_id=1&amp;menu=R">http://www.international.gc.ca/trade-agreements-accords-commerciaux/ncp-pcn/index.aspx?lang=eng&amp;menu_id=1&amp;menu=R</a></p>
<p><b>UN Global Compact</b></p>	<ul style="list-style-type: none"> <li>• The UN Global Compact's voluntary ten principles in the areas of human rights, labour, the environment and anti-corruption are the product of the following: <ul style="list-style-type: none"> <li>○ The Universal Declaration of Human Rights</li> <li>○ The International Labour Organization's Declaration on Fundamental Principles and Rights at Work</li> <li>○ The Rio Declaration on Environment and Development</li> <li>○ The United Nations Convention Against Corruption</li> </ul> </li> </ul>	<p><b>Main site:</b></p> <p><a href="http://www.unglobalcompact.org/">http://www.unglobalcompact.org/</a></p> <p><b>The Ten Principles:</b></p> <p><a href="http://www.unglobalcompact.org/">http://www.unglobalcompact.org/</a></p>

	<ul style="list-style-type: none"> <li>• Signatory companies pledge to adopt, enact and influence within the business community the core values mentioned above; the following three principles fall under the area of “Environment”:</li> <li>○ Principle 7: Businesses should support a precautionary approach to environmental challenges;</li> <li>○ Principle 8: undertake initiatives to promote greater environmental responsibility; and</li> <li>○ Principle 9: encourage the development and diffusion of environmentally friendly technologies.</li> </ul> <p>The three environmental principles of the Global Compact are drawn from a Declaration of Principles and an International Action Plan (Agenda 21) that emerged from the United Nations Conference on Environment and Development (the Earth Summit) held in Rio de Janeiro in 1992. Agenda 21 identified that business and industry’s policies and operations have a major role in the reduction of impacts on resource use and therefore the environment. Specific to freshwater management, business has a role efficient water use in its direct operations as well as through supply chain management.</p>	<a href="http://www.cbsr.org/AboutTheGC/TheTenPrinciples/index.html">org/AboutTheGC/TheTenPrinciples/index.html</a>
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