



Water and Industry in the Green Economy

Information brief



- The industrial sector uses about **20%** of global freshwater withdrawals. This includes water for hydro and nuclear power generation, industrial processes and thermal power generation.
- The annual water volume used by industry will rise from **752 km³** per year in 1995 to an estimated **1,170 km³** per year in 2025, i.e. about **24%** of total freshwater withdrawals.

Main challenges

Exploitation and contamination of freshwater

One of the major challenges for industry today is to effectively address the unsustainable exploitation and contamination of freshwater resources around the world. In comparison to other sectors, industry uses relatively little water on a global scale (**20%** of total freshwater withdrawals). Still, the annual quantity of water used by industry is rising and industry will increasingly be competing over limited water resources with growing urban and agricultural water demands.

Industry is one of the biggest water polluters, discharging about **300-500 million tons** of heavy metals, solvents, toxic sludge, and other wastes each year. Pollutants make water non-potable and contaminate and kill fish, which provide an important source of protein for many people, particularly the poor. Contaminated water also risks the transfer of contaminants (including bio-magnifying compounds) to the food chain through its use in agriculture and its uptake by plant and animal life.

- In developing countries, **70%** of industrial waste is dumped untreated into waters.

Challenges in developing countries

Expanding the industrial sector is critical for poverty alleviation, delivery of goods and services, job creation, and improving standards of living; especially in developing countries. However, in many countries industrial development goes hand in hand with environmental degradation and resource depletion, which threaten opportunities for sustainable economic growth. The main barriers that prevent developing countries from adopting green growth strategies are a lack of knowledge and skills to deal with these challenges; the absence of an adequate industry-support system to assist enterprises; fragmented and ineffective policy frameworks; and difficulties in accessing finance.

- *Least developed countries are still not consuming enough to satisfy their basic needs, while the most developed countries are consuming far beyond these needs. The transition may imply a more rational use of water in LDCs but substantially lower amounts of water used in advanced countries.*
- *In low-income countries industry accounts for about **5%** of water withdrawals, compared to up to **86%** in some high-income countries such as Germany. For LDCs economic progress may imply the relative advance of the manufacturing industry but not repeating the water intensive trends already observed in advanced countries.*

Sustainability

To meet the needs of present and future generations, industries' production systems will have to become more sustainable. Many enterprises use more materials and energy than their production processes require, since they continue to use outdated and inefficient technologies and fail to adopt proper management systems. This is particularly true for industries in developing countries. Industries can become more sustainable if their consumption of materials and energy decouples from their production growth (i.e. produce more with less). Decoupling refers to the ability of an economy to grow without corresponding increases pressures on the environment.

- *Global material consumption is projected to triple from **50 to 160 billion tonnes** per year by 2050.*

Opportunities for industry in the green economy

Industry, as the prime manufacturer of the goods and services that societies consume, has a critical role to play in creating more sustainable production and consumption patterns. Furthermore, the industry can play a leading role in making water



practices more sustainable by addressing overexploitation and contamination and improving water infrastructure and management. To reach these goals, industry must do **“more with less”**, ideally moving toward a goal of zero discharge, for example by utilising a closed-loop production system.

- UNIDO launched the **Green Industry Initiative**, which provides a sectoral approach for a global transition to green growth in the manufacturing and associated sectors. It is a two-pronged strategy for decoupling resource use and pollution from industrial development and promoting the growth of sustainable productive sectors and entrepreneurship in developing and transitioning countries. According to UNIDO, this will lead to the creation of new green jobs, new business ventures, and will drive technology development and innovation. The initiative is especially designed to support developing countries and transition economies, enabling them to benefit from the opportunities associated with sustainable industrial development and the growing global demand for greener products and services.
- The **environmental sector** offers opportunities for industries in the transition towards a green economy, as it can assist them in assessing, measuring and managing their environmental impacts, as well in the management and safe disposal of pollution and waste. Examples are cleaner production services and waste recycling. Recent statistics suggest that this industry is worth around USD 300 billion annually in the developed countries alone.
- Many types of products with an **environmental “brand”** offer opportunities for entrepreneurs. For example, in the renewable energy sector there are potential markets for solar water-heaters for commercial or residential use, or for solar cookers for use in rural areas.
- Through **environmentally sound product design**, enterprises can assist in bringing about a broader decoupling throughout societies. At one level, enterprises can redesign their products so that they contain fewer materials (dematerialization). At another level, they can redesign them to consume less (e.g. energy, water, detergents) during their use.
- The current **economic and financial crises** can also provide an opportunity for industries to become more sustainable. The large public spending programs being touted as a means to revive economies are an opportunity to place our economies on more sustainable pathways of growth. The much needed green public investments, as well as the necessary policy changes to encourage green private investments, could well ‘jump-start’ the transition towards a green economy model.

Greening of industries

The greening of industries is the process of ensuring that all industries continuously improve their environmental performance. This includes commitment to, and actions aimed at reducing the environmental impacts of processes and products by using resources more efficiently; phasing out toxic substances; substituting fossil fuels with renewable energy sources; improving occupational health and safety; taking increased producer responsibility; and reducing risks to the environment, climate and people.

Highlighting practice

This section outlines several approaches for transitioning to the green economy highlighted by the organizations participating in the conference.

Normative framework

- **Closing gaps in the normative framework.** Global trade will increasingly require enterprises in the developing countries to comply with environmental product or process standards and certify that they do so. A normative framework is required allowing enterprises to obtain certifications of compliance with local environmental standards.
- A normative framework to encourage the growth of the **recycling** industry as well as the reduction of waste through improving production processes and product redesign.
- Establishment of new **environmental laws and regulations** and enforcement of existing ones.

Improving knowledge, building capacity

- Awareness-raising amongst entrepreneurs to **promote opportunities for new green businesses** responding to demands for technologies; infrastructure; or specialized consulting, laboratory or other services.

Industrial wastewater reclamation technology for urban irrigation in the city of Windhoek, Namibia

Main challenges

- Fresh and clean water resources may be too valuable to be utilized for irrigation of urban green areas and small-scale agriculture.
- Industrial wastewater is often not treated to meet the standards for irrigational reuse.

Focus and objectives

- Reuse of industrial wastewater for urban irrigation.
- Reduce the discharge of contaminated wastewater.

Approaches

- Building a wastewater reclamation plant, basing on cost- and energy-efficient technologies.

- Access to **training, knowledge and technology**, to develop a water-friendly industry.
- Enhancement of technical and managerial **knowledge and skills** throughout the industrial sector.

Water management practices

- Improvements in **water use and energy efficiency** along the value chain of industrial processes (production, transformation, marketing, consumption, recycling) via government and market incentives and regulations/standards and consumer campaigns.
- Measurement and assessment of **water footprints** and **water risks** in operations and supply-chains.

Management of wastewater and pollution

- Cleaner production and sustainability practices contribute to the transition toward **zero effluent discharges**. Industries should work to convert wastewater streams into useful inputs for other processes, industries and industrial clusters.
- Improved management of **chemicals** (storage and handling) to prevent accidental spills and leakages that negatively impact surface water and groundwater.

Business sector

- Support to the **development of small and medium enterprises** (SMEs) and local green industry (goods and services) in the transition to a water-friendly economy.
- Promotion of good practices of **corporate social responsibility** around water, including for SMEs in developing countries.
- **Proper siting** of enterprises. For example, locating small and medium enterprises (SMEs) of similar industrial sectors in industrial zones allows for common wastewater treatment and waste-management operations, which individual enterprises might not be able to afford. It can also enable groups of enterprises to practice industrial ecology, whereby wastes from one enterprise are fed to another enterprise as raw materials.

Financing

- Improvements to the **financial support structure**. It is important that the banking sector in the position of being willing and able to support green investments by the private sector, or to invest directly in required infrastructure such as wastewater treatment plants and waste-management plants (these can be the green investments in stimulus packages).
- A **different price structure** for industrial water use which requires industry to pay more per unit of water than the public and increases the unit price with increasing water use. This promotes increased water use efficiency, since industries aim to keep costs low.
- Establishment of **loan markets** for small and medium enterprises (SMEs), municipalities, water users associations and domestic consumers.

Technology

- An integrated and strategic science and technology system that encourages **green innovation** as well as the transfer, development and adaptation of cleaner process technologies, recycling technologies, renewable-energy technologies, and other environmentally sound technologies. This makes it easier for enterprises to green themselves.
- **Eco-industrial clusters and technological parks** can increase efficiency and generate environmental benefits at the regional level.

ZINNAE (Urban cluster for water efficiency), Zaragoza, Spain

In 2010 the main water actors in Zaragoza created ZINNAE (Urban cluster for water efficiency) to promote efficient and sustainable use of water and associated energy consumption in Zaragoza.

Main challenges: Global demand for water is increasing continuously, largely due to urban population growth.

Focus and objectives

- Boost efficiency and sustainability in water use and management as well as in the associated energy consumption in Zaragoza. Reduce the discharge of contaminated wastewater.
- Showcase the cluster at a national and international level as an exemplar of using collaboration, knowledge and innovation for promoting efficient and sustainable water management and reducing energy consumption in urban areas.
- Turn water efficiency into a driver of quality employment for the city.

Approaches

- Facilitating the collaboration of different public and private actors through knowledge generation, demonstration projects and innovative solutions.
- The cluster's activities include: collaborative projects, thematic commissions, and dissemination of the activities and products of the cluster members.

Common but differentiated responsibilities for developed and developing countries

Developed countries

- Developed countries must achieve an **absolute decoupling** of natural resource use and the environmental impacts of economic growth and industrial development (i.e. environmental pressures are stable or decreasing while economic growth continues to increase). This will require a significant increase the resource productivity of their economies.
- Developed countries should **support developing countries** in achieving a reduction from the current levels of resource use intensity by providing financial and technology transfer support for green industry programs and projects.

Developing countries

- Developed countries must support developing countries in achieving a **relative decoupling** of natural resource consumption from economic growth and industrialization (i.e. environmental pressures are continuing, but at a lesser rate than the economic variable).
- Developing countries could apply “**three Rs**” strategies: reducing consumption of raw materials in production processes; switching to renewable sources of energy and materials; and redesigning products to contain fewer materials and consume less energy, water, etc. during their lifecycle. Governments can support this through awareness-raising campaigns, capacity building, and the creation of industry-support institutions and of accreditation and certification bodies.

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