ENCORE
CELEBRATING BUSINESS SUSTAINABILITY
APRIL–JUNE 2016
teri | Council for Business Sustainability

WATER USE EFFICIENCY and MANAGEMENT in the INDIAN CONTEXT

CONTENTS

TERI-Council for Business Sustainability

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TERI Council for Business Sustainability (TERI CBS) was set up by The Energy and Resources Institute (TERI) in 2001. It is a CEO-led industry body with membership of over 100 leading corporates from diverse sectors and geographies. TERI CBS provides an independent and credible platform for corporate leaders to address issues related to sustainable development and promote leadership in environmental management, social responsibility and economic performance.

BUSINESS DAY 2016

Beyond 2015: People, Planet and Progress-Mobilising Business Strategies & Solutions

- Time: 1:30 pm onwards
- Venue: Stein Auditorium, India Habitat Centre, New Delhi
- E-mail: businesscouncil@teri.res.in

05 OCT '16

Business Day will bring together corporate leaders to define a path and evolve a strategy by which the sustainable development can be mainstreamed into business planning and practices. Businesses are faced with the challenge of integrating environmental considerations into their production and marketing plans. Integration of corporate strategy and environmental/societal considerations could be achieved through improving market communications, improving manufacturing processes and carrying out research and development.

EDITORIAL

In the preceding edition, it was mentioned that EnCore will focus on four pressing themes that includes Improving the Efficiency of Energy Use, Expanding the Use of Renewable Energy, Ensuring Water Availability in Changing Climate, and Improving the Efficiency of Waste Management, from the highlights of our 'Delhi to Paris: Corporate Vision on Climate Change' initiative tabled at the 21st Conference of Parties (CoP21). While the previous edition focused on 'Expanding the Use of Renewable Energy', the focus of this edition is Water Use Efficiency and Management in the Indian context.

As per an estimate of the World Bank, 1.6 billion people live in countries with physical water scarcity—a figure that may double in the coming two decades. With little or no potential for developing new sources of water, efficient use of water becomes essential to meeting future demand.

The broad focus of the 2030 Agenda on Sustainable Development is to end poverty and promote prosperity for all. Water and related issues of sanitation are part of the dedicated Sustainable Development Goal (SDG) 6. At the 13th summit between the European Union and India held in Brussels earlier this year, the primary outcome was the 'Joint Declaration by the European Union and the Republic of India on Indo-European Water Partnership' to strengthen technological, scientific, and management capabilities in the field of water management and support the country's 'Clean Ganga' and 'Clean India' projects, directly addressing SDG6.

The cover story highlights the need for enhancing the reliability and resilience of energy and water systems for business. Aalok A Deshmukh, from Schneider Electric India, says that end-use resource efficiency is a cost-effective and elegant means of solving the multiplicity of our challenges. According to him, water fixtures for bathrooms, toilets, and kitchens account for a whopping 80 per cent of the water used in buildings. Efficient water fixtures, such as dual-flush toilets, aerators, flow-restrictors, and sensors on faucets are some of the immediate solutions that can reduce daily per capita water use by as much as 60–80 per cent. While this requires strengthening of technology and know-how, awareness generation and sensitization among builders and users is very critical.

Alcoa's Natural Engineered Wastewater Treatment System, Dalmia Cements' Water Conservation Drive through various process-related improvements and awareness generation, Lavasa's Integrated Water & Wastewater Management are the select case studies included in this edition as business best practices in water use efficiency.

This edition also includes a brief on TERI's 'Resource Centre on Water Use Efficiency' established in association with Jain Irrigation Systems Limited (JISL) and its experience in the field of integrated water management for water audits, making it within reach for businesses to enhance their water use efficiency.

The issue is tabled on Business Day—a curtain raiser to TERI's annual flagship event the World Sustainable Development Summit—a platform for industry captains to innovate and share ideas for conducting business while protecting the environment. We do hope the contents of this issue will be relevant and beneficial to our Business Council member companies and other businesses.

Dr Annapurna Vancheswaran
Senior Director, Sustainable Development Outreach and Youth Education, TERI

Cover Story

THE BUSINESS CASE FOR INDIA INC. TO ENHANCE THE RELIABILITY AND RESILIENCE OF ENERGY AND WATER SYSTEMS

Author: Aalok A Deshmukh, General Manager and Head, Energy Efficiency, Schneider Electric India.

Water and energy are deeply intertwined. Water has a significant energy footprint; and energy, especially electricity, has a large water footprint. India is severely stressed on both counts. With almost 17 per cent of the world's population, we have only 4 per cent of the world's freshwater resources; and only about a quarter of the global average of 6,000 cu. m. per person per year of renewable water resources. We use less than 5 per cent of the total energy consumed worldwide. A quarter of our population has no access to electricity and another third has only 4–6 hours of daily access to electricity. To maintain economic growth and development, at our current energy intensity, we need to add an equivalent of a 600–700 MW power plant every week or two, for the next 15 years. Given the imperative of equitable and sustainable development, this is not an easy situation to be in.

Efficiency—Our Cheapest, Cleanest, and Most Abundant Resource

End-use resource efficiency is a cost-effective and elegant means of solving the multiplicity of our challenges. The water–energy nexus ensures that radically improving the efficiency of use for one resource positively impacts the overall situation as it pertains to reliability and resilience for the other resource. With a focus on downstream end-use efficiency, compounding losses in the water and electricity supply chains are converted to compounding gains upstream. The good news is, when done right, end-use efficiency comes with a compelling business case in and of itself.

Take the example of water fixtures for bathrooms, toilets, and kitchens; which can account for up to 80 per cent of the water used in buildings. Efficient water fixtures, such as dual-flush toilets, aerators, flow-restrictors and sensors on faucets, low-flow showerheads, waterless urinals, can reduce daily per capita water use by as much as 60–80 per cent. Taking this into consideration during the design of a building can mean that the entire plumbing and pumping systems for our homes and buildings can be that much smaller; provided these systems are engineered and 'right-sized' instead of using thumb rules. So, even if it does not result in significant savings in operational costs since we do not yet value water enough to price it right; these water-efficient fixtures pay for themselves at the outset, as the cost reductions on account of smaller plumbing and pumping systems offset the increased costs of the efficient fixtures. Furthermore, the water distribution infrastructure for entire campuses, cities, and states can be reduced proportionally,

resulting in reduced infrastructure development costs up front. This picture gets even better when one considers the electricity savings accruing across the board from the reduced water requirement.

This story is similar in the case of energy efficiency as well. A best-in-class (super-efficient) office building in India uses only a third or a quarter of the energy that average office buildings use. And, again, with a whole-building design approach, these are being built today at no added costs as compared to business as usual. A best-in-class hotel or hospital is 50 per cent less energy intensive than an average hotel or hospital in India. A best-in-class steel plant is 30 per cent less energy intensive than an average steel plant in India.

There is also a strong case for deployment of smart energy and water management solutions that make the use of these precious resources visible, meaningful, and actionable. That which gets measured, gets managed. From the shop floor to the top floor, smart energy and water management systems help monitor consumption, identify leaks, and eliminate wastage. Advances in technology mean that these systems are a lot more cost-effective and easier to use than ever before.

Now, let's connect this end-use efficiency opportunity with the fact that over two-thirds of the building stock that will exist in India in 2030 is yet to be built. So also for power generation capacity—what we have now is only about a third of what we will need in 2030. This is likely the case for our water distribution infrastructure as well. Taking into consideration power plant efficiencies along with transmission and distribution losses in India; it takes 4 units of primary energy input at the power plant to deliver 1 unit of electricity at the site. Add to this the fact that a typical thermal power plant consumes around 7 litres of water to generate 1 kWh of electricity. End-use efficiency makes sense across all the energy and water value chains, upstream and downstream.

So, if it is technically possible using state-of-the-shelf technology to cost-effectively (with no added costs) reduce the water and electricity demand at site—thereby reducing the need for additional power generation capacity and water nationwide; why wouldn't we consider efficiency as our cheapest, cleanest, and most abundant resource?

Even if we were able to scale up and capture only a quarter of this water and energy efficiency potential nationwide, we're still talking in terms of avoiding the need for approximately 100 typical thermal power plants and the associated water consumption. The economic, environmental, and social benefits make a compelling case for end-use resource efficiency.

There are other things that India Inc. can do, including the use of native plants for landscaping, water treatment plants, ground water recharge, rainwater harvesting, use of distributed renewable energy, purchase of green power, and targeting energy and water self-sufficiency. As our energy and resource landscape is changing, these measures are becoming increasingly cost-effective, while also enhancing the reliability and resilience of business operations.

All these efforts could complement the Government's ambitious initiatives towards ensuring that India becomes an energy- and water-secure nation sooner rather than later. Clearly, given the importance of energy and water in the lives of our people and their well-being, it's time that every entity, public and private, stands up to contribute to this cause.

Expert Speaks

Perspectives from industry leaders.

Author: Ramani Iyer, Founder, Every Drop Counts Foundation.

Clean Water for All Citizens: Bugle Call for Democracy in Circa '2022'

Water & Urban Water in India

The United Nations sees 'water as fundamental to the three dimensions of sustainable development including social needs, economic development and environmental harmony and is a cross cutting driver'. At the street level, take for instance a housewife in a habitat recently integrated into a municipal area, lamenting the fact that she was getting 'poor quality water' through tankers as against others in the town that get their water through a pipe line. As you travel through slum colonies in Metro towns, you can see dish antennae on roofs, some have even window air-conditioners & laptops, but the houses have no running water! They depend on community toilets and municipal stand-posts for their basic needs.

By 2050, more than 800 million people will be living in the urban environment in India. From Mumbai in Maharashtra to Kapurthala in Punjab, there are over 498 urban entities and over 88 of them consist of population over five lakhs. The literacy rates in most of these towns is above 75 per cent. With strong growth in the services sector as compared to other sectors in these towns, the per capita income is expected to rise to ₹1 lakh. This has fueled higher aspirations in quality of life parameters like better housing, personal transport, TV sets, etc. Amenities like bathrooms with flush toilets and washing machines have increased the per capita consumption of water in all urban households. Use of RO-based water filters is a common way to get 'clean water'. Yet there is a yawning gap in provision of 'piped water' supply. After 65 years of free India, only 40 per cent of households have piped water connections. That too for water supply intermittently. Only 33 per cent of households have connection to city sewage systems.

India is poised to be the third largest economy in the world. India has emerged as the fastest growing major economy in the world as per the Central Statistical Organization (CSO) and International Monetary Fund (IMF). According to the Economic Survey 2015–16, the Indian economy will continue to grow more than 7 per cent in 2016–17. The steps taken by the government in recent times have shown positive results as India's gross domestic product (GDP) at factor cost at constant (2011–12) prices 2015–16 is ₹113.5 trillion (US$ 1.668 trillion), as against ₹105.5 trillion (US$ 1.55 trillion) in 2014–15, registering a growth rate of 7.6 per cent. The economic activities which witnessed significant growth were 'financing, insurance, real estate and business services' at 11.5 per cent and 'trade, hotels, transport, communication services' at 10.7 per cent. Yet the major ingredient of this success story, and often overlooked is the vibrancy of the democratic processes in a country of 1.2 billion people. In the history of nations there has been no precedent to building a nation of such diversity through massive exercises of development democratically. Of the many resources that go into making a better quality of life, water is fundamental. And in that, focus on 'clean water 24 x 7' for all citizens, particularly those in urban entities alone, can sustain democracy.

Water & its role in sustainable development

Water is crucial for human sustenance, health & dignity; and as a driver for business, for food and energy security, and for the ecosystems upon which our societies and continued development depend. The 'Millennium Development Goals' postulated in 2002 in Johannesburg, South Africa, did not include a goal on water. There were

water-related targets included in Goal 7 on environmental sustainability, but there was no holistic approach. In the post-2015 development framework, this was corrected through Formulation of 'Sustainable Development Goals (SDGs). The water community advocated strongly for a dedicated water goal to holistically address the world's water related challenges, avoiding potentially fragmented and unsustainable solutions which can increase competition amongst different water users, These water targets also connect to other relevant SDGs to secure strong interlinkages on food, energy, gender equality, health & climate.

Context SDGs vis-à-vis India's urban water scenario

The urgency to bring about changes in the Indian urban water scenario cannot be over emphasized. Like many other matters of governance, the ignorance and lack of clarity in urban water matters is endemic. Broadly speaking, they fall into the following categories:-

Water Policy & Priorities

Water is a State Subject and not a Concurrent Subject (like Power) between Centre & States. Water resources in a state belong to the state government whereas the water governance is in the hands of municipal governments. All state governments follow 'seat of the pants' philosophy, though the rhetoric is slanted to favour agriculture, the whipping boy is often industry. Municipalities have no clue to water needs of citizens today or projected needs for tomorrow. Municipalities have abandoned any semblance of planning or raising of financial resources. The Jawaharlal Nehru National Rural Urban Renewal Mission (JnNURM) was the manna till last year.

Water Resources for Cities

Many cities have not created any new water source for its growing needs. Neither have they spent efforts to recycle waste water. Measured over 71 cities, ground water constitutes 48 per cent share of the urban water supply. Fifty-six per cent of metropolitan, Class-I and Class-2 cities are dependent on groundwater fully or partially.

Water Treatment and Distribution Infrastructure

The city infrastructure for water treatment and distribution is one of the weakest links in the chain, particularly keeping in mind 'last mile delivery'. The absence of credible metering at the delivery point and the Tariff Policy have led to hampering of the process of building trust between the citizen and the municipality (often it is said that water must be charged at affordable rates. Indian experience says, if you supply water 24 x 7, consumers are willing to pay).

Water Supply Institutions & Capacity Building

There are no water supply institutions in most urban entities. Like it is in electricity distribution, you need consumer service-oriented institutions for water supply & sewage. Municipal cadres are mostly bureaucratic in nature and hence, unsuited for the need for a service-oriented approach for water.

Water Myths—Arm Chair Solutions

There is a myth that there is not enough water for urban drinking water needs. Urban drinking water needs for any and every city/town are only 4 per cent of available water, even considering the fact that agriculture need 70 per cent and industries need about 10 per cent. When you actually implement 24 x 7 water supplies, the actual draw from water sources drops by 50 per cent. Unaccounted for water (UAW) in all urban entities is to the tune of 35 per cent, due to leakages. Plug the leakages and one creates more water resources.

Today all water supply projects are based on 'arm chair solutions'. If demand is worked backwards from consumer needs and take a holistic view of water & waste water the investments required will drop to 50 per cent of what we spend today.

Last Mile Connectivity & the Need for Long-term View

Transformative approaches for last mile connectivity in water has to be backed by painstaking effort and rigorous thinking through all inter-connected issues and the impact it will have on the fallout not just the intended outcomes. There is no substitute for dedicated effort in public policy. Success in many countries over the last fifty years, after the Second World War, gives the hope that it is possible.

Until we provide 24X7 clean water to every household, we cannot say we have achieved an equitable democracy & to boot, until we eliminate the scourge of women walking for water anywhere, we cannot say we have achieved gender equality.

Innovative Interventions

Some innovative sustainable practices by India Inc.

Alcoa's Natural Engineered Wastewater Treatment System Eliminates Wastewater Discharge

The objective of the intervention was to enable the reduction of freshwater demand, provide sustainable access to water, meet or exceed regulatory requirements as a zero-discharge facility, and ultimately result in a significant cost reduction.

Type of Intervention

Provision of an innovative technology for sustainably treating sanitary and industrial wastewater at various locations across the world. The engineered wetlands technology was first deployed at the Alcoa Technical Centre—the largest metals research centre in the world. The system installed at the Mâaden Alcoa joint venture is the first-of-its-kind in Saudi Arabia and serves as the project's alumina refinery, aluminium smelter, and rolling mill in Ras Al Khair. Water is critically limited in this desert region, and it will become increasingly expensive to obtain.

Description of Intervention

The 9-hectare (22-acre) NEWT system has a design capacity of 7,500 cu. m per day (2 million gallons per day) and comprises the following three steps—(i) Removal of solids and anaerobic treatment to separate and break down the organic material in the water; (ii) An engineered wetland that uses vegetation for low-level treatment of the organic material and further removal of nutrients, such as nitrogen; and (iii) Polishing and disinfection. The 5,000 cu. m of water treated by the system each day will be reused in the manufacturing process and for irrigation at the site, reducing freshwater needs by almost 25 per cent and saving US$7 million annually in water purchases.

Benefits for Stakeholders

Compared with the traditional wastewater treatment system originally envisioned for the site, the NEWT system represented a significant capital and operating cost reduction compared to a traditional tank-based system; Reduced the start-up schedule to meet the smelters 2012 first hot metal goal; Eliminated an estimated 1,000 metric tons of steel for piping and tanks; Eliminated the use of disinfectant chemicals; Reduced energy consumption through a passive process; Significantly reduced sludge generation and disposal; Reduced ongoing operating costs by an estimated US$1 million per year; and achieved zero-wastewater discharge in the third quarter of 2014.

Location of Intervention

Alcoa Technical Center near Pittsburgh, Pennsylvania, USA

Dalmia Bharat Cement

Water Conservation Measures at Dalmiapuram Cement Works, Tamil Nadu, India

The objective of the intervention was to reduce daily water consumption through key identified measures and technological interventions.

Type of Intervention

Water conservation drive through various process-related improvements and awareness generation.

Description of Intervention

The key initiatives taken include switching to air cooling instead of water cooling for clinker cooler through introduction of fresh air damper, installation of auto-valve system with level sensors at tank inlet of cement mill water spray system to eliminate the overflow losses, replacement of 127 tape cock with lifting type and process change from semi-dry to dry for oil well cement production. A daily water consumption-monitoring format was introduced to monitor water consumption and identify the areas for improvement. Measures were also taken to harvest the rainwater by creating 20 rainwater harvesting tanks.

Benefits for Stakeholders

The daily water consumption of Dalmiapuram cement plant was 2,360 cu. m during financial year 2013 (FY13). It reduced to 1,509 cu. m due to the initiatives taken above. There was an impressive 36 per cent reduction in daily water consumption within two years at the Dalmiapuram plant.

Location of Intervention

Dalmiapuram Cement Plant, Tamil Nadu, India

LAVASA

Lavasa's Integrated Water & Wastewater Management

The objective of the intervention was to provide Water & Wastewater Management Systems to ensure continuous supply of high quality potable water 24 x 7 with effective sanitation system to protect and maintain the health and hygiene of citizens of Lavasa, in Sahyadri Ranges of Western Ghats.

Type of Intervention

Integrated Water Management (IWM) is a strategy that

MLD Sewage Treatment Plant

brings together all facets of the water cycle—water supply, water treatment, storm water management, and sewage management. In Lavasa, the City Management Services mainly focus on the different aspects of Water and Wastewater Management.

Water Management

The Division of Water Management is responsible for the effective production, filtration, and quality control of water for the city of Lavasa. The Division's responsibility starts at the source of raw water and extends throughout the treatment and distribution process. This Division operates and maintains the raw water pumping stations, water treatment plant with a capacity of 3,400 cu. m/day, and distribution system (gravity and pumping lines—50 km). The water management system is designed in such a way that every system within the plant can be isolated for maintenance or repairs without affecting the flow or quality of the water produced. The Lavasa Water Treatment Plant is known not only for quantity and quality of the water produced, but also for its staff's innovation of implementing various improvements in testing, treatment, and distribution of water.

MLD Sewage Treatment Plant

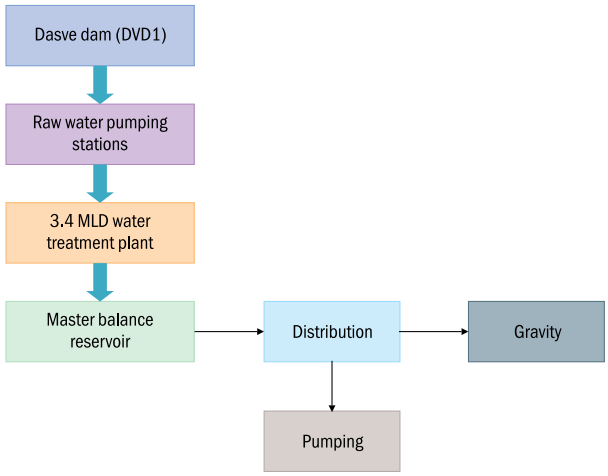
Wastewater Management

The Department of Wastewater Management is responsible for collecting, managing, and treating wastewater generated throughout the Lavasa community. The system has a capacity of 2,400 cu. m/day and is designed to protect local water resources, including groundwater and surface waters, such as the catchment of Dasve dam.

Description of Intervention

Water Treatment Plant

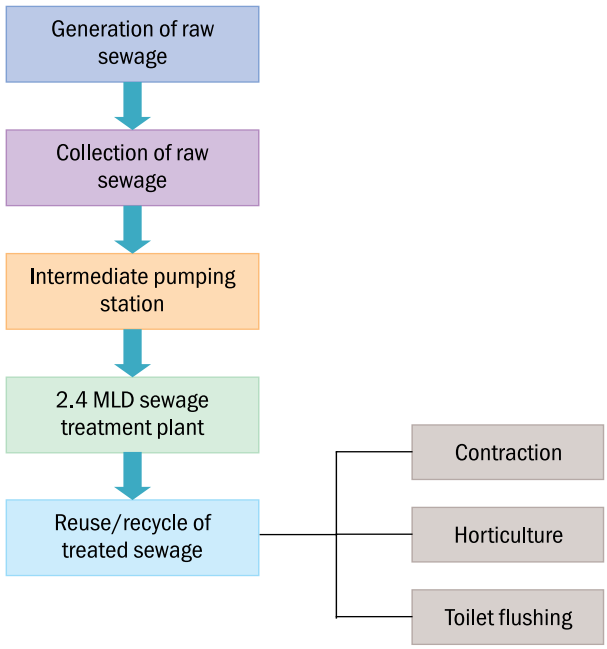
The raw water is pumped from intake well through rising mains. The first stage is the removal of dissolved gases with the help of aeration fountain. Odour-free water then passes through the flash mixer where addition of process chemicals, such as PAC, Lime, and PE takes place for uniform mixing. The chemical mixed water is allowed to settle in the tube settler for removal of turbidity and fine particles. Further, the water is pre-chlorinated with a gas chlorination system and then transferred to the Rapid Sand Gravity Filter for removing fine particles. After filtration, the water passes through a final disinfection stage, that is, post chlorination and high quality potable water is ready for distribution (both gravity and pumping system).



"Water Treatment Plant at Lavasa" - This can be used as the caption in this figure.

Sewage Treatment Plant

The wastewater is generated from various sources, such as residential and commercial and is being collected in



"Sewage Treatment Plant at Lavasa" - This can be used as a caption for this diagram.

respective pumping stations located in different areas of Dasve through gravity. There are total five pumping stations ranging from PS 1 to PS 5. Wastewater is collected at the pumping station and is pumped to a centralized pumping station, that is, Intermediate Pumping Station from where it is again transferred to Sewage Treatment Plant for treatment.

The Sewage Treatment Plant is designed to treat wastewater based on the principles of Extended Aeration Technology. The system mainly consists of Primary Treatment, which includes screening, grit removal, and de-nitrification. Secondary Treatment involves removal of organic load by diffused aeration, removal of solids by secondary clarification, and intermediate holding system. Tertiary Treatment is focussed on chemical treatment for removal of fine particles, filtration, i.e., Rapid Sand Gravity Filter and disinfection with ultramodern technology, i.e., ultraviolet, ozone system. The qualities of outlet parameters are very stringent as compared to local government bodies and are maintained throughout the year. The treated sewage is 100 per cent reused/recycled and used for construction, horticulture, and flushing purposes.

Benefits for Stakeholders

- **Water Quality Assurance**

  The Water Quality Laboratories are responsible for the collection and analysis of samples, which ensure that the water distributed meets the criteria of the Safe Drinking Water Standards. Compliance reports are sent to the management monthly with the analytical results. This is accomplished by the annual collection and analysis of 1,095 water samples from the water plant and over 840 samples from the distribution network. Apart from the in-house laboratory; third party monitoring is being conducted by an agency approved by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, and the reports are submitted to the government agency on a half-yearly basis.

  Results: Maintained the quality as per ISO 10500:2012 throughout the year.

- **Uninterrupted Supply of Potable Water**

  The supply of water in Indian towns and cities ranges from just for a few hours daily to every alternate day; it is even less in certain locations. However, in Lavasa, there is an uninterrupted supply of high quality potable water 24 x 7 throughout the year. This is possible due to preventive and predicative maintenance strategies of water network and proactive alternative arrangements in case of breakdowns in the system being adopted.

  Results: Lavasa citizens are getting hassle-free water supply throughout the year. Water availability has increased from 99.48 per cent to 99.79 per cent.

- **Water Conservation**

  Water conservation is the beneficial reduction in water use, waste, and loss. Conservation is the most economical and environmentally protective resource management tool, helping Lavasa to meet many challenges of water supply management. Few initiatives which have been taken towards water conservation are rigorous patrolling of water network to identify leakages; ensuring the metering at all consumer points; water audits for commercial establishments; implementation of cutting-edge technology to avoid the overflow and internal recycling of used process water.

  Results: Reduction in water loss by 0.2 per cent as compared to last year, that is, 2013–14, and improved revenue standard.

- **Customer Satisfaction**

  The 24 x 7 operation of a customer service desk with a required seven-day response time for new connections; 12-hour response time for complaints; resolution within 12 hours when dealing with issues of low pressure or poor water quality; 24-hour response time with seven-day resolution for other complaints (internal plumbing issues) and reported surface leaks are repaired within 12 hours.

  A half-yearly survey is carried out at residential and commercial establishments to understand the level of satisfaction of citizens and ensure appropriate improvements.

  Results: Customer satisfaction improved to 7 per cent as compared to FY 2013–14.

- **Optimization of Operational Cost**

  Water management has taken many initiatives, such as optimization of process chemicals, rationalization of operational crew, energy conservation (Implementation of APFC Panel, Level Sensors-based operation) and reduction in breakdown maintenance.

  Results: Operational costs reduced by 10 per cent as compared to FY 2013–14.

- **Wastewater Management**

  Wastewater Management at Lavasa ensures that the quality of treated sewage is maintained as per standards,

which are stringent as compared to local government authorities. Testing of sewage is performed 24 hours a day x 365 days a year. This testing gives the operational personnel timely information, so that adjustments can be made to the treatment process to ensure consistent quality of treated sewage. The plant has a quality control laboratory in which analysis is performed on raw and treated sewage. The information from the chemist's analysis is communicated to the Senior Control Room Operators who make appropriate chemical adjustments required for the proper treatment of sewage. The process of aeration, sedimentation, and filtration are monitored and tested continuously by highly trained staff of professionals. Monitoring, like the production process, is also a 24-hour activity.

- **Treated Sewage Quality Assurance**

  In-house laboratories are responsible for the collection and analysis of samples, which ensure that the treated sewage is being reused/recycled; meets and exceeds the criteria of the Maharashtra Pollution Control Board Standard. Compliance reports are sent to the management monthly with the analytical results. This is accomplished by the annual collection and analysis of 730 sewage samples from the plant. Apart from the in-house laboratory; third party monitoring is being conducted by MoEFCC-approved agency and the reports are submitted to government authorities on a half-yearly basis.

- **Reuse of Treated Sewage**

  One of the major environmental concerns is the safe disposal of treated sewage. Lavasa has laid around 8.5 km of 250 mm Ductile Iron Pipeline to cater to the needs of horticulture areas Wastewater management encourages the use of treated sewage for construction, horticulture, and flushing purposes and ensures 100 per cent reuse of treated sewage. This also accomplishes the environmental compliances and leads to reduction in potable water demand.

  Results: Hundred per cent reuse of treated sewage.

- **Optimization of Operational Cost**

  Wastewater Management has taken many initiatives, such as optimization of process chemicals, rationalization of operational crew, energy conservation (Implementation of APFC Panel, Level Sensors based operation), and effective preventive maintenance which lead to a reduction in breakdown maintenance. Wastewater management is also working on cutting-edge technologies for energy conservation, such as incorporation of variable frequency drive for air blower.

Location of Intervention

Lavasa is the first 'planned' hill city led by a private sector and the development spans over 18,000 acres of picturesque landscape. It is a hill city located roughly between 2,000 ft to 3,000 ft above Mean Sea Level. The annual average rainfall in the city ranges from 3,500 mm in one valley to around 8,500 mm at the end of another valley. The place is a mixed deciduous, wet temperate forest.

Vignettes

Happenings in the area of sustainability comprising news, policy announcements and events.

Rajya Sabha Passes National Waterways Bill

Aiming at unleashing the navigation potential of India's large river ways resources, Rajya Sabha passed the National Waterways Bill 2015. The Lok Sabha had approved the bill last year. The Bill identifies an additional 111 waterways as national waterways. The Bill also specifies the extent of development to be undertaken on each waterway. Inland waterways comprising rivers, lakes, canals, creeks and backwaters extend to about 14,500 kms across the country. Multi-modal hubs would be established in the country and once completed, cargo could directly go to Bangladesh from Maharashtra, Madhya Pradesh, Chhattisgarh, and states like Uttar Pradesh. Inland waterways is a much cheaper and environment-friendly mode of transportation as it costs only 30 paise to move cargo through waterways in comparison to ₹1.5 through road and ₹1 from rail. If edible oil and pulses are transported through waterways, it will bring down their prices in states while on concern of members that by river transport, ecology and fishery will be impacted. While countries such as China, Europe and Korea channelize over 40 per cent of their passenger and freight traffic, in India the proportion was only 3.5 per cent; and this despite it being the most fuel-efficient, cost-effective, and eco-friendly form of transport.

Source: Livemint
Author: Jyotika Sood
Dated: March 9, 2016
Link: *http://www.livemint.com/Home-Page/cYvKyv6PIUNepLE87KDzfL/Rajya-Sabha-passes-inland-waterways-bill.html*

Government asks Thermal Power Plants to Reduce Water Usage

The ministry of environment has asked all proposed thermal power plants to use at least 30 per cent less water than the existing ones, and told operating plants to reduce their water usage by at least 10 per cent. Thermal power plants are water guzzlers, consuming an average of 96,000 litres of water for every megawatt of power, and the government wants to cut this down as it contemplates the possibility of excessive dry summers and dwindling water levels in rivers in coming years. It is believed that with large number of thermal power plants being planned in clusters, the volume of water available in an area will start to compete with agriculture Power plants draw water from rivers to cool equipment and contain fly ash, the burnt coal, and then discharge it back into the river. At NTPC's Farakka thermal power station all units except one had to be shut down due to unavailability of water from Bhagirathi river. Thermal power plants at Karnataka and Maharashtra also had to be shut to water availability. This problem is expected to aggravate when more sites would be required.

Source: *The Economic Times*
Author: Debjoy Sengupta
Dated: April 14, 2016
Link: *http://economictimes.indiatimes.com/industry/energy/power/government-tells-thermal-power-plants-to-reduce-water-usage/articleshow/51817969.cms*

National Hydrology Project worth INR 3,679 crore gets Cabinet Clearance

The cabinet on Wednesday cleared the ₹3,679-crore National Hydrology Project (NHP) that aims to collect hydro-meteorological data across India and use it for efficient water management in the country. The scheme will help address the water crisis in the country. The project is the third phase of the ongoing World Bank Hydrology Project. It will inform the public about how much water is available and assist farmers in planning their crops and other farm-related activities. The idea behind it is to integrate all information about water in the country be it rivers, dams, reservoirs, surface water or ground water and then plan its management and usage. National hydro-metrological data would be collected using various information systems and technologies, including remote sensing and stored in real time and digitized for proper forecasting of water availability. It will also help develop a real-time flood forecasting model so that it increases the lead-time to atleast three days, thus preventing sudden opening of gates which inundates the downstream area. It will also integrate water resource management by adopting a river basin approach through collation and management of hydro-meteorological data. Half of the total NHP project outlay

would come from a World Bank loan and would be repaid by the central government, while the remaining 50 per cent would be in the form of budgetary support from the centre. The central funds would be passed on as grants to states and central organizations undertaking it.

Source: Livemint
Author: Indranil Bhoumik
Dated: April 18, 2016
Link: *http://www.livemint.com/Politics/HqKu1GmDyPaDD3r3fKEdrK/₹3679-crore-National-Hydrology-Project-gets-cabinet-cleara.html*

Government's Model Bill on Water to Stress on Storage Creation

A new bill is being prepared by the Union Ministry of Water Resources to give its suggestion to allocation of water for drinking, agriculture as well as industrial The new law will be aimed at better management of water and its usage will emphasise on creating large-scale rainwater storage facilities. Earlier too, the ministry brought a similar model law, which focussed on supply-side management measures like dam construction, the new law will urge states to take steps to recharge depleting groundwater, especially in floodplain areas of rivers. Also, another Government Resolution (GR) issued by Water Resources department stated that henceforth, industries and those consuming water if found polluting nearby water bodies by discharging untreated effluents will have to pay double the fine and face disconnection of water supply.

Source: *Deccan Herald*
Dated: April 25, 2016
Link: *http://www.deccanherald.com/content/542545/govts-model-bill-water-stress.html*

Increased Usage of Drip Irrigation for Sugarcane Farming

In community-led crop water budgeting recommended by agricultural economists and hydrologists, cane cultivation by way of flood irrigation linked to canal or groundwater that inevitably leads to huge water wastage is unlikely to find favour. The monthly use of water for growing the crop should be considered for the right perspective of water footprint of cane farming and not the whole amount consumed during the average 450 days of cultivation.The government and Jain Irrigation, which is single-handedly bringing a growing number of crops under micro irrigation across the country, are on the same page that large-scale application of drip and sprinkler irrigation systems will lead to conservation of water, energy and fertilisers. Drip and sprinkler irrigation is suitable for all kinds of terrain and ideal for small farmers. Indian sugarcane productivity is stagnating at 70 tonnes a hectare. Of the 5.3-million hectares under the cash crop, only a fraction is covered by drip irrigation. But, their average cane productivity is 100 tonnes a hectare, giving a major boost to farm income. The bottom line is cane growing by way of drip irrigation leads to 65 per cent saving in water and 45 per cent in electricity, while improving crop productivity by 40 per cent, compared to flow irrigation. Micro irrigation means more crop per drop.

Source: Business Standard
Author: Kunal Bose
Dated: May 30, 2016
Link: *http://www.business-standard.com/article/markets/drip-irrigation-for-sugar-cane-farming-116053001545_1.html*

Water Resources Ministry says No to More Dams on River Ganga in Uttarakhand

Going against the common stand of environment and power ministries before the Supreme Court, the water resources ministry, headed by Uma Bharti, has opposed any new dams in the upper basin of Ganga river in Uttarakhand. The water resources ministry has told the apex court that the three rivers namely, Alaknanda, Mandakini and Bhagirathi and Ganga river from Dev Prayag downwards till Ganga Sagar, should remain in their current condition without any further disruptions/interruptions or diversion. Its views come in strong contrast to the common opinion of the environment and power ministries. The water resources ministry's stance against any future dams on the upper Ganga basin also comes at a time that the power ministry is finalising a fresh hydropower policy to give fillip to the sector, which has stagnated over the past decade due to concerns about its ecological impacts, land acquisition and questions of displacement. The water resources ministry affidavit before the Supreme Court quotes from a long list of government commissioned expert and high level studies that have also warned of the consequences of multiple dams in the upper Ganga basin. The water resources ministry has said that any further projects will have a substantial impact on the ecological footprint of the area leading to severe damage for the fresh water resource base. The region around these projects is located in the geologically unstable and seismically active area. Hence, the impact of any of the disaster will have a devastating effect on the people, flora and fauna and on the entire ecosystem as a whole, which is uncalled and unwarranted for.

Source: Business Standard
Author: Nitin Sethi
Dated: June 28, 2016
Link: *http://www.business-standard.com/article/current-affairs/water-resources-ministry-no-more-dams-on-ganga-in-uttarakhand-116062700682_1.html*

On the Move

Leading the way in actioning for the cause of Water use efficiency. Initiatives by TERI.

Glacier Vulnerability Assessment (GVA) for Hydropower Projects

TERI is engaged in facilitating the achievement of sustainable construction, operation, and maintenance of socio-economic development projects of national and international significance. TERI has developed the expertise in monitoring glacier dynamics which regulates the flow pattern of Himalayan river regimes and has established "Glacier Monitoring Observations" at Kolahoi Glacier, Jammu and Kashmir and East Rathong Glacier, Sikkim, at altitudes of >4,000 masl. TERI possesses technical expertise required to undertake vulnerability assessment of hydroelectric dams to climate change and suggest necessary adaptation measures to enhance resilience. Moreover, linkages with international experts from countries like the US, the UK, Iceland, and Norway has strengthened its experience and the group envisages enhancing its competencies towards solution-oriented services and reaching a wider group of beneficiaries.

Glacier Vulnerability Analysis is an assessment of vulnerability of snow/ice catchments feeding to hydropower projects. This vulnerability may be forced upon the cryospheric catchments by factors such as geographical setting, environmental pollution, and climate change. Dam construction companies, banks financing dams, and insurance companies covering these projects are the beneficiaries to TERI's GVA tool.

TERI JISL Resource Centre on Water Use Efficiency

Addressing the future challenges of food security is largely dependent on improving the agricultural water productivity under the present land usage patterns. Alongside, it would also be necessary to use new and improved technologies to increase yields, utilize inputs more efficiently, and diversify to more sustainable and higher value cropping patterns. There is a need to adopt a more holistic approach in addressing the above challenges taking into consideration the technical, social, and environmental aspects of the above issues.

This would necessitate comprehensive research to be carried out on the themes of water use efficiency at the farm level, different water conservation and regeneration practices. The Energy and Resources Institute (TERI) in association with Jain Irrigation Systems Limited (JISL) have set up a 'Resource Centre on Water Use Efficiency' in an effort to address the current and future challenges on water and food security. The Resource Centre on Water Use Efficiency will be carrying out comprehensive research on themes of water use efficiency and management. The Resource Centre will use a multipronged approach to achieve the objectives. These would involve research, awareness creation, training and capacity building, policy advocacy, and reporting and documentation.

The Resource Centre for Water Use Efficiency follows a holistic and inclusive approach by engaging all the concerned stakeholders, including government bodies, NGOs, farmers, other research institutes, etc.
http://www.teriin.org/events/terijislcentre/index.php

Optimizing Resource Use and Reducing Water Footprints of Electricity Generation in India

Energy security is the fundamental pre-requisite for the economic development of a country. Moreover, for India's strive to transform from a developing economy to a developed country, it becomes extremely relevant to ensure sufficient energy availability in the country. However, energy security is inextricably linked to the availability of water. For production of thermal electricity, water is an indispensable input both for steam generation as well as coolant. But, India stands water stressed and is close to being categorized as water scarce with its rapidly decreasing freshwater resources. As per the estimates, India has about 16 per cent of the global population but only 4 per cent of the total water resource. Approximately 85 per cent of the water is used by the agriculture sector followed by industries at 9 per cent and the domestic sector at 6 per cent. Within the industrial sector, more than 80 per cent water consumption is for the production of electricity.

Considering the significance of inter-linkage between water and energy security for the country, TERI is conducting research on multiple dimensions related to water consumption in the electricity sector of India. The objective of the research is to reduce water footprints of electricity generation in the country, by analysing inter-linkages between power generation, available water resources, and sectoral water demands at the watershed level, and evaluating techno-economically feasible solutions for optimizing water use efficiency.

Water Auditing

Water is a unique, crucial, and very scarce resource that is essential for all forms of life in the planet. However, with the increasing demands linked with rapid population growth and economic development put escalating pressure on this resource. This is evidenced at the sectorial level by inadequate supplies, at the national level, by competing demands between sectors and by conflicts.

Water audit helps in development of an integrated industrial water management strategy, which optimizes efficient use of water, improves water productivity, reduces losses, and helps in identifying alternative methods of water conservation, such as recycling and reuse of wastewater for various process and non-process uses, rain water harvesting, and groundwater recharge. The activities ensure co-benefits in energy saving, treatment costs, water quality improvement, etc.

TERI with its experience in the field of integrated water management provides support to organizations, industries, and government officials, etc., for water audits—to help them enhance their water use efficiency. TERI has also conducted several water audits for various industries (e.g., tobacco plant, power plants, beverage industries, pharmaceuticals, heavy engineering companies, railways, etc.) and has helped them identify the losses in the system and opportunities for improving the water use efficiency as well as in the implementation of water conservation interventions, including recycle, reuse, and rainwater harvesting. Through its water audits in the city water supply system, TERI has helped the several City Municipal Corporations in identifying the UFW (unaccounted for water) and provided them different short- and long-term strategies on the technical, institutional, and financial management of water supply and demand management.

Snapshot

Leadership Summit for Sustainable Development.

Dr Annapurna Vancheswaran, Senior Director, TERI; Dr Jaco Cilliers, Country Director, UNDP India; Dr Ajay Mathur, Director General, TERI

TERI Council for Business Sustainability (TERI-CBS) organized its annual flagship event –'Leadership Summit for Sustainable Development' (LSSD 2016) on June 7, 2016, in Mumbai. Themed as 'Translating India's NDCs to Business Actions', the Summit received an overwhelming response with participation from 100+ delegates including CBS member companies. The deliberations focussed on India's commitment to NDCs and the critical role that corporates could play in technology innovation and investments in order to achieve the set targets. Leaders of corporate India at TERI-CBS's LSSD 2016 agreed that India is very well placed to be at the forefront to build the world's low-carbon economy. It was emphasized that more ambition and innovative collaboration among businesses, policymakers, and financing institutions is required for bringing the low-carbon propositions to scale. LSSD 2016 brought together corporate leaders and multiple stakeholder groups to debate and discuss the need for corporate organizations to usher in urgent commitments to the ongoing collaborative movement on climate change via a combination of interventions at the policy, financing, and technology levels.

Expanding the Share of Renewable Energy in Energy Mix—Policy, Financing, and Technology

The session focussed on underlining the role of corporates towards achieving the set goals for renewable energy, and the various factors that could accelerate this process. India is running one of the largest renewable energy programmes in the world and scale of the Indian ambition is breathtaking. The proactive approach towards this issue feeds into the current energy technology requirements, associated energy security concerns as well as the larger issues of sustainability.

Dr Pawan Singh, Director-Finance, PTC India Financial Services Ltd; Dr Chakradhar Byreddy, Regional Manager-Renewables Certification, DNVGL; Dr Ajay Mathur, Director General, TERI; Mr Ardeshir Contractor, Managing Director and CEO, Kiran Energy; Lt. Col (Retd) Monish Ahuja, Managing Director, PRESPL

Mr Arunavo Mukherjee, Director, TATA Cleantech Capital; Mr Bhushan L Patil, Chief Mechanical Engineer, Central Railways, Ministry of Railways; Amb Ajai Malhotra, Distinguished Fellow, TERI; Mr Aalok A Deshmukh, General Manager and Head: Energy Efficiency, Schneider Electric India.; Mr Damandeep Singh, Director, CDP India; Mr Sankar Bandyopadhyay, General Manager, CenPEEP, NTPC

Promoting Energy Efficiency

Panelists in the session on energy efficiency deliberated on the challenging nature of project financing associated with increasing energy efficiency in India from the perspective of financial institutes. The biggest inherent challenge: the visibility of revenue—which unlike a renewable energy plant (solar and wind) does not create a physical infrastructure and the invisible revenue flow, was discussed in detail.

Financing Climate Action to Accelerate India's NDC targets

The session discussed the strategic plans that should be kept in mind for incorporating sustainability into the corporate DNA of organizations. A low-carbon culture at all the levels of management and innovation mechanisms, such as financial transaction taxes which are being currently explored by the corporates were deliberated upon at length.

Mr. Alind Rastogi, IFS, Chief Forest Officer and Executive Director – Environment Management Group, NTPC; Mr. Rajesh Miglani, Senior Climate Business Specialist, International Finance Corporation; Mr. Jaideep Srivastava, General Manager, NABARD; Mr. Anirban Ghosh, Vice President –Group Sustainability, Mahindra Group, Ms. Alka Upadhyay, GM – Environment Services, Tata Sustainability Group; Amb Ajai Malhotra, Distinguished Fellow, TERI; Mr. A.K. Kapur, Deputy Managing Director, SIDBI; Mr. Vivek Adhia, Head – Business Engagements, WRI India;

teri Council for Business Sustainability

BUSINESS DAY

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- E-mail: businesscouncil@teri.res.in

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Plenary Sessions

- Encouraging businesses to take the lead in poverty reduction & achieving the SDGs
- Accelerating the transition to Low Carbon Industries

Thematic Tracks

- Mainstreaming Biodiversity for Responsible Business
- Valuation of Energy Costs in the Indian context
- Transitioning to More Efficient HVAC systems with Low GWP Refrigerants

PREVIOUS EMINENT SPEAKERS


Dr Bibek Debroy
NITI Aayog


Mr Rana Kapoor
YES BANK


Dr Bindu N Lohani
Asian Development Bank


Mr Philippe Joubert
Global Electricity Initiative


Dr Henrik O Madsen
DNV-GL


Erik Eid Hohle
The Energy Farm


Mr R Mukundan
Tata Chemicals


Mr John Bryson
Bryson Climate Initiative


Mr Paul Polman
WBCSD


Sir Jonathon Porritt
Forum for the Future


Mr Onno Ruhl
World Bank


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| October 5 – 8, 2016 |
| India Habitat Centre, Lodhi Road, New Delhi |

Following the landmark Paris Agreement and the adoption of the Sustainable Development Goals by the global community, the Delhi Sustainable Development Summit (DSDS) is evolving into the WSDS. This endeavour aspires to raise the platform, attract greater talent, expertise, and devise ways so that messages that are crafted at this platform are widely disseminated leading to constructive action.

WSDS CARRIES FORTH THE 15 YEAR LEGACY OF DELHI SUSTAINABLE DEVELOPMENT SUMMIT

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