



# STRATEGIC WATER PARTNERS NETWORK SOUTH AFRICA

## Closing the water gap by 2030



water affairs

Department:  
Water Affairs  
REPUBLIC OF SOUTH AFRICA





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*Strategic Water Partners Network South Africa  
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## FOREWORD BY THE MINISTER OF WATER AFFAIRS



**water affairs**

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In South Africa, water demand is expected to increase significantly over the next 30 years. As a nation, we face an increasingly likely decline in water supply, given the current trends of poor usage habits, physical and commercial water losses. The source of this demand is driven largely by population and economic growth, which in turn leads to substantially increased water requirements for agricultural and industrial uses, and the increasing demand by our growing middle class.

### Managing the water gap

As a ministry, the Department of Water Affairs (DWA) regards that amongst other key solutions to the water problem, water conservation, demand management and the diversification of the water supply mix are critical, if we are to overcome the challenge that is before us.

While South Africa has progressed in the supply of water to most urban and rural areas, water supply remains challenging in many communities in the country.

### Working with business to 'close the water gap'

I believe that closing the water volume gap will require the commitment of the public and private sectors, and our citizens. As such, my ministry is leading the Strategic Water Partners Network – South Africa (SWPN) with pioneer partners including the Water Resources Group supported by the World Bank (WB) and the International Finance Corporation (IFC), World Economic Forum (Forum), South African Breweries, Coca-Cola, Anglo American, Sasol, Nestlé, Eskom and the NEPAD Business Foundation, in an initiative to **close the water gap by 2030.**

This private and public sector partnership initiative will focus on water conservation and increasing the water supply mix. By exploring partnerships between industry and municipalities, we aim to upgrade and rehabilitate inadequate infrastructure that is central to securing our water supply mix around the country. The broader goal is to build a leadership group that will on an ongoing basis seek innovative joint solutions that

support government's water strategy and overall national water security.

The SWPN will identify potential projects, assess these projects' ability to close the water volume gap, review best practices and technology, identify challenges that are limiting the replication of these projects nationally and finally, recommend how to overcome these challenges including incentives for widespread adoption.

### Towards a water tomorrow

Through these efforts of implementing projects that will address the challenges we face today, we can altogether work towards a more sustainable tomorrow that is conscious of our climate. I would therefore like to thank the partners to this initiative for their support and willingness to work with government on an initiative that will shape our water tomorrow. I strongly urge other private sector players to join this partnership, to secure our water in the coming years.

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# Acronyms

BECSA	BHP Billiton Energy Coal South Africa
CSIR	Council for Scientific and Industrial Research
DBE	Department of Basic Education
DBSA	Development Bank of Southern Africa
DWA	Department of Water Affairs
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HIV	Human immunodeficiency virus
IFC	International Finance Corporation
NBF	NEPAD Business Foundation
NEPAD	New Partnership for Africa's Development
NPC	National Planning Commission
RAIN	Replenish Africa Initiative
SAB	South African Breweries
SI	Sustainability Index
SWPN	Strategic Water Partners Network - South Africa
TCCAF	The Coca-Cola Africa Foundation
Forum	World Economic Forum
WRG	Water Resources Group
WWF	World Wide Fund for Nature
WB	World Bank Group

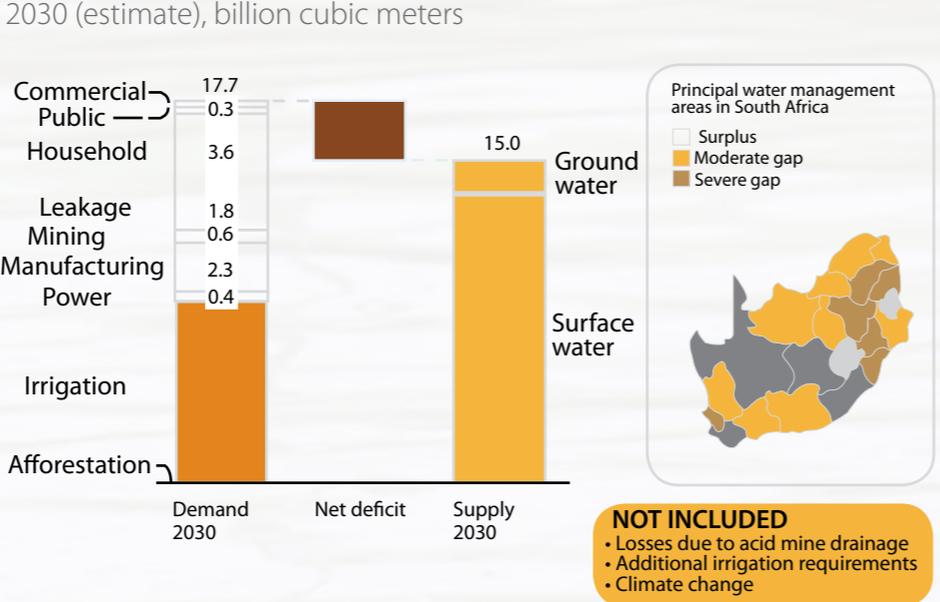
## ■ The South African water challenge

In South Africa, water demand is expected to rise over the next 20 years while its supply is likely to decline. Persistently poor usage habits, physical and commercial water losses and ecological degradation, such as the loss of wetlands, have been among the chief causes for the impending crisis.

Population growth in South Africa is playing a significant role in increasing water demand while economic growth has led to increased water requirements for agricultural and industrial uses. The two factors, considered together, have led to a growing middle class which has a larger water consumption rate overall. Water scarcity means increasingly higher water costs, and allocative forces then direct water to prioritise urban and industrial, where the country's increase in total water demand is largely attributable to. South Africa will have to resolve tough trade-offs between agriculture, key industrial activities such as mining and power generation, and large and growing urban centers.

According to the analysis done by the Water Resources Group<sup>1</sup>, based on growth projections and current efficiency levels, it is anticipated that

**Graph 1: In South Africa, under the current efficiency levels, there will be a supply–demand gap of ~17% in 2030**



**SOURCE:** National Water Resource Strategy, September 2004; WRG 2030

a water supply-demand gap of 17% will exist by 2030. This gap is critical, and if sustainable socio economic growth is to be envisioned, such a gap has to be dealt with decisively over this period.

Solutions that maximise the supply of water and minimise demand are therefore most essential. However, it is not envisaged that large scale projects of building dams can solve current problems because while they increase overall water supply, it is unlikely to curb the underlying sources of the water supply/demand gaps. Due to the scale of the gap, it is also unlikely that such capital intensive projects can be financed and developed with enough quick wins to manage the gap. Sustainability is an important issue for any water solutions going forward, and therefore solutions that embed partnership and climate consciousness will be favourable.

<sup>1</sup> Charting our water future, Water Resources Group, 2009



**Towards a water solution:  
Declaration of Partnership between  
the South Africa Department of  
Water Affairs (DWA) and the Water  
Resources Group (WRG)**

In response to a request by Mrs B E E Molewa, MP (South Africa's Minister of Water Affairs) at the World Economic Forum Annual Meeting 2011 in Davos, Switzerland, the DWA and the WRG launched a DWA-WRG partnership at the World Economic Forum's 2011 Africa Summit in Cape Town (4 to 6 May).

The partnership's key focus areas and activities were developed following discussions with the DWA's senior leadership and other South African stakeholders. Outcomes of an exploratory workshop held by the WRG in conjunction with the UN Global Compact CEO Water Mandate in Cape Town (November 2010) were used in developing the water partnership strategy. Complementary analysis commissioned by the World Economic Forum Water Initiative and produced by WWF and Pegasys (a local South African consulting company) were also used in identifying the predominant water risks based on industry sector and location, and opportunities for strategic public-private collaboration.

**Supporting water partnerships  
for the future**

The DWA-WRG partnership uses a two stage model that involves producing a diagnostic of the supply-demand dynamics for South Africa by 2030 and using findings to motivate the replication of projects that can curb supply-demand disparities by 2030.

**Step 1 (Initial diagnostic):** A comprehensive fact base on the water supply-demand balance the country faces to 2030 and the economics of options available to address any gaps

**Step 2 (Country-level support):** A public-private advisory platform that helps the government shape and test concepts and governance processes, which seek to close the identified future water volume gaps. The country-level support will entail the establishment of a nationally run multidisciplinary contact group to work with the government to help it take concepts forward into implementation.

Based on discussions with South African and international stakeholders to date, South Africa is seen as already advanced with respect to a robust fact base (Step 1). In the first phase of the

WRG, analysis was already conducted for South Africa, illustrating a 17% gap between the demand and supply by 2030 and options to close the gap.

In addition, the DWA has conducted reconciliation studies on key water supply schemes in the country to determine the supply-demand volume deficits and strategies to close the gap. For this reason, and as Mrs Molewa expressed at Davos, the DWA-WRG partnership will focus mostly on helping the government develop country-level support (Step 2) to take forward the existing analysis and other studies so as to help implement key priority areas for South Africa within the context of a fact based transformation strategy.



### Project focus areas

The two key focus areas proposed for the DWA-WRG Partnership are:

#### 1. Water conservation/demand management

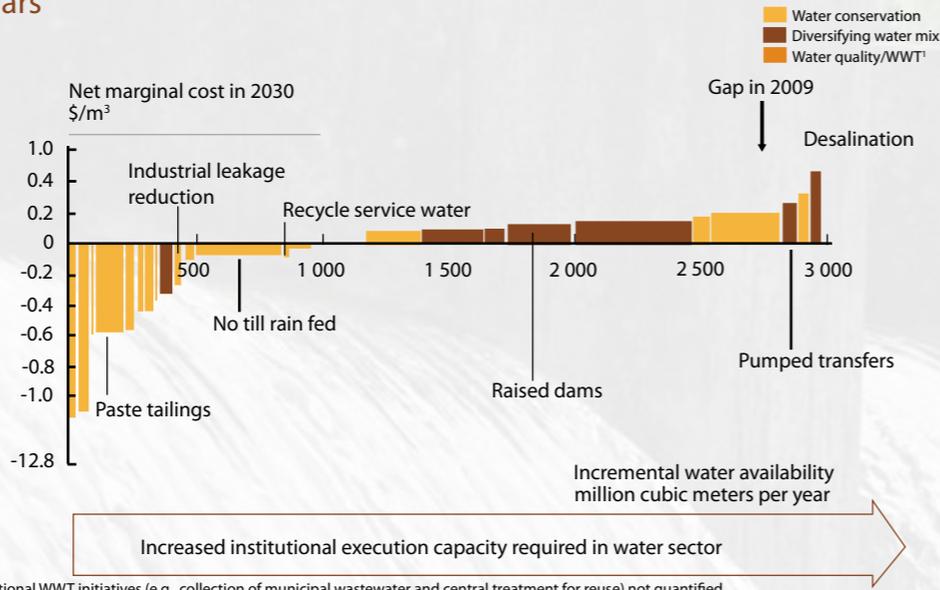
- Increasing water use efficiency (in agriculture, industry and households)
- Leakage reduction from distribution networks (municipal and others, including irrigation)

#### 2. Diversifying the water mix

- Reuse of effluent
- Desalination (sea water and acid mine drainage)
- Use of groundwater (development and sustainable management of groundwater resources, in particular for rural areas)

Within the twin focus on demand management and water mix diversification, a specific sub-component of the DWA-WRG Partnership is looking at wastewater treatment facilities. A small public-private task team is currently exploring the potential for industry-municipality collaborations to upgrade and rehabilitate inadequate / deteriorating infrastructure (noting however, that

**Graph 2: The South Africa water supply–demand gap could be closed: water conservation, supply diversification and water quality are key pillars**



<sup>1</sup> Additional WWT initiatives (e.g., collection of municipal wastewater and central treatment for reuse) not quantified

SOURCE: National Water Resource Strategy, September 2004; WRG 2030

wastewater treatment remains the responsibility of municipalities). This exploration is to be placed within the wider economic analysis of the contributions such collaborations can provide to closing the water demand/supply gap by 2030.

Under the leadership of the DWA and by engaging industry partners and experts in the above areas, the broader goal is to build a leadership group to collaborate on an on-going basis

for dialogue and to seek innovative joint solutions that support the implementation of government water strategies and overall water security for South Africa. By promoting the efforts and activities of this partnership and leadership group, the aim is to help the Government build an even wider public-private-expert movement for action. The partnership platform will be able to identify and collect the best practices, experiences, technologies and solution suppliers.



### Tangible action and effective replication

The DWA-WRG Partnership needs to focus on action and replication. The partnership is intended to deliver two primary outputs in its initial phase.

1. WRG is helping the DWA to develop sector strategies within each key focus area. These strategies will:

- identify a pipeline of potential projects for each key focus area and assessing its collective potential to close the water volume gap if implementation takes place;
- identify the best practices, experiences, technology and solution suppliers and advisors;
- identify the challenges for replication; and
- recommend a strategy to overcome challenges, including incentives for widespread adoption and contributions by each stakeholder to enable replication.

2. The WRG is providing expert support to help the NEPAD Business Foundation design pilot projects within each key focus area (a number of projects have already

been identified). Expertise from the WRG network is intended to assist the NBF in:

- developing joint public-private-expert collaborations to structure and take forward pilot projects.

### The Strategic Water Partners Network – South Africa

A crucial component of the DWA-WRG partnership is government ownership of the process and the domestic development of public-private support structures. To this end, a public-private-expert leadership group, chaired by the Director-General of the DWA, has been formed to oversee the activities and progress of the work. This partnership, formally known as the Strategic Water Partners Network – South Africa (SWPN), held its inaugural meeting on the 15<sup>th</sup> of November 2011 thereby creating a leadership group consisting of existing and new stakeholders in the water sector of South Africa.

The Director-General of DWA, as chair of the network, invited senior representatives of each participating organisation to the SWPN.

The working group is taking forward the sectoral strategies and pilot projects. The overall strategy is aligned with the National Planning Commission's growth path for South Africa. Already, three priority working groups have been formed which will focus on Water Use Efficiency / Leakage Reduction, Supply Chain / Agriculture and Effluent Partnerships.

### Partners to the SWPN

The SWPN represents a progressive platform and mechanism to solve our water challenge in a manner truly encompassing of all essential stakeholders.

These stakeholders are supportive of the initiative in tangible ways particularly through their unique operational models. The next section reflects the tangible projects that various partners are undertaking and are useful as a showcase of 'what projects' can be replicated, adopted and implementing extensively, in order to close the water gap by 2030.



**eMalahleni water reclamation plant**

The eMalahleni water reclamation plant – situated in the Witbank coalfields of the Mpumalanga province – has turned a major challenge into a valuable asset that has created far-reaching benefits for the environment, the local community, and its feeder collieries.

The award-winning project is a public-private partnership that was jointly undertaken by Anglo Thermal Coal, BHP Billiton Energy Coal South Africa (BECSA) and the eMalahleni Local Municipality, and has been described as a 'world class initiative and an exemplary model for development'.

Following over a decade of research and development Anglo American, through its Thermal Coal division, entered into a R300 million joint initiative with BECSA (15% water input) and a bulk supply agreement with the water-stressed eMalahleni Local Municipality. Commissioned in 2007, the plant desalinates rising underground water from Anglo American Thermal Coal's Landau, Greenside and Kleinkopje collieries, as well as from BECSA's defunct South

Witbank Mine. By doing so, it prevents polluted mine water from decanting into the environment and the local river system, while also alleviating serious operational and safety challenges.

**Purification and distribution of water**

Using the latest in water purification technology, it is currently desalinating record production volumes of up to 30 megalitres of water to potable quality per day, most of which is pumped directly into the municipality's reservoirs, meeting some 12% of its daily water requirements.

Additional water is piped to Greenside, Kleinkopje and Landau collieries as well as various nearby Anglo American Thermal Coal service departments for domestic use and for mining activities. These operations are now self-sufficient in terms of their water requirements (neutral water footprint), which eases the serious supply problems of the local municipality.

**Critical need for water**

The eMalahleni Local Municipality has long grappled with supply

and demand problems to cater for the water needs of an area experiencing considerable industrial, commercial and residential growth. The plant is also aiding the provincial government in meeting its Millennium Development Goals target to ensure that no household goes without a potable, reliable and predictable water supply.

Apart from benefiting the local community by supplementing the low domestic water supply, it has created a number of job opportunities. During the construction phase, between 650 and 700 temporary jobs were created, while 60 permanent positions were created for the running of the plant. Eighty-six percent of the workforce comprises historically disadvantaged South Africans, while 91% have been sourced from surrounding communities in an area of high unemployment.

**Zero-waste facility**

The plant operates at a 99% water recovery rate and the ultimate goal is for it to be a zero-waste facility through the 100% utilisation of its by-product. The 200 tons of gypsum it produces daily is not only costly to dispose of,

but is an environmental and post-closure liability. Through an extensive research project Anglo American Thermal Coal has transformed the seemingly gypsum waste into useful by-products for the housing industry and have built 62 houses made out of gypsum bricks in 2010. These houses are 3 bedroomed 62 m<sup>2</sup> houses for employees from Anglo American as part of the Sustainable Housing Charter to uplift workers in South Africa and in the mining industry to be able to afford their own homes.

**Future developments**

Anglo American approved the \$106 million to embark on phase two of the plant, which will see the facility desalinate 50 megalitres (with a maximum capacity of 60 megalitres) of water per day from the end of 2013.

The project has been designed to take into account the remaining 20 to 25-year life of contributing mines, and to cater for post closure liabilities which will require the desalination of mine water in excess of 30 megalitres per day. The plant will continue to run post mine closure.

**Awards and recognition**

During 2007, the plant won two categories of the *Mail & Guardian's* Greening the Future Awards (innovative environmental strategies that improve business performance and water care) and the sustainability category of Nedbank Capital's Green Mining Awards. These awards seek to recognise mining and beneficiation companies for their contribution to sustainability and the environment. In early 2011 Anglo American was awarded the Asia Global Mining Sustainability Award for the Best Community Project in Africa, as well as being awarded the Nedbank Green Mining Award in the Environmental category for the Gypsum Housing project a few months ago.



## ■ The Coca-Cola Company

Water is the most precious resource on our planet and is critical to the well-being of the communities and ecosystems where we operate.

Coca-Cola recognises this and is actively working to maintain a water sustainable business on a global scale. Coca-Cola's water stewardship strategy focuses first on minimising its operational water footprint by meeting or exceeding water efficiency and wastewater treatment targets.

In 2007, Coca-Cola set an aspirational goal to safely return to nature and to communities an amount of water equivalent to what is used in all our beverages and their production by 2020.

To achieve this water stewardship goal, Coca-Cola set global, time-bound, measurable targets for the entire Coca-Cola system:

- **Reducing** water usage ratios while growing our product volume, with a target to improve water efficiency by 20 percent by 2012 (using 2004 baseline). Since 2004, Coca-Cola has achieved a 13 percent at the end of 2009 improvement in its water use ratio.

- **Recycling** the water used in manufacturing processes and returning it back to the environment at a level that supports aquatic life by the end of 2010.

In 2009, 89 percent of the Coca-Cola system was aligned with internal wastewater treatment and discharge standards.

- **Replenishing** or offsetting the water used in finished beverages by participating in locally relevant projects that support communities and nature. Coca-Cola's target is to meet and maintain this goal by 2020. Current calculations estimate that 42.8 billion liters of water have been "replenished" to communities and nature, representing 33 percent of our anticipated product volume in 2010. Coca-Cola has launched a system-wide water resource sustainability corporate standard, which requires each of our more than 900 bottling plants to assess the vulnerabilities of the quality and quantity of water resources for both the plant and surrounding communities and implement a Source Water Protection Plan by 2013.

Solid progress has been made with continued investment in an array of water stewardship initiatives such as the locally relevant Community Water Partnership (CWP) projects. Since 2005, the Coca-Cola system has engaged in more than 320 CWP projects in 86 countries.

### Leading in water conservation and usage - Coca Cola Canners in Epping working

Coca-Cola Canners Epping was established in 1972. The Coca-Cola Epping Plant runs two production lines with a capacity to produce 12 million cases per annum with a workforce of 77 permanent employees. The aim of the plant is to safely return to nature an amount of water equal to the amount of water used in production process.

#### Coca-Cola Replenish

Within the plant, backwash water from the water treatment plant filters was ordinarily discharged as effluent. Under the Reduce strategy, backwash recovery was identified as an opportunity to reduce water use and related costs. In addition to this water stream, water generated from

the rinsing of cans prior to filling them with final product presented another water saving opportunity.

#### Backwash and Can Rinse Water Recovery

By re-engineering processes, Coca-Cola Epping is recovering water from can-rinsing and the water treatment plant filter backwash which it treats for re-use. This process is generating significant water recovery to water utilised in the plant. Implemented in March 2006, total water recovered to date is in excess of 75 million litres.

#### Working with communities to provide access to water

##### Water Reticulation network development in the Limpopo, North West and Eastern Cape regions

By installing a water reticulation network in the village of Ramotshinyadi in Limpopo Province and two rural villages in the northwest and eastern Cape Provinces, this project is providing access to improved water to approximately 10,000 people in the first year.

Along with the equipping of boreholes, the laying of pipeline, and

the provision of new standpipes, this project is also creating and training Village Water Committees to efficiently maintain the water reticulation network, ensuring sustainability. During the first year of this project, 60 Community Home Based Care workers, as well as people living with HIV, are being trained in hygiene and safe water practices, basic Home Based Care, HIV prevention and the establishment and maintenance of home and community gardens.



Eskom is among the top ten utilities in the world in terms of size and sales and operates a wide portfolio of generation technologies which includes coal-fired power stations, gas turbine, hydroelectric (both conventional and pumped storage), nuclear and wind turbine.

Eskom uses three major sources of energy for electricity generation, i.e. coal, nuclear and water for which coal-fired power stations account for the largest proportion of the production (89% of its operating generation capacity) making Eskom one of the single biggest consumers of water in South Africa, accounting for approximately 2% of the country's total water consumption.

**Innovative use of water technologies**

Over the last two decades, Eskom has introduced a number of innovative technologies to save water including dry cooling – both direct and indirect, desalination of polluted mine water for use at power stations, use of limited pumped storage and hydropower potential and technical improvements in treatment regimes to maximise the beneficial use of water.

**Dry cooling**

Dry cooling technology does not rely on evaporative cooling for the functioning of the main cooling systems and as a result, dry cooled power stations use approximately 15 times less water than conventional wet cooled power stations. Eskom operates the largest indirect dry cooled power station (Kendal, 4 116 megawatts) and the largest direct dry cooled power station (Matimba, 3 990 megawatts) in the world.

The investment in dry cooling results in an estimated combined saving of over 200 megalitres of water per day, or in excess of 90 million cubic metres per annum.

**Desalination**

Mines supplying coal to Eskom's power stations produce significant volumes of wastewater which Eskom accepts, treats and uses in the cooling process at Tutuka and Lethabo. At these power stations Eskom operates desalination plants to treat the contaminated mine water in an expensive desalination process.

**Innovative water and wastewater management practices**

Limiting water consumption and eliminating the contamination of water resources are Eskom's main goals with water management.

**Re-use of water through cascading**

Eskom adopted the ZLED (Zero Liquid Effluent Discharge) philosophy during 1987, in terms of which all reasonable measures are taken to prevent pollution of water resources through the establishment of a hierarchy of water uses based on quality. Cascading the water from higher quality to lower quality uses enables extensive re-use resulting in no deliberate discharge of pollutants to a water resource under normal operating conditions and average climatic conditions.

**Ash disposal**

Eskom uses either wet or dry ashing both of which utilise effluent water or wastewater, an end product of the cascading water re-use process. Wet ash disposal entails the hydraulic conveyance of ash, while dry ash disposal entails the conveyance of partially moistened ash on conveyer

belts. Good water management and accurate water balances ensure optimisation of effluent sink.

**Innovative water management strategy**

**Sustainability Index (SI)**

The SI was introduced in 1996 to ensure the long-term sustainability of Eskom's business in the areas of technical, financial, social and environmental issues. Using this index, Eskom is able to monitor its water use, allowing water practitioners to identify individual power stations with specific water management problems in order to implement targeted corrective strategies. Historical data shows a decrease in the specific water consumption (for all Eskom generation technologies) from 2.85 l/kWh in 1980 to 1.35l/kWh during the financial year 2010/11

**Commitment to co-operative governance**

Eskom has fostered an excellent relationship with DWA over the last four decades and as a major stakeholder in the water industry, Eskom assists and supports DWA in its infrastructure planning, water management initiatives and formulation of policies.

Eskom, as a strategic water user, is playing a leading role in the management of water resources. Water is scarce and deteriorating in key catchments, and important stakeholders – including consumers and investors – have heightened expectations of Eskom. Eskom's overall water management strategy, which includes a demand management strategy to reduce fresh water intake at power stations and to re-use effluent water. These initiatives form part of the DWA's water strategy which Eskom, through local and national government partnerships, aims to achieve.



## Nestlé

### Driving resource conservation and saving precious water

Towards the end of 2010, the Western Cape region experienced its worst drought in 132 years. In the Mossel Bay area the level of the local dam (Wolvedans Dam) dropped to 20% at the height of the drought in November 2010.

At its Mossel Bay factory, Nestlé produces milk powders and canned liquid milk products for which, in 2009, the average monthly water consumption at the factory was approximately 23 700 kilolitres equivalent to 14.8 kilolitres of water consumed per ton of product produced.

### Responding to crisis, conserving precious water

Nestlé, responding to the drought and need for enhanced water conservation, accelerated water use reduction projects and initiatives at the Mossel Bay factory. These initiatives allowed Nestlé to be a responsible corporate citizen in that area.

The water saving project at the Nestlé factory, which is supplied by the municipality, reduced its water consumption by approximately 50%

in 2010 compared to 2009 values. Significant savings of municipal water were due to the recovery and use of condensate from the milk evaporation process. This recovered water was used as make-up water for the boiler, refrigeration plant and cooling tower, to wash the exteriors of the company's fleet of milk tankers, and for floor washing in the boiler.

### Raising employee awareness and buy-in to water conservation

Nestlé used a multi-pronged approach to realise and sustain the water savings which included awareness campaigns, measuring and monitoring water usage, sharing results and engineering interventions. Specific actions included:

- Sharing information through notice boards and e-mails to reinforce the water saving message to staff, while water saving suggestions by staff were implemented and rewarded.
- A water usage measurement system was used to monitor water usage in the various sections of the plant.
- Water saving measures were implemented, such as shortening automated wash times,

modifying hosepipe nozzles to reduce water flow, reducing shower head water flow and reducing the pressure in ablution blocks.

By the end of 2010, the average monthly water consumption at the factory had dropped to approximately 13 600 kilolitres, equivalent to 7.5 kilolitres of water consumed per ton of product produced.

### Today's results defining tomorrow's water strategy

The reduced water usage at the factory has meant more water is available for Mossel Bay, and generally reduced water withdrawal from the Wolvedans Dam.

Nestlé is continuing its drive to conserve water in its factory by employing Phase 2 and 3 water-saving plans.

Phase II (2011–2012): Engaging milk farmers that supply Nestlé (particularly those in the Wolvedans catchment) to optimise the use of water in dairy farming through sustainable agriculture initiatives.

Phase III (2012–2015): Engineering interventions to make the factory a zero-water intake factory.



## ■ South African Breweries (SAB)

Water is a global sustainable development priority for South African Breweries (SAB), one of the world's biggest breweries. Water risk is of particular importance for the company's operations in South Africa which is a semi-arid and water scarce country. By its very nature, brewing is a water-intensive process. The security of water into the future is critical to the survival of SAB as a business, as well as to the communities in which the company operates. The way in which the scarce resource is managed is therefore of vital importance.

SAB's Water Strategy is driven by the company's Sustainable Development Priority to 'make more beer, using less water'. The strategy takes on a comprehensive risk-based approach in managing water within the business and value chain and is based on the five all important 'R's' framework, pRotect, Reduce, Re-use, Recycle and Redistribute. To date, the company has made good progress on this front with water efficiency improving by 8% over the past three years to an average of 4.1 litres of water per 1 litre of beer produced.

Key imperatives in driving water efficiency for SAB include:

- reducing water ratio from 4.1 to 3.6 by 2015, a further 13% reduction;
- improving effluent discharge quality to meet river discharge quality standards;
- engaging with key suppliers to understand their manufacturing water efficiency relative to best-in-class and their improvement plans.

### Water efficiency

SAB is systematically working to improve water efficiency at all its breweries. For example, through cascading water in Alrode brewery from one process to another the company maximises usage. Using 90% returnable bottles dramatically reduce SAB's carbon footprint, but has an implication for water use. Clean water from the final rinse is circulated for pre-wash – thus recycling water but avoiding contact with product. Cascaded water from the bottle washers is pumped to dissolved air floatation purification systems to clarify the water and used to wash crates and floors.

The company is exploring a range of opportunities such as optimising water use in boilers, steam accumulators, condensate recovery, etc. The operating philosophy is based on systematic metering of water use in different parts of the brewing process, thus driving accountability in the different sections, e.g bottling washing, brewing and packaging halls.

### Water stewardship

SAB was one of the first companies to undertake a detailed water footprinting study. The footprint revealed that more than 90% of water used across the value chain of a beer rests in the agricultural supply chain.

SAB brought together key stakeholders in the water-risk landscape within which the SAB hops farms operate. Working closely with WWF, CSIR and GIZ, a water-risk assessment was undertaken, and the implications arising from the likely future scenarios developed. Careful attention is taken to understand the implications of the local hydrology, climate change patterns, socio-economic development and agronomic realities.

SAB is also working closely with small-scale farmers in Taung to

ensure optimal irrigation through the measurement of soil moisture. Research is also being undertaken with the University of the Free State to determine a crop factor for barley and develop a computerised irrigation strategy exclusively for barley. Improved irrigation scheduling for barley will enhance the sustainability of producers by cutting on costs for unnecessary irrigation water and electricity.

### Let the River Flow – working to deliver more water to communities

Let the River Flow is a partnership between SAB, the Mafube Municipality, Department of Water Affairs and the River Trust to rehabilitate the Wilge River in the Free State. The programme's aim is to clear the 315 kilometre long river of massive debris which has built up over a decade, blocking the flow of its water while also preventing communities from accessing quality drinking water.

Rehabilitating the river is critical for the continued livelihood of millions of South Africans as the Wilge River is the primary source of water for more than 57 000 people living in the immediate Mafube municipal

district. In addition to this, members of communities surrounding Mafube are also dependent on the river's water.

To date, approximately 20 kilometres of the river has been cleared of debris through the Let the River Flow programme. An added benefit is that wood collected from the river is cut and delivered to nearby communities for their day-to-day use many of whom are reliant on this wood for cooking and heating.

### Promoting research for water security – Project Eden

The South African Breweries (SAB), in partnership with Rhodes University, has successfully treated brewery waste-water to standards suitable for re-use in irrigation and other secondary water uses using an environmentally sustainable approach. Project Eden – which aims at assisting in the preservation of the country's scarce water supply – is a new and innovative research project for the country's brewery industry and is being implemented at iBhayi Brewery in Port Elizabeth.

The process involves using High Rate Algal Ponding (HRAP) and Constructed Wetland (CW) technology

to treat effluent from the brewery's Anaerobic Digestion plant. Algae draw nutrients from the effluent, which is then transferred to the wetland where indigenous plants further absorb nutrients. To test the quality of the treated effluent, it is used in the production of hydroponic lettuce and fish in a specially-designed greenhouse.

The water generated is currently only suitable for discharge into saline estuaries, namely the Swartkops River flowing nearby iBhayi Brewery, as it contains a concentration of chlorides. Further investment in the Project Eden plant to reduce the conductivity of the effluent post the Constructed Wetland, and reduce chloride concentrates, would result in the treated water meeting general discharge standards.

Farmers who have taken up some of the improved plant varieties have been able to both decrease their water use and improve their incomes. The programme has been run in partnership with the Confederation of Indian Industry and the Advanced Centre for Water Resources Development and Management.

**Addressing the challenge of water security**

Ensuring access to a reliable supply of water is a critical strategic priority for Sasol. Sasol currently operate facilities, or are planning projects, in South Africa where there are various site-specific challenges relating to the supply, quality and reliability of water resources available for use. Water management has thus been identified as a material issue in terms of Sasol’s governance matrix. A dedicated sustainable water function has been established within Sasol New Energy to respond to these challenges.

Reducing Sasol’s footprint in Sasol’s direct operations, Sasol’s refining and chemical manufacturing processes, require significant volumes of water, primarily to regulate temperatures and generate steam. The nature of water demand by Sasol’s operations varies widely depending largely on feedstock, technology choice and the age of the facility. The gas to liquids operations, for example, have a much smaller water footprint than Sasol’s coal to liquids plants, which have larger cooling requirements. Both these processes generate useful quantities of process water that can be beneficially re-used.

Sasol’s scientists are working hard to improve the group’s water efficiency. New designs are being developed to maximise water use efficiency through total water recycle and re-use. To support these efforts Sasol Technology is developing and piloting key technology steps in the process. In 2011 the main Sasol operating facilities at Sasolburg and Secunda set voluntary internal water efficiency targets, which took into consideration site-specific constraints and opportunities. With usage in 2010 as a baseline, Sasol Synfuels at Secunda has a target to improve its water use intensity (m<sup>3</sup> of water used per ton of product) by 5% by 2015, while at Sasolburg, Sasol Infrachem is targeting a 15% improvement. These targets are linked to the successful implementation of specific capital projects and interventions and which will help the overall site water balances.

Sasol’s total water demand for 2011 has increased slightly from 2010 at 151.0 million m<sup>3</sup> to 152.5 million m<sup>3</sup> in 2011. The total quantity of water recycled for the 2011 financial year was 128.7 million m<sup>3</sup>.

**Promoting effective catchment management**

Given the importance of water as an input to Sasol’s processes, and the fact that some of Sasol’s operations are significant (current or potential) water users in water-stressed areas, Sasol recognises the benefits in playing a meaningful role in supporting water resource management in the catchments within which we operate.

Approximately 80% of Sasol’s total water requirements comes from the Vaal River system in South Africa. Sasol’s demand represents about 4% of the total off-take from this system, which supports the populous and economically important inland region of Gauteng and surrounding areas.

**Managing water needs and conserving current supply**

Longer-term sustainability of the Vaal system is being compromised by the imbalance between projected growing demand and the system’s supply capability.

Key interventions to rebalance the system include a new storage dam in Lesotho, improved licensing and enforcement of water use laws and a

greater focus on water conservation and demand management measures.

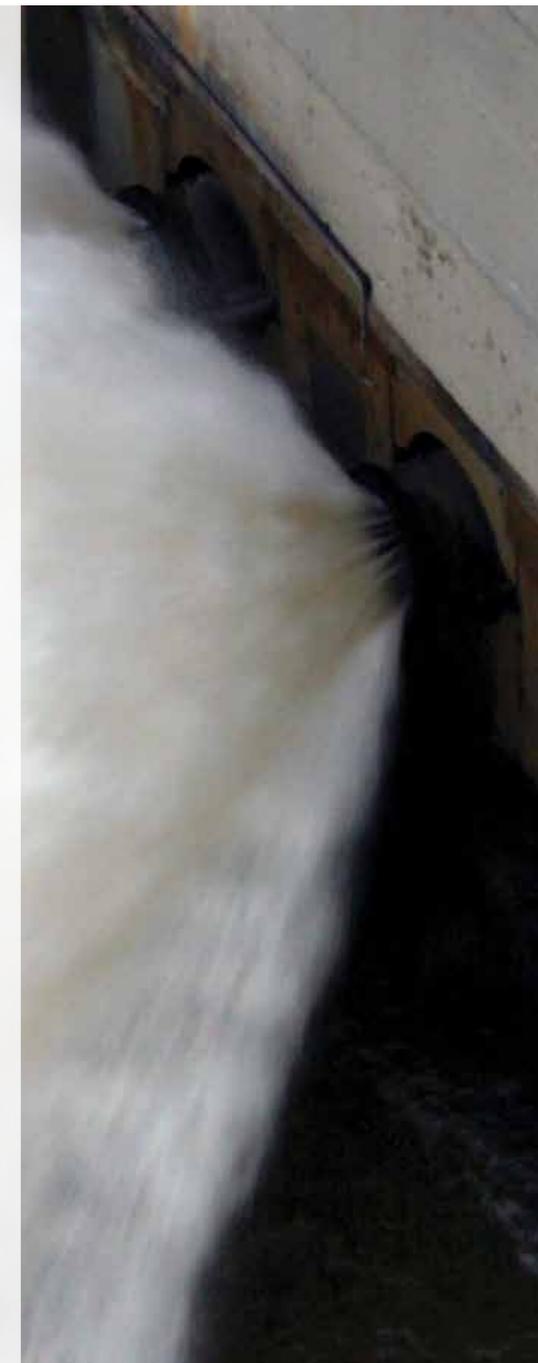
Although Sasol’s water use from this system is allocated at a 99.5% supply assurance, Sasol recognises the strategic and reputational importance of collaborating with other major water users to ensure effective water conservation and demand management initiatives.

As outlined below, Sasol participates actively in a number of initiatives aimed at contributing to the longer-term sustainability of water supply.

**The future of water – working with local municipalities to deliver water projects**

There is recognition and increasing concern that many of South Africa’s local municipalities are experiencing difficulties with the operation and maintenance of potable water and sewage treatment plants. Various opportunities have been identified to assist municipalities where Sasol operations are located to reduce water risks. Sasol has recently concluded a memorandum of understanding between Sasol Synfuels and the Govan Mbeki

Municipality in Secunda on a joint water conservation initiative in the municipal area. Sasol and GIZ initiated a water conservation and water demand management pilot project within the Emfuleni municipality just south of Johannesburg in the South African province Gauteng. In this municipality, like in many others in the country, leakages in the current water piping system lead to water losses of up to 3000 million litres per month. The Emfuleni Water Conservation Project aims to reduce water losses by retrofitting of public and household plumbing as well as by raising awareness of water issues and conservation measures through school and community education and awareness programmes. Moreover, the programme has an important regional aspect as the Emfuleni municipality sources water from the Orange-Senqu catchment area in Southern Africa so that saved water in one municipality can be utilised for consumption in other parts of the transboundary river basin.



## Joining the SWPN

A significant caveat of the partnership is its ability to draw a broad range of stakeholders towards overcoming water issues.

The Department of Water Affairs and the Strategic Water Partners Network – South Africa (SWPN) wish to invite water partners into this initiative to contribute their skill, technology, expertise and projects towards finding a way to close the water gap.

To be a part of this initiative, contact the NEPAD Business Foundation, the coordinating body of the SWPN, on the details available.

This publication was coordinated and edited by the NEPAD Business Foundation on behalf of the Strategic Water Partners Network – South Africa.

For further information on joining the SWPN please contact the secretariat on the following contact details:

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