

Corporate water efficiency targets in the mining industry

Global

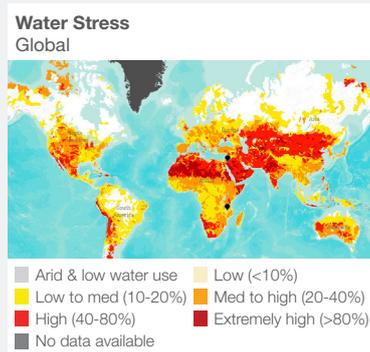
water scarcity impact

Reduced withdrawal	●
Reduced consumption	●
Improved water quality	
Increased productivity	
Net basin benefit	●

volumetric impact
36 000 000 m³/yr

programme cost
\$33 100 000

estimated unit cost of water
10 ¢/m³



Water Stress Map:
F. Gassert, P. Reig, T. Shiao, M. Luck and M. Landis, 2015. "Aqueduct Global Maps 2.1."

Confidence level
● Low ● Medium ● High

Water Scarcity Impact Key
● Main ● Minor

Credits
We would like to acknowledge Samantha Hoe-Richardson of Anglo American plc for her input in the preparation of this case study.

Project Overview

Water is one of Anglo American's mining group largest consumables with a 2014 annual use of approximately 200 million m³. This, along with the Group's geographical exposure of >70% operations in water stress basins, makes water a recognised strategic risk.

Water efficiency was introduced as a core element of the Groups water strategy and programme in 2011. Every Anglo American operation within the business works towards a water reduction target that was determined using an innovative approach named the "Water Efficiency Target Tool" (WETT). WETT, forecasts the projected business-as-usual (BAU) water demand of individual operations and establish a register of cost effective water efficiency interventions. It then links the two to identify future performance targets.

By the end of 2014, the WETT programme had achieved the corporate water reduction target originally set for 2020 (a 13.9% reduction on projected BAU use).

Key Elements

- Implementation of a bottom-up water efficiency programme using an innovative water conservation and demand tool.
- Awareness, quantification and business case for water efficiency relevant for each site and all levels in the organisation established.
- Approach underpinned by strategic risk management, core business processes (budgets, planning and projects, business improvement) and a reporting framework to executive level.
- Delivery of water targets is linked to senior management performance contracts at site and executive level.

Key Outcomes

By 2014 the Group water targets set for 2020 (13.9% reduction in water abstraction in use by the operations) had already been achieved. The projected 231 million m³ water use in 2014 has been reduced to an actual use of 195 million m³ (approximately 16% reduction).

Over 30 projects were invested in across the Group to deliver water use reductions. Most projects involved:

- water recycling/reuse improvements (i.e. recycling and treatment projects),
- switching to more efficient ore technologies/processes (i.e. new mine plant configurations), or;
- preventing water losses (i.e. dam overflow controls, dry tailings and evaporation control).



Global

Intervention Features

- Wastewater reuse in mines
- Condensate recovery and reuse
- Rainwater harvesting
- Corporate water efficiency programme

Project Levers

The main components of the water efficiency target tool and its approach are described below.

(1) Context for water efficiency:

The recognition of water security as a top ten strategic risk to business was essential. The business case for water interventions at site level was necessary (based on the water cost at point of use) and ranged from >US\$15 to <US\$0.1/m³. The impact water efficiency can then have on mitigating risk relative to cost was determined as this is not the only migratory approach available (i.e. water source switching is another alternative).

(2) Consistent and transparent process and measurement:

Information was based on reliable water and operational production data. This included defined parameters that are accurate and regularly recorded. In addition, the WETT process and output must be trusted. In 2013/14, the model was updated to improve accuracy within 5% of actual.

(3) Management engagement and alignment:

WETT is not implemented top down, but is site based. This required operational skills development with over 156 people trained over 3 years. In addition, management were coached to understand what is being reported.

Alignment with core business processes is also essential to WETT and as such: a) the site targets are linked to risk management; b) projects were driven through business improvement and projects; c) finance is imbedded in the annual budgeting and forecast process; and d) performance reported through line management.

(4) Site technical evaluation

WETT requires three things to operate: a) accurate measure of water used; b) good production and forecast information for future water demand calculation; and c) technical opportunity evaluation for efficiency projects. It is the latter where operational technical staff is vital.

(5) Management commitment:

As the water efficiency target is linked to management's performance criterion, the sign-off of targets and performance at operational level for performance and future interventions is essential.

(6) Priority focus areas:

Each site is unique in its water demand and efficiency. There are however common areas where technology can be generically applied to improve water use efficiency.

Analysis showed that the largest opportunities were in increased recycling (i.e. in beneficiation plants, domestic waste water, tailings water recovery), water loss prevention (at tailings, dams and pipelines) and water efficiency technologies (i.e. thickener optimisation, dust suppression additives).

(7) Clear and consistent reporting:

Reporting of performance in an understandable manner to both management and operational staff is essential. Monthly and annual operational reports include WETT and regular communication to staff on the progress achieved helps keep awareness and focus on delivery.

Outcomes and Challenges

WETT is now an effective part of Water Security Risk management and controls at Anglo American. Water is now more than ever recognised by management as a core business enabler.

The tool has proven a significant influencer in the currently being developed National Water Conservation and Demand Management framework for the South African Mining Sector.

The challenges that remain for the business include:

- Having reached the 2020 target early, there is the need to re-state and further extend the water efficiency targets of the business.
- The business needs to recognise that efficiency is not the only water security element and thus further diversify water risk mitigation measures in the same manner.
- The associated energy costs of some efficiency interventions are significant and further research in these technologies is required.
- The long-term implications of mine closure on infrastructure such as desalination plants are complex and issues such as ownership, dependency and cost need to be integrated into the mine closure planning.