water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

ADDRESS BY Ms. NOMVULA MOKONYANE, MINISTER OF WATER AND SANITATION AT THE HYDROPOWER LAUNCH HELD AT THE BRANDKOP CONFERENCE CENTRE IN BLOEMFONTEIN.

31st MARCH, 2015

Programme Director,

Deputy Minister of Water and Sanitation, Pam Tshwete,

Premier of Free State Province, Ace Magashule,

Executive Mayor of Mangaung Metro, Thabo Manyoni,

MEC and MMC present,

Bloemwater representatives,

University of Pretoria representatives,

Officials from Water Research Commission,

All senior government officials present,

Members of the Press,

Ladies and Gentlemen.

There is no doubt that, along with water, energy is the lifeblood of worldwide economic and social development. In fact, three of the big gaps in the basic needs package are water, sanitation and energy. Such is the importance of these issues that the South African government has set up

energy and water 'war-rooms' to address immediate and longer-term water and energy challenges facing the country.

As you may know, South Africa, like many parts of the world, is in the throes of a very difficult electricity shortage. While energy might receive attention as an important economic driver, many of the pressures that drive energy demand also apply to water.

Energy is the critical enabler at every touch-point in the water delivery chain. This begins with energy driven abstraction, either pumping water for irrigation, domestic or industrial purposes from either surface or groundwater to transporting the water to the point of treatment or direct use.

This continues with energy powered water treatment for use, and eventually for wastewater treatment post-use. More recently, and more frequently, energy is being used in freshwater production from brackish or sea water through desalination. Energy is the critical input factor that powers water delivery for all uses and in all environments.

A shortage of power has the net effect of compromising the entire water services value chain for the period of its absence. We have seen this having a major impact in South Gauteng recently with the compromise of two major pumps due to an electrical outage triggered by cable theft.

The intermittent supply of the energy service also has other potential challenges to both the pumping machinery that have been designed for continuous, uninterrupted operation without unplanned shutdowns, and the corresponding start-up surges. In addition, we have to examine the impact of interrupted flow in our pipelines and the impact of the introduction of air

pockets to both the flow regimes and the corrosion of the piping infrastructure.

Similarly, water is a major player in the electricity value chain not only as an energy user but also as an energy producer. It has the character of a generator in the form of hydroelectricity and wave power. It is also the critical growth additive in the production of biofuels, and biogas is an important by-product of wastewater treatment. It functions as an energy carrier in steam turbines and functions as a hydraulic tool to unleash energy sources like in the hydraulic fracturing or fracking of shale gas.

In this vein, it is clear to see that water can be a major player in alleviating the energy crisis. While the country is not particularly well endowed with hydropower conditions, large quantities of raw and potable water are conveyed daily under either pressurised or gravity conditions over large distances and elevations.

Programme Director,
The water-energy nexus offers several opportunities for innovation, and as such, our water knowledge entity, the Water Research Commission (WRC) started to invest in developing combined solutions to simultaneously address these challenges. These technologies include micro- and pico-hydroelectricity options utilising the potential energy stored in the water reservoirs in our towns and cities.

A collaborative effort of partners including the University of Pretoria, City of Tshwane, Bloemwater, eThekwini Municipality, and the WRC, has successfully demonstrated the potential of conduit hydropower – or the

extraction of available energy from existing and newly-installed water supply and distribution systems.

Conduit hydropower enables users to generate hydroelectricity for on-site use and, in some cases, to supply energy to isolated electricity demand clusters or even to the national electricity grid, depending on the location, type and size of installation. It taps into an unutilised source of hydropower by using excess energy in pressurised conduits to produce clean and renewable hydroelectric power.

Accordingly, conduit hydropower, is different to conventional hydropower generation where large dams are used to store river water in a reservoir. Its simplicity is what makes this solution so elegant - harnessing energy that is already present within the existing infrastructure and that would usually be lost through the use of a pressure reducing valve.

This is indeed an extraordinary collaborative effort and one that all South Africans should celebrate. For water supply utilities (including water user associations and municipalities) introducing enhanced in-house energy generation will alleviate, to some extent, dependency on the already stressed national grid and keep their energy costs down. It requires a small capital investment and has a short return on investment period. As long as people use water, renewable electricity can be generated.

The widespread roll-out of this technology could have an enormous impact on both the water and energy sectors. South Africa’s 284 municipalities and several water supply utilities and mines that own and operate gravity water supply distribution systems could be considered for small, micro and pico-scale hydropower installations.

Already, several potential conduit hydropower sites have been identified, investigated, constructed or are operational at Rand Water, Mossel Bay, Lepelle Water, Amatola Water, Bloemwater, eThekwini Municipality, City of Tshwane, Johannesburg Water, City of Cape Town, Eskom, and Midvaal Local Municipality amounting to 38.6 MW (mega-watts). This has a monetary generating value of R220 million/annum. Further estimates point to an additional 59.8 MW out there just in the larger metropolitan areas alone (monetary generating value of R340 million/annum) excluding all the mines.

Other opportunities of hydropower use include:

1. Wastewater Treatment Works – return flow to river/stream
2. Retrofitting of dam outlets
3. Large industrial water users – Conduit hydropower at off take from municipal supply
4. Very small pico units for specific electrical needs anywhere along a pipeline
5. Irrigation canals
6. Run-of-river schemes
7. Mines (and there are already mines that utilize hydropower to generate electricity)

Ladies and Gentlemen,

Indeed, we have come together this evening to celebrate this extraordinary partnership of science, engineering, and water supply services, and I would challenge this partnership even further to explore feasibility studies on where else this technology could be implemented to get it operational in our towns and cities at scale. We also need more partnerships like this one

between all tiers of government, water boards together with knowledge institutions to ensure that water based power generation becomes a cornerstone of South Africa's future energy security for the water sector and beyond. We are happy that the City of Tshwane took a Council Resolution that any new reservoirs that are being built in the City's water distribution network should investigate whether there would be conduit hydropower opportunities.

Much work remains to be done, but with implementable technologies such as conduit hydropower, our future is indeed bright!

Dankie.

Ngiyabonga.