City of Johannesburg: waste water to energy

What	Biogas to electrical energy from waste water treatment works
Where	Johannesburg, Gauteng
Who	Johannesburg Water, City of Johannesburg
Why	The City wished to offset increasing electricity costs for waste water treatment by generating its own electricity from treatment plants, with an aim for the waste water treatment works to be self-sufficient in the future
When	2012 onwards
Funding	Own build/operations – part of the City's capital investment programme

Facing a steep increase in energy costs, Johannesburg Water is upgrading the sludge handling and digestion facilities at its five waste water treatment plants, as part of the City's current capital investment programme. Upgrades provide for the cleaning ("scrubbing") of the biogas to manufacturer's specifications for use in electricity generation by means of co-generation methane gas engines or turbines.

A tender was awarded for the installation, operation and maintenance of two biogas scrubbing and Combined Heat and Power (CHP) cogeneration installations; one at Johannesburg Water's Northern Waste Water Treatment Works near Diepsloot and the second at Driefontein Waste Water Treatment Works. The Northern Waste Water Treatment Works treats about 430-million litres of sewage a day and is Johannesburg's biggest waste water treatment plant.

The initial installation was completed in 2012 (time lapse video of installation here: http://vimeo.com/45515427) and is capable of producing 1.1MW of power for the treatment plant; 18% of the plant's power requirements. CHP generation could produce about 57% of the electricity needs of 5 of the City's waste water treatment plants.

Biogas scrubbing has the side-benefit of reducing corrosion and maintenance costs; thus increasing the waste water treatment plant's performance and engine life.

The biogas-to-energy project will soften the impact of increasing power costs and has a short payback period of 4-5 years. The project also serves to showcase the City's commitment to renewable energy.

Proposed installations:

Waste Water Treatment Plant	Plant Power Requirements	Planned CHP (Units)	Planned CHP (total)
Northern	6.75 MW	4 x 380 kW 6 x 880 kW	6.80 MW
Olifantsvlei	3.75 MW	3 x 380 kW 3 x 880 kW	3.78 MW
Bushkoppie	3.75 MW	3 x 380 kW 3 x 880 kW	3.78 MW
Goudkoppies	2.03 MW	1 x 380 kW 3 x 560 kW	2.06 MW
Driefontein	0.90 MW	1 x 380 kW 1 x 560 kW	0.94 MW