E.Cape Rural Hydropower Scheme A Clean Energy Success Story

It's going to be a bright 2017 for the 39 households of the KwaMadiba settlement in the rural Eastern Cape 110 years after municipal electricity was first supplied to the provincial capital of Port Elizabeth.

This village in the OR Tambo District Municipality has quite literally been "off the grid" ever since families began settling along the picturesque, yet impoverished, banks of the Thina River. They looked set to remain part of the 55% of rural South Africa that will not be connected to the national grid in the foreseeable future.

Fortunately, the government's commitment to exploring alternative technologies in order to achieve universal access to energy has seen the commissioning of the KwaMadiba small scale hydropower (SSHP) scheme during National Water Week (13-19 March 2017).

Effectively powered by the height difference between the Thina Falls and the Thina River, the SSHP plant receives diverted river water that rotates a turbine. This mechanical energy is converted into electrical energy that provides grid quality electricity to the surrounding community.

The Banki turbine that is the core of the SSHP plant was sourced in Italy and installed by WEC Projects, a leading South African EPC (engineering, procurement and construction) contractor in the water and wastewater industry. The company specialises in the turnkey supply and installation of containerised water and wastewater treatment plants, biogas to energy projects, sludge beneficiation, and operation and maintenance contracts. It is also the exclusive SA licensee for the Nereda® sewage treatment technology that provides significant reductions in CAPEX, OPEX and plant footprint.

Local and overseas studies have determined that small hydropower schemes such as the KwaMadiba facility can serve as standalone mini electrical grids providing clean, reliable and affordable energy access in remote areas. Rural electrification has the potential to dramatically improve the standard of living in South Africa, making it a top development priority for the public, private and educational sectors.

The SSHP scheme has minimal impact on the environment as only a very small amount of water is diverted towards the turbine and the use of the water is not for consumption purposes. In addition to the full time job created for one community member, a substantial 30 temporary jobs have been created.

"Electricity will enable the green shoots of economic development quite literally as villagers begin irrigating their crops with an electric pump and the local authority is provided with its first reliable revenue stream," says Marco van Dijk of the University of Pretoria's Civil Engineering Department.

On the origins of the KwaMadiba SSHP scheme, Mr Van Dijk explained that the Department of Science & Technology is piloting innovative technology solutions to enhance service delivery through an initiative called the Innovative Partnership for Rural Development (IPRD). This involves the prioritised needs of 23 district municipalities. The DST is the lead agency steering the IPRD initiative.

The DST has contracted two implementation agencies - one of which is the Water Research Commission (WRC) - to test a range of water, sanitation and small hydropower solutions at municipal demonstrations sites. The WRC, in turn, contracted the Water Division at the Civil Engineering

Department of the University of Pretoria to conduct research within the IPRD programme on the implementation of small scale hydropower solutions for rural electrification. One of the study areas is the OR Tambo District Municipality in the Eastern Cape where it was determined that the Thina Falls within the Thina river system was feasible for a small scale hydropower development.

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