



Electricity and Energy Challenge



Challenge Statement

The power crisis of early 2008 was an experience most South Africans are not likely to forget soon and demonstrated the critical nature of security of supply of energy for South Africans. The impact of months of rolling blackouts was reduced economic activity and social hardship for the residents of metropolitan areas such as the City of Tshwane.

Section 2 of the National Energy Act (the NEA) states that its objective, among others, is to ensure an uninterrupted supply of energy to the nation and facilitate energy access to improve the quality of life of the people of South Africa. This responsibility is shared between the National Government and Municipalities such as The City of Tshwane.

The City of Tshwane Utility Services Department – Electricity division seeks innovative solutions to assist it with addressing challenges related to the provision of electricity and energy services to various communities in the City.

Background

The Electricity division is licensed by the National Electricity Regulator to distribute electricity in most parts of Tshwane and in certain adjacent areas. Most of Tshwane's electricity comes from Eskom, under licence for the area.

South Africa is an unusually energy intensive country and there clearly is scope to reduce electricity usage without compromising economic growth prospects. In metropolitan areas such as the City of Tshwane, sustained energy efficiency can contribute to better growth prospects, reducing the need to build more new generation capacity.

The percentage of households using electricity for cooking increased from 58 percent in 2002 to 78.1 percent in 2015. With rural and semi-rural communities reporting up to 70% of households using electricity to cook even where alternative fuels such as wood are easily accessible and affordable.

The Tshwane energy use profile is dominated by transport and electricity as listed below:





- Electricity - 40%
- Petrol – 30%
- Diesel – 27%
- Coal – 3%
- Parafin – 0%
- Jet Fuel – 0 %
- LGP – 0%
- HFO – 0%

5% of Tshwane’s total energy consumption on 2014 was through Electricity losses.

Electricity as a source of energy for cooking was highest in Free State (86.9 percent), Northern Cape (85.9 percent), and Western Cape (85.4 percent) and lowest in more rural provinces such as Limpopo (60.1 percent), Eastern Cape (73.1 percent) and Mpumalanga (74.2 percent), where alternative fuels such as wood were, perhaps, more accessible and affordable as presented by Eskom in a 2016 report.

Natural gas is considered the most environmentally friendly fossil fuel, and is broadly regarded as a bridging fuel to a low-carbon future. The natural gas supply chain involves field treatment, and the moving of natural gas liquids depends on many factors including the composition of the produced hydrocarbon stream, proximity to end users, market conditions, and available infrastructure. Natural gas is an adaptable fuel and supplies 22% of the energy used worldwide. It makes up nearly a quarter of electricity generation, plays a crucial role as a feedstock for industry, has fewer emissions of most types of air pollutants and carbon dioxide, and still produces an equal amount of energy. The City of Tshwane currently under performs the expected benchmark on use of natural gas by residents and businesses in the city. This has placed undue pressure on electricity supply infrastructure to cope with demand.

Electricity theft is a significant problem experienced by City of Tshwane – Electricity division. Electricity theft can be considered a form of subsidy, a transfer between paying customers and those using electricity beyond the free basic amount without paying. Eskom estimate their annual non-technical



distribution losses to be about 50% of total distribution losses of per annum. Electricity theft is exacerbated by high numbers of informal settlements where mass lighting services are provided that result in source for illegal connections within close proximity of informal dwellings in the settlements.

Electricity infrastructure is widely distributed through-out the City of Tshwane and this presents a significant security risk. Cable theft is an endemic problem in South Africa affecting many services, especially the provision of reliable electricity services to residents of the City of Tshwane. Cable theft is perpetrated in some cases as a coordinated activity and has resulted in increased maintenance costs in provision of electricity services.

The City of Tshwane is seeking innovative solutions to reduce electricity demand and / or address issues such as electricity theft and cable theft.

Key attributes of preferred solutions

- Financially achievable – solutions must be capable of self-sustaining or within reasonable cost parameters when compared to current options available to the City.
- Community enhancing – solutions that provide positive impact to communities currently affected by these challenges or provide opportunities for communities to effect their own solutions are preferred.
- Job creating – solutions that create employment opportunities with emphasis on designated groups are preferred.
- Environmentally neutral – solutions must not negative affect the environment within the city.
- Limited scope – challenge areas discussed are broad and preference will be given to solutions that are focused and can be implemented within a limited and manageable scope.
- Process or product – the solution can be a product or process that will contribute to addressing the any of the challenges listed above.
- Collaborative – solutions that enable other stakeholders such as communities or private entities to contribute to addressing the challenges above are preferred.