Kenya thermal energy storage

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Thermal power plants (heavy fuel oil/diesel/kerosene generators) in Kenya charge the highest in excess of $0.20 per unit of electricity produced and injected into the national grid.

This is four times more expensive than hydropower ($0.05) and slightly over twice the cost of geothermal ($0.08) and wind ($0.08) - the other main sources in Kenya"s energy mix. Besides being expensive, fossil-fuelled thermal plants emit greenhouse gases during generation, leaving a stain on the environment.

But beyond pricing and cleanness, thermal plants have over the years offered Kenya crucial backup as standby plants that swing into action at a moment"s notice during downtimes in geothermal and weather-dependent hydropower.

The diesel generators are flexible enough to be switched on and off and ramped up and down. This flexibility enables them to play a crucial role of matching demand spikes and drops in the national grid, acting as system stabilisers.

Kenya has in recent years sharply cut the share of thermal plants in its generation mix while at the same time increasing geothermal, wind and solar production.

Currently, geothermal serves as a reliable baseload while hydropower stations, which are very flexible to adjust power output, are acting as spinning reserve for balancing out fluctuations in wind and solar sources. Thermal plants" share is now below 10 percent compared to over 30 percent in 2013. But independent investors in thermal plants are still being paid capacity charges whether or not they generate electricity as stipulated in the power purchase agreements (PPA).

Kipevu 1 power plant with a net capacity of 60 megawatts (MW) is located in Mombasa port city and was commissioned in 1999. It"s owned and operated by government-owned power producer KenGen.

The plant comprises six diesel engine generators manufactured by Mitsubishi Heavy Industries of Japan. The engines are rated at 12.5 MW each. However, over time, the engines have been derated to 10.4 MW each. The engines are fuelled with heavy fuel oil (HFO).

Launched in 1999, Kipevu 1 is due for decommissioning in 2023.

Tsavo diesel power plant (74MW) also known as Kipevu 2 is located directly next to Kipevu 1 plant in Mombasa, at Kenya"s coast. It"s owned and operated by independent power producer (IPP) Tsavo Power. It was commissioned in 2001 and is due for retirement in 2021, a 20-year lifespan.

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The thermal power plant consists of seven diesel generators manufactured by Finnish firm Wartsila. The engines are fuelled by heavy fuel oil (HFO) to generate electricity.

It"s the largest fossil-fuelled power plant in Kenya with a contracted effective capacity of 115 MW. It is owned and operated by KenGen and was commissioned in 2011.

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