Pretoria energy storage for demand response

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A significant milestone in the development of any energy facility is the upfront assessment of the energy resource. With many different energy resources available in abundance in South Africa, a key skill to be developed, is that of resource assessment. For the most part, this is currently accomplished by private entities who are looking for energy facility development opportunities. From a South African public point of view, however, the capacity for such resource assessment is limited and needs to be developed.

The CSIR continues to support the further expansion and maintenance of the Wind Atlas for South Africa (WASA). The provision of high-resolution wind resource data is directly impacting energy policy development which include the Integrated Resource Plan (IRP)and as well as wind farm developers, stakeholders, and academia.

The South African integrated resource plan foresees a significant growth of variable renewable energy generation. One of the system operator"s most challenging issues, resulting from this increase, is keeping the grid stable and maintaining security of supply as the energy mix diversifies. To achieve this, short-term (intra-day and day-ahead) variable renewable energy forecasting capacity building is essential.

The projected growth in South Africa"s electricity demand over the next 20 years, coupled with the planned decommissioning of the country"s existing generation fleet, will create a supply gap that must be addressed through the construction of new power generation capacity. Long-term capacity expansion planning is required to determine the optimal mix of new-build technologies that should be constructed in order to provide the required system adequacy (energy and reserve provision) at least-cost, while meeting South Africa"s commitments to reducing greenhouse-gas emissions.

A power grid characterised by an increasing penetration of variable renewable energy (VRE) generators such as solar PV and wind, requires the flexibility of the grid to be improved in order to ensure the matching of instantaneous supply and demand. This grid flexibility can be provided through a number of approaches, including: (1) demand-side management, (2) flexible generation, (3) energy storage (4) sector coupling and (5) grid expansion.

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