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With the rising adoption of renewable energy, traditional power generation methods are utilized less, and generators are being shut down. Once these generators are shut down, their role in providing rotational inertia, short circuit power and voltage control, to help balance the grid system disappears with them also. Grid stability is, therefore, a vital consideration for transmission and distribution network operators, with increasing renewable penetration.

With the Rotating Grid Stabilizer (RGS) Conversion solutions, you can convert your existing power plant assets to a synchronous condenser to achieve grid stability. By utilizing power plants that may otherwise become stranded assets, RGS conversions provide necessary system inertia, short circuit power and reactive power to the grid for that balance.

Inherent frequency response, the result of system inertia, is the ability of an electrical machine to absorb and store or inject energy in order to manage frequency. One way to do this is to use technology with a rotating mass, like flywheels and synchronous condensers, to store energy for short-term frequency support. This helps to prevent blackouts, due to a rapid change of frequency and maintains a stable grid, within its frequency limits.

Our conversion approach is tailored to meet your needs. Building new infrastructure is one option, but the infrastructure that is already in place can be repurposed as well. Typically, we begin the project with a feasibility assessment to determine whether your assets can be converted to a Rotating Grid Stabilizer (RGS). The next step is to initiate a Front End Engineering Design (FEED) study in order to achieve a successful RGS conversion.

RATCH-Australia Corporation Townsville Power Station is collaborating with Siemens Energy to convert its existing gas turbine into a Hybrid RGS to provide system strength and inertia services.

Traditionally, grid stability is achieved through the dependence on the system strength and system inertia. System strength refers to the ability of the electricity grid to recover intact from major disturbances and it is provided by the short-circuit power of the generator or synchronous condenser. The same generator also provides system inertia which is critical to maintaining a steady frequency in the grid. And no matter the source of generated power, electrical grid systems rely on both for grid security, safety, and reliability.

Ensuring grid stability is key to integrating more renewable energy. Download our new white paper to explore how thermal power plants can support grid stability.

Grid stability is what keeps the challenges to power systems, such as the spikes or lulls in demand, power line, or even generator failure, in check. Since power is produced on demand, it's critical to ensure that the power system frequency and voltage remain within normal ranges. Maintaining this balance is necessary to keep the power grid stable and efficient.

To ensure the grid remains stable and secure, it is essential to balance the electricity grid through frequency stabilization, short circuit power, and voltage control. Flexibility stabilization happens when system inertia responds to sudden load imbalances. The inertia delays the Rate of Change of Frequency (RoCoF), so downstream grid stability controls can be executed.

Grid inertia is the ability of a power grid to absorb changes in frequency without destabilizing the system. It is the key factor for maintaining grid stability.

Short circuit power contribution is the ability of an electrical machine to inject high levels of current during a grid short circuit event, to ride through the fault and maintain a stable grid.

Voltage control is the ability to inject and absorb reactive power to ensure a stable system voltage. This helps to reduce the voltage drop caused by the short circuit, limit the short circuit current, and quickly restore the power system's stability. It also enables keeping the system voltage within an acceptable range.

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