GE VERNOVA

ROTATING STABILIZERS

Power Conversion & Storage range of synchronous condensers

CO_2 free, high-inertia machines to help stabilize weak grids and enable higher penetration of renewable energy.

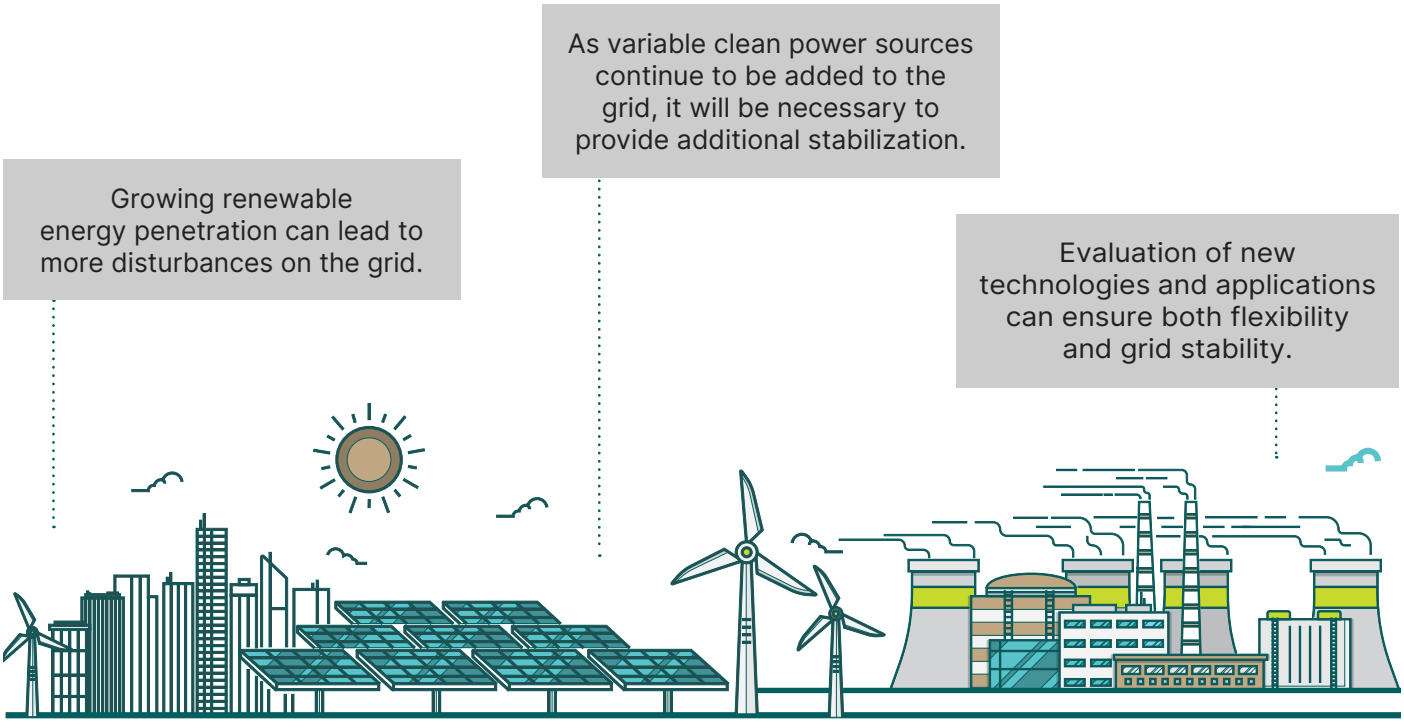
Ensuring grid stability

Fossil fuel-based power generation has long stabilized grid frequency through the continuous rotating mass of synchronous gas or coal-powered generators. Although coal, oil, or gas power generation is not easily adjustable to meet demand fluctuations, its turbines and generators possess significant built-in inertia, offering a robust grid that simplifies managing trips or blackouts.

However, the global energy mix is shifting towards more clean renewable sources, posing challenges to grid integration and stability. The rise of non-synchronous wind and solar energy is reducing synchronous generation on the grid, altering dispatchable power dynamics. This potential instability might force grid operators to limit renewable generation for stability or maintain costly coal or gas power reserves.

As renewable energy reshapes power generation, national grid codes—especially in countries with weaker infrastructures—are evolving to address this new mix. These codes specify the electricity quality that plants and grid technologies must deliver, both in normal and fault conditions, spurring innovative solutions like Power Conversion & Storage's Rotating Stabilizer.

Our Rotating Stabilizer solution, drawing o extensive experience in rotating machines technology, offers a CO2-free, cost-effective alternative to replicate the synchronous inertia response of traditional thermal power generation.



Rotating stabilizers are synchronous machines connected to the grid, operating at a frequency of 50/60 Hz. They deliver efficient and reliable synchronous inertia, short circuit current and reactive power to help stabilize the grid.

They provide essential support to the network grid, particularly in scenarios involving increased non-synchronous penetration and extensive distributed generation. They offer grid support capabilities comparable to those of a Combined-Cycle Gas Turbine (CCGT) power station, ensuring stable operation without causing disturbances during variable speed drive starts.

Key features and benefits

OPERATING MODES

Short-circuit contribution

- Only synchronous machines contribute significant short-circuit strength to the grid
- Short-circuit strength assists with post-fault voltage recovery
- Short circuit current is ~5-10x the rated current

Synchronous inertia

Support to the grid with instantaneous response to change in grid frequency

Reactive power VAR

- Like SVC or STATCOM, synchronous condensers continuously vary VAR output to regulate grid voltage.
- Can operate in voltage control or reactive power control modes.

CO-LOCATED WITH DISTRIBUTED GENERATION

- Improve grid connection agreement and reduce overall costs
- Stability at point of non-synchronous generation
- Voltage support to enable more active power

PROVEN TECHNOLOGY

More than 40 synchronous condensers installed worldwide since 2008, for a total of 3+ GVAR.

COMPLETE LIFE CYCLE SOLUTION

We offer a robust suite of services tailored to the utility and industrial companies' business imperatives:

- Life cycle management,
- Service contracts, including Long Term Service Agreements (10+ years),
- Digital & monitoring services,
- Spare parts,
- Training,
- Comprehensive global network of experts and contact center.

Ratings per unit

Our Rotating Stabilizers can be tailored to suit customer requirements.

Reactive power	Up to 100 MVAr
Inertia	Up to 505 MW.s
Short-circuit power	Up to 986 MVA
Frequency	50/60 Hz
Voltage	Up to 15 kV
Mounting	Horizontal
Cooling	Air or Air to Water

N.B: Ratings at machine terminal and subject to manufacturing tolerances

We have the right grid stability solution to address your needs

Discover Power Conversion & Storage's extensive portfolio of electrification solutions designed to stabilize, strengthen, and support your grid network. Explore the table below for a high-level overview of each solution's benefits and guidance for an initial assessment.

	Synchronous condenser	STATCOM	STATCOM with BESS	SVC
Inertia (frequency stability)	✓✓		✓	
Dynamic reactive power support	✓	✓✓	✓✓	✓✓
Short circuit power	✓✓	✓	✓	✓
Overload capacity	✓✓		✓	
Full load losses	✓	✓	✓	✓
Response time for voltage regulation	✓✓	✓✓	✓✓	✓
Footprint	✓	✓✓	✓✓	✓✓

Comparison based on similar required performance.

For a personalized assessment tailored to your specific needs, please contact us: gevernova.com/power-conversion/contact

About GE Vernova's Power Conversion & Storage

GE Vernova's Power Conversion & Storage business combines advanced energy conversion and storage systems to meet the electrification needs of utilities and industries. With a focus on power stability, energy storage, and industrial electrification solutions, Power Conversion & Storage empowers customers by addressing their most complex electrification challenges and accelerating their transition to a sustainable, decarbonized future.

For more information, please visit
gevernova.com/power-conversion

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