

SVCs & STATCOMs

Is clean energy transition possible without FACTS?

Webinar on April 28th, 2022

www.siemens-energy.com



Three major trends are changing transmission systems.



Decarbonization

- While energy demand is growing significantly, fossil and nuclear power is replaced by renewables
- Electrification and sector coupling
- Higher renewable generation and integration



Decentralization

- Growing energy demand
- Missing public acceptance for overhead transmission lines
- Integration of non-controllable, distributed generation from renewables energy systems
- More variable energy production and consumption



Deregulation

- Energy exchange between countries and regions becomes more and more important (meshed grids)
- High price differences between market areas



Grid topology is constantly changing

Flexible AC Transmission Solutions (FACTS)



FACTS - the economic solution to...

- ... support the grid voltage
- ... balance the reactive power
- ... provide short circuit power and inertia

Siemens Energy solutions offer the following customer benefits

Utility

Industry

- Increase of power transfer capacity
- Support the integration of renewables
- Improve the stability of long-distance transmission
- Higher active power stability
- Key element for blackout prevention
- Increased stability of the production process
- Secured grid connection and avoid penalties
- Flicker reduction

FACTS – Improve power quality and transmission efficiency



Flexible AC Transmission Solutions (FACTS)

Full turnkey supply - customized solutions & services



SVC PLUS (STATCOM)
IGBT based



**Series
Compensation**



**Synchronous
Condenser**



**Mechanically Switched
Capacitors /Filter
Circuits**

What are FACTS devices?

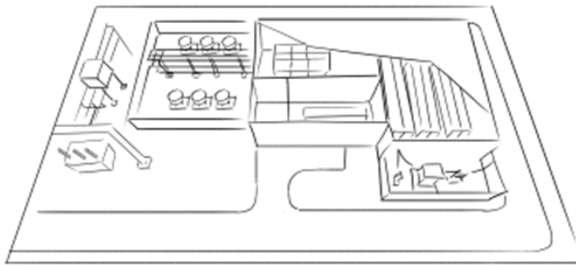
Integrated at critical nodes of the grid, FACTS devices are providing reactive power compensation up to 1200 MVar. Siemens solutions include a set of electric equipment (e.g. transformers, shunt reactors, capacitors or generators) *switched* via switches or power electronics.

Transmission
Solutions - Full
Turnkey project
supply

Siemens Energy portfolio offers solutions for all FACTS needs

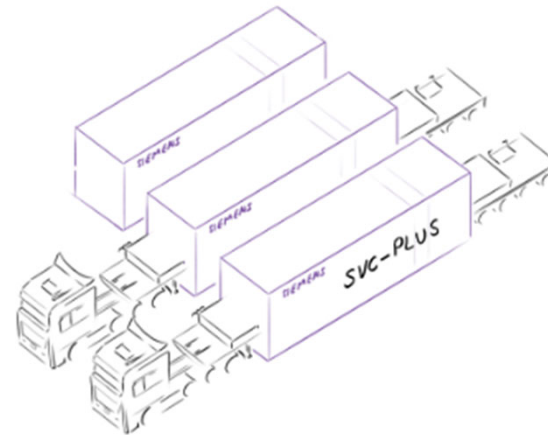
Flexible AC Transmission Solutions (FACTS) Trend-setting innovations for resilient grids

SIEMENS
energy



SVC PLUS Frequency Stabilizer

Frequency and voltage support for
dynamic grid stability



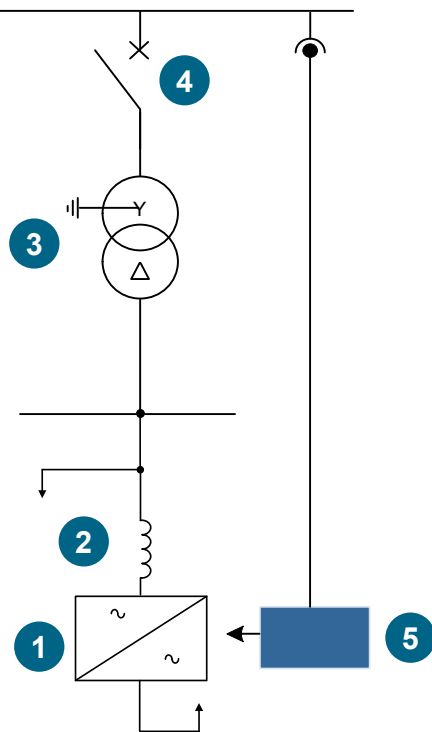
Mobile STATCOM

Plug and play solution with
reduced installation time

Stay on top of the market and get your problems solved with Siemens Energy innovations

Technology SVC PLUS

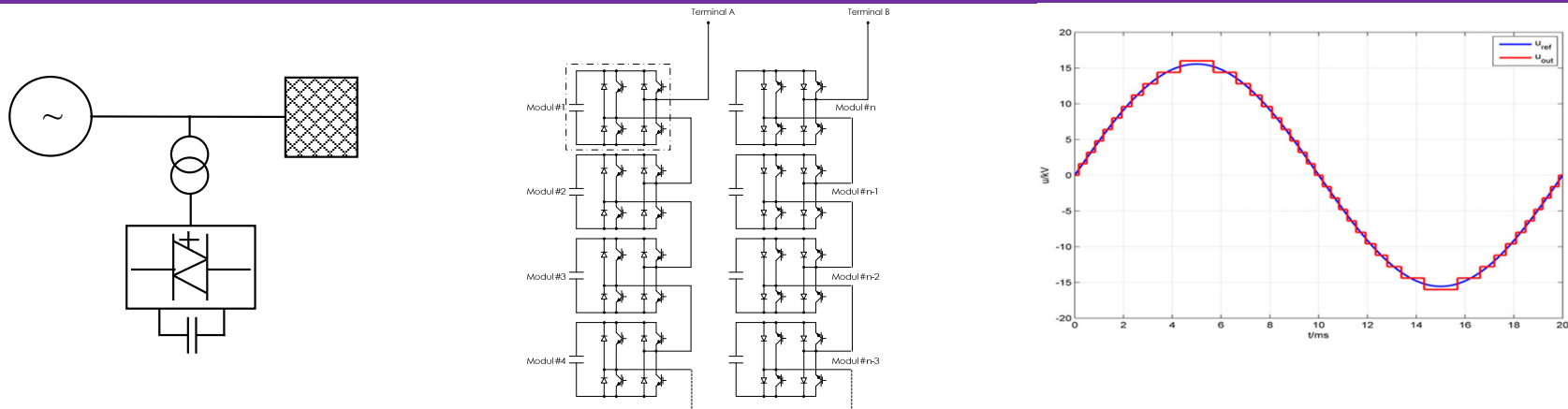
Simplified Single Line



- 1 SVC Plus Converter
- 2 Phase Reactor
- 3 Transformer
- 4 Circuit breaker
- 5 Control system

Technology Multilevel STATCOM

Topology Overview



- Multilevel STATCOM is built by Power Modules connected in series. The required output determines the number of modules.
- The sum of all power module output voltages form the terminal voltage.
- The reactive power output is controlled via the amplitude of the converter voltage.
- Redundant modules in each phase.

Dynamic response

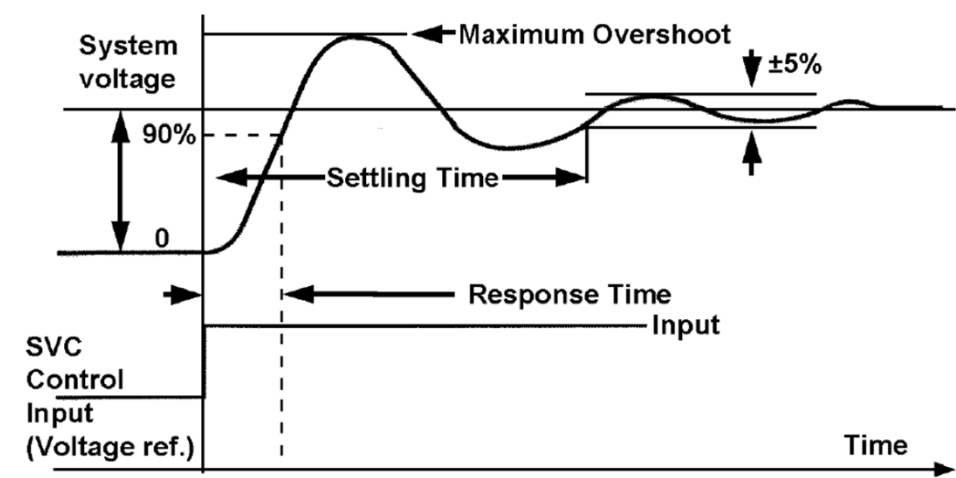


Figure 3—Response of the SVC

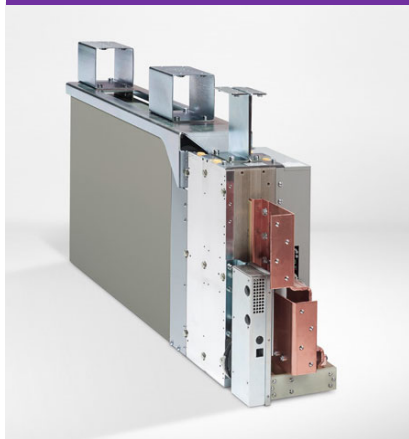
	SVC PLUS
Response time	1-2 cycles
Max. Overshoot	10%
Settling Time	100ms

SVC PLUS in Detail

IGBT Module



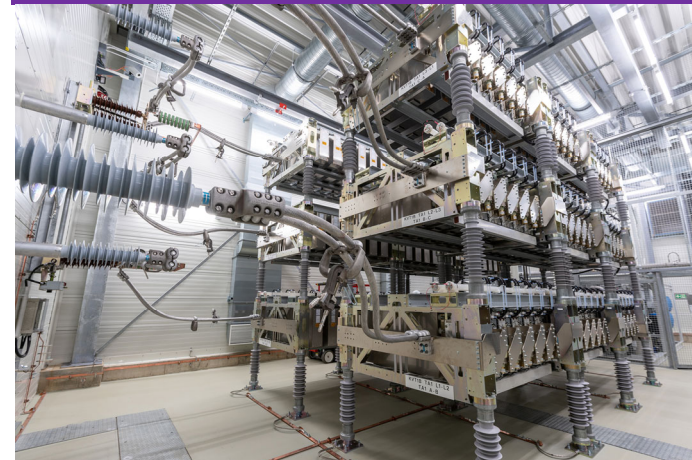
Power Module



Converter



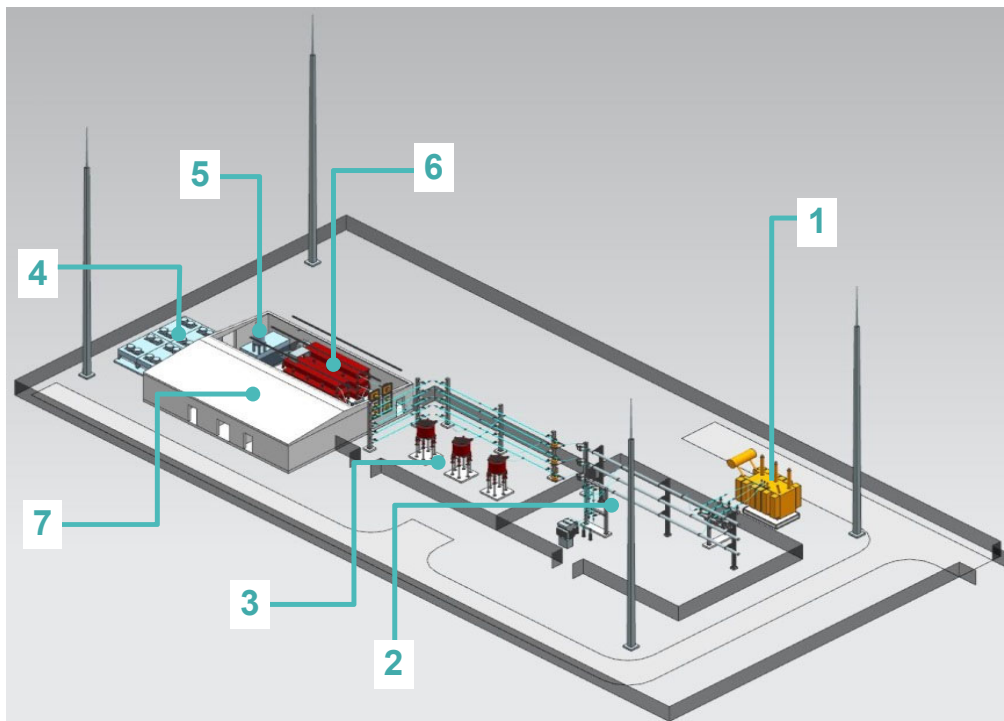
Converter Towers



The SVC PLUS is the best solution to tackle stability challenges in the grid



Compact footprint through multilevel STATCOM for voltage control



Technical Data

- Footprint: 2.600 m² to 3.150 m²
- Rated power: +/- 75 Mvar to +/- 400 Mvar
- Predefined one branch design
(scaling up by two branch design is possible)

1	Power Transformer	5	Cooling Room
2	AC Yard	6	Converter tower with IGBT
3	Phase Reactors	7	Control & Protection Room
4	Outdoor Cooler		

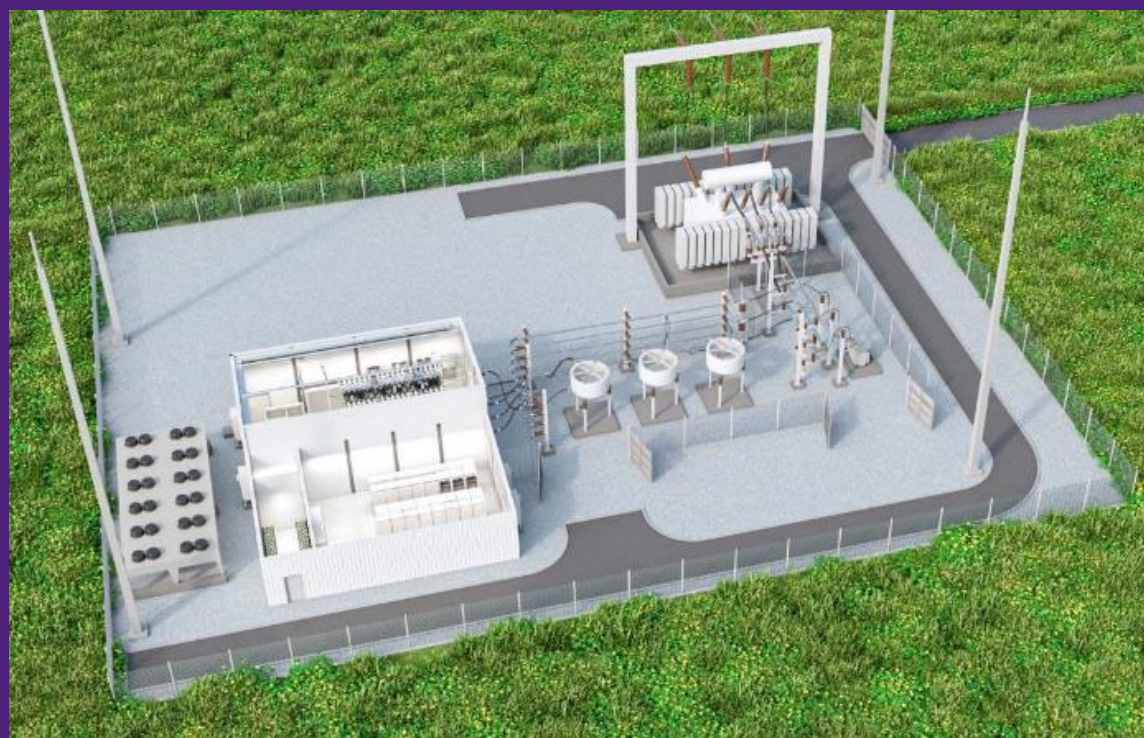
SVC PLUS – the advanced STATCOM – a robust and flexible solution in a fast changing environment.



SVC PLUS...

- Handling changes in grid topology, power quality and system requirements
- Superior over- and undervoltage behavior
- Active Filter functionality

... with over 10 years and 100 installations of experience

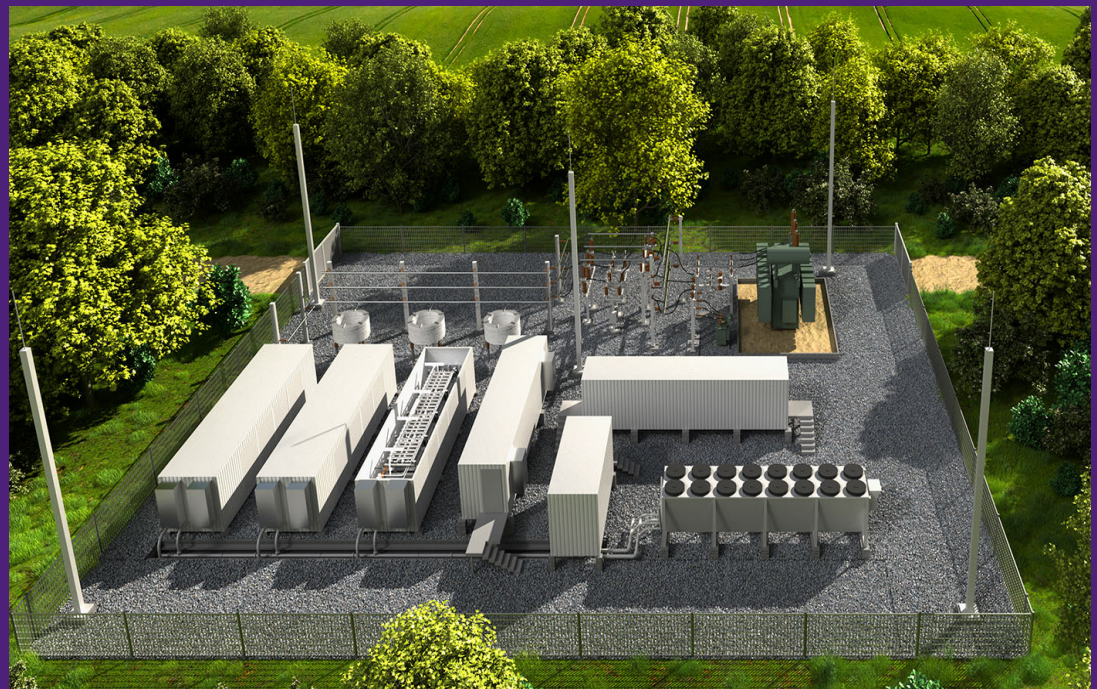


SVC PLUS – proven technology, customized to the needs

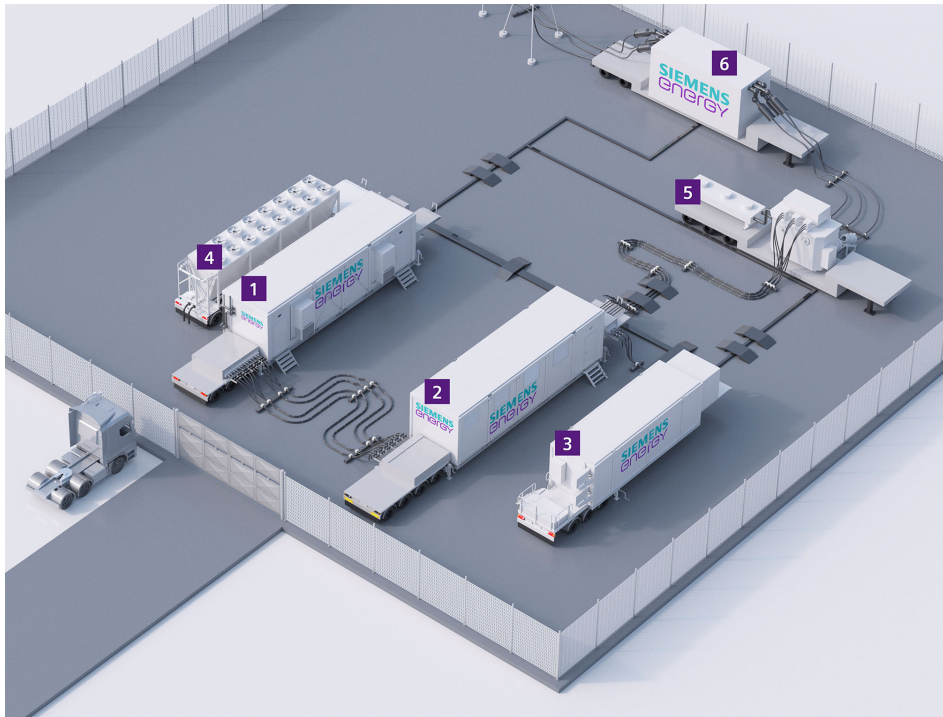


SVC PLUS...

- Continuous improvement to meet marked requirements
- >30 years in FACTS technology
- High flexibility in changing Grids



Mobile Statcom



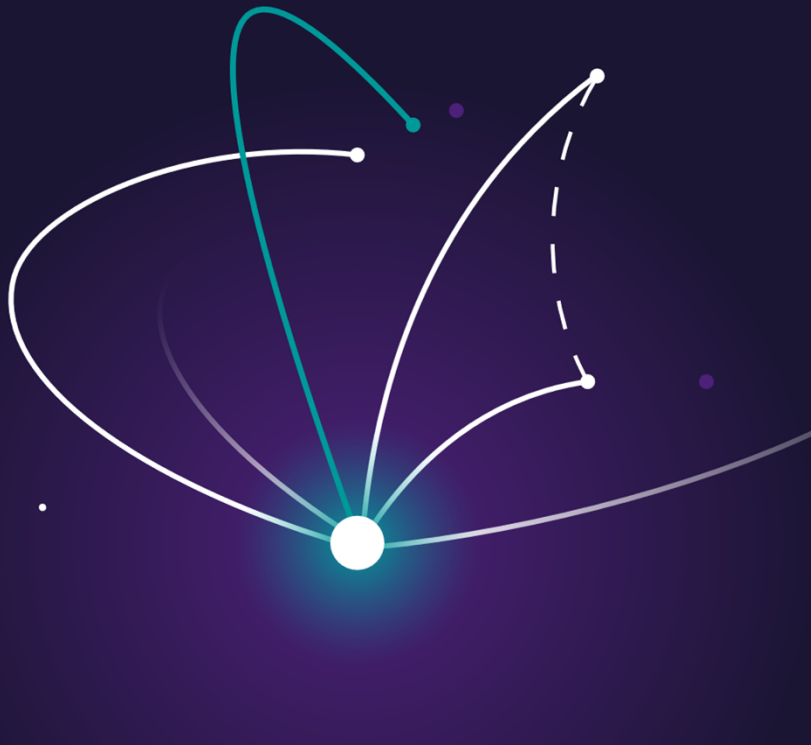
- 1 SVC PLUS® Trailer
- 2 Reactor Trailer
- 3 Auxiliary Trailer
- 4 Outdoor Cooler
- 5 Power Transformer (if required)
- 6 GIS Trailer (if required)



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