



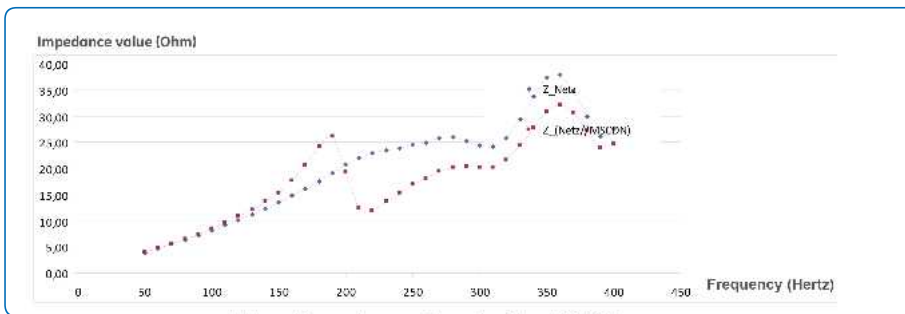
# MSCDN

## Mechanically Switched Damped Capacitor Networks Delivering Reactive Power Compensation for Extra High Voltage Systems

Modified conditions at generation feeding points, the unbundling of energy generation and transmission, as well as a growing energy trading activity are creating new fields of application. The installation of reactive power compensation systems - such as Mechanically Switched Damped Capacitor Networks (MSCDN) and other FACTS solutions - can improve long AC transmission line capacity in widespread high voltage networks.

Until recently, energy generation and consumption have resided relatively closely to each other. With the construction of larger generation plants or offshore windfarms, energy has to be transported longer distances to consumption load-centres. This requires the application of shunt capacitors along transmission lines to secure voltage stability in peak-load periods and for reactive power compensation. These capacitors generate controllable reactive power at the point where it is needed.

A higher transmission capacity also facilitates more energy trading - without the construction of new transmission lines. An additional benefit transmission system operators is that their network's become more independent from the power plants in terms of reactive power compensation. The losses associated with generation and transmission of reactive power are reduced in comparison with a situation where only power plants provide reactive power. Reactive power compensation equipment offers a very quick return-on-investment.



Network impedance with and without MSCDN

### Scope of Supply

- Network analysis: measuring and evaluation of harmonic components in an HV network
- Installation design
- Design of the protection and monitoring equipment
- Supply for switchgear and reactive power compensation equipment
- Integration of the compensation equipment into existing substations
- Construction, reconstruction and assembly
- Commissioning

### Key Benefits

- Lower reactive power demand of the transmission line during strong load condition
- Less emission of CO<sub>2</sub> because of reduced power losses
- Optimal workload on overhead lines
- New construction of overhead lines can be postponed
- Return-on-investment of approximately two years
- Easy supply of reactive power wherever needed



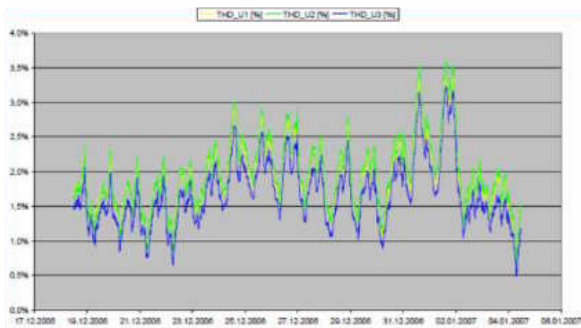
## Further Possibilities to Increase the Transmission Capacity

Besides the already mentioned fixed compensation, GE offers dynamic reactive power compensation installations with thyristors (SVC), as well as STATCOMs in VSC technology.

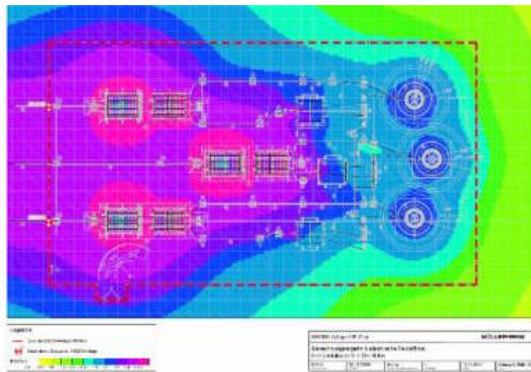
These systems allow the reactive power to be continuously adapted to the particular situation. Furthermore, the excellent dynamic performance permits the transmission of more power while ensuring transient stability in the case of system disturbances.

GE's High Voltage Direct Current (HVDC) transmission systems are another possibility to increase the transmission capacity and to avoid network bottlenecks.

Our experts support you in the optimal planning of technological and economical steps to increase the transmission capacity of your networks.



Measurement of harmonics waveform

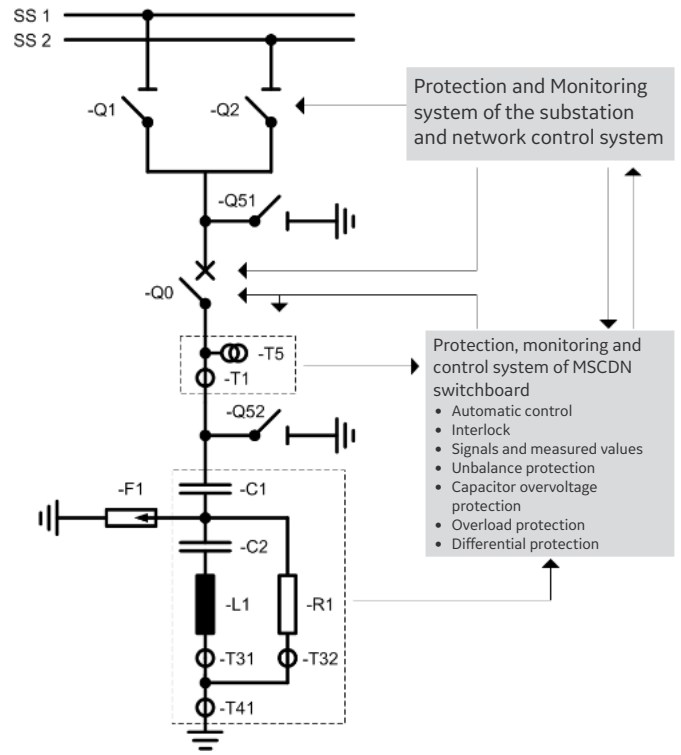


Electro-mechanical Compatibility calculation

For more information please contact  
GE Power  
Grid Solutions

### Worldwide Contact Center

Web: [www.GEGridSolutions.com/contact](http://www.GEGridSolutions.com/contact)  
Phone: +44 (0) 1785 250 070



Single Line Diagram



MSCDN installed in Germany

## GEGridSolutions.com

IEC is a registered trademark of Commission Electrotechnique Internationale.

GE and the GE monogram are trademarks of General Electric Company.

GE reserves the right to make changes to specifications of products described at any time without notice and without obligation to notify any person of such changes.

MSCDN-Brochure-EN-2018-01-Grid-PEA-0538. © Copyright 2018, General Electric Company. All rights reserved.



Imagination at work