

## Mechanical Switched Capacitors (MSC/MSCDN) – Reference List



The picture shows a MSCDN for National Grid Company, U.K.

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This reference list gives an overview of Siemens' Mechanical Switched Capacitors (MSC) technology for reactive power compensation and power quality management projects for utility applications.

Siemens has always been a leader in the reactive power compensation business, both in conventional and new technologies. Reactive power compensation based on Thyristor controlled technology started in the early 1970's with various applications of thyristor controlled booster magnets and arc furnace flicker control. Siemens' first Static Var Compensator for utility application was ordered in 1980 by the Brazilian utility Companhia Hidro Elétrica do São Francisco (CHESF).

Because of its in-house resources and world-wide presence Siemens is able to cover all fields of Reactive Power Compensation and Power Quality Management. The scope of services includes network planning, consulting, design, manufacturing, testing, project management, installation, commissioning, maintenance and service of all types of Reactive Power Compensation systems. Siemens also spends considerable effort in developing new strategies and technologies for use in tomorrow's transmission and distribution networks.

For more information please contact:  
Siemens AG / E T PS SL 2

Freyeslebenstr. 1  
91058 Erlangen  
Germany

Fax +49 9131 7 32094  
Tel. +49 9131 7 35288  
[matthias.claus@siemens.com](mailto:matthias.claus@siemens.com)

#### Abbreviations:

|              |   |
|--------------|---|
| <b>MSC</b>   | <b>M</b> echanical <b>S</b> witched <b>C</b> apacitor                                 |
| <b>MSCDN</b> | <b>M</b> echanical <b>S</b> witched <b>C</b> apacitor <b>D</b> amping <b>N</b> etwork |
| <b>SVC</b>   | <b>S</b> tatic <b>V</b> ar <b>C</b> ompensator  |
| <b>FACTS</b> | <b>F</b> lexible <b>AC</b> <b>T</b> ransmission <b>S</b> ystem                        |

| Award | Customer                        | Station      | Type  | Voltage                    | Rating                    | Remarks                  |
|-------|---------------------------------|--------------|-------|----------------------------|---------------------------|--------------------------|
| 2009  | RTE, France                     | RTE          | MSCDN | 225 kV<br>and 63 kV        | 4x80 MVar and<br>1x8 MVar | Turnkey Project          |
| 2007  | National Grid Company, U.K.     | Harker       | MSCDN | 4x80<br>MVar +<br>1x8 MVar | 225 MVar                  | Turnkey Project          |
| 2007  | National Grid Company, U.K.     | Harker       | MSCDN | 275 kV                     | 150 MVar                  | Turnkey Project          |
| 2007  | National Grid Company, U.K.     | Wymondley    | MSCDN | 400 kV                     | 225 MVar                  | Turnkey Project          |
| 2006  | National Grid Company, U.K.     | Staythorpe   | MSCDN | 400 kV                     | 225 MVar                  | Turnkey Project          |
| 2006  | National Grid Company, U.K.     | Grendon      | MSCDN | 400 kV                     | 3x225 MVar                | Turnkey Project          |
| 2006  | National Grid Company, U.K.     | East Claydon | MSCDN | 400 kV                     | 225 MVar                  | Turnkey Project          |
| 2005  | RED Eléctrica de España, Spain  | Benejama     | MSCDN | 220 kV                     | 100 MVar                  | Turnkey Project          |
| 2005  | RED Eléctrica de España, Spain  | Saladas      | MSCDN | 220 kV                     | 100 MVar                  | Turnkey Project          |
| 2005  | National Grid Company, U.K.     | Sudon        | MSCDN | 400 kV                     | 2x225 MVar                | Turnkey Project          |
| 2005  | National Grid Company, U.K.     | Beddington   | MSCDN | 132 kV                     | 45 MVar                   | Turnkey Project          |
| 2005  | Southern California Edison, USA | Devers       | MSC   | 500 kV                     | 165 MVar                  | Turnkey Project with SVC |
| 2005  | CONCO, Ghana, South Africa      | Ahafo        | MSC   | 8 kV                       | 16 MVar                   | Turnkey Project with SVC |
| 2004  | National Grid Company, U.K.     | Chickerill   | MSCDN | 400 kV                     | 225 MVar                  | Turnkey Project          |
| 2004  | National Grid Company, U.K.     | JAS          | MSCDN | 400 kV                     | 225 MVar                  | Turnkey Project          |
| 2004  | RED Eléctrica de España, Spain  | Jijona       | MSCDN | 220 kV                     | 100 MVar                  | Turnkey Project          |
| 2004  | RED Eléctrica de España, Spain  | Hoya Morena  | MSCDN | 220 kV                     | 100 MVar                  | Turnkey Project          |
| 2003  | National Grid Company, U.K.     | Monkfyson    | MSCDN | 275 kV                     | 150 MVar                  | Turnkey Project          |
| 2003  | TNB, Malaysia                   | Kuala Lumpur | MSC   | 275 kV                     | 3x60 MVar                 | Turnkey Project          |

| <b>Award</b> | <b>Customer</b>             | <b>Station</b> | <b>Type</b> | <b>Voltage</b> | <b>Rating</b> | <b>Remarks</b>  |
|--------------|-----------------------------|----------------|-------------|----------------|---------------|-----------------|
| 2003         | National Grid Company, U.K. | Norwich        | MSCDN       | 132 kV         | 3x45 MVar     | Turnkey Project |
| 2003         | National Grid Company, U.K. | Bishopswood    | MSCDN       | 132 kV         | 45 MVar       | Turnkey Project |
| 2003         | National Grid Company, U.K. | Fleet          | MSCDN       | 132 kV         | 45 MVar       | Turnkey Project |
| 2003         | SEC, Saudi Arabia           | SEC            | MSCDN       | 132 kV         | 2x20 MVar     | Turnkey Project |
| 2002         | National Grid Company, U.K. | Kirkby         | MSCDN       | 275 kV         | 150 MVar      | Turnkey Project |
| 2000         | National Grid Company, U.K. | FG1E           | MSCDN       | 132 kV         | 6x45 MVar     | Turnkey Project |
| 2000         | National Grid Company, U.K. | Whitegate      | MSCDN       | 400 kV         | 225 MVar      | Turnkey Project |
| 1997         | National Grid Company, U.K. | West Midlands  | MSCDN       | 275 kV         | 150 MVar      | Turnkey Project |
| 1997         | National Grid Company, U.K. | West Midlands  | MSCDN       | 275 kV         | 3x225 MVar    | Turnkey Project |