SIEMENS

Connecting wind power to the grid

Gas-insulated medium-voltage switchgear for wind farms

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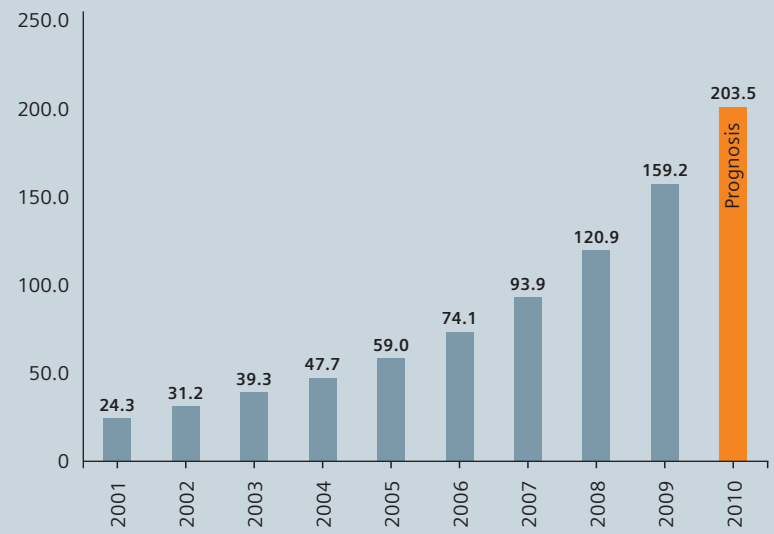
Answers for energy.

Wind power is booming – now and in the future

Installed wind power capacity worldwide



Installed power in gigawatts (GW)

Source: WWEA

The international targets for reducing greenhouse gases have led to a boom in renewable energies, with a special focus on wind power. Since the start of the new millennium, the newly installed capacity has increased by up to 30 percent per year. The European Union's goal is to obtain 20 percent of generated electricity from renewable energy sources by 2020, with the largest share coming from wind power at almost 35 percent. To reach this goal, new wind power capacities with a total output of around 100 GW need to be installed in the EU by 2020.

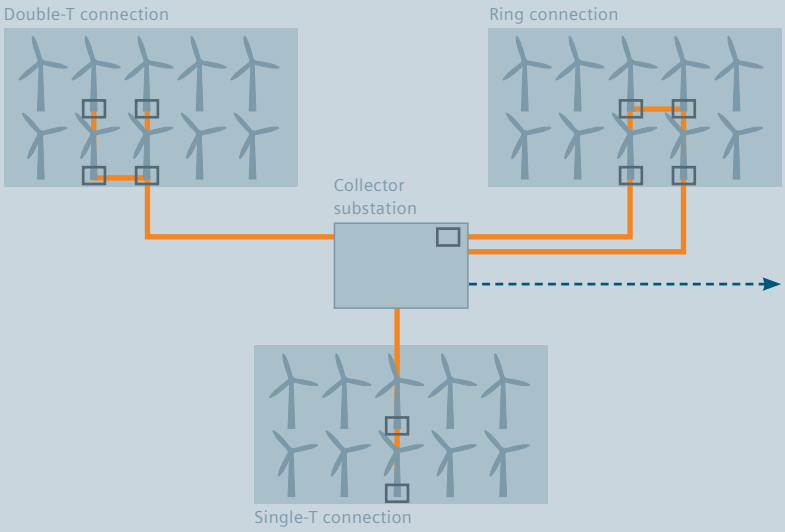
Market prospects are also promising in other parts of the world. The need and demand for wind power is constantly growing, not just in industrialized but also in emerging countries.

The ideal choice for every application

Gas-insulated medium-voltage switchgear (GIS) are used for various applications in wind farms. Depending on the operator's requirements, different configurations of medium-voltage GIS allow the individual wind turbines to be safely connected to the wind farm's own power grid.

Cables transmit the generated power to a collector substation where another medium-voltage GIS protects the wind farm on the one hand and the power transformer on the other, and therefore ensures a safe connection of the sustainably generated power to the high-voltage transmission grid. Within larger wind farms, reactive power compensation is used to minimize reactive power flow. This system is also connected with the wind farm via gas-insulated medium-voltage switchgear.

Typical layout of wind farms



Arrangement of the gas-insulated medium-voltage switchgear in wind farm applications

For the optimal operation of your system

Gas-insulated medium-voltage switchgear for wind farm applications

- Wind turbine: NXPLUS C Wind, 8DJH, SIMOSEC, NXPLUS, 8DA
- Collector substation: 8DA, NXPLUS, NXPLUS C, 8DJH
- Reactive power compensation: 8DA, NXPLUS, NXPLUS C, 8DJH

NXPLUS C Wind

8DJH

SIMOSEC

NXPLUS

8DA

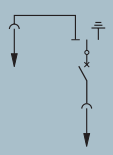
NXPLUS C

Switchgear type	Voltage (kV)	Short-circuit current max. (kA)	Rated current busbar max. (A)	Rated current feeder max. (A)
8DA	40.5	40.0	5,000	2,500
NXPLUS	40.5	31.5	2,000	2,000
NXPLUS C Wind	36.0	25.0	1,000	1,000
NXPLUS C	24.0	25.0	2,500	2,000
SIMOSEC	24.0	20.0	1,250	1,250
8DJH	24.0	20.0	630	630

Offshore projects

Walney, United Kingdom

Position:	Wind turbines
Switchgear type:	NXPLUS C Wind, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	36 kV, 20 kA, 630 A
Scope of supply:	51 panels



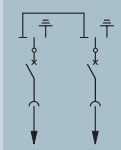
Scheme 1

Greater Gabbard, United Kingdom

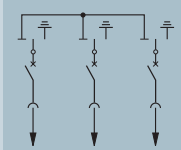
Position:	Collector substation and reactive power compensation
Switchgear type:	NXPLUS, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	40.5 kV, 31.5 kA, 2,000 A
Scope of supply:	31 panels
Switchgear type:	8DA10, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	24 kV, 40 kA, 2,500 A
Scope of supply:	6 panels

Middelgrunden, Denmark

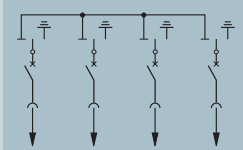
Position:	Wind turbines
Switchgear type:	NXPLUS, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	36 kV, 31.5 kA, 1,600 A
Scope of supply:	59 panels



Scheme 1



Scheme 2

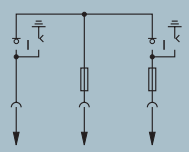


Scheme 3

Onshore projects

Lamèque, United States of America

Position:	Wind turbines
Switchgear type:	Simosec, fixed-mounted circuit-breaker switchgear, single busbar
Electrical data:	15 kV, 16 kA, 630 A
Scope of supply:	60 panels



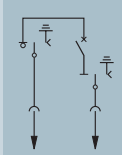
Scheme 1

Bisdorf, Germany

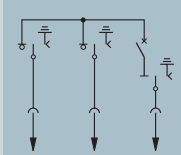
Position:	Collector substation
Switchgear type:	NXPLUS, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	36 kV, 31.5 kA, 1,250 A
Scope of supply:	12 panels

Germinon, France

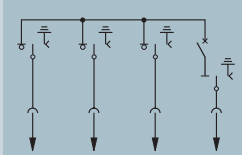
Position:	Wind turbines
Switchgear type:	8DJH, fixed-mounted circuit-breaker switchgear, gas-insulated, single busbar
Electrical data:	24 kV, 20 kA, 630 A
Scope of supply:	32 panels



Scheme 1

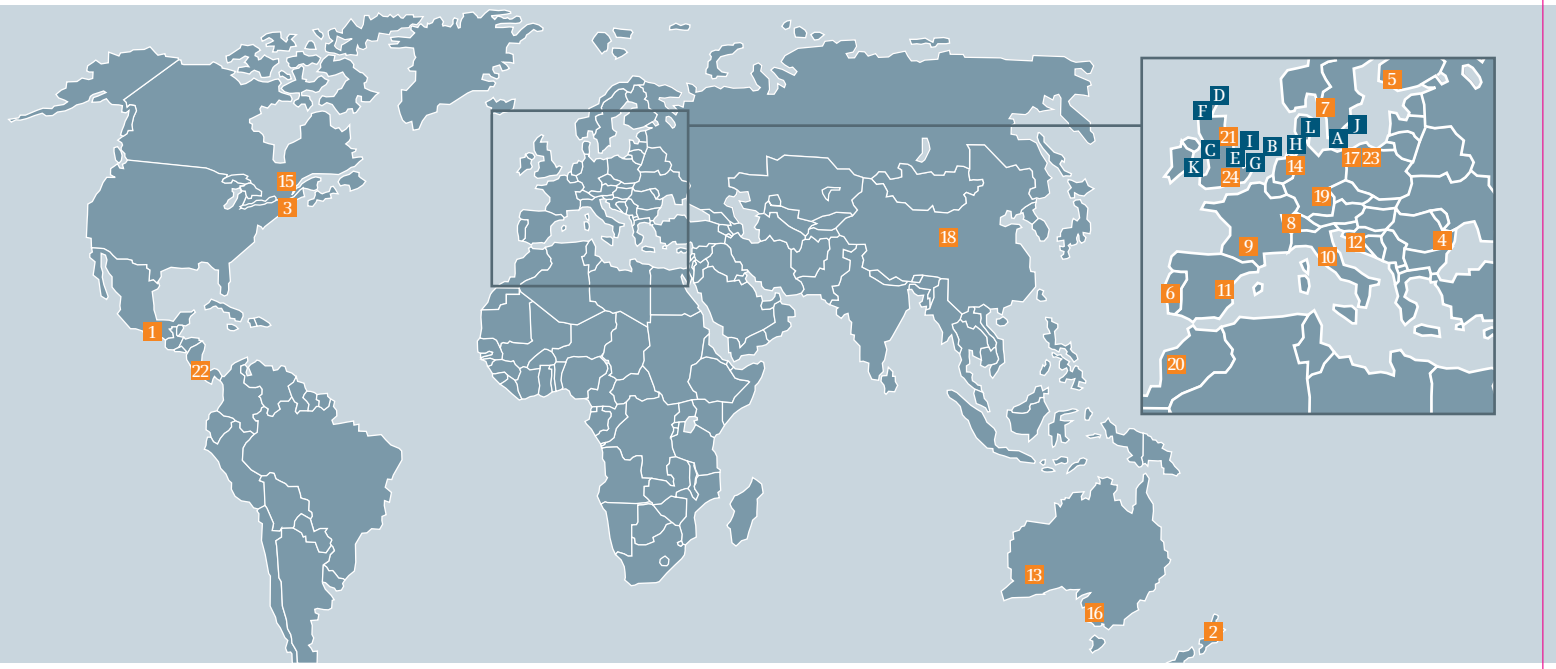


Scheme 2



Scheme 3

Worldwide references



Offshore projects

A Baltic 1, DE, 2010
21 panels

B Belwind, BE, 2010
14 panels

C Walney, GB, 2010
51 panels

D Lincs, GB, 2010,
26 panels

E London Array, GB, 2010
20 panels

F Greater Gabbard, GB, 2009
37 panels

G Thanet, GB, 2009
30 panels

H Offshore 1, DE, 2009
120 panels

I Lynn and Inner Dowsing, GB, 2007
10 panels

J Lillegrund, SE, 2006
10 panels

K Arklow Bank, IE, 2003
47 panels

L Middelgrunden, DK, 2000
59 panels

Onshore projects

1 Oaxaca, MX, 2010
22 panels

2 Te Uku, NZ, 2010
6 panels

3 Lamèque, US, 2010
60 panels

4 Cernavoda, RO, 2010
28 panels

5 Puuska, FI, 2010
22 panels

6 Alto Contada, PT, 2010
18 panels

7 Töftedal, SE, 2010
60 panels

8 Mont Crosin, SZ, 2010
24 panels

9 Germinon, FR, 2010
32 panels

10 Fossa del Lupo, IT, 2010
35 panels

11 La Fatarella, ES, 2010
21 panels

12 Velika Popina, HR, 2010
13 panels

13 Brown Hill, AU, 2009
14 panels

14 Westereems, NL, 2008
6 panels

15 Amherst, CA, 2008
27 panels

16 Hallet, AU, 2007
18 panels

17 St. Karścino, PL, 2007
16 panels

18 Zhangbei, CN, 2006
99 panels

19 Fröhden, DE, 2006
13 panels

20 Parc Eolien, MA, 2006
209 panels

21 Red Tile, GB, 2006
7 panels

22 Turbowinds, CR, 2002
5 panels

23 Darlowo, PL, 2001
12 panels

24 Carno, UK, 1996
3 panels

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