



The strategic role of power grids in the worldwide energy transition

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1. Towards a low carbon energy and sustainable development

The three European Union objectives :

- Reduction of CO₂ emission in the atmosphere
- Security of supply by limiting dependence on fossil fuels
- Completion of structuring electricity and gas internal markets



2. The predominant role of electricity in the new power context

Gross electricity generation of the EU as in its 2nd strategic energy plan

EU - 27 (TWh)	2011	(%)	2020 green New policy*	(%)
Fossil -fuel	1636	48,9	1489	42,6
Nuclear	886	26,5	911	26,1
Renewables	822	24,6	1094	31,3
	3344	100	3494	

(*) 100\$/b

(Sources : European Commission 11/ 2011)
ENTSO-E Memo 2011



Gross electricity generation of the EU 27 in 2020

- 2/3 from low carbon sources:
 - Less than 1/3 from nuclear energy
 - More than 1/3 from renewables:
 - Wind energy : 13% of total mix



The wind energy in the electricity mix in 2020

- 13% of electricity mix in 2020 will represent more than 450 TWh out of a total of 3500 TWh
- To generate such an output, between 200 and 250 GW of wind capacity should be connected to the grid out of a total of 1000 GW



3. The strategic role of power system networks (1)

- Such a drastic change in power systems will require a strong evolution of power grids ...

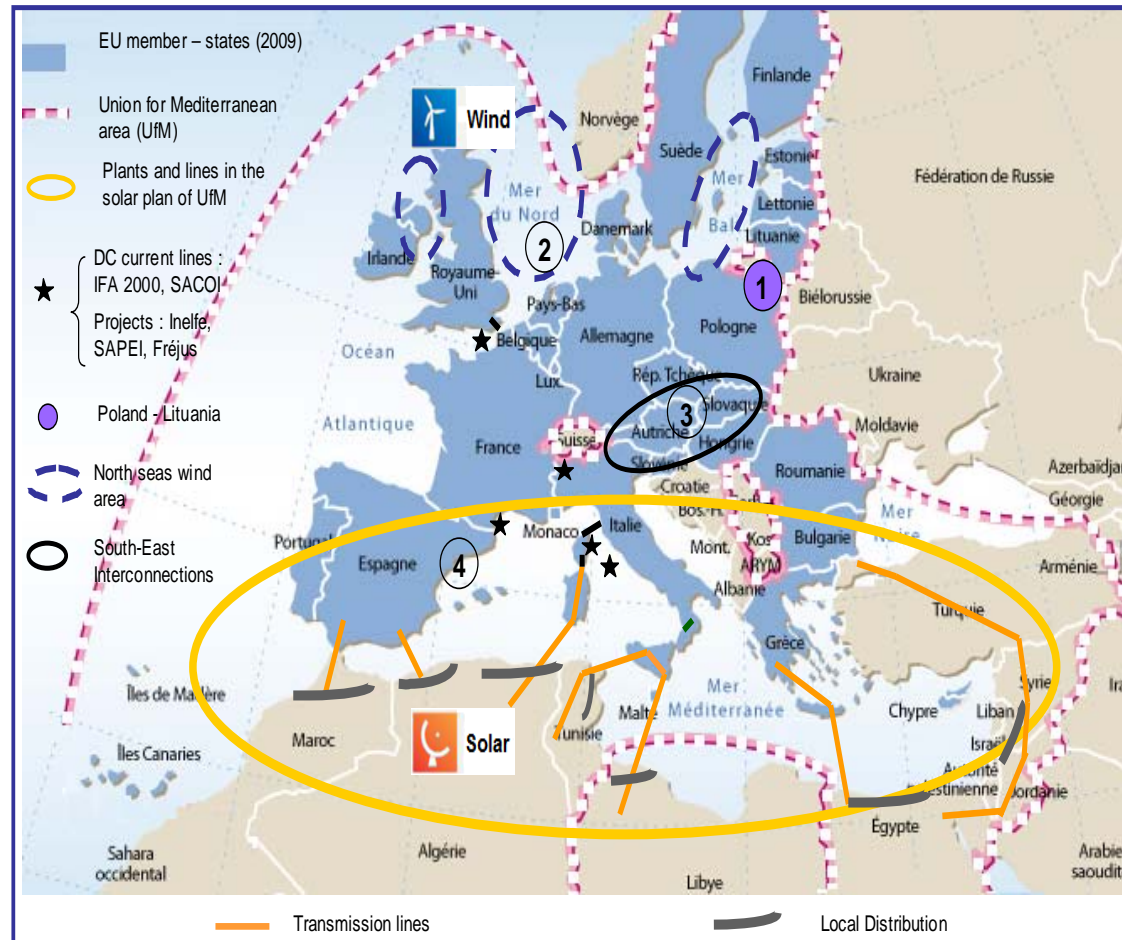


3. The strategic role of power system networks (2)

- To enable the integration of large quantity of intermittent energy (wind and solar)
- To increase the security of supply for mutual back-up of neighbouring member state power grids and regional neighbouring systems
- To achieve a better integration of the EU electricity market



8 Infrastructure development of electricity transmission : four major strategic projects of the EU (3)





The two main strategic directions for the power grid of the future

➤ ***SUPER GRIDS***

- Ultra High Voltage in AC and DC

➤ ***SMART GRIDS***

- More intelligence in the grid



The smart grids

- Transmission grids are intelligent since the 1960's
- More decentralized production in distribution networks : active distribution grids
- Intelligent metering devices enabling greater energy efficiency for end consumers
- More coordination in the operation of the European electric systems, through greater integration of intelligence in the transmission systems



4. The role of CIGRE in this context

- To facilitate the sharing of information and of experience at the World level between the actors of the power systems : operators, manufacturers, regulators, grid users, ...
- To stimulate innovation through the participation of engineers, experts and academics to support the electric power industry,



Thank you for your kind attention!

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