INSULATED CONDUCTORS COMMITTEE – Spring 2010

March 21st – March 24th
Transnational lunch

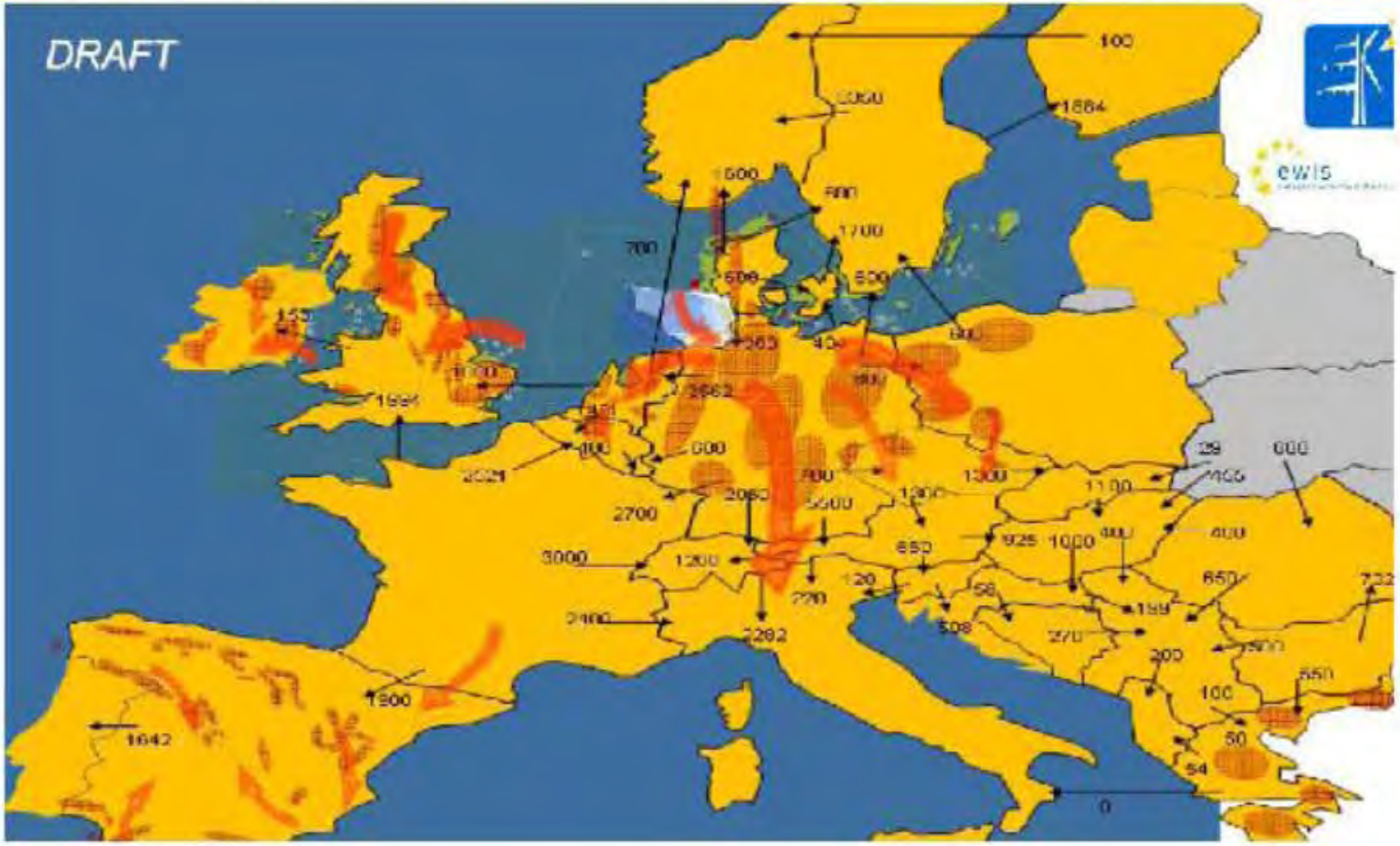
AC, DC and superconductive technologies for power transmission under high voltage and high current

P. Mirebeau – F. Schmidt

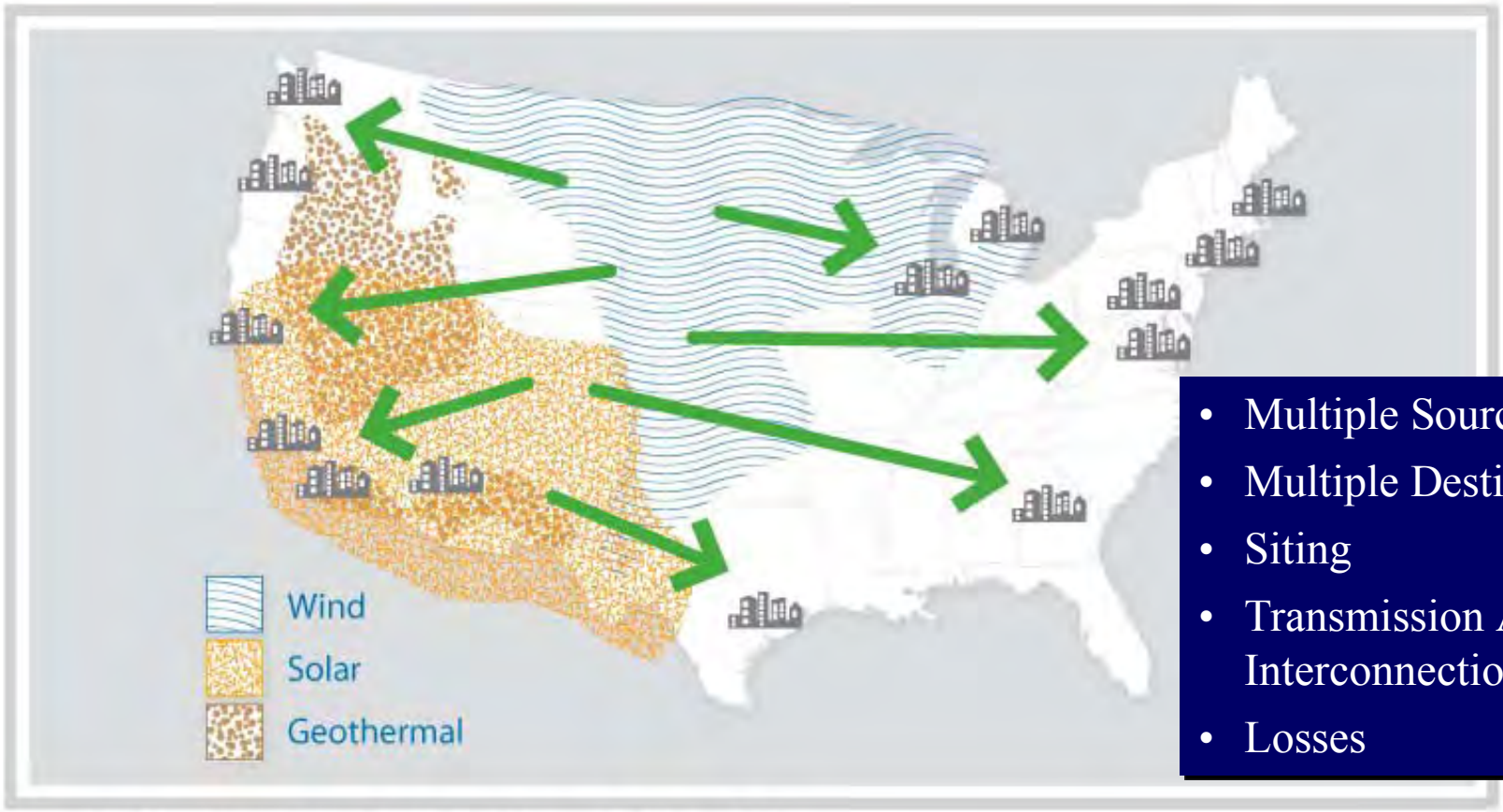
*** TECHIMP for PD tests on 500kV cable system**

ewis
european wind integration study

Necessary Grid Re-Enforcements by 2015



Today's Key Energy Challenge: Carrying 100's of Gigawatts of Green Power to Market



Source: AWEA and SEIA: "Green Power Superhighways" - February 2009

- Multiple Sources
- Multiple Destinations
- Siting
- Transmission Across Interconnections
- Losses

The challenge of moving renewable power over long distances needs a case by case solution

HVAC feeder system
SHIBO 500kV – 2500mm²

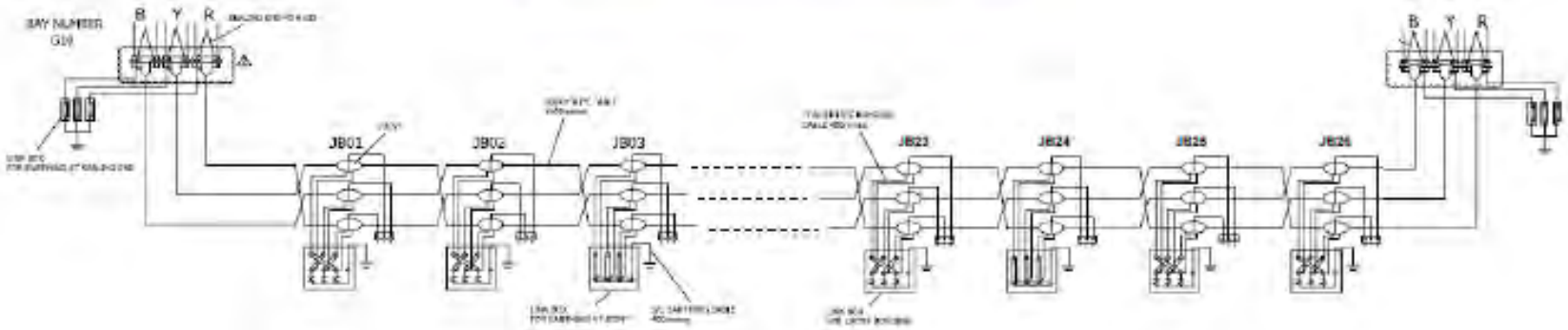
- **Cable characteristics :**
- **Design insulation screen stress: 7kV/mm at Uo**
- **Short circuit current: 63kA 2sec**
- **Halogen free**
- **Fire behaviour complying IEC 332-3 A**
- **Transmitted power: 1560MVA**
- **Weight: 40kg/m**
- **Diameter: 152mm**

HVAC feeder system
SHIBO 500kV – 2500mm²

- **1 link of 17km**
  - 6 oil filled GIS terminations
  - 78 joints

HVAC feeder system
SHIBO 500kV – 2500mm²

All the joints are equipped with an embedded capacitive sensor.



GIS termination

PD: HFCT the ground link

SYNCH: Rogowski sensor

Joint

PD: embedded capacitive sensor

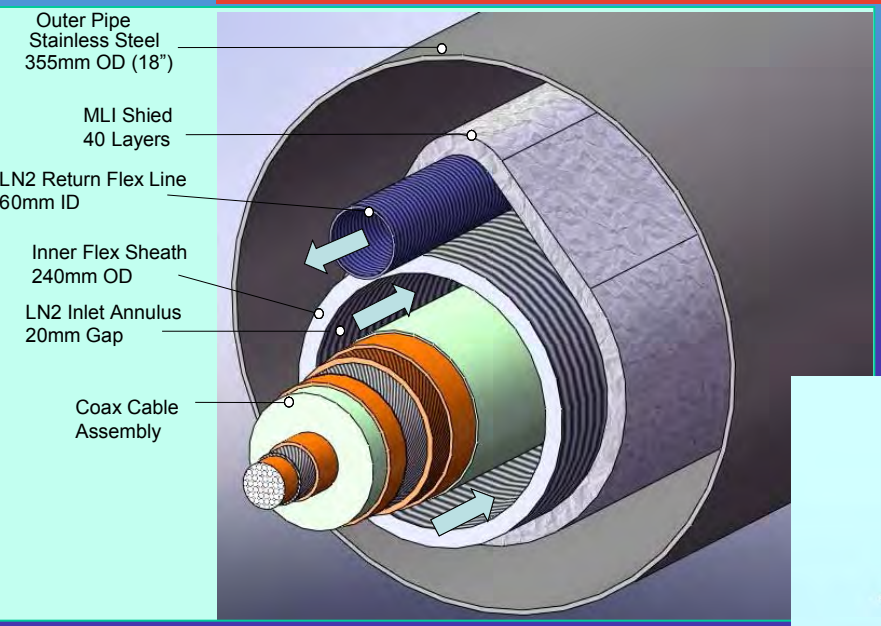
SYNCH: Embedded capacitive sensor

HVAC feeder system
SHIBO 500kV – 2500mm²

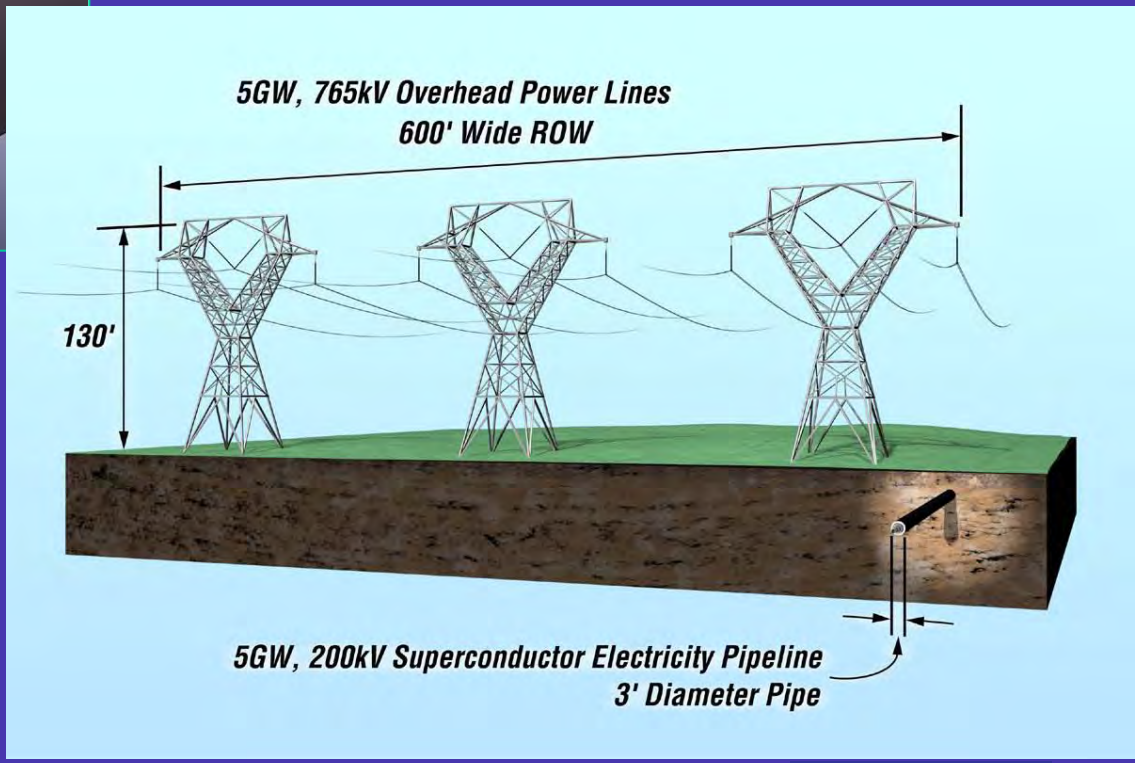
- **After installation tests :**

  - ✓Soak test 24h Uo (290kV)
  - ✓3 times switch on – switch off
  - ✓PD test (in progress, up to now 24 joints out of 78)

HVDC transmission of large power

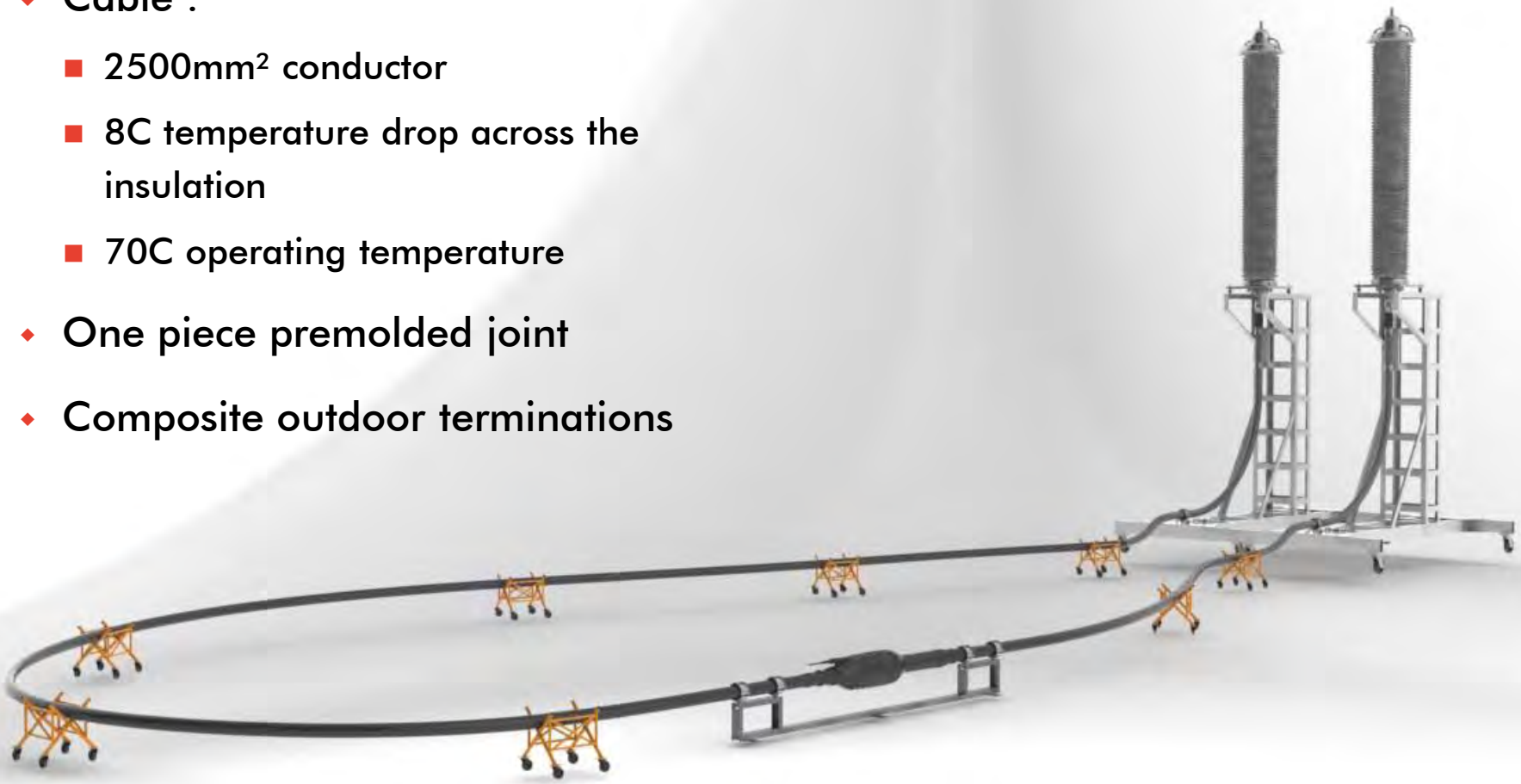


- A dream for transmission people ?
- +/- 200kV 12500A
- Low losses



HVDC transmission of large power

- Tests on resistive cable systems
  - Type test at 220kV vs CIGRE TB 219
  - Cable :
    - 2500mm² conductor
    - 8C temperature drop across the insulation
    - 70C operating temperature
  - One piece premolded joint
  - Composite outdoor terminations



Conclusion

- For power transmission under high voltage and high current, AC, DC resistive and superconductive technologies provide new tools to the network designer.
- Let's guess that these technologies will improve globally the electric network efficiency.
- All of them should be used depending on a case by case optimisation as well as traditional electric power transportation means

THANK YOU FOR YOU ATTENTION