ENTSO-E’s Perspectives on HVDC

SEE: HVDC 2012 - LE COURANT CONTINU HAUTE TENSION
Calais, 23 – 24 Octobre 2012
Energy policy goals

- **Sustainability/GHG:**
  - More renewables, further from the loads
  - More heating and mobility with electricity

- **Competitiveness/market integration:**
  - More long-distance flows

- **Security of supply**
  - More optimal resources sharing
Where are we heading to?

Share of total RES in NGC per country in January 2020, 7 p.m.,
Scenario EU2020

2012
320 GW of RES
538 GW of peak load
3300 TWh demand

2020 – TYNDP 2012
536 GW of RES
567 GW of peak load
3600 TWh demand

2014 TYNDP
2030 visions

2050
80-95% reduction in greenhouse gases with higher reduction for the electricity sector
Why a Ten-Year Network Development Plan?

Regulation (EC) 714/2009 – “In order to ensure greater transparency regarding the entire electricity transmission network in the [Union], the ENTSO for Electricity should draw up, publish and regularly update a non-binding [Union]-wide ten-year network development plan”
The TYNDP 2012 package

a vision for the European extra high voltage grid

- non-binding
- updated every 2 years
- based on common market and network studies
- generation adequacy outlook

a comprehensive document suite that includes

- Ten-Year Network Development Plan
- Scenario Outlook and Adequacy Report
- 6 Regional Investment Plans

Consultation: 1 Mar - 26 Apr.
Final release: 5 July 2012
www.entsoe.eu
Renewable energies boom – by 2020 provides 38% of the electricity demand

1/3 of present generation capacity to be replaced to meet demand in the coming decade **+3% per year**

Peak load growth **+1.7% per year**

Grid length development **+1.3% per year**
2020 Europe – 17% increase in infrastructure

By end 2016

2017 and beyond

Legend
- Transmission Upgrade
- Transmission New
- 110kV New
- 220kV New
- 380kV New
- 400kV New
- 400kV DC New
- 400kV DC Upgrade
2020 Europe – additional 52300 km lines

DC

<table>
<thead>
<tr>
<th>AC &gt;= 330kV</th>
<th>AC&lt;330kV</th>
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<tbody>
<tr>
<td>Upgrade 8300 Km</td>
<td>subsea cable 680 Km</td>
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<tr>
<td>Overhead lines 28400 Km</td>
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<td>inland cable 420 Km</td>
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<td>subsea cable 400 Km</td>
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overhead lines 2100 Km
inland cable 1490 Km
subsea 9000 Km

12590 km DC lines

Security of Supply: 21.900 km
Renewable Energy Sources Integration: 45300 km
Internal Energy Market: 18.200 km

60% long term
40% Mid term
1. Permitting and public acceptance
   - Slow and cumbersome permitting procedures the main obstacle for delivering investments
   - Public acceptance cannot be improved by TSOs alone

2. Legislative implementation
   - Some compatibility among the 27 MS energy policies
   - Some stability in EU legislation

3. Attractive financing framework
   - “real” return in line with similar risk profiles businesses
   - incentives for activities “really” managed by TSOs
   - legislation and regulation in line with 20 to 50 years assets
A 10-year plan to meet EU 202020 goals

> 100 projects, 52 300 km, approx. €104 bn of investments

• Notwithstanding non pan-European significance projects

+1.3% per year grid length development despite a major upcoming shift in generation mix to accommodate wider, stronger, more volatile power flows

• One third of the present generation capacity to be built in the coming decade (i.e. +3% per year)

A solid basis for the Project of Common Interest selection

Social acceptance is still the major challenge!

• 1 in TYNDP 2010 investment projects are delayed because of longer than expected authorization procedures
HVDC Challenges

HVDC integration in AC networks: stability and control issues to be solved; e.g. France – Spain HVDC interconnection.

Multi terminal operation

Meshed HVDC grids: stability, control and DC breaker

Multi vendor: meshed grid is only conceivable if interoperability between different vendors is solved.

Cables: higher power ratings