# Danish Policy on Underground Cabling of HV lines

Anders H Kristensen
Danish Energy Agency

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# Background

- Local opposition to new overhead HV lines has always been strong, but the voice has been low
- The strength of this opposition has remained and increased over the years
- Politicians listen to their voters and some voters have a very high voice
- Only limited expansion of the HV grid required during the last 20 years
- A new need for expansion due to wind integration; need for a new political decision
- Existing guidelines proved inadequate

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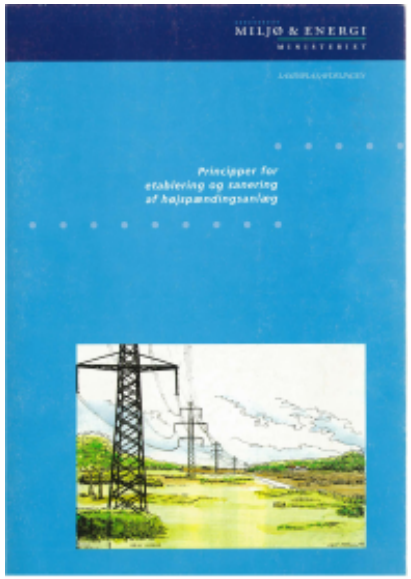
# Guidelines from 1995

- New 400 kV as overhead lines
- New 132-150 kV as overhead lines except in urban areas or nature of national importance
- Under 100 kV as underground cables
- DC as underground cables




- Theoretically logic but practice showed huge dificulties for new OH line projects

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# STRONG OPPOSITION !

- Local and political opposition against OH lines
- Upgrade of the North-South 400 kV axis in Jutland stalled
  - Application for permission in 1995 according to Electricity Supply Act.
  - Physical planning 1995-2007. Ready for decision, but the County in charge did not decide before adminstrative reform in 2007. The County and the administration closed down without a decision being taken.
- Connection of 200 MW offshore wind at Horns Rev redefined
  - Original project included 25 km new 400 kV overhead line on land
  - Due to strong local and political opposition and the risk of penalty if delayed connection of the turbines – the project was changed to a 100% cable connection
- Strong political will for more underground cabling with the central administration pushing for analysis

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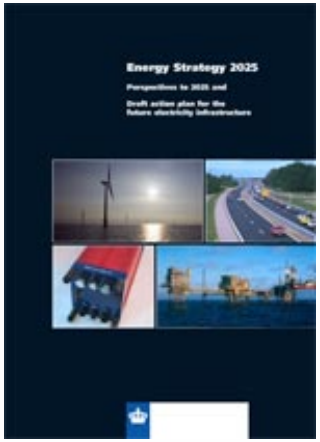
# National Energy Policy




- Two key elements during the last 10 years:
  - Expansion of wind power capacity
  - Further integration into the European electricity market
- No overall policy on power infrastructure apart from the guidelines, which proved inadequate
- Fragments of policy support for specific projects – Energy Strategy 2025 as example
  - Support to the Great Belt Link for commissioning in 2010
  - Awaiting final analyses for a Skagerrak 4
  - Increase of capacity towards Germany – support to Energinet.dk to establish a constructive dialogue with the German TSO
- Fragmented and very detailed at the same time

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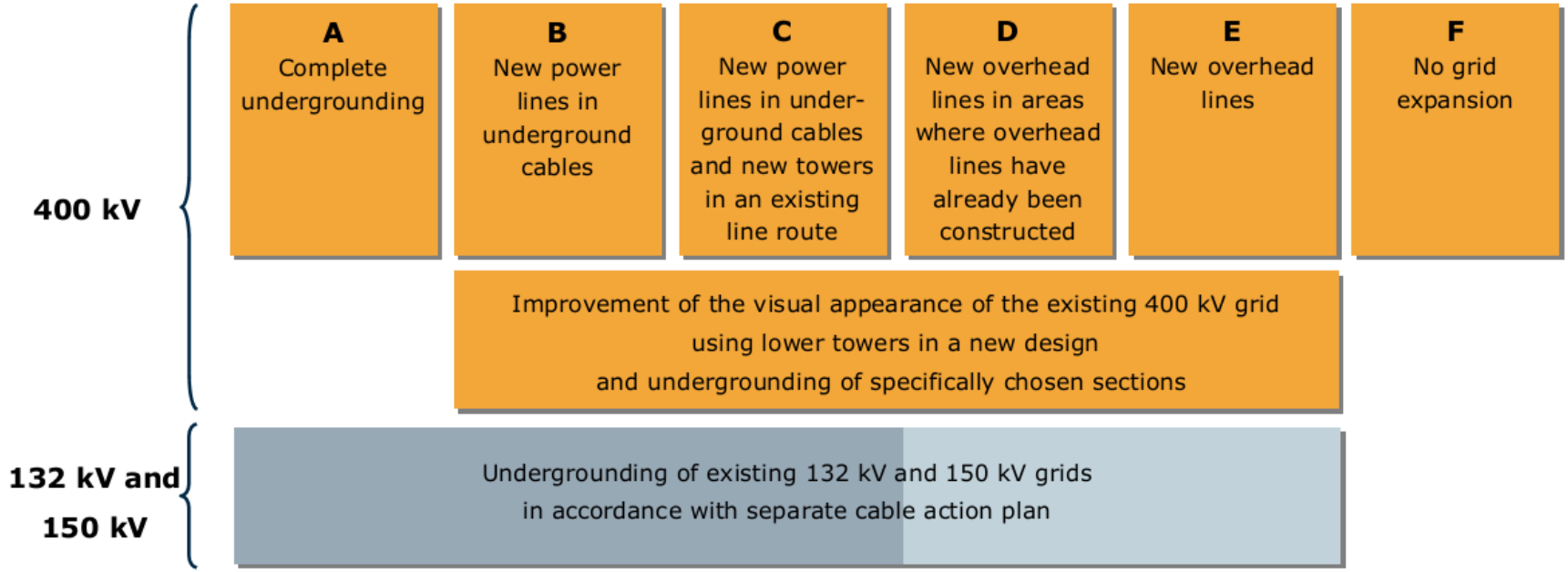
# Electricity Infrastructure Committee

- An ad hoc committee established by the Minister of Transport and Energy in Summer 2007 with the technical analysis handed over to the minister April 2008
- Energinet.dk chairing the committee and carrying out the technical analyses. Supplemented with external landscape analyses and visualisations.
- Representatives from Ministry of Finance, Ministry of Transport and Energy, Ministry of Economics, Ministry of Environment, Association of grid companies and Association of Municipalities

# Electricity Infrastructure Committee

- A number of scenarios being analysed




- Costs up to 48bn DKK of which 11,5bn for cabling of the 132 and 150 kV grid
- An analysis without a recommendation

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# The administrative and political process

- A proposal for political decision drafted by the energy administration
- Interministerial hearings – Discussions on the models B-C-D. Economic assessments. An open recommendation
- Proposal approved by Government
- Political negotiations between Government and opposition – considered as a necessary but not the most important element in discussions.
- 4 November 2008 agreement reached on new guidelines

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# New administrative guidelines 2008

- The aim is – as security of supplies, technology and socio economy makes it possible – that all 400 kV-connections are established underground instead of overhead lines.
- However, today it is a technological challenge and very expensive to cable underground at long distances at 400 kV voltage level – but there is an actual need to upgrade/renew the 3 existing 400 kV overhead lines. Those three projects can without further analyses start up aiming at commissioning in the mentioned years .
- An analysis on reduction of the impact on landscape to be initiated
- New 132 and 150 kV-connections will be constructed as underground cables.
- The existing 132/150 kV-grid shall be cabled underground according to a coherent master plan for underground cabling.

ENERGI STYRELSEN

**NEW ADMINISTRATIVE GUIDELINES**

Unofficial translation from Danish

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Side 1/2

**Underground cabling and expansion of the Danish electricity transmissions grid**

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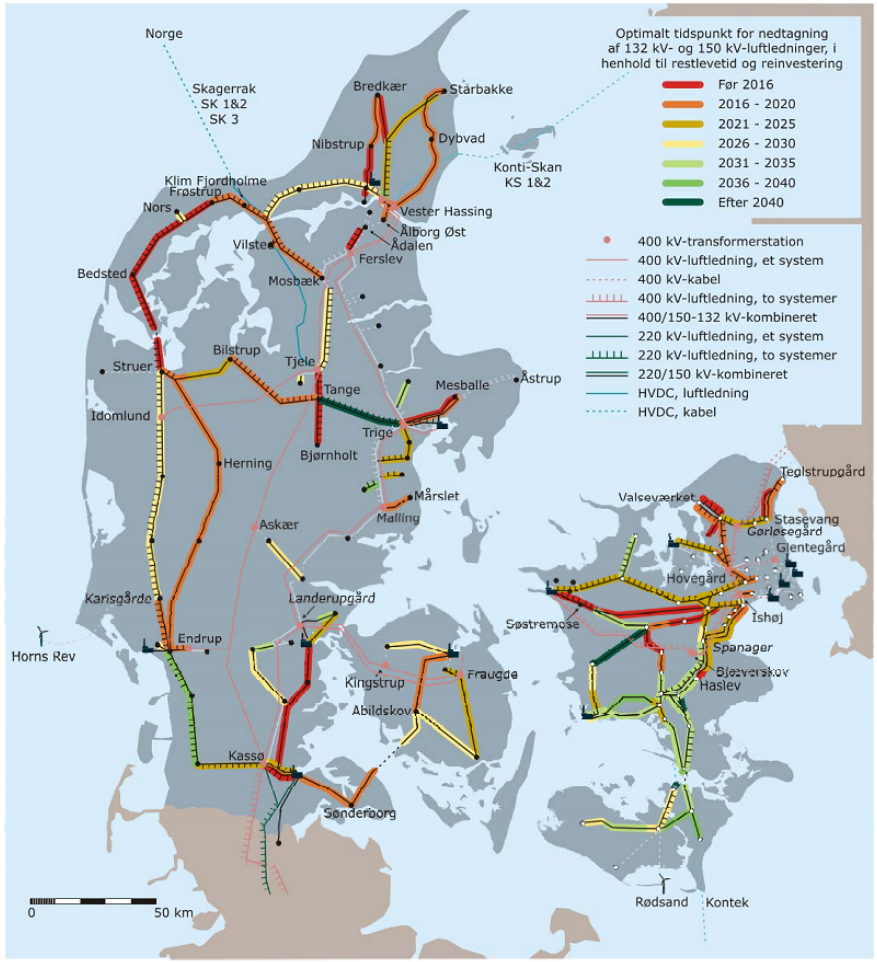
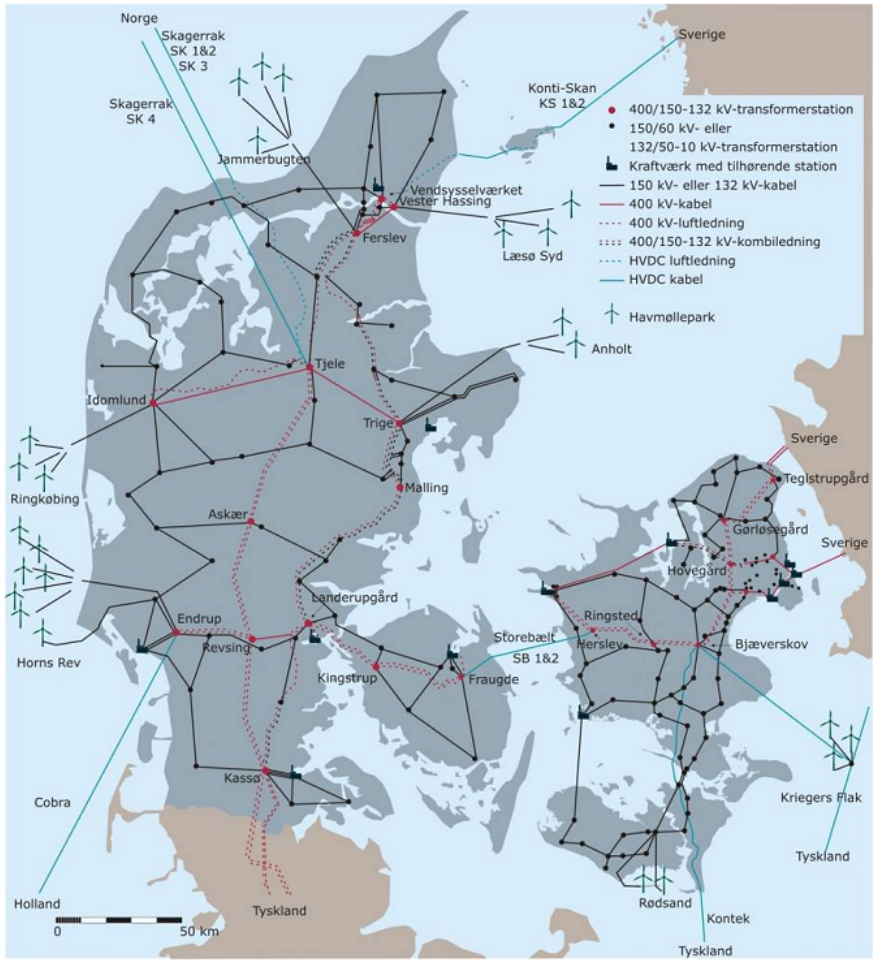
# Detailed planning 2009

- Two plans to be carried out
  - Master plan for underground cabling of existing 132 and 150 kV
  - Plan for reduction of the visual impact of the existing 400 kV-grid (selection of 6 spots for investment)
- Presented for members of Parliament in April 2009 who accepted the reports.
- Decision on a 20 year implementation of undergrounding cabling of 132 & 150 kV
- Regular progress reports on the implementation to the energy administration as follow-up

# Underground cabling - 132 & 150 kV

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# Status 2013

- Upgrade of 400 kV overhead line Kassø-Tjele under construction, to be commissioned 2014

- Reduction of visual impact of existing grid. 2 projects under construction. Planning phase for another project finalized. 3 projects postponed.

- Underground cabling of 132 and 150 kV- grid. 300 km of ~3.200 km decommissioned.