

Well Connected?

Power Highways for Renewables!

European Perspective on GRID Connections

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No roads => no cars, no road transport, no development

No rail tracks =>

No telephone cables =>

No internet lines and high speed backbones =>

No grid => no wind power, no clean & cheap electricity

Denmark: Pioneer of Wind Energy in Europe

Strategic decision against nuclear and for wind in the 70ies

=> minimum price plus (degressive) subsidy on private investments

=> a wind turbine manufacturing industry was quickly established

Wind is seen as national asset.

Grid access and planning permissions were very simple.

Neo-liberal thinking ended the minimum price law and introduced "competition" in the grid in the late nineties, killing the home market for Danish wind manufacturers (and only Vestas remains).



Denmark 'renationalised' its high voltage grid in 2004 in order to facilitate strategic development that competition will not ensure in a system that is by nature a monopoly.

In 2005 Denmark 'socialised' costs for expanding and strengthening the grid and for extending it to a connection point at the boundary of designated areas for wind. These costs are part of grid operator's costs.

Denmark regards this as a good investment as it generates income in rural regions and reduces the outflow of money from the national economy for imported fuels.

Denmark aims at 50% wind by 2025. In this scenario the wind benefit is calculated to be 2.7 €m p.a. (The assumed oil price for the scenario was 52 US\$/barrel!)



The grid in rural northern Germany (Schleswig-Holstein) was not designed to take 2,754 MW of wind power.



Had you asked the grid experts in 1990, they would have told you it was impossible. But 2,754 MW are there. And wind is still increasing. (Even plans for massive expansion off-shore.)

Schleswig-Holstein:

15,799 sqkm

pop. 2.8 Mio

2,754 MW wind

>30% wind power

Ireland (with lots more wind):

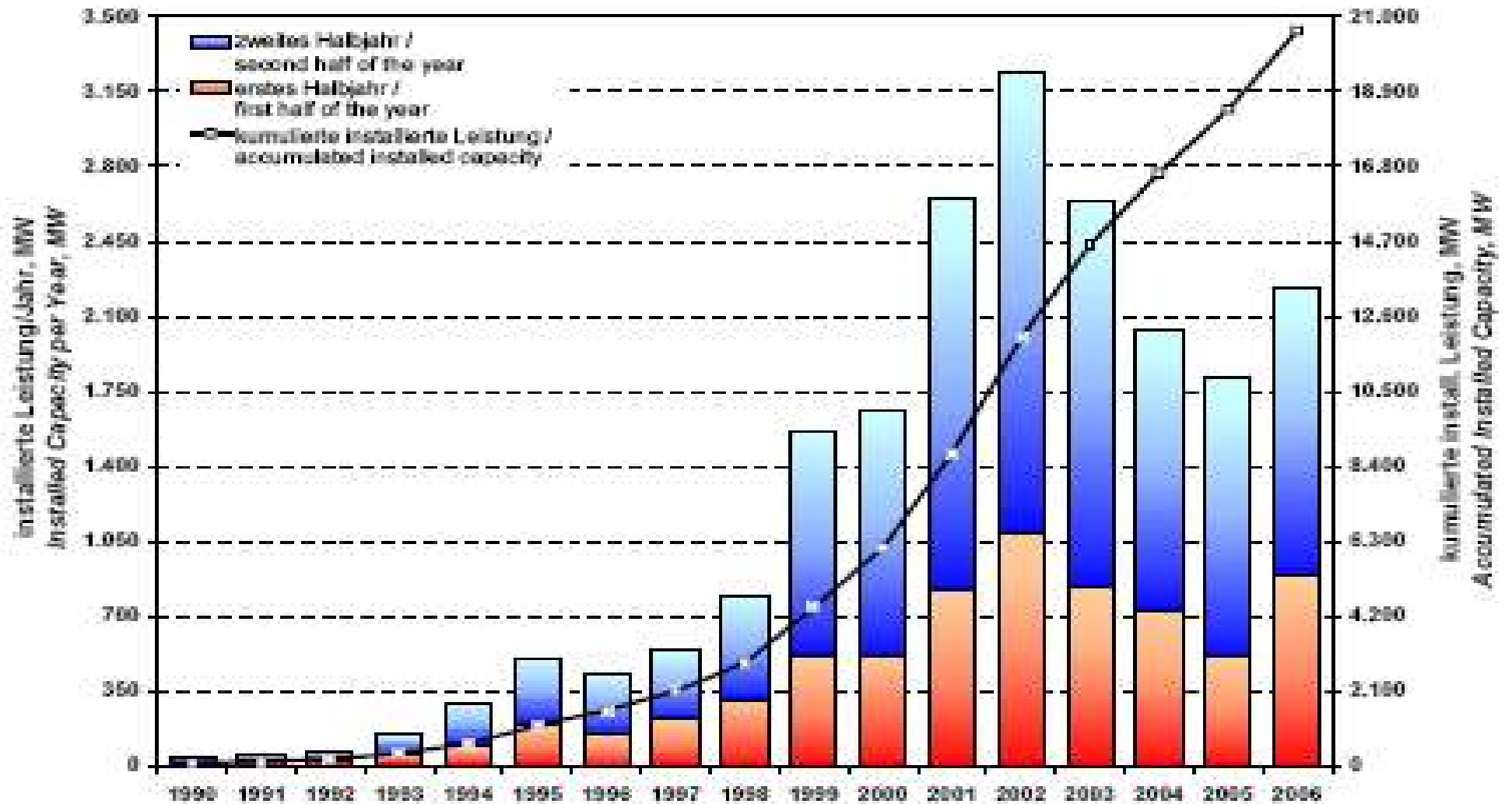
70,182 sqkm

pop: 4.2 Mio

866 MW wind

5.6% wind power





Electricity from Wind in Germany: $\approx 7\%$
 Sachsen-Anhalt $\approx 40\%$

Germany now has >21,000 MW wind.

Potential of Wind Energy in Germany 2020

Wind on-shore: 45,000 MW
Wind off-shore: 10,000 MW
Share of Electricity: 25%

Source: BWE PI 4 May 2007

EWEA (2010) 4,000 MW Off-Shore in Europe

Installed 2007: 852 MW (Source: WAB PI 13.6.2007)



Four aspects of wind power success in Germany

1. Energiewirtschaftsgesetz (1935)
obligation to buy all available electricity
/ reviews of 1998 (unbundling) and 2007 (regulator)
2. Minimum Price Law (FIT) (1990)
all renewables must be bought
Renewable Energies Law of 2000 / review 2004 (EEG)
priority for renewables in grid
cost added to price of electricity (1€/month per household)
obligation to immediately re-enforce grid if required (but no sanctions)
"Clearing Unit" to settle grid disputes
from 2004: curtailing is possible
3. Federal Building Law (1997) „building privilege for water and wind“
4. Infrastrukturplanungsbeschleunigungsgesetz (2006)
Off-Shore plus 20 km in land, grid access is free (to 2011)!



Ireland has a **vast** resource!

With new technology in wind turbines, it is probably large enough to produce all the electricity Ireland needs – and more: a commodity of great value that can be exported. So investing in grid infrastructure will pay for itself (grid lasts 30-40 years).

Ireland consumes some 26,000 GWh/a.

With a capacity factor of 28%,
5,300 wind turbines (2 MW) or
1,770 wind turbines (6 MW) will produce that power.

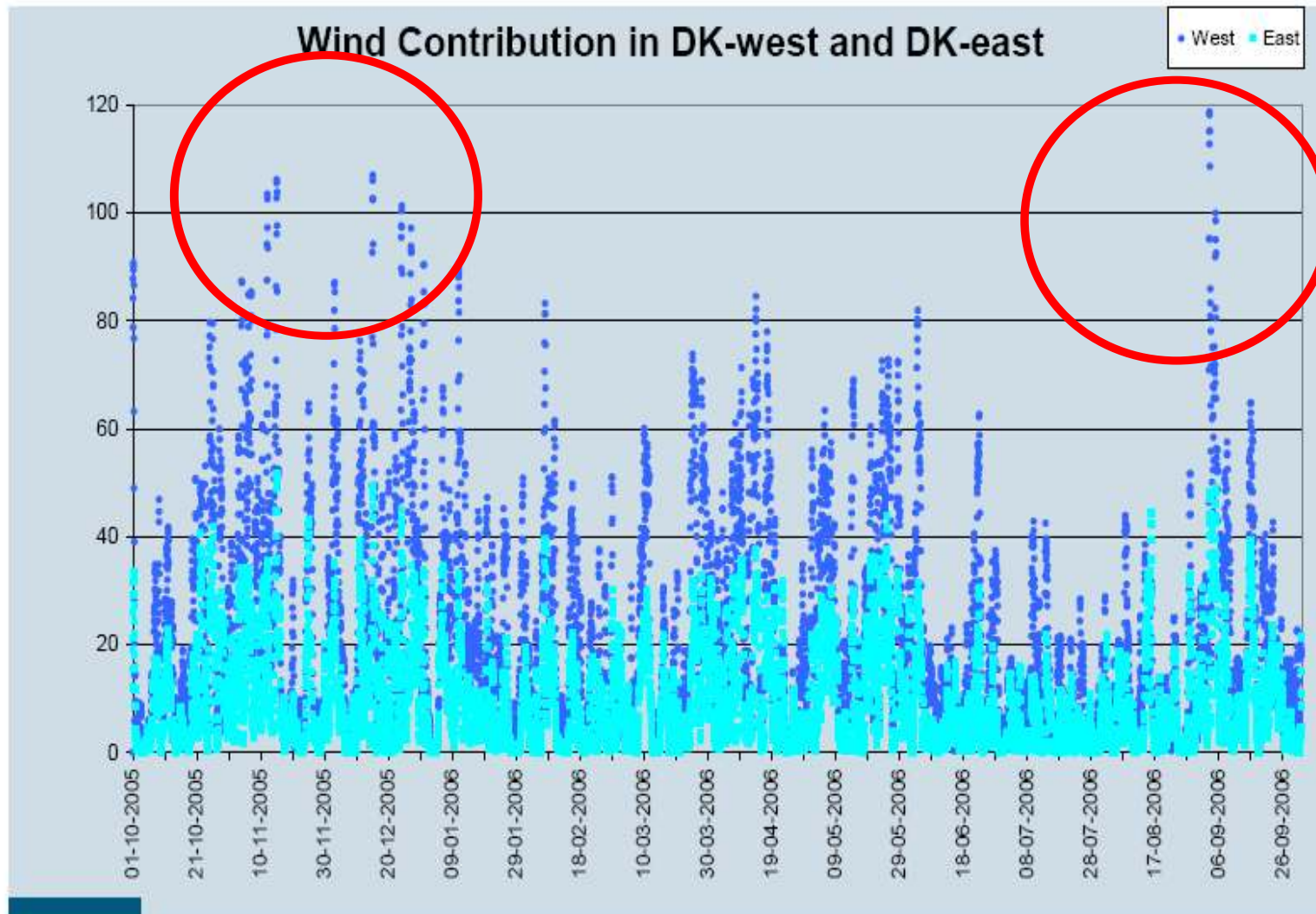
Schleswig-Holstein has 2,754 wind turbines.

And of course we all want a mix of renewables!
Biogas, bio-oils, wood, solar, hydro, wind
(and energy saving/efficiency)



Can the grid cope with 100%? Yes! – 2006 in West-Denmark And in Schleswig-Holstein, and Northern Lower Saxony

ENERGINET/DK



Given the experience of to decades of legislation: What is required to utilise this potential in Ireland?

1. A decent minimum price for wind.
(And perhaps 5,7 ct/kWh is not enough.)
2. A clear-cut grid strategy that consists of two parts:
 - 2.1 Interconnection to the UK and France, as part of a European grid structure (co-)financed by EU.
 - 2.2 Simple rules for connecting wind (and other renewables).
i.e., priority connection; a strong grid that is easily available to those wanting to invest in clean generation.
Such networks require state finance and control.

If you ask grid operators, the answer will always be: NO, it cannot be done. They will come up with all kinds of reasons for NOT doing it. German legislation had to be improved with each revision of the law to make our grid operators comply (and that battle is not over).

The grid is too important an asset to leave it to technocrats and pseudo-rational rules of connection.



The essence of two decades of dealing with grid issues:

1. All renewables must be connected to the grid within two years.

If the grid operator fails to connect the generator within that period, he must pay compensation to the generator at an increasing percentage of the lost generation, maximising at 100% after the end of the third year.

This is not what we have, but what we should have in German law. The 2009-revision does contain a clause for damages.

No time frame or damages in Danish law, but then Energinet.DK is state controlled.

2. The grid must be expanded to the point that allows easy access for the generator.

This we have – in theory, but in practise often in lengthy legal disputes between grid operators and planers. It is tightened in the 2009 review.

This is what the Danish law requires.

3. Grid expansion, improvement and connection are to be regarded as grid operating costs.

This is the provision in Danish law.

In Germany such costs are distributed across all kWh sold. In combination with costs for higher prices, e.g. for solar (45 ct/kWh), this raises the consumer price by 0,3 ct/kWh – or by 12 € p.a. per household, a sum easily saved with increased efficiency.



Why is such a radical shift required?

Infrastructure investments are investments into our future, especially if the infrastructure will pay for itself.

Wind is free - and will be for the foreseeable future.

Climate change and depletion of fossil resources are increasingly affecting our economies and way of life.

Both Al Gore's presentation and the Stern report tell us we need alternatives for electricity, heating and traffic – and the faster, the better.

If global warming is like a fire, the renewables are the fire brigades. And fire brigades have clear priority rights: they can go across red lights, break all speed limits – and go the wrong way up one way streets.



What are the obstacles to this radical shift?

The biggest obstacles are:

- a) vested interests; (back home these are called RWE, Eon, EnBW and Vattenfall, our four big grid operators / generators.)
- b) technocrats and grid operators; (Who like to keep things running as they always were run, minimising their risk and the need to learn new ways of doing things.
But it is indeed impossible to run a grid with decentralised generators with rules designed for a grid with large centralised generators.
Decentralised grids were not taught at university 30 years ago to those who now are the decision makers in grid operation.)
- c) Political inertia (why reverse an existing policy) – and lack of vision (of a 100% renewable Ireland).



100% Renewables in Ireland can be done!

**Access to grid and minimum price
are the keys to success!**



