DUTCH RENEWABLES ABOUT FACE TOWARDS NUCLEAR, by Willem Post; dated February 13, 2011
http://www.coalitionforenergysolutions.org/

INTRODUCTION

The Borssele Nuclear Power Station, Borssele, The Netherlands, capacity 485 MW, output 3,625 GWh/yr, started producing power in 1973. It has a pressurized water reactor, PWR, similar to other nuclear plants in the US. It is the only nuclear power plant in the Netherlands.

Areva, a French company, reprocesses the spent fissionable material in La Hague, Manche, Basse-Normandie, France. Part of the agreement is that the radioactive waste, i.e. the products of the reprocessing which are not useful, are taken back by the Netherlands. They are stored at the Central Organization for Radioactive Waste, COVRA, also in Borssele.

COVRA is the national storage facility for all radioactive wastes. It is a surface facility suitable for the next 100 years. Borssele produces around 12 metric tons of high level waste per year.

In 1994, government and parliament decided to close down the Borssele plant as of 2004. However, due to legal action by owners and employees of the plant and changes in government policy in 2002, the decommissioning was delayed until 2013, a 40-year life.

http://www.powergenworldwide.com/index/display/articledisplay.articles.powergenworldwide.nuclear.reactors.2010.09.dutch-provinces_plan.QP129867.dcmp=rss.page=1.html
http://en.wikipedia.org/wiki/Borssele_Nuclear_Power_Station
http://www.ask.com/wiki/Borssele_nuclear_power_plant

DUTCH AND DANISH OPPOSITION TO WIND POWER

Dutch Opposition

The Netherlands annual consumption is about 108,200,000 MWh/yr. It has about 2,000 onshore and offshore wind turbines. Installed capacity of wind turbines has been stagnant for the past 3 years. It was 2225, 2229, and 2237 MW at the end of 2008, 2009 and 2010, respectively. The main reason for the stagnant onshore capacity is that the Dutch people's opposition to up to 400-ft tall wind turbines has increased during the past 3 years.

Wind power production was 2,237 MW x 8,760 hr/yr x national capacity factor 0.186 = 3,644,878 MWh/yr in 2010, or about 3.37% of total annual power production.

The Dutch national wind capacity factor is a dismal 0.186. The German national wind capacity factor is an even more dismal 0.167; Holland and Germany are very poor places for wind power.

Expanding wind power to meet the European Union's 20% renewables targets by 2020 meant adding at least another thousand 3 MW, 400-ft tall wind turbines to the Dutch landscape at a cost of about $6 billion. The Dutch people found that to be an unacceptable intrusion into their lives and an unacceptable return on their investment, especially when considering the small quantity of CO2 reduction per invested dollar.

An additional 3,000 MW of offshore wind turbines was considered but rejected, because the capital cost of about $10-$12 billion was found to be excessive and the power produced too little. The power would have to be sold at very high prices to make the projects feasible. The ill-conceived, offshore Cape Wind project in Massachusetts is a perfect example. See Base Power Alternatives..... website below.

Solar power was considered but rejected, because of the German experience which has a dismal national PV solar capacity factor of 0.095 out of a theoretical maximum of about 0.115. The reasons for the deviation is that PV panels are aging, roofs are not true-south facing and are not correctly-angled, snow covers the panels for about 20-30 days during the winter, etc.

For comparison, Vermont's statewide PV solar capacity factor is about 0.12 out of a theoretical maximum of about 0.143; also dismal. Germany and New England, because of their rainy, snowy and cloudy weather, are very poor places for solar power. See Impact of PV ..... Germany website below.

As a result of the above and other drawbacks of variable, intermittent wind power, nuclear power became less controversial and is again viewed as one of many possibilities to reduce CO2 emissions and increase national energy self-reliance.

The Dutch government decided in 2006 that Borssele would remain operational until 2033, a 60-year life, the same as dozens of similar plants in the US.

The governments of Germany, Sweden and the UK have also reversed themselves and decided to keep their existing nuclear plants in operation, extend the lives of many of them to up to 60 years and build new nuclear plants.

Danish Opposition

Denmark's prevailing winds are from the North Sea, across Denmark, to the Baltic Sea. Denmark has more than 4,000 onshore wind turbines with a capacity of about 3,150 MW, nearly unchanged since the end of 2003. The increases in capacity in 2009 and 2010 are due to offshore wind turbines. About 90% of the wind turbines are supplied by Vestas.

It may be a surprise to many people that Denmark is not a very a good place for wind power. Denmark's national average wind capacity factor is 0.242 for the 5 years ending 2009. A capacity factor of about 0.40, such as in many areas of the Great Plains states, is required for the costs of unsubsidized wind power to be on par with the cost of power generated with coal, gas and nuclear plants.

Denmark exports most of its wind power to the pumped-storage hydro plants of Norway and Sweden, which, for a fee, integrate the power into the Scandinavian grid. The power is subsequently used elsewhere in Scandinavia and Germany. The low capacity factor, the transmission losses, the integration fees and the additional grid management efforts all combine to make Danish wind power a rather poor investment; its losses are recovered by raising residential electric rates. The Danish COMMERCIAL rates are kept at about 1/3 of the residential rate for international competitive reasons; an illegal trade subsidy?

Opposition to the up to 400-ft tall onshore wind turbines had increased so much over the past 6 years that Dong Energy, the giant state-owned utility, finally announced in August, 2010, that it would abandon plans for new onshore wind power and that any future wind power development would be offshore. This may have elicited a sigh of relief from the Danish people and a feeling they have some control of their government after all.

The reason for the slowness of Dong Energy is to protect a national champion, the Danish wind turbine company Vestas. With government subsidies it became the largest such company in the world (GE is second). The Danes are proud of it, despite their very high residential electric rates.

Besides opposition to 400-ft tall wind turbines, the stagnant onshore capacity is also due to the greater access to information on the Internet; the Danes became aware of the poor economics of their heavily-subsidized wind power which is one reason Denmark's residential rate is the highest in Europe.

In 2009, the Institute for Energy Research commissioned the Danish think-tank CEPOS (Centre for Political Studies) to report on electricity exports from Denmark and the economic impact of the Danish wind industry. The report states that Danes pay the highest residential electricity rates in the European Union (partly to subsidize wind power), and that the cost of saving a ton of carbon dioxide between 2001 and 2008 has averaged $124. The report estimates that 90% of the jobs were transferred from other technology industries to the wind industry, and that 10% of the wind industry jobs were newly created jobs, and states that as a result, Danish GDP is $270 million lower than it would have been without wind industry subsidies. Subsidized job creation and subsidized industry building appear to be economic downers.

Likely Scenario of the Opposition

What caused these three nations to invest in wind power, and in case of Germany to also invest on a grand scale in PV solar power, when much less capital intensive measures, such as increased energy efficiency, would create much quicker and greater returns per dollar invested AND reduce CO2 more effectively per dollar invested?

The scenario likely was as follows: a cause (global warming); an optimistic, can-do, should-do hubris; a charging-ahead without knowing likely outcomes (lack of engineering studies); a hiding-of-the-facts (higher capital costs, lower power production and CO2 reduction, bigger visual impact and less job creation than promised) by insiders when the reality of subsidized outcomes veers from what was envisioned and promised; multiple analyses of the facts by credible, knowledgeable skeptics slowly entering the consciousness of the electorate (the insiders likely already knew the outcomes they had been creating); and finally opposition by the aggrieved electorate and the defense of the status quo by the ones (vendors, developers, financiers, legislators, etc.) who have dug their way to the vault (favorable regulations, subsidies, re-election, etc.) and will do anything (such as threatening to move their businesses out of state) not to have the fault moved.

http://theenergycollective.com/willem-post/46824/impact-csp-and-pv-solar-feed-tariffs-spain

http://theenergycollective.com/willem-post/46142/impact-pv-solar-feed-tariffs-germany
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http://www.cbs.nl/en-GB/menu/themas/industrie-energie/publicaties/artikelen/archief/2010/2010-3052-wm.htm
http://en.wikipedia.org/wiki/List_of_countries_by_electricity_consumption
http://www.telegraph.co.uk/news/worldnews/europe/denmark/7996606/An-ill-wind-blows-for-Denmarks-green-energy-revolution.html
http://en.wikipedia.org/wiki/Wind_power_in_Denmark

DUTCH GOVERNMENT DECISIONS

Recently, the Netherlands

- became the first nation to abandon the EU-wide target of producing 20 per cent of its domestic power from renewables by 2020.

- reduced its targets for renewable energy, such as wind and solar power, and reduced subsidies from 4 billion euros to 1.5 billion euros. If the Danes cannot show a profit from their wind investments with a national wind capacity factor of 0.242, then the Dutch would certainly not show a profit from their wind investments with a national wind capacity factor of 0.186, and neither would the Germans with a national wind capacity factor of 0.167

- approved construction of an up to 2,500 MW nuclear plant which could consist of (2) Westinghouse AP1000 units @ 1,154 MW each.

The Netherlands policy U-turn means that:

- the EU renewable targets aren't set in stone.
- there are more cost-effective ways of reducing CO2, such as nuclear power and increased energy efficiency.

http://www.theregister.co.uk/2011/02/10/holland_energy_switch/
http://www.nucleartownhall.com/blog/tag/borssele-plant/
http://theenergycollective.com/willem-post/46652/reducing-energy-use-houses
http://www.euractiv.com/en/energy/eu-renewable-energy-policy-linksdossier-188269

NUCLEAR AND WIND COMPARISON

Nuclear

Power production by the new nuclear plant: 2.308 GW x 8,760 hr/yr x capacity factor 0.90 = 18,196 GWh/yr.
Capital cost: 2.308 GW x $7 billion/GW = $16.2 billion.
If factory-built, modular reactors are used, the capital costs will be significantly less. See Base Power..... website below.

Nuclear power attributes:

- is steady, 24/7/365, CO2-free, has a small foot print, relatively low-cost.

- requires long-term waste storage.

- systems have useful service lives of about 60 years.

Wind

Power production by new onshore wind turbines: 11.168 GW x 8,760 hr/yr x national capacity factor 0.186 = 18,196 GWh/yr.
Capital cost: 11.186 GW x $2 billion/GW = 22.34 billion.
Number of 3 MW wind turbines required: 11,186 MW/3 MW = 3,729

Wind power attributes:

- is variable, intermittent, CO2-free, has a huge footprint, highly visible, relatively low-cost, if capacity factor is high,

i.e., 0.35, or greater.

- requires additional backup power plants (continuously running and on standby), likely CO2-producing, if and when wind speed is too low, insufficient or too high.

- requires additional transmission and distribution system changes and greater grid management efforts.

- integration into the grid costs about $0.004-$0.006 per kWh.

- systems have useful service lives of about 25 years.

FRENCH NUCLEAR POWER

France made a wise decision to go nuclear about 50 years ago. While France will be enjoying low electric rates, its competitors, such as Germany, the US, etc., will be increasing their electric rates, because they need to invest trillions of dollars over several decades to get to France's low CO2 intensity; a major competitive advantage for France.

- France produces about 541 TWh/yr, exports about 100 TWh/yr and consumes about 426 TWh/yr. About 79% of its power production is nuclear and about 12% hydro. Its PWR nuclear plants and hydro plants are designed to be load-following.
- France reprocesses its "spent" fuel, and that of other nations, to make new fuel for nuclear reactors, thereby much better utilizing the uranium and greatly reducing waste.
- France has among the lowest electric rates in Europe.
- France has the lowest CO2 intensity, 0.37 lb of CO2/$ of GDP, of all industrialized nations.
- France is developing EVs to boost nighttime electric demand to better utilize its nuclear plants.
- Denmark, paragon of renewables, 0.43 lb of CO2/$ of GDP, has among the highest electric rates in Europe.

http://en.wikipedia.org/wiki/List_of_countries_by_ratio_of_GDP_to_carbon_dioxide_emissions
http://theenergycollective.com/willem-post/47519/base-power-alternatives-replace-base-loaded-coal-plants

INCREASED ENERGY EFFICIENCY

This section is included, because energy efficiency will have a much bigger role in the near future, as energy system analysts come to realize that tens of trillions of dollars will be required to reduce CO2 from all sources and that energy efficiency will reduce CO2 at a lesser cost and more effectively.

Energy efficiency projects:

- will make the US more competitive, increase exports and reduce the trade balance.

- usually have simple payback periods of 6 months to 5 years.

- reduce the need for expensive and highly visible transmission and distribution systems.

- reduce two to five times the energy consumption and greenhouse gas emissions and create two to three times more jobs than renewables per dollar invested; no studies, research, demonstration and pilot plants will be required.

- have minimal or no pollution, are invisible and quiet, something people really like.

- are by far the cleanest energy development anyone can engage in; they often are quick, cheap and easy.

- have a capacity factor = 1.0 and are available 24/7/365.

- use materials, such as for taping, sealing, caulking, insulation, windows, doors, refrigerators, water heaters, furnaces, fans, air conditioners, etc., that are almost entirely made in the US. They represent about 30% of a project cost, the rest is mostly labor. About 70% of the materials cost of expensive renewables, such as PV solar, is imported (panels from China, inverters from Germany), the rest of the materials cost is miscellaneous electrical items and brackets.

- will quickly reduce CO2 at the lowest cost per dollar invested AND make the economy more efficient in many areas which will raise living standards, or prevent them from falling further.

- if done before renewables, will reduce the future capacities and capital costs of renewables.