

Denmark's Road to a Low-Carbon, Energy-Efficient Economy, Climate and Energy Revolt By Anders Østervang, First Secretary, Economic Affairs, Danish Embassy 2011-05-13.

<http://blogs.worldwatch.org/revolt/denmark%E2%80%99s-road-to-a-low-carbon-energy-efficient-economy/>

As the world's population grows and emerging economies expand rapidly, global demand and competition for energy are set to intensify in the decades to come. This will likely drive up prices of the world's finite oil and other fossil fuel resources, which are concentrated largely in a handful of politically unstable countries. The International Energy Agency projects that global energy demand will increase 34 percent by 2035.

In Denmark, we have decided that we do not want to be in that energy race. We want to insulate ourselves from future peaks in energy prices and disruptions in supply, and to invest our money in green, long-term, sustainable sources of energy. Our government has announced its ambition that Denmark should become fully independent of fossil fuels by 2050, and instead meet its energy needs with renewable energy. A detailed, comprehensive strategy for how to get there, "Energy Strategy 2050", was launched a few months ago—the first of its kind in the world.

The journey toward a low-carbon and energy-efficient society actually started decades ago, during the oil crises of the 1970s. We took it up as a serious challenge to reform our energy model. At the peak, we stopped driving our cars on "car-free Sundays," and after the crises we kept gas prices high.

We went into the 1973 oil crisis almost 95 percent dependent on foreign oil imports for meeting our energy needs. Since those days, we have broken this spell of dependence by focusing heavily on energy efficiency and energy savings (in industry as well as households); by exploring domestic oil and gas; by diversifying our energy mix; and, increasingly, by investing in renewable energy sources.

As a result, Denmark is now one of the most energy-efficient countries in Europe and a net exporter of energy. We have reduced our oil consumption substantially so that today oil accounts for less than 40 percent of the energy we use overall. Renewables now account for 23 percent of the energy we consume, and for 30 percent of the electricity. Our many wind farms deliver two-thirds of that energy.

Importantly—and with a bearing on the current debate in the United States—we did this while securing economic growth. Since 1980, the Danish economy has grown by almost 80 percent while our energy consumption has remained more or less flat and CO₂ emissions have fallen. We have also seen the development of a strong and globally competitive energy efficiency and sustainable energy industry.

A recent report commissioned by WWF shows that Denmark earns the world's largest share of its national revenue from the clean tech industry, at 3.4 percent of GDP. This is far ahead of China, in second place at 1.4 percent. The clean tech industry now also accounts for more than 13 percent of our exports. Denmark is now a world leader in wind turbine production, and Vestas alone holds a 12 percent share of the global market.

On the end-user side, we focused heavily on strict building and appliance efficiency standards, public awareness campaigns about savings in households, and taxes on energy consumption that result, in a way, in the price of energy including the environmental costs of production, use, and disposal.

On the production side, cogeneration of electricity and heat (combined heat and power [CHP]) and district heating have been critical. CHP uses approximately 30 percent less fuel than separate heat and power plants producing the same amount of heat and power. Almost 53 percent

of Danish electricity is cogenerated with heat, concentrating emissions at CHP-plants that are equipped with efficient emission-reduction equipment.

As in Austria, individual communities have helped drive this development. One example is the pioneering island of Samsø, home to 61,000 inhabitants. In 1997, Samsø entered a Danish government challenge along with four other islands to cut its carbon footprint and increase production of renewable energy—and won. Afterward, Samsø decided to continue what it had started and is now entirely self-sufficient. It is even selling surplus energy generated by windmills. It has cut its carbon footprint by 140 percent (carbon emissions are now in effect negative, since Samsø is selling clean power to other communities).

Samsø owes much of its success to a model of strong public participation and local ownership. It now attracts thousands of visitors each year from around the world and has become a worldwide showcase for sustainable energy. But our journey is not finished. There is still work to be done to transition fully to a sustainable energy model. With our government's new energy strategy to phase out fossil fuels, we are continuing to go full steam ahead, so to speak.

Obviously, 2050 is a ways down the road, and policies will need to be adjusted along the way. 2020 will be the first benchmark. If we move ahead according to the strategy, by 2020 we should have reduced our use of fossil fuels by 33 percent relative to 2009 levels and increased the share of renewable energy significantly (33 percent of overall energy consumption and 62 percent in the power sector).

The government will use a range of tools and policies to enhance the use of renewable energy sources in the heat and power sector—such as wind power, biomass, and biogas—while at the same time allowing new sources of renewable energy to develop. For example, large CHP producers will see a streamlined bureaucratic process associated with fuel switching, encouraging a shift from coal to biomass. Smaller energy producers will also be given greater freedom to choose their sources of fuel. This will allow a shift from the use of natural gas to biomass.

Our transportation sector is almost fully dependent on fossil fuels, accounting for one-third of our fossil fuel use. It will therefore need to see a radical transition in the decades ahead. The government will take a number of policy steps to promote a fleet of green, advanced vehicles and relevant infrastructure in Denmark. However, with technological advancements and market developments coming rapidly in this area, maintaining flexibility is critical.

Essentially, in Denmark we see the green trajectory that we have embarked on as a win-win. As we ensure our future energy independence and insulate ourselves from global rising energy prices, we also are demonstrating a responsible and sustainable approach to global resources and climate change and expanding the domestic market for new and innovative technologies and, in turn, export opportunities for Danish companies in a growing global market for smart energy solutions. While the government's strategy is fully financed, consumers will likely see moderate increases in their heating and power bills. But you can also look at that as paying an insurance premium against rising fossil fuel costs in the future!

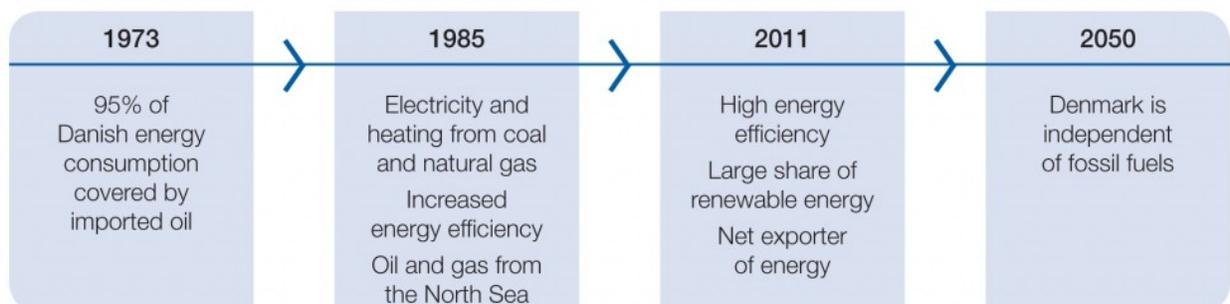


Figure 1.1 Phases in the transition of the Danish energy system