

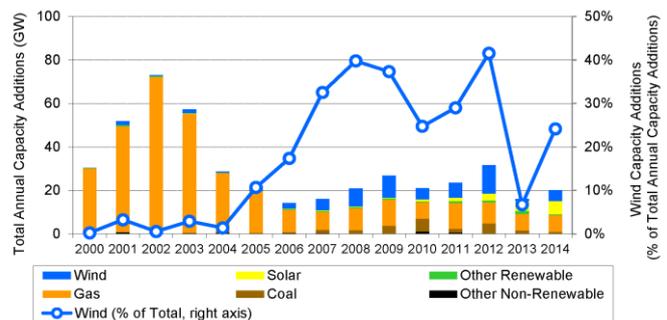
## Wind always blows, incentives are intermittent—Perry Sioshansi’s Letter from America

### Wind’s future prospects depend on a multitude of factors.

The US Department of Energy (DOE) publishes an annual report on the status of wind. Not much changes from one year to another, yet it is always a good read with a comprehensive assessment of cost trends and technological developments that cannot be found elsewhere. Among the highlights of latest edition, which covers the period to the end of 2014, are the following:

- nearly 5GW of new wind capacity was added in the US in 2014 representing 24% of all new generation additions for the year—the third biggest contributor after natural gas and solar;
- wind business is heavily concentrated with the top 3 manufacturers—GE, Siemens and Vestas accounting for 98% of the market in 2014;
- wind capacity factors have improved in recent years, now exceeding 30% or better;
- installation costs, which have gone through ups and downs in the recent past, are trending down due to better designs, taller towers, bigger rotors—but not exhibiting the kind of falling costs experienced in the solar sector;
- wind generation prices, as reflected in power purchase agreements (PPA) signed in 2014 averaged around \$23.5 \$/MWh, a new low; and
- major uncertainties clouds the future of US wind development beyond 2015-16 depending on the fate/extension of production tax credits (PTC), renewable portfolio standards (RPS) and further restrictions on carbon emissions as proposed by the EPA under the Clean Power Plan.

### Wind major contributor to new capacity additions



Source: DOE

China, which has taken the lead in so many areas—including carbon emissions—enjoys a commanding lead in cumulative installed capacity, nearly twice as much as the US and nearly three times as much as Germany.

Aside from China and India, both major growth markets, countries including the UK and Brazil are now heavily investing in wind, both offshore and offshore.

Clearly, wind is no longer for the rich and affluent countries as it begins to contribute to meeting demand in many parts of the world. In some cases, the pattern of wind generation complements solar production, making the combination more valuable and synergistic.

This phenomenon is evident in places such as Texas and California, where wind tends to be more plentiful in early morning hours before the sun rises, and tends to be scarce during the peak sunny periods of summer. With added experience, grid operators can better manage the combined output of the two to meet demand. Moreover, wind in different regions tends to blow at different times, also a big plus.

The global leader in wind in terms of its contribution to the overall generation mix, however, is not China nor the US or Germany but Denmark, Ireland and Portugal. The US and China

### US falling behind China in wind capacity, cumulative or otherwise

Annual Capacity (2014, MW)		Cumulative Capacity (end of 2014, MW)	
China	23,300	China	114,760
Germany	5,119	<b>United States</b>	<b>65,877</b>
<b>United States</b>	<b>4,854</b>	Germany	39,223
Brazil	2,783	India	22,904
India	2,315	Spain	22,665
Canada	1,871	United Kingdom	12,413
United Kingdom	1,467	Canada	9,684
Sweden	1,050	France	9,170
France	1,042	Italy	8,556
Turkey	804	Brazil	6,652
Rest of World	6,625	Rest of World	60,208
<b>TOTAL</b>	<b>51,230</b>	<b>TOTAL</b>	<b>372,112</b>

Source: DOE

are, in fact, not even in the top 10 even though they have sizable installed wind capacity.

Within the US, there are significant disparities among the states, with Texas in the lead in absolute terms at 14GW and Iowa with the highest percentage of its electricity generation supplied by wind at 28.5%.

Nine states, Iowa, South Dakota, Kansas, Idaho, North Dakota, Oklahoma, Minnesota, Colorado and Oregon get double digit percentage of their electricity demand from wind; for Texas the figure is 9%, for US as a whole it is 4.4%.

As prior DOE reports have suggested, there are no insurmountable obstacles for the US not to meet 20% of its electricity demand from wind within a decade or two. Denmark currently gets nearly 40% of its demand from wind, the corresponding figure for Ireland is 25%. What it takes, aside from more wind capacity, is a better transmission network that allows the excess generation in one region to be shared with neighbouring regions using the interconnected grid.

One might assume that the states with more installed wind are better endowed. That is true to a large extent, but equally important is the presence or lack of favourable incentives and/or mandates such as renewable portfolio standards (RPS).

Investment in wind is driven by PTCs, RPS and resource availability. There is virtually no installed wind capacity in the Southeast—and not all of that can be attributed to lack of decent wind resources. The reverse is true in South and North Dakota, for example, where there is no prevailing RPS but significant installed wind simply because the wind resource is so good.

The DOE report, like everybody else who is looking at wind's future prospects in the US, identifies RPS standards among the major driving forces. With many states within reach of their 2020 goals, what happens to RPS beyond the next 5-15 years clearly matters.

Price of wind as reflected in long-term power purchase agreements signed in recent years has been on a slow declining path. There are many factors including PTC, RPS, overall demand growth, cost of natural gas, restrictions on coal combustion, to name a few. But by any measure, wind at around \$23/MWh is cheap when/where you can get it. If it were not for its relatively low capacity factor, it would be a steal compared to fossil fuels and even solar generated energy.

**Perry Sioshansi is a specialist in electricity sector restructuring. He is founder and president of Menlo Energy Economics and is the editor and publisher of *EEnergy Informer*, from which we have sourced this article, and which we commend.**

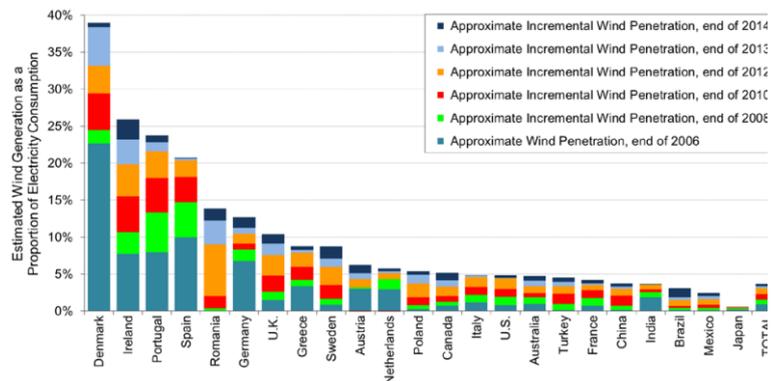
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### And way behind Denmark



Source: DOE