

Germanischer Lloyd beaufort 6



Wind Energy Newsletter for Customers and Business Partners

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Contents

Voltage Drop?	4
Fire Protection Systems	5
Capturing the Wind in a Bottle	6

Hélimax at Windpower 2008 in Houston, Texas: Dynamic Simulation of Utility-Scale Wind Farm Clusters

Dr. Dariush Faghani, Section Head Research & Development at Hélimax. **Date: 3 June 2008, 1.00 – 2.30 p.m. in Ballroom C.**

Please visit Germanischer Lloyd and Hélimax on their joint booth 2213 at Windpower 2008 in Houston, Texas.

Increasing wind market

New Energy for the New World

More than a quarter of the wind energy capacity newly installed in 2007 was installed in Canada and the US. After a number of setbacks in the past it looks like a long-term success story this time.

It is now the third year that the US has led the international wind market. Last year newly installed capacity increased by 45 per cent, exceeding 5,200 MW. For the international wind industry the US has become the most important market in the

world. In terms of total installed capacity the United States is going to overtake Germany, the former “world champion”, no later than next year with a total capacity of 22,000 MW. “We are experiencing a new start-up of wind energy,” comments

Edward Zaelke, former President and consultant of the American Wind Energy Association AWEA, on this development. “The question is whether the boom will last.” A rhetorical question which Zaelke answers himself immediately: “This year ▶

Photo: © iStockphoto

AMERICA IS A WIND ENERGY COUNTRY

“Westernmills” is the name of the windmills equipped with about 30 rotor blades that conquered mainly the West of the US and Canada in the second half of the 19th century. First they were used for pumping water, but from the 1880s they delivered more and more electrical power as well – up to one kilowatt per mill. By 1940 about six million windmills had been erected, and in 1980 about 100,000 of them were still in service.

The history of modern windmills in North America began in 1941, when a 1.25 MW plant was erected in the State of Vermont. However, only four years later it collapsed due to a rotor failure. Then nothing at all happened for a long time until the oil price shock of the 1970s triggered a true wind energy boom in the US. Huge wind farms with a total capacity of 1,500 MW were built, mainly in the West Coast regions. The rise of nuclear power, falling oil prices and the lack of interest of presidents Reagan and Bush senior brought this boom to a quick end in the early 1980s.

At the beginning of the new millennium the role of wind energy for North American energy supply has grown again. The development has speeded up since 2003, and from 2005 the US wind market has been the largest market in the world.

Historical windmill with 18 rotor blades.



we expect 40 per cent market growth.” In the long run AWEA forecasts a 20 per cent average annual market growth. In 2030 the total installed capacity would then reach the 300,000 MW mark.

The course has been set. It is not only individual states promoting wind energy by setting quotas, but also Washington. In early



Many wind energy plants in Canada – such as this one in Springhill, Nova Scotia – operate under arctic conditions.

April the US Senate extended the tax credits for power generated from renewables (Production Tax Credit, PTC) until 2009 before it expired. That may seem a short-term measure by European standards, however in America this is almost considered to be a stable framework.

Yet this boom has its downside as well. Today the US wind energy industry cannot master the current growth alone. “America is a large market, and there are niches for your business as well,” is what Friedrich Wagner, foreign trade expert of the North Rhine-Westphalian Ministry of Economic Affairs, told representatives of the German wind energy industry at a German-American conference in Cologne. His recommendation for the strategic approach is “Start small, but think big.”

The European wind energy industry has been in America a long time. After some initial hesitation the European turbine manufacturers have not just entered the market, but they are also building the first production facilities in the US. Component manufacturers and service companies are also setting up their business. They make use of the serious lack of qualified staff, which is a major obstacle to the development of the American wind energy industry.

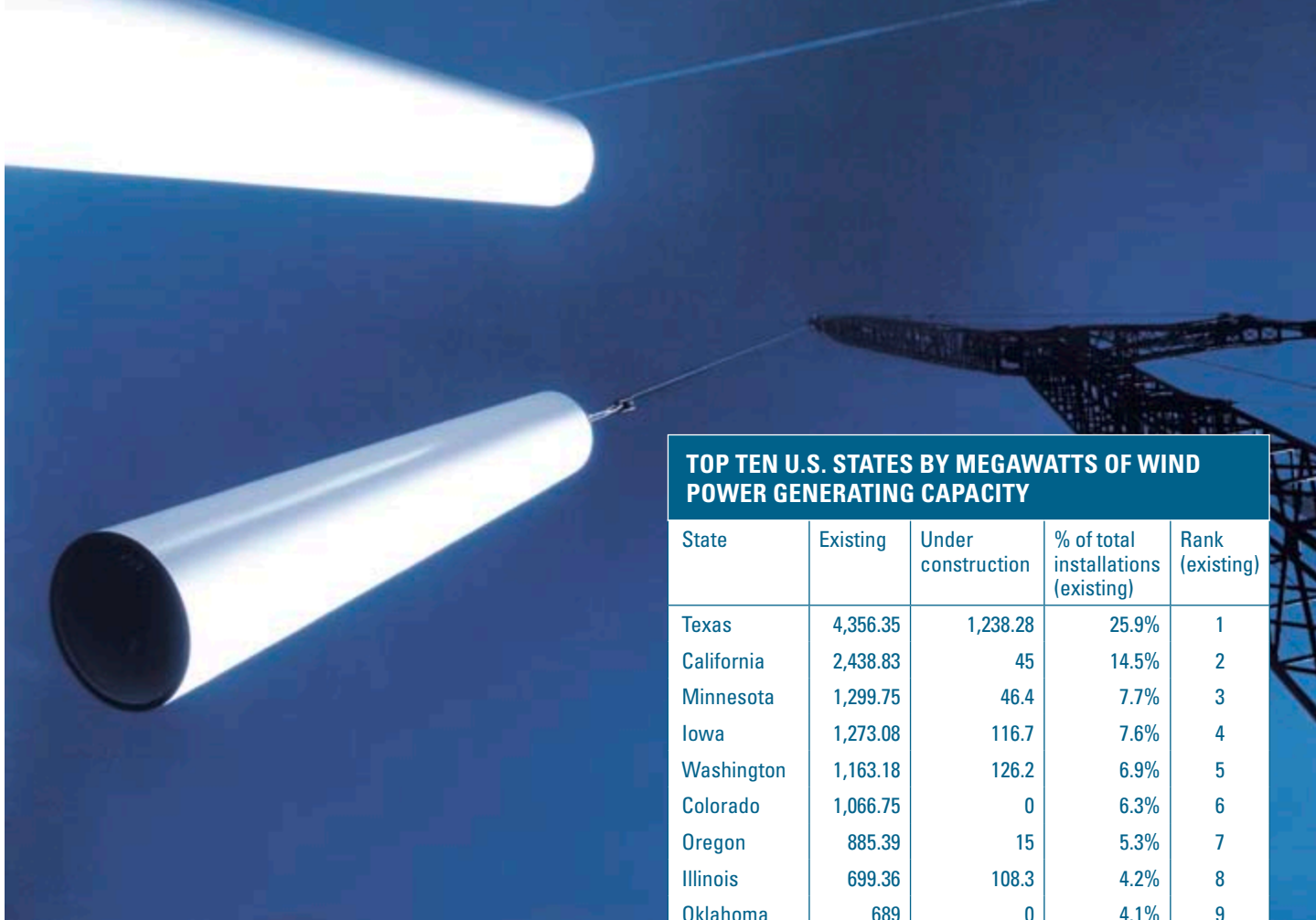
Another barrier which could impede the

further growth of wind energy in the US is the insufficient power grid. It is especially the regional imbalance between generation and consumption that presents a challenge. In the plains in the Midwest there is much wind, but only few consumers.

Canada overcomes dent in growth curve

In Canada the development is promising, but far less buoyant than in the US. Currently the country is ranking as number 10 in the world list of market volume for 2007, but it has lagged behind expectations. Following the boom year of 2006 with just under 800 MW of newly installed capacity, the Canadian wind energy industry had hoped that market volume would reach the 1,000 MW mark. But at the end of 2007 the total growth was only 386 MW.

According to the Federal Agency for External Trade (bfa), which watches the wind market in Canada closely, the reasons were delays and uncertainties in the approval procedures. However the most serious problems have been the bottlenecks in the transmission grid which are similar to the US. Canada is a country with an extremely high per capita energy consumption due to the extremely long transmission distances, cold winters and hot summers. Energy consumption, which is already high, keeps growing at an annual



USA in wind euphoria: Last year the newly installed capacity increased by 45 per cent.

TOP TEN U.S. STATES BY MEGAWATTS OF WIND POWER GENERATING CAPACITY				
State	Existing	Under construction	% of total installations (existing)	Rank (existing)
Texas	4,356.35	1,238.28	25.9%	1
California	2,438.83	45	14.5%	2
Minnesota	1,299.75	46.4	7.7%	3
Iowa	1,273.08	116.7	7.6%	4
Washington	1,163.18	126.2	6.9%	5
Colorado	1,066.75	0	6.3%	6
Oregon	885.39	15	5.3%	7
Illinois	699.36	108.3	4.2%	8
Oklahoma	689	0	4.1%	9
New Mexico	495.98	0	2.9%	10

(as of 31 December 2007)

Source: © Global Wind Report 2007

rate of two per cent. So there is fierce competition for free grid capacity. The wind farm operators' demands to be connected sometimes collide with the demands of nuclear power plants that were overhauled in order to compensate for the shutdown of old power plant capacity.

Ambitious expansion goals

In spite of last year's dent in the growth curve industry experts are in no doubt that Canada will in the medium term develop into a hot spot of the worldwide wind power industry. This is supported by the political will of the province governments,

almost all of which have formulated long-term ambitious development goals. Take Ontario, for example: there is a plan by the energy authority (OPA) to add 3,000 MW to the existing installed wind power capacity of 460 MW. Robert Hornung, President of the Canadian Wind Energy Association CanWEA, says, "The plan is a vision. OPA has understood that wind energy will play an increasingly important role in the energy mix."

WHAT SUPPORT EXISTS FOR RENEWABLE ENERGIES?

USA:

Support mainly relies on two instruments. RPS is the abbreviation for "Renewable Portfolio Standard", the American version of a quota system. So far RPS has been the matter of the states. They oblige the power generation companies to cover a certain percentage of electrical power generation from renewable energies. The percentages vary between states, and in some states there is no RPS at all.

PTC is the Production Tax Credit. It reduces the income tax burden by 2 US cents for every kilowatt hour generated from renewable energies. This spring the federal government in Washington extended the PTC up to the end of 2009.

In addition various tax deductions are possible depending on the tax laws of the according state, and there is investment support for solar energy and fuel cells.

Canada:

Energy policy is a task of the provinces. In certain regions (e.g. Ontario or British Columbia) the feed-in price for wind power reaches the German level. Like the states of the US the Canadian provinces have formulated their individual renewable energy expansion targets. Support from the federal government is rather moderate: since 2001 the Wind Power Production Incentive Program (WPPI) has guaranteed wind energy producers CAD 0.01, and for newer plants CAD 0.008 per kilowatt hour (EUR 0.063 and EUR 0.05, respectively). Currently the budget for this support scheme is CAD 1.5 billion (EUR 1.03 bn).

i **GL IN NORTH AMERICA**

Helimax, a holding company of Germanischer Lloyd headquartered in Montréal, Canada, is an independent consultant and expert company for wind energy (www.helimax.com). Helimax Renewable USA Inc. is working for the American market from its new office in New Berlin, Wisconsin.

FOR FURTHER INFORMATION

Richard Legault
 Président Helimax
 Phone: +1 514 272-2175
legault@helimax.com