



WIND CARRIES CHINA'S ENERGY CONSUMPTION TOWARDS A GREENER PATH

China is experiencing an increased demand for energy, as population urbanizes and industry grows. Accordingly China has increased their focus on renewable energy in an attempt to combine growth with sustainability – wind power constituting a key area. Danish experiences with integration of wind power into flexible energy systems assists China in handling large amounts of energy from a fluctuating energy source such as wind.

WIND ENERGY IN CHINA

China's wind adventure is relatively new. In 2004 China did not have an actual wind turbine industry, but the following year Chinese authorities announced public objectives and incentives for the Chinese manufacturers. Since then, the Chinese wind power industry has steadily progressed and today China holds the position as the world's largest market for wind turbines. The development up until 2030 is moving from a focus on onshore wind power towards also focusing on offshore wind power.

China's energy consumption is expected to increase, as a result of the economic growth and the demands of the growing Chinese middle class. Chinese authorities aim to increase the share of renewable energy to 15 pct., no later than 2020. Wind power constitutes one of the fundamental energy technologies, which meet the objectives of reduced carbon emission, also wind power is considered to be a cost-effective, thoroughly tested and a reliable renewable energy source. In addition, wind energy is a strategically important industry for China, with great export potential.

CHALLENGES FOR CHINA

The Chinese expansion of wind power has been remarkably fast, and with wind being a fluctuating resource to generate energy from, the challenge for China remains to integrate such a fluctuating generation of energy into the power grid, without sacrificing the security of supply. Technical obstacles are being solved and institutional barriers are being identified. However, wind turbines are often disconnected when they are generating power, simply because they generate more power than the grid is able to handle. This is undesirable environmentally and economically, as clean and cheap wind energy is lost and conventional energy generated from fossil fuels used in its place. The pace of China's green development makes it an interesting market for wind pioneers such as Denmark to participate in.

Denmark collaborates with China on renewable energy in the China National Renewable Energy Centre (CNREC). Many years of Danish experiences in wind energy can be exchanged with China, as Denmark may benefit from the immense Chinese economic venture into wind energy, both from export and finance of joint development and demonstration.

WIND POWER IN CHINA



DANISH EXPERIENCES INTEGRATING WIND POWER

Denmark is the country in the world with the largest share of wind power in domestic demand. As a consequence, Denmark has obtained years' of experiences integrating large shares of wind power into the grid, without decreasing the security of supply. In 2014 the generation of wind power passed 39 pct. of the electricity consumption. This is accomplished through the operation of flexible energy systems; so-called smart grids.

Additionally, Denmark has a tradition of energy cooperation across its neighbouring borders. This is realized in the open regional power market Nord Pool. Nord Pool's mission is to ensure that the cheapest possible mix of generation covers demand, at any point in time. If there is a decrease in demand for wind energy in Denmark, the energy can be sold to the neighbouring countries via the shared transmission grid. The Nordic power market thus functions as a cost-effective reserve for wind power.

These experiences can prove helpful for the development of energy systems optimized for handling wind power in China. Denmark has generated significant know-how in research institutions, at manufacturers and subcontractors etc. in the wind sector. Especially within offshore wind turbines, Danish businesses can provide reliable and efficient solutions for large offshore wind power productions. The Danish experiences in the integration of wind power are shared with China through

the cooperation with CNREC, which in turn shares relevant information with the Chinese administration. Many of the Danish principles are applicable to China's framework and China can benefit from the Danish experiences with development and use of a flexible power grid.

Visit the Danish Energy Agency's website:
www.ens.dk/en/policy/global-cooperation

Visit the CNREC website:
www.cnrec.org.cn/english
And,
www.boostre.cnrec.org.cn

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"It is my hope that we through the continued development of wind power will be able to develop a green and sustainable future for both our countries"

Friis Arne Petersen, ambassador of Denmark to China, at the opening of the conference China Wind Power November 15, 2012.