

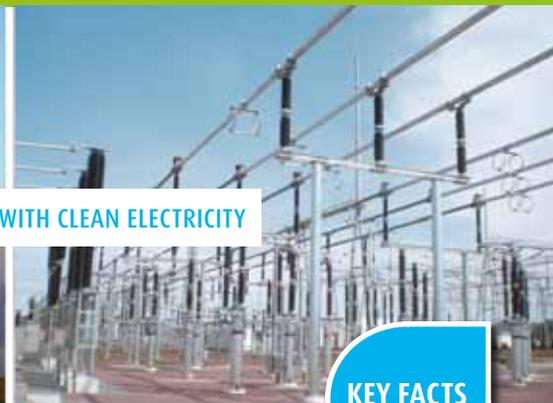


CHINA: FUELLING GROWTH WITH WIND POWER IN SHANDONG PROVINCE



SUSTAINABLE SOLUTIONS OFFERED BY RENEWABLES

SUPPLYING 76,500 CHINESE HOUSEHOLDS WITH CLEAN ELECTRICITY



KEY FACTS

Enabled predominantly by the burning of fossil fuels, China's extremely rapid growth has made it the world's top emitter of greenhouse gases. Coal is particularly prevalent within China's fuel mix due to its relative abundance, and consequently air quality in cities is incredibly poor. A study by the World Health Organisation found that over 650,000 people die prematurely from diseases related to air pollution in China every year, the most vulnerable being pregnant women, the elderly, and young children. Concern over pollution has prompted China to set a target of 15% renewable energy by 2020. But the dominance and abundance of fossil fuels combined with the investment risks traditionally associated with renewable energy means that funding for renewable energy is limited.

This project involves the construction of a wind farm to generate clean energy to be fed into the grid. Located in Rongcheng City in Shandong province, the wind farm consists of 33 turbines with a total installed capacity of 49.5 MW. An annual 100,000 MWh of electricity is supplied to the North China Power Grid via Shandong Power Grid, displacing the equivalent amount of fossil fuel generated energy. It thereby reduces the emission of greenhouse gases and limits local air pollution, curtailing its negative health impacts. The amount of electricity generated is enough to supply approximately 76,500 Chinese households for a year.

Such a project is associated with investment risks and as a result loans are difficult to come by. It is therefore unlikely that investment would have been secured for this wind farm without funding from carbon credit sales.

SUSTAINABILITY BENEFITS

This project has created 65 additional jobs during construction and period and 24 permanent positions during operation in an area with limited employment options. Furthermore, it has built domestic capacity in terms of manufacturing, installing, operating, and maintaining a substantial wind farm.

Besides greenhouse gas emissions, the project activity reduces other air pollutants associated with the burn of fossil fuels such as sulphur dioxide, dust and nitrogen oxides, improving air quality and reducing negative health impacts.

By demonstrating and disseminating this clean, renewable energy source this project stimulates the growth of wind power industry in China and assists in the diversification of China's energy supply and in the meeting of its renewable energy targets.

Location:

Shandong province

Project type:

Renewable energy – Wind

Project standard:

VCS

Total emission reductions:

»» 97.000 t CO₂e p.a. ««

Project start date:

November 2009

Project partner:

Guohua Resourceful (Rongcheng)
Wind Power Generation Co., Ltd.

Validator:

SGS (DOE)

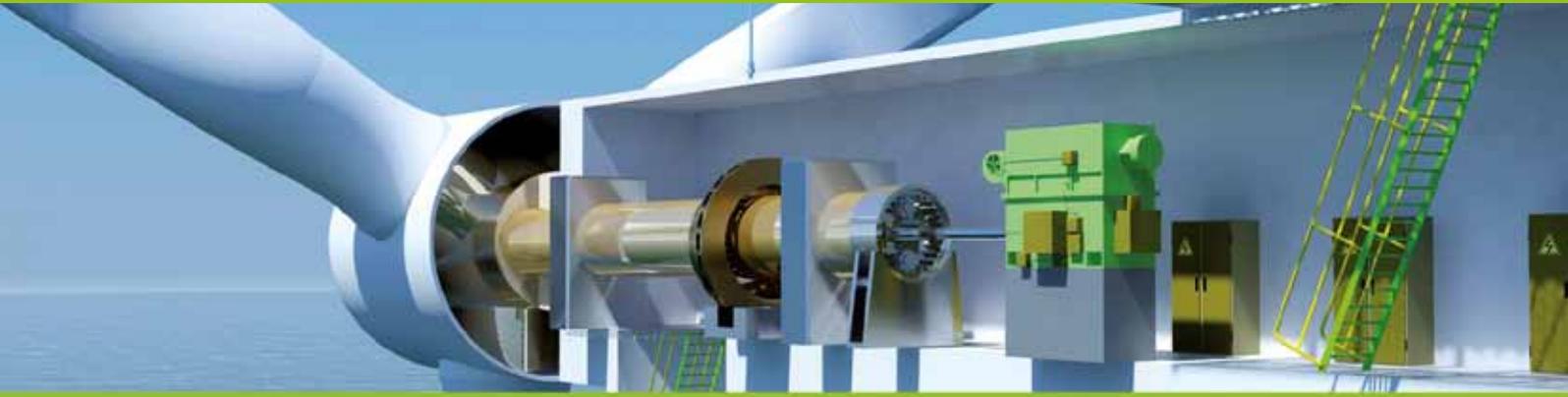
Verifier:

China Classification Society (DOE)





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TECHNOLOGY BRIEF - HOW IT WORKS

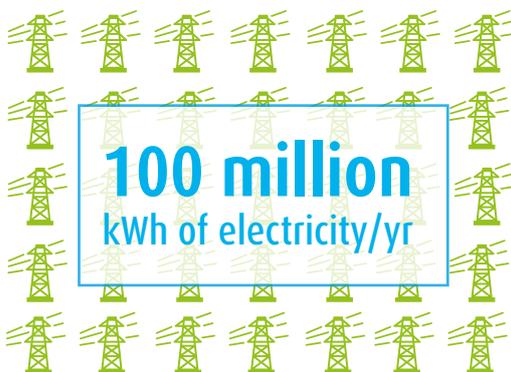
Driven by the kinetic energy of moving air, the mechanical energy created by a rotor is fed into an attached generator to produce electricity. Output can vary depending on wind speed and this is ultimately determined by atmospheric conditions, although it is also influenced by ground characteristics.

A rough surface exerts significant friction, effectively consuming energy and thereby slowing down the moving air. Smooth surfaces cause very little friction, the most obvious example being higher wind speeds in coastal areas. It is therefore important to site wind farms carefully to maximise their potential. Over the last two decades wind power technology has rapidly improved. The size and power output have consistently increased while lowering the cost per electricity unit. Constructions with a maximum power output of 1.5 megawatts are now considered standard technology.



FACTS & FIGURES

Number of families supplied

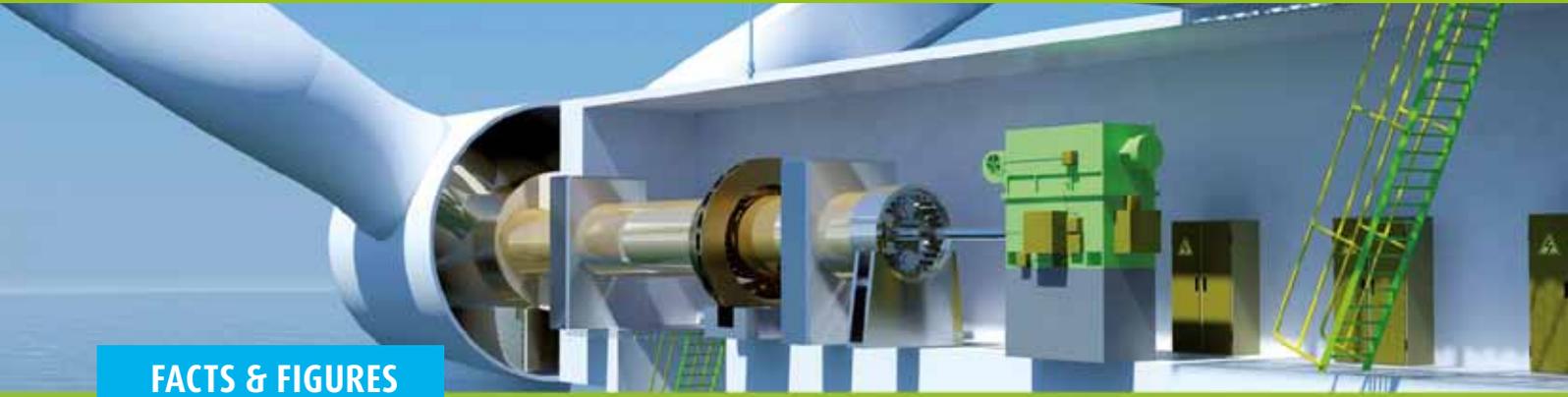


➔ Clean electricity for **76.500** Chinese families





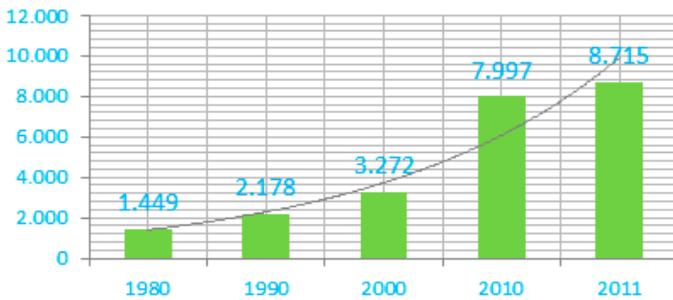
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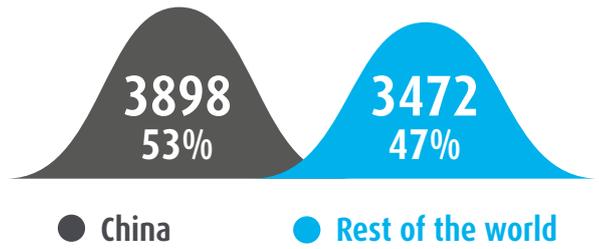
FACTS & FIGURES

China CO₂ emissions

from fossil fuel consumption (million metric tons)



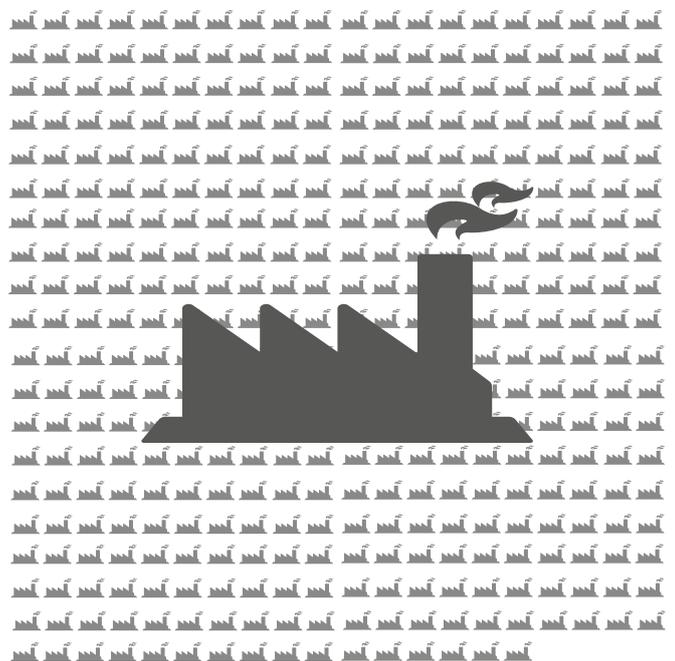
Coal Consumption million metric tons



Estimated health impacts in mainland China due to air pollution from coal plants in Shandong per year:

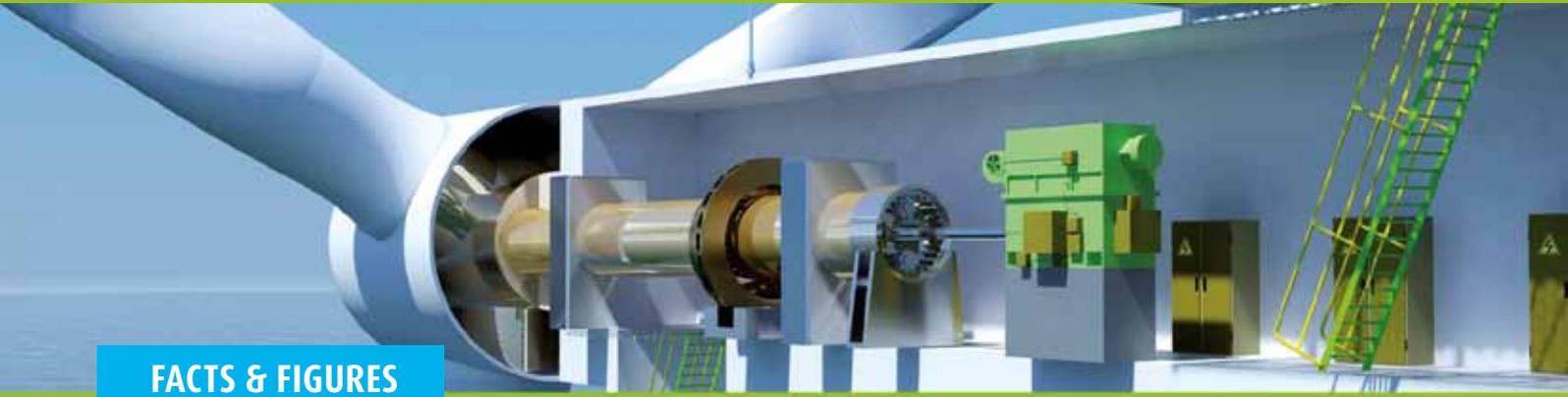
- 29.800 pre mature deaths**
- 40.000 asthma incidents in children**
- 50.000 chronic bronchitis**

387 coal-fired plants in Shandong (2011)





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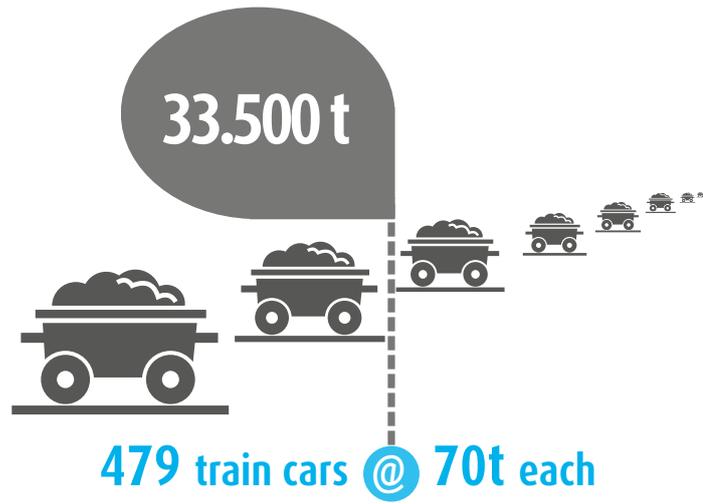
FACTS & FIGURES

Avoided Pollutant Emissions

$SO_x = 355 \text{ t}$
 $NO_x = 104 \text{ t}$
Particulate Matter (PM2.5) = 12 t



Avoided consumption of charcoal



65 jobs

Construction: 55
Operation: 10 managers



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