Turbine Integration and Applications

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New (added) Worldwide Capacity in GWs

Can We Get to 100% Renewable Energy?

- 200 years ago 95% of energy came from wood
- By 1900 it was 50% coal
- By 2000 it was a mix of coal, nuclear, oil, and gas
- The Union of Concerned Scientists has published a plan for renewable energy to provide 80% of electricity by 2050
- Why stop there? Solar enthusiasts want to go for 100%

Introduction
HVDC lines are more compact, and less costly than HVAC lines of the same capacity.

Direct vs alternate current argument

Transmission Cost

Autonomous Power Supply System

NYSERDA Report (2005)

Time Scales in System Planning and Operations

Irrigation System

Hau (2006), p. 567

Hau (2006), p. 573
Desalination Plant

Energy and Water Supplying System

Household WT Interconnected with a Grid

Grid Connection of a Small Wind Farm
Internal Cabling of a Large Wind Farm

Hydrogen Transmission Scenario

PE: Power Electronics

Offshore Developments

Offshore Developments

Denmark: Middelgrunden, 13 x 1500 kW

Offshore Wind Magazine, Feb 2010
Offshore Developments

WT shuttle concept