PHASING OUT CONVENTIONAL POWER BY 2037!

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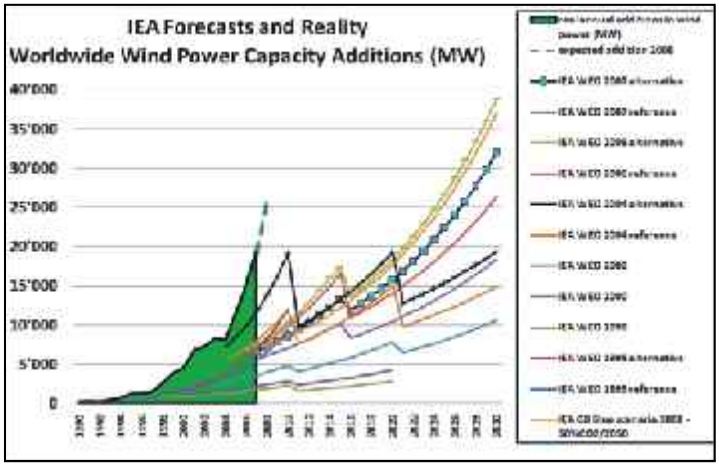
A new study by the Energy Watch Group has predicted complete phasing out of conventional power within the first half of the 21st century. Titled, 'Wind Power in Context: A Clean Revolution in the Energy Sector', the report predicts that global non-renewable power generation would 'peak' in 2018 and could be phased out completely by 2037!

The study provides details about the growth, past forecasts and future prospects for wind energy. It traces the exponential growth in wind power capacity since the early 1990s, with mean growth rate of annual MW additions exceeding 30.4% per year during 1998–2007. This resulted in doubling of net additions every two-and-a-half years. Supporting the exponential growth scenario, the study predicts that future growth will be driven not only by costs of fossil fuels and nuclear cost overruns, but also by access to new wind resources, new grid regulations, an emerging world market for wind turbines and components and by cheaper and better wind technology. In 2007, net capacity additions for wind reached 19,553 MW, a level that most energy pundits failed to anticipate. Net additions in 2007 were 417% more than the mean estimated addition published by the International Energy Agency (IEA) in its *World Energy Outlook* 1995–2004 editions.

Alleging that the IEA is biased towards fossil fuels, the report projects various predictions made by the agency in the past and compares them with actual wind power installations. In IEA's most recent *World Energy Outlook 2008*, it again predicted a low growth "reference scenario" for wind power,

Fig.1: IEA Long-term Forecasts of Annual Wind Capacity Additions



Source: World Energy Outlook, 2008

with only a 2.2% increase in annual wind capacity additions over the 2010–30 period (Figs. 1 & 2). The IEA acknowledges that the "risk of supply crunch" for oil after 2010 could be "driving up the oil prices—possibly to new record highs", but then fails to revise its forecasts for renewable energy.

The study has developed four different global scenarios for the future of wind power (see box below), assuming a continuous growth in global wind power additions over the next decade. The driving force for future growth as

Box: Four Scenarios for Wind and Solar Power by 2025

Scenario A: High power consumption and high wind power growth see renewables exceed 50% of global electricity provision before 2025, with a total demand of 37,600 terawatt-hours (TWh) and wind generation capacity of 75,00,000 MW worldwide, producing 16,400 TWh. Wind energy, along with solar would command 50% of the market share of new power plant installations by 2019. Global non-renewable power generation would peak in 2018 and could be phased out completely by 2037.

Scenario B: High power consumption and moderate wind power growth (15.2% per year, half the rate historically observed in 1998–2007) see renewables at 23% of global electricity provision in 2025, with a total demand of 37,600 TWh and wind generation capacity of 18,37,000 MW worldwide, producing 4023 TWh (including a non-specified amount of solar). As a result, wind energy would secure a 50% market share of global new power plant installations by 2033 alongside solar.

Scenario C: Moderate power consumption growth (1.8% per year) and high wind power growth see renewables exceed 65% of global electricity provision in 2025, with a total electricity demand at 27,430 TWh and wind capacity of 52,12,000 MW worldwide, producing 11,414 TWh. As a result, wind energy will command a 50% market share of global new power plant installations by 2017 alongside solar.

Scenario D: Moderate power consumption (1.8% per year) and moderate wind power growth (15.2%) see renewables exceed 31 percent of global electricity provision in 2025, with a total electricity demand of 27,430 TWh and a wind generation capacity of 18,37,000 MW worldwide, producing 4023 TWh. As a result, wind energy will register a 50 percent market share of global new power plant installations by 2026 alongside solar.

Fig. 2: IEA Projection of Annual Wind Capacity Additions (2010–30)

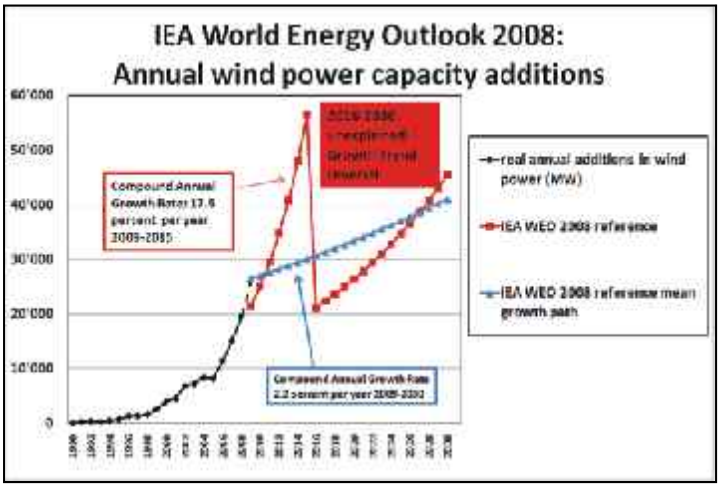
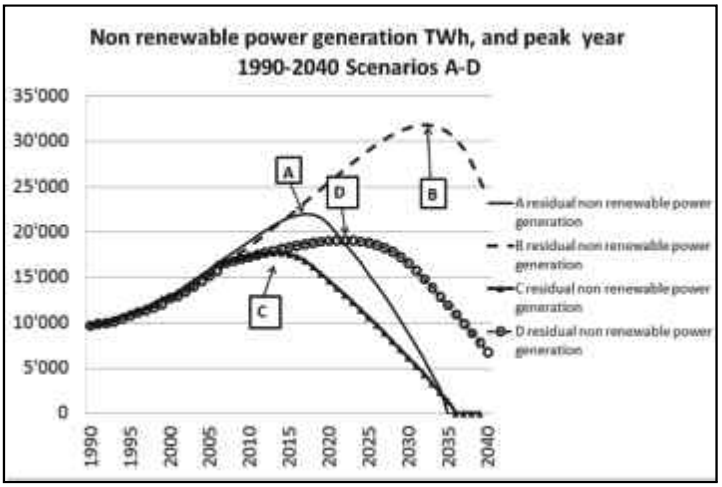


Fig.3: Non-renewable Power Generation (1990–2040)



shown in the report is not ecological or moral motivation but demonstrable economic advantages of wind power. The drivers behind the growth in wind power are 'peak oil' and 'peak natural gas'. The study identifies sixteen key attributes that will continue to drive growth. These mainly include free primary energy, an infinite resource supply, global accessibility to supply, stable life-cycle costs guarantee, increasing price competitiveness, zero operational carbon emissions or hazardous waste, zero requirement for cooling water, decreased payback times and fast innovation cycles. Fig. 3 gives different scenarios of peaking non-renewable power.

The study concludes with the discussion of barriers affecting wind power development and solutions for tackling them. Issues such as fluctuations in wind, lack of grid connectivity and lack of reserve capacities can be overcome through planning, growing price incentives derived from the observed increase of oil prices and restructuring of electricity markets (unbundling). Technical improvements will further propel the wind industry to deliver even more affordable, secure and clean electricity at a very high rate that will be unattainable by more traditional technologies such as nuclear, natural gas or coal. Wind and solar, accompanied by hydro power, biomass and geothermal energy, will pave the way for 100 percent renewable power generation, most probably within the first half of this century. It is interesting to note that this is the first report of its kind to predict a definite time-frame for phasing out non-renewable power and its replacement with renewable power on a large scale. Utility planners and operators along with policy makers worldwide now need to prepare themselves for this transition waiting right at their doorsteps.

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SINGAPORE TO UNVEIL FIRST ZERO ENERGY BUILDING

Singapore's first retrofitted zero-energy building (ZEB) incorporating some of the latest energy-efficient inventions is being designed by the city's Building and Construction Authority (BCA) under its Green Building Master Plan at a cost of $10 million. According to the BCA, the building—the first-of-its-kind in South East Asia—has a gross floor area of 3000 sq.m, and will be 60% more efficient than a normal commercial building. A massive array of solar panels covering about 1300 sqm will be integrated on the roof of the building to produce enough electricity to power lights, office equipment and air-conditioning in 32 five-room flats.

The BCA is working with the National University of Singapore to develop ventilation strategies which would help reduce the high consumption resulting from the use of air-conditioners. A local innovation—a single coil twin fan ventilation system—will help regulate the flow of fresh and recycled air, according to demand, throughout the building. Fresh air, which requires more energy to chill compared to recycled air, will only be channelled to rooms that are occupied. Recycled air will be used for ambient cooling. Another unique concept—personalised ventilation system—will use sensors to detect the presence of users and direct fresh air to their breathing zones. Solar chimneys will be used to draw warm air from within non air-conditioned rooms. The convection of air will pull cooler air from ducts and improve natural ventilation by 11 times the rate of air replacement. The ZEB will also be linked to the grid for drawing electricity when needed and will feed back the same amount into the grid using solar energy. The building is expected to be completed in 2009.