

# Study claims 100 percent renewable energy possible by 2030

January 19 2011, by Lin Edwards

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Burbo Bank Offshore Wind Farm, at the entrance to the River Mersey in North West England. Image: Wikipedia.

(PhysOrg.com) -- New research has shown that it is possible and affordable for the world to achieve 100 percent renewable energy by 2030, if there is the political will to strive for this goal.

Achieving 100 percent [renewable energy](#) would mean the building of about four million 5 MW [wind turbines](#), 1.7 billion 3 kW roof-mounted solar photovoltaic systems, and around 90,000 300 MW solar power plants.

Mark Delucchi, one of the authors of the report, which was published in the journal [Energy Policy](#), said the researchers had aimed to show enough renewable energy is available and could be harnessed to meet demand indefinitely by 2030.

Delucchi and colleague Mark Jacobson left all fossil fuel sources of energy out of their calculations and concentrated only on wind, solar, waves and geothermal sources. [Fossil fuels](#) currently provide over 80 percent of the world's energy supply. They also left out biomass, currently the most widely used renewable energy source, because of concerns about pollution and land-use issues. Their calculations also left out nuclear power generation, which currently supplies around six percent of the world's electricity.

To make their vision possible, a great deal of building would need to occur. The wind turbines needed, for example, are two to three times the capacity of most of today's wind turbines, but 5 MW offshore turbines were built in Germany in 2006, and China built its first in 2010. The solar power plants needed would be a mix of photovoltaic panel plants and concentrated solar plants that concentrate solar energy to boil water to drive generators. At present only a few dozen such utility-scale solar plants exist. Energy would also be obtained from photovoltaic panels mounted on most homes and buildings.

Jacobson said the major challenge would be in the interconnection of variable supplies such as wind and solar to enable the different renewable sources to work together to match supply with demands. The more consistent renewable sources of wave and tidal power and geothermal systems would supply less of the energy but their consistency would make the whole system more reliable.

Delucchi is from the Institute for Transportation Studies at the University of California, Davis, while Jacobson belongs to Stanford

University's Department of Civil and Environmental Engineering. They first began to study the feasibility and affordability of converting the world to 100 percent renewable energy sources in a Scientific American article published before the Copenhagen climate talks in 2009.

The pair say all the major resources needed are available, with the only material bottleneck being supplies of rare earth materials such as neodymium, which is often used in the manufacture of magnets. This bottleneck could be overcome if mining were increased by a factor of five and if recycling were introduced, or if technologies avoiding rare earth were developed, but the political bottlenecks may be insurmountable.

**More information:**

-- Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials, *Energy Policy*, [doi:10.1016/j.enpol.2010.11.040](https://doi.org/10.1016/j.enpol.2010.11.040)

-- Providing all global energy with wind, water, and solar power, Part II: Reliability, system and transmission costs, and policies, *Energy Policy*, [doi:10.1016/j.enpol.2010.11.045](https://doi.org/10.1016/j.enpol.2010.11.045)

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