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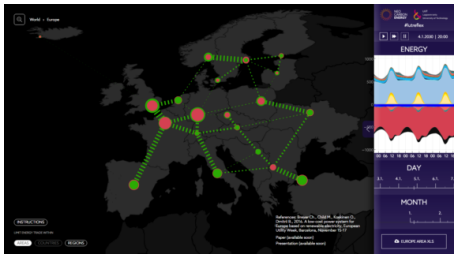
100% Global Renewable Electricity No Longer Flight Of Fancy, More Cost-Effective Than Current System

November 9th, 2017 by **Joshua S Hill**

Making a global transition to a 100% renewable electricity grid has long been a dream of many, but new research published this week by the Lappeenranta University of Technology has proven it is no longer just a dream but a viable reality — a reality that is more cost-effective than the current fossil fuel-reliant system.

Presented on Wednesday during the Global Renewable Energy Solutions Showcase event (GRESS) on the sidelines of the United Nations Climate Change Conference COP23 in Bonn, Germany, the new study — *Global Energy System based on 100% Renewable Energy – Power Sector* — was conducted by the Lappeenranta University of Technology (LUT) and the Energy Watch Group (EWG).



Many might already be aware of the **work being done by LUT**, investigating the potential of 100% renewable electricity grids based on its own modeling work — modeling which "computes the cost-optimal mix of technologies based on locally available renewable energy sources for the world structured in 145 regions and calculates the most cost-effective energy transition pathway for electricity supply on an hourly resolution for an entire reference year."

The University has already published results which highlight the potential case for a **100% Russia & Central Asia by 2030**; a **100% South America by 2030**; a **100% Iran & Middle East by 2030**; **India by 2050**; and its biggest accomplishment, a successful model of a **100% renewable energy planetary system**.

The new study, however, makes the case that 100% renewable electricity is not just a far-off possibility, but a potential current-day reality — given the right political conditions.

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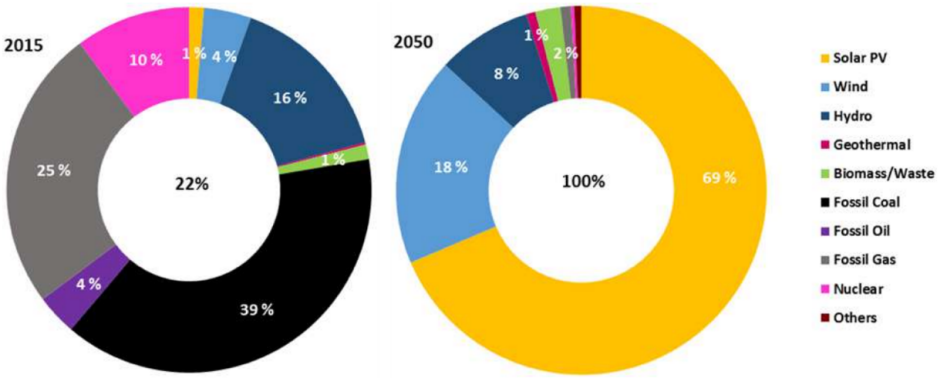
The technologies already exist, according to the authors of the study who claim that existing renewable energy potential and technologies (including storage) can already generate sufficient and secure power to cover the entire global electricity demand by 2050. This would result in a levelized cost of electricity (LCOE) on a global average for 100% renewable electricity in 2050 of €52($60)/MWh (including curtailment, storage and some grid costs), compared to €70($81)/MWh in 2015. A transition along these lines would reduce greenhouse gas emissions in the electricity sector down to zero as well as drastically reduce total losses in power generation. Finally, the transition would result in 36 million jobs by 2050 — 17 million more than today.

"A full decarbonization of the electricity system by 2050 is possible for lower system cost than today based on available technology," **explained Christian Breyer, lead author of the study, LUT Professor of Solar Economy and Chairman of the EWG Scientific Board**. "Energy transition is no longer a question of technical feasibility or economic viability, but of political will."

The transition would be driven by solar PV and battery storage, with solar PV accounting for 69% of the total 2050 energy mix followed by wind with 18%, hydropower with 8%, and bioenergy with 2%.

Electricity generation from renewables in 2015 and 2050. In 2050, nuclear power still accounts for negligible 0.3% of the total electricity generation, due to the end of its assumed technical life, but could be phased out earlier



The figures look a little different by 2030, with wind accounting for 32% of the global energy mix, but post-2030 LUT expects solar to become more competitive and take up the slack, increasing its share from 37% in 2030 to around 69% in 2050.

"There is no reason to invest one more Dollar in fossil or nuclear power production," added EWG President Hans-Josef Fell. "Renewable energy provides cost-effective power supply. All plans for a further expansion of coal, nuclear, gas and oil have to be ceased. More investments need to be channeled in renewable energies and the necessary infrastructure for storage and grids. Everything else will lead to unnecessary costs and increasing global warming."

The key findings (**PDF**) as laid out in the study are as follows:

- Existing renewable energy potential and technologies, including storage can generate sufficient and secure power to cover the entire global electricity demand by 2050. The world population is expected to grow from 7.3 to 9.7 billion. The global electricity demand for the power sector is set to increase from 24,310 TWh in 2015 to around 48,800 TWh by 2050.
- Total levelized cost of electricity (LCOE) on a global average for 100% renewable electricity in 2050 is €52/MWh (including curtailment, storage and some grid costs), compared to €70/MWh in 2015.
- Due to rapidly falling costs, solar PV and battery storage increasingly drive most of the electricity system, with solar PV reaching some 69%, wind energy 18%, hydropower 8%

and bioenergy 2% of the total electricity mix in 2050 globally.

- Wind energy increases to 32% by 2030. Beyond 2030 solar PV becomes more competitive. The solar PV supply share increases from 37% in 2030 to about 69% in 2050.
- Batteries are the key supporting technology for solar PV. The storage output covers 31% of the total demand in 2050, 95% of which is covered by batteries alone. Battery storage provides mainly diurnal storage, and renewable energy based gas provides seasonal storage.
- Global greenhouse gas emissions significantly reduce from about 11 $GtCO_{2eq}$in 2015 to zero emissions by 2050 or earlier, as the total LCOE of the power system
- The global energy transition to a 100% renewable electricity system creates 36 million jobs by 2050 in comparison to 19 million jobs in the 2015 electricity system.
- The total losses in a 100% renewable electricity system are around 26% of the total electricity demand, compared to the current system in which about 58% of the primary energy input is lost.

*Check out our new **93-page EV report**, based on over 2,000 surveys collected from EV drivers in 49 of 50 US states, 26 European countries, and 9 Canadian provinces.*

Tags: 100% renewable electricity, Bonn, COP23, Energy Watch Group, Germany, Lappeenranta University of Technology

About the Author

Joshua S Hill I'm a Christian, a nerd, a geek, and I believe that we're pretty quickly directing planet-Earth into hell in a handbasket! I also write for Fantasy Book Review (.co.uk), and can be found writing articles for a variety of other sites. Check me out at about.me for more.

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