

Researchers developing decentralised power grid modeled on the Internet

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Meeting the world's energy demands is one of the major challenges of our time. Renewables? Nuclear? Fracking? Carbon Capture and Storage? We're desperate to discover a silver bullet. Our researchers are exploring all possible solutions - from mathematical methodologies for adapting our systems to visionary, seemingly whacky, plans for future energy extraction.

The way that we consume and generate electricity has changed enormously since the era when electricity grids were first developed. The grids haven't always kept pace. *Scientific American* reports this week on how researchers at Boston University are developing software that will let renewable energy flow into and out of a decentralised power grid

just like data on the Internet.

The research team, led by Pablo Ruiz, has written algorithms that analyse power flows on the transmission grid and identify less-congested routes. Scientific American likens the method to 'the way a car navigation program will propose back roads if there's heavy traffic on the main highway'.

Armed with this information, grid operators can then open and close circuit breakers to redirect power and make the most cost-effective energy source available. Ruiz estimates the project's Topology Control Algorithms software could save 100 million dollars (around EUR 73 million) a year in congestion-related costs and reduce wind curtailments by roughly 50 percent.

Meanwhile, scientists in Japan have dreamt up a slightly more daring plan to secure the earth's energy supply. Iflscience.com reports that researchers at the Japan Aerospace Exploration Agency (JAXA) are exploring the possibility of developing a giant solar farm in space. The floating power plant could gather the sun's energy with virtually no constraints from the weather, seasons or time of day, delivering a constant supply of green energy to Earth.

How would our space solar farm actually work? According to iflscience.com, the proposed model, consisting of floating [solar panels](#), would be several miles long and weigh 10 000 metric tons. The panels would be tied to a station on the ground in order to keep the satellite at a fixed point in geostationary orbit.

Researchers are currently exploring how we could get all of that precious sun [energy](#) back to Earth. At the moment, they believe that we could convert the [solar energy](#) into either laser beams or microwaves, or perhaps even a combination of both, which would then be transmitted to

a receiving facility situated on Earth.

Ifscience.com notes, 'These space based solar panels would be around 5-10 times more efficient than ground-based solar conversion systems. Furthermore, CO2 emissions will be low and will only come from the receiving facility. It's predicted that SSPS will be able to process around 1 gigawatt of power, which is a similar amount to [nuclear power stations](#)'

The science site concludes. 'This concept may seem a little far-fetched, but JAXA believe they are getting tantalizingly close to turning this vision into a reality.' This is science without the fiction, according to JAXA anyway.

Provided by CORDIS

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