Estimating the actual costs of converting to renewable energy sources

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A pair of researchers at Imperial College London has taken on the difficult task of attempting to estimate the actual cost of utilities converting to renewable energy sources. In their paper published in the

journal *Nature Energy*, Philip Heptonstall and Robert Gross looked at the costs associated with installation, hardware, maintenance, distribution and handling of off-times for renewable energy sources and compared them to traditional sources such as coal and oil.

Because the hardware costs involved in using renewable resources to produce electricity have come down so much, the main factor now holding up wholesale conversation of gas, coal and other energy plants to renewable plants is off-times—variable winds and the Earth's day/night cycles affect wind and solar sources. Even some hydro plants can suffer during dry spells. Complicating the issue is the variability of availability of renewable resources across geographic regions: day length differs depending on latitude; some places are much windier than others; some places do not have a nearby water sources for hydro-energy. Thus, large utilities have been reluctant to fully convert to renewable resources. Many have doubts about the costs associated with dealing with down or off-times. In this new effort, the researchers have calculated the costs associated with such downtimes and have compared them to costs associated with traditional fuel sources. They found that in most instances, renewables are still cheaper.

To find the true costs of switching to renewable resources, the researchers pored through the results of studies of the costs associated with various ways that power companies would have to deal with outages due to bad weather and other factors. They then broke down such costs into three categories: dealing with erratic sources, using renewables to meet peak demands and integration with the existing grid.

Applying these categories to existing infrastructures, the researchers found a wide range of possibilities. They also found that many utilities could easily make the switch to all-renewable systems, while some would struggle. But more importantly, they found no evidence to suggest that the costs averaged across the industry would be any higher than costs

currently being incurred. Thus, they conclude that the time has come for most utilities to make the switch—because the future of the human race depends on it.

More information: Philip J. Heptonstall et al. A systematic review of the costs and impacts of integrating variable renewables into power grids, *Nature Energy* (2020). DOI: 10.1038/s41560-020-00695-4