

FROM THE GRID TO ENERGY DEMOCRACY: MAKING THE RENEWABLES TRANSITION



We know where to go, but the getting there remains.

When Naomi Klein spoke about her book *This Changes Everything* at the Hammer Museum in Los Angeles in September 2014, she was asked if she agrees with James Hansen's support for nuclear power. She began by crediting Dr. Hansen -- a scientist who worked for decades at the U.S. National Aeronautics and Space Administration -- with doing more than anyone else to alert the public to the dangers of climate change.

Klein then added that she does not agree with Hansen that nuclear power is part of the solution:

"I understand why people looking at the current power configurations as they are believe that we need these centralized solutions that are less threatening to our elites.

There's amazing research out of Stanford University by Mark Jacobson that says we could get to 100% renewable energy with existing technologies by 2030.

Renewable energy is quite challenging to existing power structures because it's inherently decentralized."

Elon Musk, CEO of the Tesla electric car company, recently announced that he will be manufacturing batteries for home and commercial use at a new lithium-ion-cell "gigafactory" in Nevada, complementing his SolarCity business for making solar panels. Rapid increases in efficiency and decreases in costs of solar panels and of batteries to store solar power, means that the era of "grid parity" is fast approaching. Soon it will be cheaper for many homeowners to generate their own power to run their homes and electric vehicles, rather than relying on the grid.

There is clearly a powerful appeal to freedom from reliance on centralized energy systems. Decentralization and democratization of energy go hand in hand with a transition to a more equitable society.

This reverses the current trend towards increasing concentration of wealth and political power in the hands of the few, helps society exit the fossil fuel treadmill, and minimizes harmful effects of climate change.

Yet there is irony in building gigafactories to bring down costs of producing batteries that are key to decentralized energy.

Extracting the raw materials that go into those batteries -- such as lithium -- will require large mining operations, with environmental risks that must be carefully managed.

Democratization of energy is a powerful and positive vision for the future, far more appealing than a world of increasing extremes of wealth and poverty, and consequent violent social unrest. To realize this vision will require a well thought-out transition. Do we still invest in the grid? Are renewables inherently decentralized?

Plan for a renewable economy

Mark Jacobson, the scientist cited by Naomi Klein, presented an updated plan for each of the 50 U.S. states to make the transition to 100 per cent renewable energy by 2050 at the February 2014 annual meeting of the American Association for the

Advancement of Science. A graphic version of this plan shows a mix of centralized and decentralized technologies.

For example, concentrated solar plants (CSP) -- which use mirrors or lenses to focus a large area of sunlight onto a small area -- would provide 15 per cent of California's proposed renewables mix. California already has the world's largest CSP, a 377-megawatt facility in the Mojave Desert.

Other centralized technologies in Jacobson's plan include hydroelectric dams, large-scale solar photovoltaic (PV) plants, and wind turbines (including offshore wind).

Smaller-scale technologies such as geothermal energy, and roof-top solar panels on residential and commercial buildings, comprise less than 10 per cent of the proposed energy mix for most states. There are important exceptions. Southern-tier states -- including Florida, Georgia, California, New Mexico, Arizona and Nevada -- would all use more than 10 per cent of these decentralized power sources. If entrepreneurs such as Elon Musk are successful in increasing the affordability and performance of solar, and making battery technologies much faster, Jacobson's predictions for solar power may be far too conservative.

Wind power comprises the largest share of the renewables mix in Jacobson's plan. While offshore wind is clearly a centralized power source, onshore wind could be developed in a more decentralized fashion. Expansion of wind power at the scale envisioned by Jacobson would require enhanced regulations to address wind's environmental and social impacts, and democratic reforms to share revenues equitably with Indigenous and local communities.

Jacobson's plan shows hydroelectricity as an important power source in states such as Vermont, Washington, Oregon and Montana. If a similar plan were prepared for Canada the proportional role of hydropower would be far greater, given that it currently provides over 90 per cent of the electricity needs in several provinces (British Columbia, Manitoba and Quebec). That being said, major expansion of hydropower is not foreseen, and the transition to a full renewable economy will instead need to focus on how to integrate new solar and wind projects with existing hydropower facilities.

Democratized energy

Naomi Klein makes a strong argument that the need to find solutions to climate change is one of the best reasons to question the dominance of capitalism and centralized power in modern society.

Decentralized and democratized energy systems should be encouraged using means such as the feed-in tariff under Ontario's Green Energy Act. If costs fall and renewable installations come online more quickly, they will displace more expensive centralized power systems and reduce everyone's electricity bills over the longer term.

At the same time, centralized power systems will necessarily be part of the transition to 100 per cent renewable energy.

Major utilities -- many of them publicly owned -- will need to step up to the plate and invest in renewables if we want a decent future for our children.

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