MACALESTER COLLEGE

A Distributed and Community-Based Electrical Grid: Building the Energy, Economy, and Democracy for Tomorrow

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Problem: Our current, centralized electrical grid is causing many problems, including poor economic organization and sustainability, corporate and undemocratic control structures, national security issues, and sustained reliance on fossil fuels.

Costly and Wasteful Energy Production

Currently, our power generators are centralized near large coal or nuclear plants that support an extensive multistate generation system. Since these plants appear "dirty" to people, they are generally located far away from the cities they power. Transmission services are costly, both in monetary and political terms. Each mile of transmission lines costs about $1 million to construct, and a centralized grid requires many interconnected generators and users. Nationwide, about 7% of electricity is lost during transmission as heat. Finally, transmission services alienate those they serve – as demonstrated when the construction of a transmission line running from North Dakota through Minnesota resulted in intense opposition from western Minnesota farmers.

Alienating Structure and Economics

Centralized power systems alienate not only with transmission lines, but also political power. When big energy giants control the construction, price, and source of energy and the government supports the system, average people lose. Citizens are reduced to price takers, forced to buy whatever energy the power company supplies. Personal and community renewable energy sources are overlooked, energy efficiency is ignored, and democracy is discouraged.

Openings for Failures and Terrorist Attacks

A well-placed attack nearly anywhere within a centralized electrical grid could result in a black or brownouts throughout a large region. Even without our increased terrorist threat, centralized electricity is open to many threats that can upset the entire system, as they did in the Northeast Blackout in 2003. The largest blackout in North American history, affecting two countries, millions of people, and costing billions of dollars in damages and lost time was caused at least partially by a tree. Furthermore, deregulation of the electricity market has resulted in a deteriorating and unstable infrastructure that easily lends itself to failures.

Inadequate Solutions for Renewable Energy

A centralized energy system will not accommodate the renewable energy sources that will power our lives. Currently, power companies view renewables as a supplement to a coal or nuclear base load. Yet solar systems work better with on-site generation on the

rooftops of houses, and geothermal systems also work well at residential or neighborhood levels. Meanwhile, wind farms and other renewable sources have had extreme difficulty connecting to the grid through Independent Service Transmission Operators (ISOs) at the speed at which they are built or needed. We have a moral and economic responsibility to reduce the greenhouse gas emissions that are causing global warming, and carbon dioxide from power generation composes about 20% of America's total emissions. Our current centralized structures will not support a quick and just transition to a clean energy future.

Solution: The solution to these problems is to build America's clean energy future through a distributed grid, also known as a "smart grid." Under a decentralized system, electricity generation will be distributed among communities, near its consumption and under relative local government control.

In order to achieve this transformation, the US government needs to support a transition to a distributed electric grid through a Distributed Grid Package, including the following provisions.

Invest in the Creation of a Smart Grid
The Apollo Project estimates that $1 billion spent over five years on research and demonstration programs would be sufficient to successfully prototype a smart grid and lay the regulatory groundwork to ensure its implementation. In both government and societal terms, this is a small cost, and the benefits are vast and diverse. This investment would almost immediately stimulate $100 billion in deployment expenditures from its owners and operators and 400,000 jobs that would revive our faltering economy. A distributed grid would also retain more jobs than a centralized system, and will further stimulate growth in the renewable energy market. Finally, a distributed grid would fix the economic and environmental problems of a centralized system – no large brown or blackouts, no opening for terrorist attacks, better efficiency in transmission and off-base generation, and fewer health and environmental problems.

Create National Net Metering Laws
Net metering allows excess local production of energy to be sold or credited back to the grid. Many states already have net metering laws, but they often have a cap on how much energy can be sold and allow energy purchase at reduced prices. A national net metering law will encourage local production of energy, especially household systems like rooftop solar. Net metering literally gives the power back to the people, by allowing individuals to make choices about their energy sources and invest in personal or community energy development.

Form National Nondiscriminatory Interconnection Laws
Many states have discouraged distributed production by adding unnecessary costs for interconnection. Since local production reduces transmission fees and electric demand, any discentives to local interconnection need to be eliminated. Additional interconnection fees should be eliminated to encourage further development.

Reform the Independent Service Transmission Operators (ISOs)
ISOs have a virtual monopoly on transmission and generation connections. The ISO system needs to be revised and coordinated to support the transition to a clean energy economy.

Support Community Based Energy Development (CBED) Initiatives and Participatory and Local Democracy
CBED initiatives have proven to be successful at the state level in Minnesota with flip mechanisms, outside investment, power purchase agreements, and other structures that allow community ownership and benefit from wind turbines. These policies and others like feed-in taxes will be further applied to engage the citizenry in directing the renewable energy transition. An engaged citizenry with an involved government and an eager business sector will be able to pursue the right renewables for each community. This collaboration will translate to a mobilized citizenry, ready to take the individual and community responsibilities that come with climate change and create further state, national, and international solutions. The creation of CBED solutions for a smart electric grid will be accepted and promoted by the people it affects, the cost effective for the state and public, and the quickest and most environmentally friendly solution.

In order to do this, the federal government should provide incentives for community-development strategies, through reform of the government fund allocation process from the Department of Energy. While the federal government is certainly wary of giving up any power to the states, the best possible solutions will result from local and regional leadership on the issue. The federal government could also provide standards for zoning, which states could then choose to adopt, codify, or even strengthen. Finally, empowering local government is crucial – any engagement cannot be a shroud.

A distributed grid is the best first step we can take to transition from dirty electricity to clean renewables. It will provide stimulus and jobs for our sagging economy. It will help the United States find climate solutions. It will empower people to believe and participate in our governance once again. Global warming isn't waiting for us. The rest of the world isn't waiting for us. The future isn't waiting for us. It's time we face our responsibilities and move forward, as a nation united once again.

Resources:
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