

5. Infrastructure and Public Facilities



RESEARCH TEAM: Greening of energy production and policy

Grand Challenge: Sustainable Energy and Environmental Monitoring

Key Terms:

Renewable energy, Assembly Bill 32, distributed generation, cap-and-trade, climate change

Student Leader: Jake King

Student Members:

- Jake King East County San Diego Renewable Energy Park
- John McMillan Diversifying America's Energy Portfolio: Changes within Wind Power and Oil Subsidies
- Won Bae California's Problem with Implementing Renewable Energy: What's in Store for the Future

Mentor(s) Leader:

- Rich Caputo

Research Team Narrative:

Escalating fossil fuels costs and rising concern over the related impacts of a changing global climate together with declining costs and increased efficiency of renewable energy sources have stimulated the quest for sustainable energy resources. Renewable energy uses natural resources through differing technologies such as solar power, wind power, biomass, geothermal, and various others as mechanisms to produce energy, mostly through electricity and heat. The significance of the greening of energy production and policy lies within the uncertain future of our national energy infrastructure and the ability for renewable energy to provide a long- term sustainable alternatives to traditional oil-

based systems. The diversification of America's energy portfolio is an integral part of the goal to reduce greenhouse gas emissions, provided that the necessary institutional framework exists to increase the incorporation of these technologies through public policy change as well as their expanded implementation at the local and regional levels.

This Research Team narrative documents each research team member's projects. The project foci range from national to local levels of policy development. By deconstructing national, state, and local policies, each study uses a system of comparative strategic and data analysis to better define the distinctive methodologies necessary to induce change in both public policy and the normative values associated with environmentally conscious development. The course of study provided by each author examines the fundamental role of policies in re-adjusting the existing energy infrastructure as well as the expanding availability of economically viable solutions to help alleviate the impending difficulties associated with our dependence on fossil fuels. Much of the research draws upon government documents such as the U.S. Department of Energy's "Wind Power: Today and Tomorrow", U.S. Department of Energy Efficiency and Renewable Energy's "Wind Powering America", as well as resources from the California Public Utility Commission and the California Energy Commission. Other references were provided by peer-reviewed sources such as *The Market Value and Cost of Solar Photovoltaic Electricity Production* by Severin Borenstein, *Emissions Trading, Electricity Industry Restructuring, and Investment in Pollution Abatement* by Meredith Fowlie and several others as well as white papers and journals from organizations such as the American Wind Energy Association, the Sierra Club, and the San Diego Renewable Energy Society amongst others. These sources of information as well as others are cited within each document to provide a basis of applicable knowledge to inform the reader of pertinent information as well as to provide a foundation to better construct the individual arguments found in each project.

John McMillan's project concentrates on studying the methods and policies associated with successfully diversifying our national energy portfolio with the use of renewable energy resources. In 2007, the wind energy industry installed 5,244 megawatts in the United States alone, increasing the national generating capacity by 45% in a single year. This expansion of wind energy capacity injected an investment of over \$9 billion into the U.S. economy. The total U.S. wind generation capacity now equals 16,818 megawatts, with 34 states having installed wind facilities. The Renewable Portfolio Standard (RPS) uses market mechanisms to ensure that a growing percentage of electricity is produced from renewable sources, like wind power. For instance California has an RPS of 20% renewable energy by 2010, additionally 24 other states and the District of Columbia have passed similar measures. The most significant national subsidization of wind power development is the Production Tax Credit, which offers sizeable incentives for the development of alternative energy. The PTC reduces the price of wind-generated electricity by roughly 2 cents per kilowatt-hour produced, making wind more economically viable and attractive for utilities and investors. The PTC has been allowed to expire three times, each of which resulted in a 76%-93% decrease in the number of wind energy megawatts developed, the current PTC is set to expire at the end of 2008. A national 15% RPS is achievable with technology available today, but only through long-term support and enactment of the PTC. Significant policy changes must be enacted, support of renewable energy legislation, such as an RPS and PTC, in both a national

and local context, is the only means to weaning the country from its oil addiction, while simultaneously reducing emissions and spurring economic growth.

The focal point researched by Won Bae in his study is the developing of an understanding of how California can begin utilizing more renewable energy in a system that is both practical and economically feasible. California is embarking upon ambitious legislation that would require the state to cut back on carbon emissions by 25%, or to 1990 levels by 2020. To meet this standard, California plans to pursue a cap-and-trade program for carbon abatement. His research suggests that a cap-and-trade system would not be the best platform for guiding California's future with renewable energy, but instead a carbon tax. The main reasoning behind this position is that fossil fuels will soon become a depleted resource. A carbon tax would place direct pressure on major carbon emitters to increase efficiency in energy production. Therefore, it is imperative that California begins investing heavily on renewable energy and a carbon tax would be the best system to push this process forward. There is a large amount of renewable energy potential in California that remains untapped, and this research explains what some cities are doing to implement renewable energy in their infrastructure.

Jacob King's project is focused on studying the effects of non-profit advocacy organizations' strategies in attempting to create policy change regarding the local renewable energy solutions to the issue of future electrical infrastructure in the region. San Diego is currently engulfed with the debate over the future development of local electrical infrastructure. SDG&E proposes that to meet the new state laws that require utilities to generate 20 percent of their supply through renewable resources by 2010, there is a need to overcome the transmission barriers linked to green energy supplies. Their proposal of the Sunrise Powerlink is opposed by several local non-profit organizations, among which the Sierra Club is arguably the most influential. The Sierra Club specifically outlines a broad resolution in "San Diego Smart Energy 2020" that integrates several points attempting to invalidate SDG&E's claims to the need of a transmission line of the magnitude proposed by the Sunrise Powerlink. The research attempts to connect the effects employed by the strategies of a smaller, locally based organization, San Diego Renewable Energy Society (SDRES), to those connected to the Sierra Club's agenda-setting and policy change campaign involved in securing "a clean and sustainable energy future for the San Diego region." The research shows that while the effects of these organizations cannot be measurably separated, their supportive role with one-another and their similar strategies suggest that the success as a whole of their joint advocacy work supports the theory that non-profit organizations can play a role in changing policy and the public awareness. The local emphasis on in-region renewable energy production employed by SDRES and supported by the Sierra Club provides an important and exemplary foundation for policy-advocacy groups to better examine their effects on local government and policy change.

The future of a reliable sustainable energy infrastructure hinges upon the initial success of public policies that attempt to integrate broad economic resolutions with local implementation measures. However, the greening of energy production and policy research provided by these projects suggests that while policy initiatives are essential, they ultimately are just a part of the process. The participation of each individual as a citizen propagating the necessary mechanisms of change is the crucial element in creating successful diversified energy programs. The research presented here argues

that the development of future energy infrastructure depends on individual choice as a vital instrument of change, signifying the interdependent nature of policy change and public participation.

References:

Borenstein, Severin, The Market Value and Cost of Solar Photovoltaic Electricity Production. Berkeley: UCEI, 2008.

Bradford, Travis, Solar Revolution, The Economic Transformation of the Global Energy Industry. Cambridge, Massachusetts: The MIT Press, 2006.

Farhar-Pilgrim, Barbara and Charles T. Unseld. America's Solar Potential. Praeger Publishers, 1982.

Fowlie, Meredith. "Emissions Trading, Electricity Industry Restructuring, and Investment in Pollution Abatement". Berkeley: UCEI, 2005.

Fraser, Peter. "Power Generation Investment In Electricity Markets". International Energy Agency, 2003.

Links:

[California Energy Commission](#)

[Cost, Conflict and Climate: U.S. Challenges in the World Oil Market](#)

[The Energy Foundation](#)

[Vote Solar](#)

[California Public Utilities Commission](#)