

Bridging Climate Action Policies and Green Job Development

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About the Report

This is an invited white paper submitted to Janet Joseph, Vice-president for Technology and Strategic Planning of the New York State Energy Research and Development Authority (NYSERDA), for use by NYSERDA and the Integration Advisory Panel of the New York State Climate Action Council. The report is based on preliminary research for the grant "The Greening of Economic Development," supported by the Science and Technology Studies Program of the National Science Foundation (SES-0947429). A full report will be made available in August 2010. Any opinions, findings, conclusions, or recommendations expressed in this report are those of the author and do not necessarily reflect the views of the National Science Foundation.

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David J. Hess is a social scientist and professor of Science and Technology Studies at Rensselaer Polytechnic Institute. He is director of the Program in Ecological Economics, Values, and Policy and advisor for the Design, Innovation, and Society program. He is author of over a dozen books and fifty articles, and his work focuses on public understandings of and engagements with science and technology. He is the recipient of various grants and awards, including the Robert K. Merton award for the best book in science and technology studies. His current research focuses on the green transition at the state and local government level in the United States from the perspective of policy, job development, and local business development.

Executive Summary

As the New York State engages in long-term planning for climate change and sustainability policy, general environmental policy goals should be connected with the prospects for green job development. There are many types of green job development, but a successful state green-collar economy will have a diversity of positions that includes the construction, installation, maintenance, manufacturing, and high-technology sectors. To ensure the success of the upper-level of the career ladder, state governments must carefully craft environmental and energy policies to coincide with economic development efforts so that both sets of policies work together to enhance the growth of clean-energy innovation clusters. Doing so requires a complementary set of policies that can be integrated with general clean-energy and sustainability policy goals. By thinking through the connections between long-term climate action policy and the development of clean-energy innovation clusters, potential new opportunities can be recognized and policies can be designed with dual objectives in mind. If the policies succeed in creating a wide range of green jobs, from those of the high-tech innovation clusters through service-delivery positions, they will likely receive widespread and growing support from voters and their representatives.

To address long-term environmental problems such as greenhouse gas emissions, state governments are developing scenarios and plans for the greening of their economies. There are many technological issues to consider, such as what type of clean or green energy should be prioritized and how to it is most feasible to achieve policy goals such as an eighty percent reduction in 1990 carbon emissions by 2050. However, there are also important issues related to public support that should be considered as well. To obtain widespread public support for environmental transition policies and to strengthen the long-term prospects for the state's economy, one important consideration is how the plans for a greening of energy technology and the overall economy can be connected with green job development.

The promise of green job development offers many sources of support from diverse constituencies:

- For elected political leaders during a recession, it addresses the problem of unemployment and popular demand from voters for job development.
- For environmentalists, it diversifies political support for environmental policy reforms.
- For educational and research organizations, it offers new opportunities for research funding and curriculum development.
- For advocates of low-income neighborhoods, it offers the potential of job training and cost reductions on home energy bills.
- For business leaders and entrepreneurs, it offers new areas of investment in a rapidly growing industry.
- For labor and hourly workers, it offers new opportunities for work, including potential jobs in manufacturing and the skilled service sectors.
- For the small business community, it offers new prospects for service-sector employment and energy-based cost reductions.

Although significant differences exist among the various constituencies over what the clean-energy transition should and should not entail, there are also opportunities for new areas of consensus to be forged, and the frame of “green jobs” provides one such opportunity.

The category of “green jobs” can be broken down by industry and skill level. Green-collar jobs range from entry-level to advanced in at least ten sectors: energy, water, green building, woodworking, green space, food, transportation, nontoxic printing, nontoxic cleaning, and waste stream diversion (Pinderhughes 2007). This report focuses on the energy sector. In that sector, entry-level jobs include construction and installation, whereas more advanced jobs include electricians, engineers, managers, and even business founders. Some jobs in the green building sector, such as building weatherization, have been linked to longstanding programs of job training for persons with employment barriers, whereas at the high-tech end, there are opportunities for new technology companies that address building system controls and appliance connections with emergent smart-grid technologies. Most green-collar jobs will be in the service industries, but well-paid manufacturing jobs are highly desirable as are the opportunities for entrepreneurship (Centers of Excellence 2008).

A good state government policy will ensure that there is a wide range of green-collar jobs and that potential career ladders exist from low-skilled, entry positions to the more highly skilled positions. Many clean-energy and related sustainability policies will

improve the demand conditions for green job development, but if a state government is not careful, it is also possible to miss the potential for broader energy and environmental policies to spur the creation of the full range of green-collar jobs. For example, in a general way a renewable energy portfolio standard and a renewable fuel standard will create local jobs by encouraging energy production that tends to be located within the state. By shifting the flow of expenditures from out-of-state energy sources (such as coal from other states or oil from abroad), the energy policy has essentially established a pattern of import substitution that facilitates local job creation. Likewise, investments in energy conservation also enable expenditures to out-of-state energy sources to be diverted into in-state installation industries and potential long-term savings that can generate multiplier effects for the state's economy.

However, one should avoid the assumption that green jobs automatically follow from broader green transition policies. The general policies may create green jobs, but they will not optimize the potential to create the full range of green jobs in the state. Consider two state government strategies. State government A designs energy policies that lead to high levels of long-term renewable energy production, but it does so by importing from other states and other countries most of its wind turbines, solar photovoltaics, electric vehicles, biofuels, fuel cells, energy storage technologies, and other green technologies. State government B has similar policies, but it also attends to the development of its clean-energy (and even broader clean-technology) industries. By 2050, both states have achieved the laudable goal of an eighty percent greenhouse gas emissions reduction below 1990 levels. But State B has a sizzling innovation economy with high wages and a vibrant culture of innovation, whereas State A imports most of its green technology and ends up, in effect, as a green colony of state and countries like State B. In short, State A has failed to reap the benefits of high-wage innovation jobs and profit retention from new business development.

Clearly, it is desirable to follow the policies of State B and to develop the state's clean-technology industry alongside its general sustainability and climate action plans. To do so, the state government must promote its clean-energy and broader clean-tech industries. One way to do so is to recruit manufacturers of clean-energy technology to locate in the state. The recruitment of manufacturers is widespread among some state governments, especially for the wind turbine and solar photovoltaic industries. However, it is not enough to build a cluster of manufacturers in the state. When demand conditions and incentives change, the companies will consider locating elsewhere or reducing production in their host state. Furthermore, the long-term trend for the manufacture of many green technologies is toward outsourcing to foreign countries. Already, seventy-five percent of the components of photovoltaics and fifty percent of wind turbines are estimated to be produced abroad (Maryl et al. 2010). For the final assembly of large and heavy technologies such as wind turbines and rail vehicles, there are some advantages to local manufacturing. However, in general the recruitment of manufacturers in the clean-energy industry affords precarious long-term green job prospects unless recruitment is embedded in a broader economic development strategy.

The broader economic development strategy involves creating innovation clusters so that businesses are headquartered in the state and retain essential, high-end functions in the state even if some or all of the manufacturing is shifted elsewhere.

The creation of innovation clusters is a long-term process that fits well with other long-term planning exercises. Successful clusters require a vibrant base of research, adequate sources of capital (including state government funds), related industries that can be transformed into the new industry, an adequately trained workforce, supporting service industries, local demand, testing facilities, and many other features that are discussed in the regional innovation literature. When clusters are successful, it is easier to recruit not only manufacturing facilities but also corporate headquarters, and it is easier to retain existing companies because of their strategic location.

My research identifies significant emerging and existing innovation clusters in the United States in the biofuels, smart grid, solar, electric vehicles, energy storage/fuel cell, and wind industries. In many cases state governments have played an active role by investing in research clusters and by facilitating the development of new clean-energy businesses. They have also leveraged existing industrial strengths, such as the following:

- automotive manufacturing for energy storage, electric vehicles, fuel cells, and wind energy components (in Michigan, Ohio, and South Carolina)
- agriculture and food processing for biofuel production and refining (in the upper Midwest and the Southeast)
- biotechnology for next-generation biodiesel and ethanol (in California and Massachusetts)
- information technology for smart grid technologies (in California and Washington)
- semiconductors and advanced materials for photovoltaics (in California), and glass manufacturing and advanced materials for photovoltaics (in Ohio)

Although California is strong in most industries, there are also significant innovation clusters emerging in the other states.

New York State has done well in the competition to develop leading clean-energy innovation clusters. There are now assessments of clean-energy strengths completed by the New York Academy of Sciences (Cooke 2009) and initiatives to develop its battery, energy storage, and smart grid industries already underway. There are significant strengths for an innovation cluster in the battery and energy storage industries, but to date most of the manufacturing and software companies in the smart grid industry are concentrated in California and Washington, and it is likely that New York will become an importer of smart-grid technologies. However, the state has strengths in existing related industries, such as the building systems control industry, and it has strong research and development facilities for smart buildings and lighting. Likewise, it is possible that the Ohio model, in which highly targeted investments from the state government helped to transform the automotive window glass expertise in Toledo into a photovoltaic cluster, might help guide a transition of New York's nanotechnology industry into next-generation solar. A wind-industry supply chain could be identified, and synergies among emergent green industries that build on the state's impressive research and industry strengths could be identified. Relations with clean-energy clusters in neighboring states could also be developed.

Demand-side policies can also be configured to help the local innovation clusters. Some states are already establishing incentives and goals for in-state or regional production of biofuels. State government policies can also create favorable

demand characteristics by establishing preferences for procurement policies for in-state companies. The recruitment of manufacturing facilities must be conducted with rigorous clawback arrangements. Likewise, tax credits and other policy instruments can be used to favor wind farms that utilize in-state manufacturing components, as has occurred in Michigan.

By thinking through the connections between long-term climate action policy and the long-term development of clean-energy innovation clusters, opportunities can be recognized and policies can be designed with dual objectives in mind. If the policies succeed in creating a wide range of green jobs, from those of the high-tech innovation clusters through service-delivery positions, they will likely receive widespread and growing support from voters and their representatives.

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