

SIZING THE CLEAN ECONOMY



A NATIONAL AND REGIONAL GREEN JOBS ASSESSMENT



EXECUTIVE SUMMARY

The “green” or “clean” or low-carbon economy—defined as the sector of the economy that produces goods and services with an environmental benefit—remains at once a compelling aspiration and an enigma.

As a matter of aspiration, no swath of the economy has been more widely celebrated as a source of economic renewal and potential job creation.

Again this year President Obama spoke in his State of the Union Address of “the promise of renewable energy” and environmental pursuits that will “strengthen our security, protect our planet, and create countless new jobs for our people.” Since then, a global “race to clean” has gained new urgency with numerous nations—such as China, Japan, and the United Kingdom—all having made new commitments to invest in the low-carbon and environmental goods sector as a source of quality jobs, exports, and industry growth.

Yet, the clean economy remains an enigma: hard to assess. Not only do “green” or “clean” activities and jobs related to environmental aims pervade all sectors of the U.S. economy; they also remain tricky to define and isolate—and count.

The clean economy has remained elusive in part because, in the absence of standard definitions and data, strikingly little is known about its nature, size, and growth at the critical regional level.

Currently no comprehensive national database exists on the spatial geography of the clean economy and its sub-industries, although important work has assessed the clean economy across states. And while numerous studies have analyzed individual regional clean or green industries, a proliferation of definitions and the absence of data for large

numbers of regions has made it difficult to situate regional clean economies in a national and comparative context.

The result: Debates about the so-called “green” economy and “green jobs” have frequently been short on facts and long on speculation, assertion, and partisanship.

Which gets to the impetus of this report: Seeking to address some of these problems, the Metropolitan Policy Program at Brookings worked with Battelle’s Technology Partnership Practice to develop, analyze, and comment on a detailed database of establishment-level employment statistics pertaining to a sensibly defined assemblage of clean economy industries in the United States and its metropolitan areas.

Covering the years 2003 to 2010 for every county in the United States, the resulting information (available for download at http://www.brookings.edu/metro/clean_economy.aspx) and this report represent the first study of the U.S. clean economy to provide timely information that is both comprehensive enough in its scope and detailed enough in its categorization to inform national, state, and regional leaders on the dynamics of the U.S. low-carbon and environmental goods and services “super-sector” as they are transpiring in regions and metropolitan areas. This information is then employed in a discussion of how the nation, the states, and localities and regions might address a number of key policy problems that may be slowing the growth of the clean economy.

Most importantly, "Sizing the Clean Economy: A National and Regional Green Jobs Assessment" concludes that:

- **The clean economy, which employs some 2.7 million workers, encompasses a significant number of jobs in establishments spread across a diverse group of industries.** Though modest in size, the clean economy employs more workers than the fossil fuel industry and bulks larger than bioscience but remains smaller than the IT-producing sectors. Most clean economy jobs reside in mature segments that cover a wide swath of activities including manufacturing and the provision of public services such as wastewater and mass transit. A smaller portion of the clean economy encompasses newer segments that respond to energy-related challenges. These include the solar photovoltaic (PV), wind, fuel cell, smart grid, biofuel, and battery industries

wages. Yet a disproportionate percentage of jobs in the clean economy are staffed by workers with relatively little formal education in moderately well-paying "green collar" occupations

- **Among regions, the South has the largest number of clean economy jobs though the West has the largest share relative to its population.** Seven of the 21 states with at least 50,000 clean economy jobs are in the South. Among states, California has the highest number of clean jobs but Alaska and Oregon have the most per worker
- **Most of the country's clean economy jobs and recent growth concentrate within the largest metropolitan areas.** Some 64 percent of all current clean economy jobs and 75 percent of its newer jobs

The clean economy permeates all of the nation's metropolitan areas, but it manifests itself in varied configurations.

- **The clean economy grew more slowly in aggregate than the national economy between 2003 and 2010, but newer "cleantech" segments produced explosive job gains and the clean economy outperformed the nation during the recession.** Overall, today's clean economy establishments added half a million jobs between 2003 and 2010, expanding at an annual rate of 3.4 percent. This performance lagged the growth in the national economy, which grew by 4.2 percent annually over the period (if job losses from establishment closings are omitted to make the data comparable). However, this measured growth heavily reflected the fact that many longer-standing companies in the clean economy—especially those involved in housing- and building-related segments—laid off large numbers of workers during the real estate crash of 2007 and 2008, while sectors unrelated to the clean economy (mainly health care) created many more new jobs nationally. At the same time, newer clean economy establishments—especially those in young energy-related segments such as wind energy, solar PV, and smart grid—added jobs at a torrid pace, albeit from small bases
- **The clean economy is manufacturing and export intensive.** Roughly 26 percent of all clean economy jobs lie in manufacturing establishments, compared to just 9 percent in the broader economy. On a per job basis, establishments in the clean economy export roughly twice the value of a typical U.S. job (\$20,000 versus \$10,000). The electric vehicles (EV), green chemical products, and lighting segments are all especially manufacturing intensive while the biofuels, green chemicals, and EV industries are highly export intensive
- **The clean economy offers more opportunities and better pay for low- and middle-skilled workers than the national economy as a whole.** Median wages in the clean economy—meaning those in the middle of the distribution—are 13 percent higher than median U.S.

created from 2003 to 2010 congregate in the nation's 100 largest metro areas

- **The clean economy permeates all of the nation's metropolitan areas, but it manifests itself in varied configurations.** Metropolitan area clean economies can be categorized into four-types: service-oriented, manufacturing, public sector, and balanced. New York, through mass transit, embodies a service orientation; so does San Francisco through professional services and Las Vegas through architectural services. Many Midwestern and Southern metros like Louisville; Cleveland; Greenville, SC; and Little Rock—but also San Jose in the West—host clean economies that are heavily manufacturing oriented. State capitals are among those with a disproportionate share of clean jobs in the public sector (e.g. Harrisburg, Sacramento, Raleigh, and Springfield). Finally, some metros—such as Atlanta; Salt Lake City; Portland, OR; and Los Angeles—balance multi-dimensional clean economies
- **Strong industry clusters boost metros' growth performance in the clean economy.** Clustering entails proximity to businesses in similar or related industries. Establishments located in counties containing a significant number of jobs from other establishments in the same segment grew much faster than more isolated establishments from 2003 to 2010. Overall, clustered establishments grew at a rate that was 1.4 percentage points faster each year than non-clustered (more isolated) establishments. Examples include professional environmental services in Houston, solar photovoltaic in Los Angeles, fuel cells in Boston, and wind in Chicago

The measurements and trends presented here offer a mixed picture of a diverse array of environmentally-oriented industry segments growing modestly even as a sub-set of clean energy, energy efficiency, and related segments grow much faster than the nation (albeit from a small base) and in

ways that are producing a desirable array of jobs, including in manufacturing and export-oriented fields.

As to what governments, policymakers, and regional leaders should do to catalyze faster and broader growth across the U.S. clean economy, it is clear that the private sector will play the lead role, but governments have a role too. In this connection, the fact that significant policy uncertainties and gaps are weakening market demand for clean economy goods and services, chilling finance, and raising questions about the clean innovation pipeline reinforces the need for engagement and reform. Not only are other nations bidding to secure global production and the jobs that come with it but the United States currently risks failing to exploit growing world demand. And so this report concludes that vigorous private sector-led growth needs to be co-promoted through complementary engagements by all levels of the nation's federal system to ensure the existence of well-structured markets, a favorable investment climate, and a rich stock of cutting-edge technology—as well as strong regional cast to all efforts.

Along these lines, the report recommends that governments help:

- **Scale up the market by taking steps to catalyze vibrant domestic demand for low-carbon and environmentally-oriented goods and services.**

Intensified “green” procurement efforts by all levels of government are one such market-making engagement. But there are others. Congress and the federal government could help by putting a price on carbon, passing a national clean energy standard (CES), and moving to ensure more rational cost recovery on new transmission links for the delivery of renewable energy to urban load centers. States can adopt or strengthen their own clean energy standards, reduce the initial costs of energy efficiency and renewable energy adoption, and pursue electricity market reform to facilitate the use of clean and efficient solutions. And localities can also support adoption by expediting permitting for green projects, adopting green building and other standards, and adopting innovative financing tools to reduce the upfront costs of investing in clean technologies

- **Ensure adequate finance by moving to address the serious shortage of affordable, risk-tolerant, and larger-scale capital that now impedes the scale-up of numerous clean economy industry segments.**

On this front Congress should create an emerging technology deployment finance entity to address the commercialization “Valley of Death” and also work to rationalize and reform the myriad tax provisions and incentives that currently encourage capital investments in clean economy projects. States, for their part, can supplement private lending activity by providing guarantees and participating loans or initial capital for revolving loan funds targeting clean economy projects using new or improved technologies. And for that matter regions and localities can also help narrow the deployment finance gap by helping to reduce the costs and uncertainty of projects by expediting their physical build-out, whether by managing zoning and permitting issues or even pre-approving sites

- **Drive innovation by investing both more and differently in the clean economy innovation system.**

With the needed major scale-up of investment levels unlikely for now, Congress at least needs to embrace continued incremental growth of key energy and environmental research, development, and demonstration (RD&D) budgets. At the same time, Congress should continue its recent institutional experimentation through measured expansion of such recent start-ups as the Energy Frontier Research

Centers, ARPA-E, and Energy Innovation Hubs programs. Two worthy additional experiments would be the creation of a water sciences innovation center and the establishment of a regional clean economy consortia initiative. States can also advance the clean economy through maintaining and expanding their own RD&D efforts, perhaps by tapping state clean energy funds where they exist. All should be focused and prioritized through a rigorous, data-driven analysis of the nature, growth, and strengths of local clean economy innovation clusters

In addition, the “Sizing the Clean Economy” emphasizes that in working on each of these fronts federal, state, and regional leaders need to:

- **Focus on regions, meaning that all parties need to place detailed knowledge of local industry dynamics and regional growth strategies near the center of efforts to advance the clean economy.**

While the federal government should increase its investment in new regional innovation and industry cluster programs such as the Economic Development Administration's i6 Green Challenge, states should work to improve the information base about local clean economy industry clusters and move to support regionally crafted initiatives for advancing them. Regional actors, meanwhile, should take the lead in using data and analysis to understand the local clean economy in detail; identify competitive strengths; and then move to formulate strong, “bottom up” strategies for overcoming key clusters' binding constraints. Employing cluster intelligence and strategy to design and tune regional workforce development strategies will be a critical regional priority

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The measurements, trends, and discussions offered here provide an encouraging but also challenging assessment of the ongoing development of the clean economy in the United States and its regions. In many respects, the analysis warrants excitement. As the nation continues to search for new sources of high-quality growth, the present findings depict a sizable and diverse array of industry segments that is—in key private-sector areas—expanding rapidly at a time of sluggish national growth. With smart policy support, broader, more rapid growth seems possible. At the same time, however, the information presented here is challenging, most notably because the growth of the clean economy has almost certainly been depressed by significant policy problems and uncertainties.

In that sense, what is most challenging here is the fundamental question raised by the dynamic growth but modest size of the most vibrant and promising segments of the clean economy.

That question is: Will the nation marshal the will to make the most of those industries?

In the end, it is a question raised frequently by these pages. ●