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Commentaries

Local Power: Generating Clean Energy in Our Communities

Stephanie Wang, Timothy Green, and Rebecca Davis

In light of the rapid pace of deployment of cost-effective renewable energy projects in Europe and China, it is clear that the United States will eventually make the transition from an electrical power generation model—that predominantly relies on environmentally and economically unsustainable fossil fuel and nuclear technologies to generate the vast majority of its electrical power—to a new one that utilizes, to the greatest extent possible, renewable sources of energy.

The fundamental issue that U.S. policy makers must confront, therefore, is not *if* such transition will take place, but whether the nation will mobilize quickly enough to (a) remain competitive with Europe and Asia in the race to research, develop, manufacture, and deploy renewable energy technologies; (b) contribute in a timely way to the reduction of greenhouse gas emissions;[1] and (c) take full advantage of the myriad benefits of a transition to a clean energy economy, including increased job creation and private investment, energy independence, stabilization of energy prices due to reduced exposure to fossil fuel price volatility, and the health benefits that will accrue from a cleaner environment.

Accordingly, it is crucial that policy makers focus on identifying and leveraging renewable energy policies that accelerate deployment and thus maximize the economic and environmental benefits of our transition to a renewable energy future. Unfortunately, the national policy discussion in the United States remains largely fixated on supplementing our aging fossil fuel and nuclear electricity generation infrastructure with correspondingly large-scale renewable power facilities and related infrastructure that will most likely take decades to construct as a result of the significant barriers to development that such projects face, including long project development lead times, the frequent delays involved in the permitting and development of new transmission infrastructure, complex state and federal environmental review processes, and often intense community opposition to such projects.

Comments or questions regarding this month's Commentary? Discussion of "Generating Clean Energy in Our Communities" can be found at: http://blogs.planning.org/policy/?p=489.

Far from Washington, however, state and local policy makers are implementing programs that incentivize the development of renewable power projects that harness the combined power of small- to mid-sized renewable generation facilities located within communities (or close to the load center), and that are connected to the local utility's distribution grid. This decentralized approach to electricity generation is known as "distributed generation." Distributed generation projects can be rapidly deployed and are able to use a variety of types of renewable power technologies. Effective distributed generation programs enable communities to leverage previously untapped or underutilized community resources—such as commercial rooftops, municipal waste byproducts, and brownfields—to generate electricity that can be fed into the distribution grid for widespread use. This article provides an overview of the benefits of distributed generation of renewable electricity and the state and local policy changes necessary to rapidly increase installation of clean local energy projects in the United States.

BENEFITS OF DISTRIBUTED GENERATION

Faster Transition to Clean Energy

By supporting distributed generation, U.S. policy makers can accelerate the nation's transition to a sustainable electrical generation system. Because distributed generation projects are relatively small-scale and are often installed in built environments and brownfields, these projects are not subject to the delays associated with the development of central-station renewable plants, including extensive federal and state

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[D]evelopment of distributed generation capacity would enable businesses and individuals located in communities across the United States to take part in the electrical production economy, stimulating private reinvestment of electricity dollars in communities and local job creation.

environmental review processes, local opposition, and related issues that result in long lead times before large-scale projects are "shovel-ready."

Furthermore, the U.S. transmission system is inadequate to handle vast numbers of new large-scale, renewable power plants without major extensions and upgrades. Transmission bottlenecks currently impose significant constraints on daily power delivery and long delays for the interconnection of new projects.[2] Therefore, states risk failure to meet renewable energy targets when they focus on building large-scale, renewable projects that rely on the completion of new high-voltage transmission projects before they can be brought online. Under the best circumstances, permitting, siting, and construction of a new transmission line may take seven to 10 years.[3] Local opposition and legal challenges make new transmission lines among the most difficult projects to site and sometimes even result in the abandonment of proposed transmission projects.

Attempts by federal policy makers to streamline the approval of new transmission capacity have met with limited success. In February, the U.S. Ninth Circuit Court of Appeals rejected the U.S. Department of Energy's attempt to establish national interest corridors for new transmission lines that would cover 100 million acres in 10 states, including state and national parks, ruling that the Department had failed to adequately consult affected states or conduct federally mandated environmental reviews in identifying vast swaths of land as suitable for fast-track treatment of applications to construct transmission facilities.[4]

Local Jobs and Business Opportunities

In a centralized electricity system, most cities and counties are precluded from participating in electricity production and are thus unable to reap the economic benefits associated with being a participant in this crucial marketplace. By contrast, the development of distributed generation capacity would enable businesses and individuals located in communities across the United States to take part in the electrical production economy, stimulating private reinvestment of electricity dollars in communities and local job creation. Further, distributed generation of renewable energy creates significantly more jobs than producing fossil fuel or nuclear energy. For example, solar photovoltaic (PV), one of the most common distributed generation technologies, contributes nearly nine times the number of jobs as coal or natural gas production.[5]

Another important aspect of distributed generation technologies is that they can be deployed in a wide variety of settings, which enables cities and counties to repurpose or maximize the productivity of many different types of underutilized spaces in their communities. For example, PV systems can be installed on rooftops, parking lots, power distribution line right of ways, and brownfields. Many rural communities are also well positioned to take advantage of local-scale wind power opportunities.

Community water and wastewater treatment plants (WWTPs) are another potential source of electrical generation capacity. These facilities are among the most energy-intensive facilities operated by local governments, accounting for nearly 35 percent of all municipal energy consumption.[6] On a national level, municipal energy use in the operation of WWTPs amounts to 56 billion kilowatt (KW) hours of electricity per year, costing $4 billion and generating 45 million tons of greenhouse gases.[7] Additionally, in 2008, U.S. local governments collectively spent more than $20.5 billion on solid waste management, primarily on landfills and associated transportation costs.[8]

Many local governments are unaware that the opportunity exists to turn these energy-intensive, costly programs into sustainable, revenue-producing enterprises by transforming municipal wastewater treatment plants into dual-use facilities that also act as waste-biomass power plants.[9] These plants can supply themselves with the power necessary for their operations by converting the organic waste into methane. In addition, the organic fraction of municipal waste, which accounts for the vast majority of municipal solid waste that would normally be sent to a landfill, can be diverted and processed in a waste-biomass facility, thereby substantially reducing municipal landfill costs. The technology for creating such facilities is readily available and primarily uses existing infrastructure. The results of such operations can be dramatic: significant reductions in municipal energy expenditures, waste disposal fees, greenhouse gas emissions, and hazardous sources of water contamination.

State and local governments can use Clean Local Energy Accessible Now (CLEAN) programs, which enable community members to sell renewable power back to the grid (further described on page five) to encourage the development of distributed generation in their communities. In addition to spurring the deployment of renewable energy systems and stimulating the economic benefits discussed in this section, CLEAN programs also ensure that electricity dollars are reinvested in the community. It is important to note that CLEAN programs also do not rely on rebates or other major expenditures by state or local governments; generally, the only costs to the state or local government are the administrative costs of developing, implementing, and managing the program.

By increasing distributed generation of renewable energy, electricity ratepayers also benefit by avoiding the costs associated with long-distance transmission of energy. Developing a new high-voltage transmission line to deliver electricity from a large-scale renewable power project to consumers often costs billions of dollars.[10] Further transmitting energy across long distances is very inefficient and results in significant loss of energy. For example, transmission line losses range between 7.5 percent and 14 percent for California and around eight percent for the New York City.[11]

Further, widespread deployment of renewable distributed generation drives down the costs of distributed generation projects. Germany's CLEAN program caused the installed cost of distributed

> [T]he key to making our electricity grid more resistant to cascading failures or coordinated attack [is to build] "microgrids" into our existing distribution system.

PV generation to drop 40 percent from 2006 to 2009.[12] The Lawrence Berkeley National Laboratory (LBNL) found that California has among the lowest average costs for solar PV systems under 10 KW in the United States, supporting the proposition that larger solar PV markets stimulate greater competition and hence greater efficiency in the delivery chain for solar PV.[13] LBNL concluded that the lower installed costs of small solar PV systems in Germany and Japan indicate that increased solar PV market scale in the United States will result in lower installation costs in the near term.[14]

Disaster Resilience

On August 14, 2003, a transmission line in northern Ohio failed after softening under the heat of the high current coursing through it. When the alarm system failed to register the problem, this triggered a cascade of grid failures throughout southeastern Canada and eight northeastern states in the United States. Approximately 50 million people lost power for up to two days, resulting in at least 11 deaths and an estimated $6 billion in costs.[15]

As former Central Intelligence Director Jim Woolsey pointed out in an article for the *World Affairs Journal*, our transmission grid vulnerability is also a national security issue. Terrorist attacks at a few isolated physical points in the grid or a coordinated cyberattack could cause the same cascading failures that occurred during the 2003 blackout, crippling the country's infrastructure by compromising its water, sewage, phone, transportation, and medical systems, and most of our basic economic functions.[16] Woolsey concludes that distributed generation is the key to solving America's energy problems and to making our electricity grid more resistant to cascading failures or coordinated attack by building "microgrids" into our existing distribution system that have the capability to separate and provide essential services with enough power to function during even a long-term emergency. The development of such microgrids could be facilitated through a CLEAN program that enables individuals and commercial enterprises to sell electricity to the grid and to generate a return on their investments in distributed generation projects. Woolsey envisions that "by building resilience into our current grid, we could have both the benefits of a national grid system and the flexibility of distributed, independent generating capacity."[17]

The City of San Diego came to a similar conclusion following California's 2001 energy crisis. Its Solar Energy Implementation Plan explained that the disruptions caused by the 2001 energy crisis, as well as the wildfires it experienced in 2003 and 2007, underscored the necessity of emergency operation of the electric grid, and concluded that "distributed self-generation can provide stability in grid operations [and] should be considered as a key component of smart-grid and micro-grid systems."[18]

STATE-LEVEL POLICY CHANGES NEEDED TO ENCOURAGE DISTRIBUTED GENERATION

Why We Need New Policies

Unfortunately, the most popular distributed generation incentive policies in the United States—"net metering" and rebates—have limited potential for transforming the electrical system. Rebate programs, which rely on public money to encourage installation of distributed generation projects, are politically difficult to enact and fund when state and local governments are making budget cuts to essential services.[19] Net metering programs provide that a participating utility customer with a renewable energy system on its property will receive a credit on its electricity bill for the electricity generated and fed back to the utility's grid, permitting the customer to "bank" the excess power it generates during periods when it generates more power than it consumes. Such programs do not require the utility to make payments to customers that are net producers of power over a given billing period (e.g., on an annual basis). Net metering has limited appeal to investors because it results only in energy savings, instead of enabling investors to realize a revenue stream from their investment in a renewable energy project. In addition, it is more difficult to secure financing for projects that do not have a stable revenue stream. Further, because the potential financial benefits under a net metering program are limited to the extent of a total offset of on-site usage, this amount sets a *de facto* cap on how much a customer is willing to invest in renewable energy technology.[20] Commercial and multifamily residential property owners have no incentive to install renewable energy arrays when energy costs are simply passed on to tenants, while tenants lack the incentive to invest in renewable energy technology for a rental property that they may vacate before they see a return on the investment.[21]

Distributed generation projects that sell electricity to local utilities, known as "wholesale" distributed generation projects, are not hampered by these limitations. However, these projects face significant barriers—securing a contract to sell electricity and obtaining access to the grid involves major risks and high legal and other transaction costs, which makes it difficult to secure financing. Distributed generation projects have a disadvantage when competing with large-scale projects under these circumstances; developers can bear greater risks and higher transaction costs for larger energy projects in exchange for a commensurately larger return on investment. In addition, utility companies often have financial incentives to make it difficult for small, independent power projects that compete with their own power projects.[22] Electric utilities that profit from building new transmission lines have additional financial incentives to discourage distributed generation projects.

CLEAN Programs

As discussed above, CLEAN programs are policy tools that create a stable market for clean energy by addressing the main barriers to wholesale distributed generation. CLEAN programs (also known as "feed-in tariffs") are the most effective market-based solution for spurring renewable energy deployment. The U.S. Department of Energy's National Renewable Energy

> [S]tates have the authority to set interconnection procedures for the vast majority of wholesale distribution generation interconnections.

Lab found that CLEAN programs are responsible for 45 percent of wind energy and 75 percent of solar PV electricity capacity installed in the world before 2008.[23] CLEAN programs are the primary renewable energy policy tools in Europe, and are responsible for 85 percent of new wind systems, nearly 100 percent of new solar PV systems, and 68 percent of new biomass generation installed in the European Union since 1997.[24]

CLEAN programs succeed because they minimize transaction costs and bring transparency and certainty to the marketplace, enabling wide-scale installation of clean energy systems. Effective CLEAN programs generally have the following key features, which greatly reduce market barriers to entry and lead to broad deployment of clean energy:

- *CLEAN contract.* The electric utility is required to offer standard contracts to purchase all electricity fed into the grid by eligible renewable producers[25] at a predetermined, fixed price for a long term (typically 15 to 20 years).[26]
- *Grid access.* Under a CLEAN program, the process for connecting a project to the local electric utility's distribution grid must be fast, transparent, and accountable. To encourage distributed generation, programs should include an expedited interconnection process for smaller systems.[27]

U.S. state policy makers are required to navigate certain federal legal issues when designing CLEAN programs. The U.S. Federal Energy Regulatory Commission (FERC) generally approves the prices that utilities pay for wholesale electricity, while state public utility commissions approve the rates that utilities charge consumers for retail electricity. Therefore, FERC must approve proposed CLEAN contract prices for state programs, but not for CLEAN contract programs created by municipal utilities, cooperative utilities, or community choice aggregation programs. In 2010, FERC clarified that states can set CLEAN contract prices (1) in relation to the costs of renewable energy if the state has a Renewable Portfolio Standard that requires electric utilities to purchase a certain percentage of electricity from renewable generators by a target date, and (2) reflecting the locational benefits of distributed generation.[28]

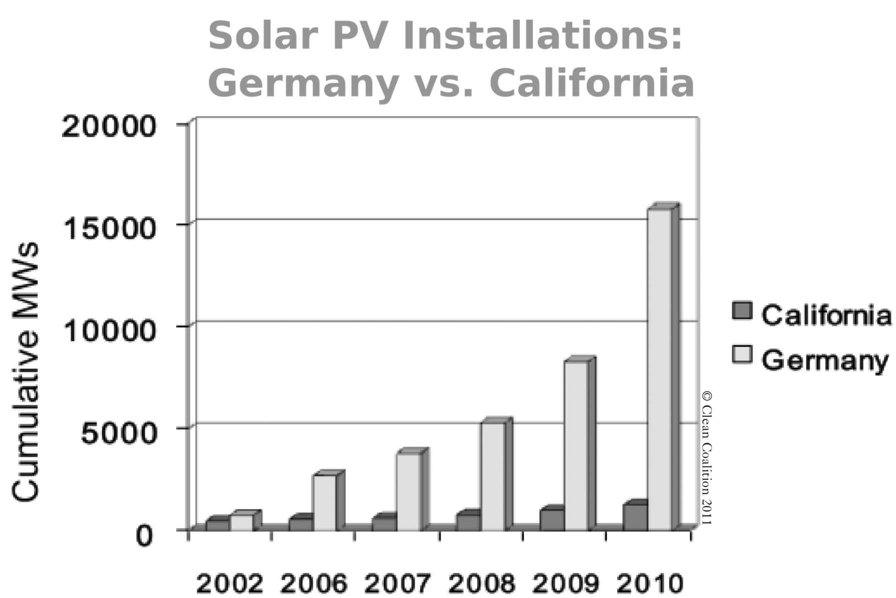
State policy makers should also consider the boundaries of federal jurisdiction when reforming grid interconnection procedures for wholesale distributed generation projects. State regulators have the authority to assert jurisdiction over interconnections to the local distribution grid for renewable energy facilities that sell energy only to the local host utility, while FERC retains jurisdiction over all interconnections to the transmission grid, as well as interconnections to the distribution grid if the generator sells any energy to any party other than the host utility. This means that states have the authority to set interconnection procedures for the vast majority of wholesale distribution generation interconnections.[29]

CLEAN Program Case Studies

Germany. Germany enacted its Renewable Energy Sources Act in 2000, creating a groundbreaking CLEAN program for the country.[30] The initial goal of Germany's CLEAN program was to generate 12 percent of the nation's electricity from renewable sources by 2010, a target that it was able to reach three years ahead of schedule.[31] By 2010, renewable energy was providing nearly 17 percent of Germany's electricity demand.[32]

Germany's CLEAN program encourages distributed generation by setting CLEAN contract rates that are based on project development costs and are differentiated by factors such as project size and technology type.[33] As a result, despite having a land area similar to California's[34] and solar resources roughly equivalent to those of Alaska,[35] Germany installed more than 25 times more solar PV capacity than California in 2010[36] and leads the world in solar PV electricity production.[37] More than 80 percent of solar PV power capacity installed in 2009 was located on rooftops, and more than 50 percent of Germany's total wind power capacity is supplied by wind projects smaller than 20 megawatts (MW).[38]

Germany's CLEAN program has produced significant economic benefits. In 2010, clean energy investment in Germany totaled $41.2 billion, and more than 340,000 new jobs have been created in the renewable energy sector.[39] By contrast, Germany's only domestic fossil energy source, lignite coal, employs only 50,000 people along its entire supply chain, from mining to the power plants.[40]



> Increasingly, local governments and regional planning agencies are providing for distributed generation in their general plans, climate action plans, and sustainable development policies.

In 2010, gross employment in Germany from the manufacture of renewable energy facilities was approximately 234,100, a 12 percent increase since 2009.[41]

Gainesville, Florida. On February 5, 2009, the Gainesville City Commission approved a proposal for a solar CLEAN program for its municipal utility, creating the first European-style CLEAN program in the United States.[42] Because the program was enacted by a city with a municipal utility, local leaders were free to implement the program without federal interference.

Gainesville had originally attempted to achieve its greenhouse gas emissions reduction goals with a net metering program; however, two years of net metering resulted in less than 400 KW of deployed solar. As a result of its CLEAN program, Gainesville's municipal utility deployed more solar capacity during the first year of its CLEAN program than the entire State of Florida in its entire history through mid-2009. Gainesville also saw a six-fold increase in the number of solar companies participating in the market, which, combined with the 20-fold increase in volume of deployed solar, significantly increased economies of scale and drove down solar system installation costs for local solar developers.[43]

Ontario, Canada. In 2009, Ontario passed the Green Energy and Green Economy Act,[44] which created North America's first comprehensive CLEAN program. In 2008, Ontario's total installed solar PV capacity was less than two MW.[45] As a result of its CLEAN program, Ontario installed 143 MW of solar PV systems in 2010 and leapt to second place in North America for installed solar PV capacity, just behind California.[46]

Ontario's CLEAN program includes a "domestic content" provision that requires project developers to source up to 60 percent of the project's value from within the province.[47] This requirement has contributed to the emergence of a fast-growing renewable energy manufacturing industry in Ontario, with more than 20 manufacturing facilities scheduled to open in the next two years. More than 30 companies have publicly announced plans to set up or expand manufacturing facilities in Ontario to produce equipment for wind and solar generation systems.[48] It is worth noting that this approach has risks. In September 2010, Japan filed a request for consultation with Canada through the World Trade Organization, asserting that Ontario's domestic content requirement is inconsistent with Canada's obligations under the General Agreement on Tariffs and Trade and the Agreement on Trade-Related Investment Measures.[49]

LOCAL-LEVEL POLICY CHANGES NEEDED TO ENCOURAGE DISTRIBUTED GENERATION

Create or Endorse a CLEAN Program

A city or county that has its own municipal utility, cooperative utility, or community choice aggregation program has the freedom to create a local CLEAN program that meets the needs of its community members.[50] Communities that purchase electricity from a private utility company cannot mandate a local CLEAN program, but these cities and counties can endorse a statewide campaign for a CLEAN program. In California, a broad partnership led by the Clean Coalition is forming to support the CLEAN California Campaign, including the city and county of San Francisco; the Los Angeles Business Council; the U.S. Green Building Council California Chapters; the Clean Economy Network; the University of California, Berkeley, Renewable and Appropriate Energy Laboratory; the Galvin Electricity Initiative; Global Exchange; Pacific Environment; and many others.[51] A study by the University of California, Berkeley, found that the creation of a robust CLEAN program in California would (a) stimulate up to $50 billion in total new investment in renewable energy, (b) increase direct revenues by an estimated $1.7 billion over the next decade, and (c) create three times the number of renewable energy jobs over a 10-year period than would be created under the present system.[52]

Include Distributed Generation in Local and Regional Plans

Increasingly, local governments and regional planning agencies are providing for distributed generation in their general plans, climate action plans, and sustainable development policies. The City of New York's PlaNYC includes a roadmap for the city to work with the utility and other agencies "to reduce financial, technical, and procedural barriers related to interconnection in order to achieve, at minimum, 800 MW of clean distributed generation by 2030."[53] Chicago's Climate Action Plan similarly includes a goal of increasing distributed generation to replace traditional sources of generation with clean renewable energy.[54] The plan praises distributed generation for its job creation and environmental benefits.[55] As part of its City Energy Strategy, San Diego plans to achieve 100 MW of distributed generation, including landfill gas and solar PV systems, by 2013.[56]

The San Francisco Bay Area Joint Policy Committee, which coordinates the regional planning efforts of four major regional agencies, is currently evaluating initiatives to promote distributed generation as part of its Climate Bay Area initiative.[57] The Climate Bay Area initiative focuses on providing alignment and coordination on climate plans and initiatives across the nine-county region. A draft of the Climate Bay Area Regional Strategy Recommendations highlights promotion of distributed generation through CLEAN programs and other efforts as one of the top five high-impact projects the Bay Area regional agencies should focus their efforts on "to integrate climate action, economic development and equity enhancements to help transform the Bay Area."[58]

CONCLUSION

State and local policy makers have the opportunity to lead the nation's transformation to a more decentralized and sustainable electrical system. Distributed generation of renewable electricity has enormous benefits: By encouraging distributed generation, local leaders can maximize local job creation and opportunities for local businesses, create greater disaster resilience in the national electrical infrastructure, and accelerate the nation's transition to a clean energy economy. Communities do not need to wait for national leadership to enact CLEAN programs and should strongly consider including distributed generation in their general plans and sustainable initiatives. It would be fitting if the decentralization of our electrical system were accomplished by a vast number of local governments and regional agencies acting independently and coordinating their efforts to ensure that the nation achieves this transformation quickly enough to maximize the economic and environmental benefits of transitioning to a clean, resilient, and inclusive energy infrastructure.

ADDITIONAL RESOURCES

- Local CLEAN Program Guide (Clean Coalition 2011), *available at* http://www.clean-coalition.org/local-action.
- Mendonça, Miguel, David Jacobs, and Benjamin Sovacool. 2010. *Powering the Green Economy: The Feed-in Tariff Handbook*, at 136–138. Earthscan Publications Ltd.
- Couture, Toby D., et al. 2010. *A Policymaker's Guide to Feed-in Tariff Policy Design*. National Renewable Energy Laboratory. *Available at* http://www.nrel.gov/docs/fy10osti/44849.pdf.

ENDNOTES

1. According to a 2011 report by the U.S. Environmental Protection Agency, the U.S. electrical power industry was responsible for 33.1 percent of total U.S. greenhouse gas emissions; nearly all such emissions were attributable to the use of fossil fuel combustion to generate electricity. U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2009, p. 2–16 (April 15, 2011). This percentage should only rise as the U.S. automobile industry makes the transition to hybrid and plug-in electrical vehicles.

2. Chi-Jen Yang, *Electrical Transmission: Barriers and Policy Solutions*, 16 (Duke University 2009), *available at* http://www.nicholas.duke.edu/ccpp/ccpp_pdfs/transmission.pdf.

3. *Id*. at 17.

4. Julie Cart, *Court Rejects U.S. Bid to Establish Corridors for New Electric Transmission*, L.A. Times (Feb. 2, 2011), *available at* http://articles.latimes.com/2011/feb/02/local/la-me-electric-corridors-20110202.

5. Ditlev Engel and Daniel M. Kammen, *Green Jobs and the Clean Energy Economy, Copenhagen Climate Council*, at 13 (2009), *available at* http://rael.berkeley.edu/sites/default//files/old-site-files/TLS%20Four_May2209_1.pdf.

6. R. Neal Elliot, *Roadmap to Energy in the Water and Wastewater Industry*, American Council for an Energy Efficient Economy (2005), *available at* http://www.aceee.org/research-report/ie054.

7. *Id*.

8. U.S. Census Bureau, Governmental and Employment Payrolls (2008), *available at* http://www.census.gov/compendia/statab/2011/tables/11s0459.pdf.

9. In 2007, the U.S. Environmental Protection Agency found that "more than 16,000 municipal wastewater treatment facilities (WWTFs) operate in the United States, ranging in capacity from several hundred million gallons per day (MGD) to less than 1 MGD. Roughly 1,000 of these facilities operate with a total influent flow rate greater than 5 MGD, but only 544 of these facilities employ anaerobic digestion to process the wastewater. Moreover, only 106 WWTFs utilize the biogas produced by their anaerobic digesters to generate electricity and/or thermal energy. In places where the spark spread is favorable, great potential for combined heat and power (CHP) at WWTFs exists." U.S. Environmental Protection Agency *Combined Heat and Power Partnership, Opportunities for and Benefits of Combined Heat and Power at Wastewater Treatment Facilities*, 1 (April 2007), *available at* http://www.epa.gov/chp/documents/wwtf_opportunities.pdf.

10. Andrew Mills, Ryan Wiser, and Kevin Porter, *The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies*, Lawrence Berkeley National Laboratory (February 2009), *available at* http://eetd.lbl.gov/EA/EMP/reports/lbnl-1471e.pdf.

11. Bill Powers and Sheila Bowers, *Distributed Solar PV: Why It Should Be the Centerpiece of U.S. Solar Energy Policy*, *available at* http://solardoneright.org/index.php/briefings/post/distributed_solar_pv_why_it_should_be_the_centerpiece_of_u.s._solar_energy_. *See* also The City of New York, Energy Initiatives, PlaNYC: A Greener, Greater New York, *available at* http://www.nyc.gov/html/planyc2030/html/home/home.shtml.

12. John Farrell, *Astonishingly Low Distributed Solar PV Prices from German Solar Policy* (April 21, 2011), *available at* http://energyselfreliantstates.org/content/astonishingly-low-distributed-solar-pv-prices-german-solar-policy.

13. G. Barbose, N. Darghouth, and R. Wiser, *Report Summary for Tracking the Sun III: The Installed Cost of Photovoltaics in the U.S. from 1998–2009*, Lawrence Berkeley National Laboratory 16 (2010), *available at* http://eetd.lbl.gov/ea/emp/re-pubs.html.

14. *Id*.

15. J.R. Minkel, *The 2003 Northeast Blackout–Five Years Later,* Scientific American (Aug. 13, 2008), *available at* http://www.scientificamerican.com/article.cfm?id=2003-blackout-five-years-later.

16. R. James Woolsey, et al., *No Strings Attached: The Case for a Distributed Grid and a Low-Oil Future*, World Affairs Journal (Sept.–Oct. 2010), *available at* http://www.worldaffairsjournal.org/articles/2010-SeptOct/full-Woolsey-SO-2010.html.

17. *Id*.

18. City of San Diego Solar Energy Implementation Plan (2010), *available at* http://www.sandiego.gov/environmental-services/sustainable/pdf/SolarImplementationPlan-May2010.pdf ("distributed generation can provide stability in grid operations").

19. It is worth noting, however, that this difficulty may be due to a failure to properly contextualize the argument for renewable development subsidies. The national discussion regarding such subsidies often focuses on the cost to taxpayers of renewable energy subsidies, rather than pointing out that the fossil fuel and nuclear industries are already heavily subsidized in the United States and that renewable energy subsidies simply level the playing field for renewable projects in an already heavily subsidized industry. *See* Miguel Mendonça, David Jacobs, and Benjamin Sovacool, *Powering the Green Economy: The Feed-in Tariff Handbook*, at 136–138, Earthscan Publications Ltd. (2010).

20. Ethan Elkind, *In Our Backyard: How to Increase Renewable Energy Production on Big Buildings and Other Local Spaces*, 9–10 (U.C. Berkeley School of Law & UCLA School of Law 2009), *available at* http://www.law.berkeley.edu/files/In_Our_Backyard.pdf.

21. *Id*.

22. Mendonça et al., *supra* note 19, at 30–31, 133–134.

23. Toby D. Couture et al., *A Policymaker's Guide to Feed-in Tariff Policy Design*, National Renewable Energy Laboratory (2010), *available at* http://www.nrel.gov/docs/fy10osti/44849.pdf.

24. Paul Gipe, Status of Feed-in Tariffs in Europe, (2011) (citing the 8th International Feed-in Cooperation Workshop), *available at* http://www.wind-works.org/FeedLaws/Germany/StatusofFeed-inTariffsinEurope2010.html.

25. Mendonça et al., *supra* note 19.

26. Couture et al., *supra* note 23, at vi.

27. *Id*. at 101–102.

28. Cal. Pub. Util. Comm'n, S. Cal. Edison, Pac. Gas & Electric & San Diego Gas & Electric 133 Fed. Energy Regulatory Comm'n ¶ 61,059 (2010), *available at* http://www.ferc.gov/whats-new/comm-meet/2010/102110/E-2.pdf.

29. Ted Ko, Tam Hunt, and Rebecca Davis, Memo: *When State Regulators Can Assert Jurisdiction Over Interconnection Procedures,* Clean Coalition (May 2011), *available at* http://www.clean-coalition.org/studies.

30. Germany Renewable Energy Sources Act (RES Act) (2000). "Act on Granting Priority to Renewable Energy Sources," Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), *available at* http://www.wind-works.org/FeedLaws/Germany/GermanEEG2000.pdf. Revised Germany RES Act (2004). "Act Revising the Legislation on Renewable Energy Sources in the Electricity Sector," BMU, *available at* http://www.wind-works.org/FeedLaws/Germany/EEG-New-English-final.pdf; Revised Germany RES Act (2008). "Act Revising the Legislation on Renewable Energy Sources in the Electricity Sector and Amending Related Provisions," BMU, *available at* http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/eeg_2009_en.pdf.

31. Wilson Rickerson et al., *Feed-in Tariffs and Renewable Energy in the USA—a Policy Update*, 3 (2008), *available at* http://archives.eesi.org/files/Feed-in%20Tariffs%20and%20Renewable%20Energy%20in%20the%20USA%20-%20a%20Policy%20Update.pdf.

32. Paul Gipe, New Record for German Renewable Energy in 2010, March 24, 2011, *available at* http://www.wind-works.org/FeedLaws/Germany/NewRecordforGermanRenewableEnergyin2010.html.

33. Couture et al., *supra* note 23, at 10–11.

34. California's land area is approximately 156,000 square miles; Germany's is approximately 138,000 square miles. *See* U.S. Census Bureau, *California Land Area* (2000), *available at* http://quickfacts.census.gov/qfd/states/06000.html and National Geographic, Germany Facts, *available at* http://travel.nationalgeographic.com/travel/countries/germany-facts.

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State and Federal Frameworks for Distributed Solar and Wind Projects

Jill Greaney

INTRODUCTION

The federal government and many states have recognized and are addressing the disconnect between extensive federal- and state-level incentives to promote distributed wind and solar power and outmoded local permitting and zoning procedures that impede installation of generation equipment. Federal renewable energy production incentives, loans, grants, and tax credits, and state renewable portfolio standards, tax rebates, and feed-in tariffs are all designed to encourage development of renewable energy facilities. Yet it is municipal and county governments that typically oversee the siting and installation of small- to mid-scale wind and solar projects.[1]

Under pressure from opposing interests—commonly those that object to distributed power generation facilities on aesthetic grounds—some local jurisdictions have implemented measures that obstruct introduction of renewable energy equipment, in direct contravention of federal and state goals.[2] Other localities wish to foster distributed solar and wind power, but they lack the funding and expertise to update zoning ordinances that incidentally hinder installations or to streamline permitting processes to facilitate deployment of these technologies.[3] Consequently, prospective generators frequently confront complicated, unpredictable, and time-consuming requirements as they endeavor to bring renewable energy online, and, with rules varying from jurisdiction to jurisdiction, development companies cannot standardize procedures to reduce overhead.[4]

Comments or questions regarding this month's Commentary? Discussion of "State and Federal Frameworks for Distributed Solar and Wind Projects" can be found at: http://blogs.planning.org/policy/?p=489S.

Excessive permitting fees for wind and solar systems also can discourage new projects.[5] Some counties charge a flat permitting fee for renewable energy projects, while others base fees on a percentage of installation costs. According to one recent study, an estimated 13 to 30 percent of solar project costs are attributable to administrative expenses associated with siting and permitting requirements and fees, and this percentage will increase as the cost of the technology declines. Together with delays, these expenses can undermine the viability of alternative power systems.[6]

Local governments, likewise, incur unnecessary expenditures when making zoning determinations on a case-by-case basis and applying ambiguous permitting rules. Conducting administrative hearings or special permitting and variance reviews is more costly than applying standardized "as-of-right" zoning regulations for classes of renewable energy projects. Building and electrical

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