

Think Solar, Think Small

By [Craig D. Rose](#)

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As the Obama administration and Congress search for worthy infrastructure projects to fund as part of the stimulus and economic-recovery package, there is a growing consensus in support of major investment in the renewal and greening of America's electricity grid. Texas oilman T. Boone Pickens's plan for a huge new grid to tap wind energy across the Plains States has attracted the most attention, but the grandest aspiration is for a "national backbone grid," a coast-to-coast project tapping renewable energy sources that would cost hundreds of billions of dollars.

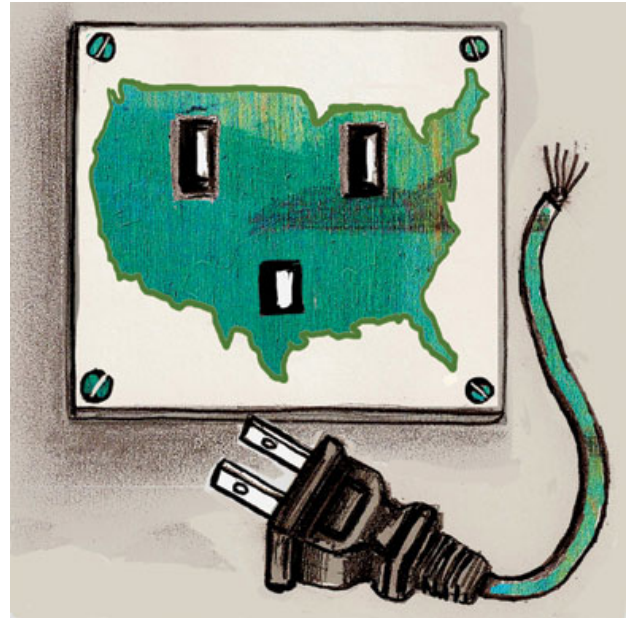
Big electric-transmission projects have developed a potent support base that includes large utility companies as well as many environmentalists, who argue that all means must be pursued to save the planet by reducing the burning of fossil fuels. The presumption is that big new transmission projects are required to reach America's vast renewable resources, from the strong, steady winds of the Midwest to the relentless sun of the Southwestern deserts.

Although massive expansion of the electric grid threatens to despoil the last of America's undeveloped places, some environmentalists mistakenly believe the urgency of dealing with climate change leaves no alternative to large, remotely sited renewable electric-generation facilities and the transmission lines they need to get power to consumers. In fact, there is an alternative: "distributed generation," or smaller solar technology installations on rooftops and near existing transmission lines, or even scaled-down wind farms sited closer to consumers.

To be sure, the romance of a renewable national grid is classic American thinking: a big problem requires a big solution. But the distributed generation approach (DG in energy lingo) is emerging from advances in solar technology and detailed studies of alternatives to big power-line projects. Consider what happened when Minnesota regulators looked carefully last year at the CapX 2020 project, a proposed cluster of new power lines costing up to \$1.7 billion. A key purpose of the lines was to link Minnesota with proposed wind farms in the Dakotas. This is just the type of project favored by Pickens and other supporters of big electric transmission. But after examination the regulators found that Minnesota could develop many small 10-40 megawatt wind farms within the state totaling 600 megawatts--equivalent to a modern power plant--without any new transmission.

"We call it the '600 megawatts for nothing' study," said Mike Michaud, an engineer and consultant who formerly worked with the state regulatory staff. "There was no denying there were twenty spots on the existing grid [where] you could put generation for no cost at all." Michaud added that there is no guarantee the \$1.7 billion transmission project would be restricted to clean power--it might in some cases be used to transport power from coal-burning plants.

The DG strategy is particularly applicable to rooftop solar power. It taps existing transmission infrastructure and thus saves the huge cost of building new lines while avoiding the controversy of running power lines through communities. DG also provides the security of dispersed generating resources, so a power failure in one area is far less likely to cause the massive blackouts that can result from the outage of a single unit in the big, centralized power system we have now.



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Clean distributed resources in the form of wind, biomass and solar are far more available than is generally known. A November study by the Institute for Local Self-Reliance (ILSR), a thirty-five-year-old group focused on community development, may have been the first to examine the potential for DG on a national scale. The study found that half the states could be energy self-sufficient by harnessing renewables within their borders, and most states can satisfy a considerable fraction of their own energy needs this way.

What's more, encouraging local ownership of distributed resources would solidify local support for the projects and increase the economic benefits, because much more of the spending--and the jobs created--would stay in the community. This is precisely why big utility companies fear advances in rooftop solar technology: it could make every building owner a power generator and leave utilities with long-term prospects similar to those of Detroit automakers or the newspaper industry. "The big utility companies are looking at the future, and they're getting freaked out," said Tyson Slocum, director of Public Citizen's energy program.

Certain areas of the country do have superior renewable resources, such as solar in Nevada and wind in North Dakota. But when the cost of transmission to move that electricity is included--along with the loss of up to 15 percent of the power from moving it long distances--homegrown electricity proves superior. The ILSR study asserts, for example, that if Ohio's electricity came from North Dakota wind farms 1,000 miles away, the cost of constructing lines to transport that power and the losses during transmission would surpass the lower cost of production, resulting in consumer costs 15 percent higher than those from locally generated power.

A similar conclusion was reached by many who studied the Sunrise Powerlink, a planned \$2 billion transmission line to move electricity from desert projects 150 miles east of San Diego to the urban area. Proposed by San Diego Gas & Electric, Sunrise won approval in December from the California Public Utilities Commission (CPUC) only after regulators ignored the recommendation of the administrative law judges who oversaw a three-year review. Those judges recommended rejection, concluding that it would be cheaper and better for the environment if SDG&E developed renewable and other projects closer to home.

Despite SDG&E's assertions to the contrary, the judges found that the utility could meet California's strict 20 percent renewable energy standard by the end of next year without the long-distance power line. Only after Governor Arnold Schwarzenegger suddenly created a 33 percent renewable requirement by 2020--one that project opponents never had the opportunity to consider in relation to Sunrise--could regulators find cover for approval. The one vote against: CPUC commissioner Dian Grueneich, who was assigned to oversee the Sunrise case. In a scathing dissent, Grueneich noted that regulators were approving a project ostensibly to develop renewable energy but failed to guarantee that it would do so. In other words, after all the money spent on Sunrise, it could wind up carrying mostly dirty electricity. This contradiction was highlighted when SDG&E--which had insisted the line would be used largely for green power--characterized as unacceptable a requirement that the line carry a fixed percentage of green power. In fact, current federal transmission rules prohibit restricting any transmission project to green energy only, a policy the Obama administration should reconsider if it wants to encourage renewable energy.

A broad community coalition has arisen to oppose the Sunrise project; its legal challenge will likely be based on the CPUC's failure to respect the voluminous factual record established in the case. Among its leaders is Bill Powers, a 52-year-old engineer who has worked on licensing power plants. Powers believes that advances in solar technology--in particular, declining costs that are poised to fall even faster this year--should make development of rooftop solar a top priority. Powers wrote a study that found that the \$2 billion SDG&E will spend just to access desert renewable energy could be spent building 1,300 megawatts of photovoltaics (PV) in San Diego--with nearly no cost for transmission lines. And researchers--among them, SDG&E itself--have concluded that San Diego has the potential for some 5,000 megawatts of rooftop photovoltaics, or about enough at peak production to power the entire city on a hot day. "The trump card of urban PV is that there is no lengthy environmental review required and no land requirements," said Powers. "PV goes on rooftops and over parking lots. What is going to slow the plans for big, remote solar and wind projects is what is slowing the Sunrise proposal--citizen opposition. The concept of building remote renewable in most cases is the promotion of investor-owned utilities and their holding companies, who want as much high return on investment transmission projects as possible."

To be sure, many environmentalists insist that saving the planet will require DG and remotely located projects. And to some extent, the push for a bigger grid piggybacks on the reasonable call for modernizing the nation's badly decayed grid. President Obama apparently sees upgrades and a major expansion of the grid as a single package, with his call for "a bigger, better, smarter grid" along with "more than 3,000 miles of new or modernized transmission lines." In the practical world, dollars translate into priorities, and money spent on major grid expansion is money unavailable for cheaper and more environmentally friendly DG projects. Case in point: while SDG&E could spend \$2 billion for its transmission project, it proposes to spend just \$250 million over five years for urban solar projects.

The irony is that SDG&E's parent company, Sempra Energy, has reached what has long been considered a historic milestone in solar energy. Using thin-film photovoltaic panels from First Solar, a fast-growing supplier, Sempra's recently completed 10-megawatt generating plant outside Las Vegas can produce electricity at rates comparable to or below those of fossil fuel fired plants, according to Mark Bachman, a research analyst with Pacific Crest Securities. The use of thin-film technology will be revolutionary, says Powers, and California regulators apparently agree. In a recent study by the CPUC, analysts concluded that DG--in particular, small 20-megawatt installations of thin-film photovoltaics--could satisfy most of California's aggressive target for renewable energy at competitive cost and without new transmission lines. The study emphasized that it was only a test case, based on expected cost reductions for thin-film. But those lower costs have already arrived, Powers noted. "That's what Sempra used to make its breakthrough," he said.

And the breakthrough may well be more than Sempra's. If Sempra and First Solar have crossed the threshold for producing electricity at parity--equal to or less than plants that burn coal or natural gas--it should prompt a drastic recalculation of how we generate power.

Let's call it electricity's wireless future.

About Craig D. Rose

Craig D. Rose is a San Diego-based journalist who writes about business and energy.