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Why distributed electrical generation?



This 3.6 Kw photovoltaic array on my roof is a good example of distributed generation where the electricity produced serves not only my house but other houses in our neighborhood as well.

by Kelly Hart

You hear a lot about “distributed generation” these days as the best model for moving toward a sustainable energy future using renewable sources. Just what is “distributed generation,” and how would it work?

The basic idea is that instead of having large central power plants for generating electricity that are often quite some distance from the ultimate consumers, as has been the model most of our lives, the proposed approach is to simply distribute the generation facilities much nearer the places where the electricity is actually used. If you imagine the form of a tree, the central power model places the generator at the base of the main trunk and it supplies energy to every branch on that tree, whereas with distributed generation there are many smaller power sources located further out on the branches, even at the very tips.

Creating a system of distributed generation has many advantages. It eliminates the necessity of having massive power lines that form the trunk of the tree because the electricity can get to where it is needed via much smaller branches, so costly and ugly transmission lines might be avoided. Less energy is lost in the lengthy transmission lines. There is also the advantage of greater energy security, because consumers are not reliant on a single source many miles away for their power. There would be natural redundancy from many smaller generators nearby.



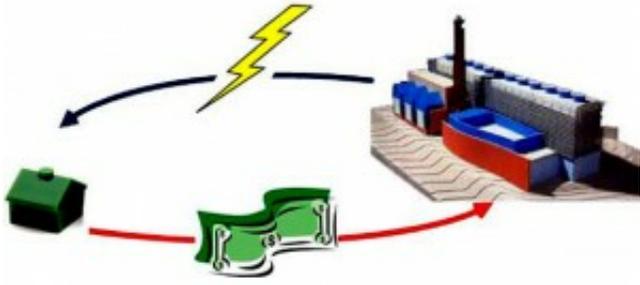
This NET meter started at zero Kwh and now reads 99929, or minus 71 kwh, after a month of recording the electricity coming and going through it.

Another significant advantage of the distributed generation model is that it can be much less disruptive to the environment. Instead of building a new generation plant that might take up many acres of pristine countryside and be objectionable because of noise, unsightliness, or environmental hazards, small scale generators can often be placed on rooftops or already disturbed land with a much lower negative impact.

What makes this concept viable these days is that small scale generators of electricity are commonly available and relatively affordable. Photovoltaic panels, wind generators, small hydro power systems, and biogas plants can be located in many places and effectively feed the grid that connects everything to the tree trunk, relieving the central power plant from the need to produce all of the needed electricity.

One of the wonderful things about electricity is that it can move in either direction on a power line, so for instance the PV panels that I have on the roof of my house not only supply electricity for me when the sun is shining, but they also send extra power to other houses in my neighborhood. This is called a "net metering" arrangement. I love to go out to my meter and watch it run backwards, selling electricity back to SLVREC. The meter keeps track of the balance, and I will actually get a check from them eventually if I sell more than I consume.

I sized the system for my house big enough to provide all of the power that I typically use (including a small electric hot tub) plus some extra to eventually charge an electric vehicle. My aim is to reduce my carbon footprint to near zero. The system is capable of supplying up to 3.6 Kw, has a small battery pack for backup in case the grid is down, and it cost me about \$14,000. I did the installation myself, which saved a bunch. After the federal tax credit of 30%, the system will cost closer to \$10,000. Sure, it will take many years before the system will pay for itself, but for me I have already benefitted by the peace of mind that I am no longer contributing so much to fossil fuel depletion and global warming . . . and I am more secure in the unknown energy future.



Conventional Energy Model: This diagram illustrates the conventional model of central power generation, where electricity flows in only direction and the dollars flow in the other. Image courtesy of the Solar Garden Institute

Distributed generation schemes can also use larger systems of aggregated power production, like what is commonly done with “solar gardens” where many folks combine their resources to build a larger solar array in their neighborhood. This can relieve individuals from the need to site PV panels on their own property or even pay much attention to the mechanics of it all. Ideally they can also have the net metering advantage of seeing lower electric bills. This is where our local solar garden initiative fell flat in that SLVREC was not willing to do net metering for a solar garden, but wanted us to sell the power produced en mass and subscribers would just become investors who would eventually see a return on their investment many years down the road.

We have many local advocates for developing a distributed generation reality, most notably Ceal Smith with her Renewable Communities Alliance (www.renewablecommunities.org) and Joy Hughes with the Solar Gardens Institute (www.solargardens.org). Not only are these ladies active locally, but they have influence both statewide and nationally, and their initiatives are well worth supporting.

While the reasons to move as quickly as possible toward the distributed generation model are compelling, the reality is that the task is monumental and can only occur in small incremental steps, as more and more local generation facilities go on line. The impediments are insufficient incentives, financing, organization, education, and intention. Those places where a renewable distributed generation model has been activated to any substantial degree tend to be places where the government has gotten behind the notion and provided the right kind of incentives. One such country is Germany where they established feed-in tariffs that offer long-term contracts to renewable energy producers, basically subsidizing the development.

I feel that we really need to consider all options for moving toward a sustainable energy future. We should press forward with small and medium scale distributed generation facilities as fast as we can, but we should also support responsible large scale renewable energy facilities. I think that the two approaches can be complimentary and will get us to our destination sooner. Larger plants have the advantage of financial incentive, organization, and resources that are simply unavailable to a fragmented movement.

The question is: Will we as a society be able to maintain healthy lives in a healthy environment through the use of renewable energy, or will we continue on the path that we currently follow toward a more costly, polluting and hazardous future of burning diminishing fossil fuels? Time will tell.

Kelly Hart is a Crestone resident who is an advocate of sustainable development, mainly through his websites: www.greenhomebuilding.com, www.dreamgreenhomes.com, and www.earthbagbuilding.com.

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