Will solar energy ever be a viable alternative to traditional power?

Will solar energy ever be a viable alternative to traditional power?

 **Bob Bumala, ECN Reader**

No. Solar power can never supply more than 20% - 25% of the power requirements. Solar can be divided into two types of systems 1) Photovoltaic and 2) solar-thermal.

1) Non-rotating photovoltaic systems, the kind mostly installed, are limited to a load factor (percent of actual power produced vs. rated capacity) of about 12%. That means that 89% of the time you have to use something else. This is because the rated capacity of a solar panel is measured with direct perpendicular sun. The angular difference off of that reduces the amount of energy produced by the panel. Furthermore, in the winter time the panels produce about 60% of the energy that they do in the summer. This is because the sun has to traverse more air. In northern climes the winter sun is reduced even more, and it’s more problematic, because the sun is up for a lot less, and a foot of snow greatly reduces the output. Also, if you look at a typical electric company load graph, the peak energy use is at 6:00 PM, after the sun sets. Sun tracking, will give you about 10% more, but has its own problems. You need a powerful motor to move a large panel in a goodly wind. The cost of maintaining such a moving system is usually not viable.

2) Solar-thermal can stretch the load factor to 20% or 30%, but require much more area. My local utility reports an average load factor 20% total for thermal and photovoltaic.

Because there is no economic way of storing power, more panels won’t improve things. The other thing is that because it only provides power 12% of the time, you must match watt for watt with a much less efficient power plant. Efficient power plants take a while to start and stop, and are not useful for backup systems. Solar power systems (solar + backup) probably use as much or more fossil fuel than just building a more efficient plant to begin with.

Solar power is only really useful in Sothern deserts, to offset the cost of air conditioning. Areas with trees, mountains, or snow will never be able to use them.

 **Dave Telling, ECN Reader**

This is a difficult question, made more so by the fact that there are too many unknowns in the equations, so to speak. Obviously, storage of excess power is a major consideration, and adding storage capacity may be much harder than we think. In addition, even though it seems every day that researchers have come up with solar cells with higher efficiencies, the actual availability of these technologies is ambiguous. Another factor to consider is that we have a tendency to under-estimate the collateral effects of our large-scale decisions, as evidenced by the recent spate of stories about the problems with the mandated ethanol use in gasoline. Overall, it seems to me that local solar heating (as opposed to system-wide or local solar electricity generation) might be a better overall use of solar radiation, especially in areas like the southwest where sunshine is abundant. In many ways the tech is much lower (i.e. cheaper and easier to implement) and the payback time may be smaller. When combined with backup heat sources for rainy/cloudy days and nighttime use, I think that a solar installation might make sense.

For long-term, system-wide power, it is hard to ignore modern nuclear designs, as they have some very definite advantages as far as power density, related footprint, capability of being installed in almost any locale, and very low pollution.

Unless solar power can solve the problems of inexpensive, efficient conversion and adequate storage for dark times, I think that it will only be attractive to those who have no other choice (i.e. living where there IS no grid service) or who have the disposable income to install a system to appear to be “green”.

 **Fred Schaff, ECN Reader**

The rest of the story!! Solar energy — unless viable high energy storage means becomes available for use when the "Sun don't shine" — is no good for replacement for traditional power-plants. But, worse yet, should too many private facilities be created that use solar when available and the "Grid" when not available, power companies still have to build and maintain the "Grid" even as the revenues received from "Grid Users" decreases such that either electricity rates to those still using power-plant energy have to pay the per-capita increased per-unit costs or power industries
will go out of business.

 **Rudy Wodrich, Vice President – Solar, Schneider Electric Photovoltaic**

Solar is already a viable alternative to traditional carbon based and nuclear thermal power plants. In 2012, over 31 Gigawatts (GW) of new PV generation went online globally including 3.5GW in the United States alone. In 2013, that number in the United States is expected to grow by 28% to reach 4.9GW. Places like Ontario, Canada and Germany have already retired the majority of their coal based generation plants in favor of new wind and solar generation. Cumulatively, over 30GW of solar had been installed in Germany at the end of 2012. According to FERC, in October 2013 over 72% of the 699MW of new generation that went online was Solar. In the US, the adoption of solar has been driven by a combination of lower cost solar equipment, federal tax incentives that have spurred investment and state level policy initiatives towards Renewable Portfolio Standards (RPS) which encourage utilities to source a percentage of their generation from renewable sources. Solar is currently the fastest growing source of new generation but still accounts for only 0.6% of the total generation capacity in the US so there

is still a long way to go.

Solar projects are, by their nature, very capital intensive but have minimal operation and maintenance costs and, of course, no fuel cost. A well-designed solar installation can easily provide energy for 20-25 years so that up front investment can be amortized over a long period of return. Of the projects being installed in the US, approximately 40% are Utility Scale Solar Farms, 46% are attached to commercial buildings and the remaining 14% are residential. While the US is currently enjoying the benefit of newly discovered deposits of natural gas which has stabilized energy prices, we must not lose sight that actually using those fuel sources and releasing the carbon trapped in them will have a detrimental effect on our climate. So, not only is solar, along with wind, viable as an alternative to traditional power, it is crucial that we capitalize on these renewable sources of energy.

 **Steven Collier, IEEE Smart Grid expert and Director, Smart Grid Strategies, Milsoft Utility Solutions**

This question presumes that solar energy is not already a viable alternative. It is a false presumption. The key argument is that solar energy is too expensive unless subsidized by the government. This is a disingenuous argument in light of the substantial past and present government grants, tax credits and other incentives for nuclear, coal, oil and gas. In any event, solar energy is already a viable alternative in in many situations and will become even more so. Technological advances and increasing production volumes are steadily reducing the capital costs of solar PV, while the operating costs are much lower than traditional power and the fuel is free. Capital, operating and fuel costs of traditional power are steadily increasing as are the risks associated with construction, operation and fuel supply. The cost of traditional power does not include future costs resulting from the rejection of combustion byproducts into the atmosphere, water and earth, whereas solar energy has none. Finally, grid parity is not solely about cost. Solar energy, even at a higher cost than traditional power, may be attractive to consumers for other reasons: sustainability, reduced carbon footprint, avoidance of nuclear waste and risk, reliability, grid independence.

A global view reveals that, for literally billions of people in the world with no access to a traditional power grid, on-site solar energy is actually the only viable electric energy source available to them for the foreseeable future. Also, there is not an

unlimited supply of coal, oil, gas and uranium at reasonable extraction / production costs to meet the needs of the entire world forever whereas there will be enough solar energy to do so until the sun no longer shines.

Source URL (retrieved on *12/27/2014 - 3:33pm*):
http://www.ecnmag.com/articles/2014/01/will-solar-energy-ever-be-viable-alternative-traditional-power