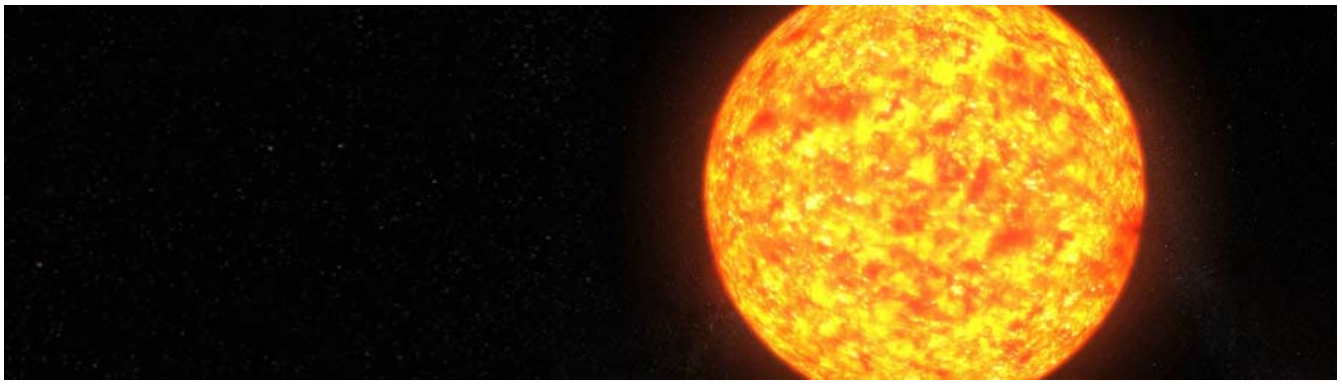
Advantages of Utility-Scale Solar PV Farms



Advantages of Utility-Scale Solar

8minuteneergy Solar White Paper

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There are two basic models of solar PV; distributed and utility-scale. In distributed applications, relatively small solar systems are mounted on residential and commercial rooftops. A typical residential system is around 5kW (producing around 8,000 kWh of electrical energy per year from 25 panels). A typical commercial application is comprised of 25 kW of panels, and produces 45,000 kWh's of energy per year. However, most rooftops are not optimally oriented with respect to the sun, and the cost of small systems is much greater per watt due to the fact that there is a lot of fixed cost in the equation. The small-sized, distributed paradigm is expensive. The advantage of distributed type systems is that the energy is being produced right where it's consumed, so there is no need for interaction with expensive transmission equipment (the grid).

Utility-scale solar plants range in size from 10MW to over 200 MW. A 50MW plant supplies enough energy to power 20,000 homes with clean, renewable energy.

In California, the utilities have been mandated to obtain 20% of their energy from renewable sources (wind, solar, geothermal, biofuels, etc.). The legislature is working to increase this mandate to 33%.

For utilities, solar PV farms provide major advantages:

Utilities need peak power generators, and solar is ideal for satisfying this demand. Utilities all rely on base generators, such as coal generators or nuclear power, to provide the lion's share of their customers' energy demands. But during peak times (hot summer afternoons when air-conditioning loads are ponderous) additional generation capacity is needed, and solar is ideal because it realizes maximum outputs during peak times.

The base generators that utilities rely on are extremely large (physics dictates that the bigger the generator, the more efficient the operation). When one of these generators goes down, the effects on the entire grid can be tremendous. Solar generators, by their relatively smaller scales, offer a much better reliability factor because if one goes down, the effect on the grid is minimal. This is due to the distributed nature of solar; even large solar farms are small in comparison to the base generators.

Solar farms are far less environmentally intrusive than conventional combustion generators. Solar farms may be built very close to urban load centers because their presence is minimally disruptive to the local ambient. This minimizes not only transmission burden, but results in a higher level of efficiency because line losses are minimized.

Solar is basically solid state in nature. The power output of a solar farm may be increased or decreased in a very short period of time, so that load and generation may be matched very easily. Large generators take a great deal of time to turn on and off, or up and down; nuclear reactors can take days to turn on, for instance.

From a political standpoint, utilities are facing increasing pressure to reduce their carbon outputs. Solar is the ideal solution, as there are no carbon emissions at all from a solar plant.

Utilities enjoy better community reputations when they pursue clean, renewable power resources.

The most straightforward way to reduce carbon footprints is to simply use less power. By its distributed nature, solar allows utilities to employ "smart grid" technologies more efficiently. Power may be switched and directed to where it's needed the most, and line losses and other usage factors may be minimized.

The raw fuel for solar power is free, and requires no transport to the generator site. A great deal of energy is required at a coal-fired generator site simply to get the coal to the site. Plus there is a need to eliminate the waste products at a coal site, which requires further transport costs (transport is almost always driven by gas or diesel combustion, and creates noise and roadway congestion in the process).

There are no cost fluctuations associated with solar power, as there are with hydrocarbon sources. Once a solar plant is built, the costs are virtually guaranteed, and this makes budgeting and planning much easier, and more reliable. Residential energy consumers of natural gas see their power bills fluctuate from year to year, sometimes drastically. Solar power will never suffer this disadvantage.

In the same way that computer chips became much more powerful, while at the same time experiencing price declines, the cost of solar panels will come down in the next decade while performance increases. Current PV costs are around 15 cents per kWh. Within ten years, the cost will be equivalent to that of coal, or nuclear (this is referred to as grid-parity). As more utility-scale solar farms are built and operated, economies of scale will further drive down the price of new solar systems. Utility-scale solar is the largest segment of the solar PV market, and its percentage of the total will continue to increase. The more solar farms that are built, the lower the cost of future solar farms.

The use of home-grown renewable resources reduces the country's dependence on foreign suppliers of oil and natural gas. Solar is good for America, in many ways. Large-scale solar is the least expensive way to implement solar power, and provides benefit to all utility customers, not just those who are lucky enough to have roofs conducive to solar, or who live in areas where there's a lot of sunshine. Distributed solar is a function of sheer luck, while utility scale solar is for everybody.