

# The future of solar power investment lies in infrastructure

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John Tuerk

As the cost of solar power has come down considerably, and more public utilities seek to incorporate it into their energy mix, infrastructure is where we will see the next phase of technological development. For investors, this presents a powerful opportunity to back the solutions that will transform the energy industry over the next decade.

## The next phase of investment

In reality, energy generation only

Infrastructure is not a short-term investment. Once installed, these critical systems have to remain useful for at least 20 years. Public utilities looking to invest in solar power and other renewable energy systems face pressure to ensure that these systems are cost-effective and meet the energy demand.

accounts for 35 percent of a utility's costs, be that from solar power, wind power or natural gas. The bulk of utility costs come from operating and maintaining the underlying distribution infrastructure. Even the most efficient energy generation methods will result in excessive costs if the distribution infrastructure fails or functions incorrectly. For newer systems to be installed effectively on a large-scale, it is not enough to simply shoehorn them into old structures.

The state of solar power today demonstrates this phenomenon. As it stands, solar photovoltaic (PV) hardware is more affordable than ever, according to the U.S. Department of Energy. Yet, high prices are still cited by public utilities as a deterrent towards solar power on a large scale.

In my career providing clean energy solutions at Clear Blue Technologies and other companies, I have seen this first-hand. Governments jump at the chance to incorporate solar power without a long-term plan, only to see their high

utility bills get even higher, and then conclude that solar power is to blame. But utility costs of solar power are comparable to other energy generation methods. The real added costs to a utility bill for either a city or a consumer come from operational and maintenance issues of their distribution infrastructure's patchwork of improvements, not the inclusion of alternative energy generation.

Alleviating the high costs of building and maintaining a distributed infrastructure strategy, just to get energy to where you use it, is the next wave of energy development and investment. In the past decade, technological advancements in wireless systems, big data, cloud technology, the Internet of Things (IOT) and battery storage have brought new solutions that can be incorporated into an infrastructure strategy that enhances the hidden cost benefits of localized solar, wind and hybrid power.

Here are some of the biggest technological shifts for solar power infrastructure over the next decade.

*‘Advanced battery technology will make both large-and-small-scale storage of electricity from renewable sources a reality.’*

### New batteries for a new frontier

Advanced battery technology will make both large-and-small-scale storage of electricity from renewable sources a reality.

Traditionally, the electric grid had not incorporated battery storage. By combining power from gas, nuclear and coal, utilities would juggle these sources to meet demand and manage cost. Utilities are now beginning to invest in localized storage, to level out energy demands on their distribution infrastructure. As energy storage increasingly becomes part of the energy mix, solar solutions will also benefit from the natural acceptance of storage as a key component of energy infrastructure.

As with solar panels themselves, the cost of battery storage is going down, with the push towards renewable energy and lowering carbon emissions creating a natural demand. Companies like Tesla have championed lithium-ion batteries, which have dropped from about \$1,000 per kilowatt-hour in 2010 to about \$209 per kWh in 2017.

Not all battery packs are created to suit all energy applications. Tesla’s lithium-ion batteries, for instance, are ideally suited for cars, but not necessarily utilities, or off-grid streetlights. The move from Lead Acid Batteries to Lithium Ion packs is similar to what happened when the lighting industry shifted from incandescent to LED bulbs. By going from a capital-intensive manufacturing process to making a printed circuit board style product, small, market

specific companies will begin to build their own battery pack solutions. These batteries can be tailored down to their chemistry to account for differing uses, terrains and even weather patterns.

### Smartly moving off the grid

Arguably, decentralization of utilities systems will be the most significant development for the future of solar power as an alternative to traditional sources of energy generation.

Until now, street lights, telecommunications systems, security monitoring and other critical infrastructure devices have relied heavily on the electric grid, which in many parts of the world is inefficient, expensive, unreliable or non-existent. But today, as the wattage of these devices has decreased, much of this infrastructure can now be sufficiently powered by off-grid solar power instead.

Smart off-grid technology enhances reliability by connecting solar power systems to the cloud and enabling remote control and management over the internet. This can cut costs by limiting the training of service personnel on new technology and instead remotely assist them during the provisioning and commissioning, and then help manage potential installation problems resulting in the diminishment from the expected sun or wind energy, through online alerts and reports. Smart data and processing helps detect any decline in battery charge due to poor weather conditions, system damage or aging, before

it impacts the device, and even enables proactive changes to avoid outages.

Integrated weather forecasting can also determine whether there will be enough energy generated in the near future for the battery to recover automatically, or whether a technician needs to take action to reduce energy draw. Seasonal conditions also can be anticipated, and load profiles can be updated online each season to maximize performance. This data history also plays a huge role in keeping systems serviced properly, as well as troubleshooting issues.

By increasing the reliability of these off-grid systems, smart off-grid technology reduces the cost of installation and maintenance by up to 80 percent. The inclusion of smart off-grid in solar powered utilities infrastructure creates a real alternative to the electric grid.

### Investment Impact

For investors, more efficient infrastructure will be the next phase of solar power development, as it becomes a viable source of energy generation. This will close the gap between off-grid renewable energy and the electric grid, both in terms of cost and reliability. Public utilities, searching for the best solution to updating tired and outdated infrastructure, will find greater value in solar due to these infrastructure advancements. As such, these new technologies, offer a viable, large-scale implementation of alternative solutions, which represents the next wave of opportunity in solar powered investment.

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