Could Gigafactories Power the Whole World?

Elon Musk, the visionary billionaire CEO of Tesla and SolarCity, says that the revolutionary new "Gigafactory" now under construction can serve as a model for transitioning the world to sustainable energy. In an interview in the short film, *Before the Flood*, he states:

> *"We actually did the calculations to figure out what it would take to transition the whole world to sustainable energy… and you'd need 100 Giga factories."*
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> *For utilities and grid operators, the technology is designed to enable remote-aggregated control of solar battery systems. I urge anyone reading this who is responsible for managing grid operations, and who is interested in procuring capacity, reactive power, or voltage management services deep in the distribution system to contact us."*

Tesla's batteries also give energy users the ability to go completely off the grid using clean renewable energy.

With the goal of reducing dependence on fossil fuels and halting climate change, Musk's company, SolarCity, has revolutionized the rooftop solar industry. It has become the largest supplier of solar power for homes and businesses in the United States. Just a month after Google invested $300 million in the company, SolarCity activated a fund that included an investment from Credit Suisse, which is expected to finance more than $1 billion in commercial solar energy projects.

Businesses and government organizations are able to access SolarCity's DemandLogic energy storage system. That access enables them to reduce their energy costs by using stored

electricity during times of peak demand. Remote communities that are vulnerable to frequent power outages that result in higher energy costs can also access the company's GridLogic micro-grid service.

Musk is urging other large companies worldwide to invest in building Giga factories of their own. "If the big industrial companies in China, the U.S., and Europe…do this then collectively we can accelerate the transition to sustainable energy. And if the government sets the rules to favor sustainable energy, we can get there really quickly."

There are a number of things about Tesla's Gigafactory that are well worth emulating.

The Model

Located in Sparks, Nevada, on Electric Avenue, Tesla's Gigafactory is one of the largest structures ever built. At approximately 6 million square feet, it covers 126 acres. Multiple levels could expand its square footage to up to 15 million square feet. Employees there call it the "alien dreadnaught." Musk estimates that by 2020, the factory will house 6,500 employees.

The good news for those employees is that the heavy lifting and transport will be done by mobile robots called automated guided vehicles (AGVs). They navigate by following magnetic tape on the ground and are equipped with sensors and a laser guidance system. Much of the repetitive motion work of battery building will be assisted by robotic arms.

To reduce the environmental impact of excavation and building, the factory is diamond-shaped. It is also aligned with true north to allow daily operations to take full advantage of solar panels and GPS capabilities. The design allows it to be powered entirely by sustainable energy sources. For the first time, all the processes required to build batteries will be in

a single factory. Rail cars will transport raw materials straight into one end of the factory, and finished batteries will emerge at the other end.

Musk estimates that by 2020, the factory will be able to produce more lithium-ion batteries than all of the worldwide battery makers combined were able to produce in 2013. Further, he estimates that the price of those batteries will be reduced by approximately 30%. In practical terms, that means that the cost of the eco-friendly Tesla Model 3 will be priced at just $35,000.

In an effort to further encourage the use of solar energy worldwide, in 2015, SolarCity purchased ILIOSS, a company in Mexico that specializes in solar installation for commercial and industrial projects. According to research data, demand for solar power by commercial and industrial interests in Mexico are expected to increase over 1000% by 2020. According to a company spokesperson, “Mexico’s combination of high electricity rates, favorable solar economics, and massive solar resources makes it one of the most promising solar markets in the world.”

South Australian companies have been promised governmental support in transforming the country’s energy infrastructure to include solar energy. Energy storage capability is essential for replacing aging coal and gas plants. Towards that end, Musk recently issued a promise of his own via Twitter, namely that he could build a battery storage farm there within 100 days – or it would be free.

Global Solar Expansion

While the world’s first Gigafactory will be in the United States, there are a number of other countries leading the way in making the transition to solar energy. In 2016, Portugal was the first country to be completely powered by sun, wind, and rain for 107 hours. Coopérnico has already installed its

seventh photovoltaic facility on Portugal's southern coast.

Germany ranks first in renewable energy, leading the world in solar PV capacity. It has met as much as 78 percent of its daily demand for electricity from renewable energy sources.

China is also a world leader in renewable energy. In 2014, China had the highest installed wind energy capacity and the second highest installed solar PV capacity. These efforts demonstrate China's commitment to reducing dependence on coal and improving air quality. Sun-drenched Morocco holds the title for the largest solar power plant in the world.

Critics of solar energy point to higher unemployment rates caused by the closure of coal plants. However, with a few economic adjustments, the global transition to sustainable energy, coupled with technological advances such as robotics, may well result in everyone being able to work less and enjoy life more.

Sources & Further Reading:

- *Inside Tesla's Gigafactory: A Crazy Idea Takes Shape In Nevada* – Forbes
- *Rooftop Solar Boom Underway* – Ecowatch
- *SolarCity Activates Fund to Finance More Than $1 Billion in Commercial Solar Projects* – GlobalNewsWire
- *These 10 countries are leading the world in solar energy* – Business Insider
- *Morocco's grand dream of energy independence* – PRI
- *How 11 Countries Are Shifting To Renewable Energy* – The Climate Reality