



The Renewable Energy Future Emerges? Integration of Solar Energy, Battery Storage and Electric Vehicles

Par [Roy Morrison](#)

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A global renewable energy transformation is underway. The proposed merger between Tesla and Solar City outlines the shape of things to come.

The integration of solar panels with battery storage and electric vehicles is the paradigm for both ecological global economic growth, and reaching the goals of the Paris Climate accord.

An integrated renewable energy company will combine electric vehicles, battery storage, and solar electric panels, all with rapidly expanding market share and plunging prices. Globally, investment in cheap and carbon free solar energy is already rapidly supplanting fossil fuels.

Whether or not Tesla's corporate reorganization proceeds, this is the model for a global renewable energy company with a comprehensive and compatible product line.

Elon Musk of Tesla understands that the combination of increasingly cheaper solar panels with rapidly developing and affordable battery storage makes 100% renewable energy systems achievable globally.

Mega battery and photovoltaic factories, being constructed by Tesla and others like Faraday Future in the United States, and in India, China, Ghana, mean that global industrial productive might is being rapidly deployed for a renewable energy transformation.

Benchmark Mineral Intelligence estimates that at least 12 lithium ion mega-factories will come online by 2020. Seven of them in China. Sony is pushing forward with sulfur lithium battery development. China has passed the US in yearly production of electric vehicles by the start of 2016. 250,000 to 180,000 a year. China is now also global leader in lithium battery anode production. The French oil giant Total has bought the lithium battery company SAFT for \$950 million as big oil is beginning to see where the sun is shining. And even the Saudis are now planning for major solar development as oil revenues collapse.

Profit driven renewable enterprises need sensible encouragement by fair market and utility rules, not carbon taxes, in order to continue to rapidly transform the global energy balance. Regulators and politician need to support, not sabotage the renewable energy transformation.

Instead of economically destructive and costly carbon taxes that would put a break on all

economic activity, what's needed is using the already successful renewable portfolio standards (RPS) mandating an ever increasing percentage of renewable energy.

The more renewables that are built, the lower the cost, the less pollution, the more good community jobs are created. California and its utilities and regulators are a good example of how we are moving rapidly toward a renewable turn.

California Utilities like PG&E and Southern California Edison have seen the future and it's renewable. They're investing big time in electric vehicle charging stations at the same time the state, led by Gov. Jerry Brown, mandates the phase in of more renewable power. The utilities understand that the renewable future means more, not less, electric sales.

And it's companies like Tesla, Faraday Future, China's BYD, and Mercedes that aim to provide the vehicles to take advantage of this electricity and charging stations. And the batteries on these electric cars can also plug into the grid and your house to help provide supplemental power.

California regulations use RAM (Renewable Auction Mechanism) with competitive bids to help finance renewables, employing market forces to help keep pushing the cost of renewables down.

Wall Street investment in renewable energy is now far greater than in fossil fuels. Peabody Coal is bankrupt. On the same day the Solar City - Tesla merger was proposed, PG&E announced the planned shut down of Diablo Canyon, California's nuclear last nuclear plant.

The sun is rising. Politicians and regulators need to assist our renewable entrepreneurs, workers and their unions, and communities hungry for clean sustainable jobs. We are witnessing the dawn of global ecological economic growth.

Roy Morrison's next book is Sustainability Sutra forthcoming March 2017 from Select Books in NY

Fact check:

TESLA-Solar City Merger

<http://www.utilitydive.com/news/tesla-makes-offer-to-buy-solarcity/421314/>
<http://www.vox.com/2016/6/21/11996508/tesla-solarcity-merger>

Giant PV Production Factories

<http://www.buffalonews.com/city-region/as-solarcity-turns-giant-call-goes-out-for-supply-chain-20150611>

India releases guidelines for 'Ultra Mega' solar power projects

By [Tom Kenning](#) Jul 07, 2015 11:53 AM BST [0](#)

"Guidelines for implementing India's plans for 20GW of solar capacity from "Ultra Mega solar power projects" in 25 parks have been published by the Ministry of new and Renewable energy (MNRE).

Each of the solar parks will have a minimum capacity of 500MW to be set up within five years from 2014/15 to 2018/19."

http://www.pv-tech.org/news/india_releases_guidelines_for_ultra_mega_solar_power_projects

[How Did China become the largest Solar PV Manufacturing ... - Cstep.in](#)

www.cstep.in/uploads/default/files/.../stuff/dc6ff09f580c30a0a6fc0d1a90ed813f.pdf

Ghana Africa's largest solar (PV) power plant

5th August 2015

<http://www.blue-energyco.com/africas-largest-solar-pv-power-plant/>

"Blue Energy is to build Africa's largest solar photovoltaic (PV) power plant in a move which could spark a renewable energy revolution in West Africa.

The giant 155-megawatt Nzema project will be one of the biggest in the world - only three solar PV plants in operation today are bigger. It will increase Ghana's current generating capacity by 6% and will meet 20% of the government's target of generating 10% of its electricity from renewable sources by 2020.

The Nzema project will be the first to go ahead under Ghana's 2011 Renewable Energy Act, which set up a system of feed-in tariffs, and it is a success for the government's policy of attracting international finance. Last month Energy Minister Joe Oteng-Adjei announced he was seeking \$1 billion of private investment to help Ghana achieve its renewables target."

12 Mega-Lithium Battery Factories Under Construction Including 7 in China who leads in Electric Cars

[/http://www.benchmarkminerals.com](http://www.benchmarkminerals.com)

<http://www.discoveryinvesting.com/blog/2016/5/10/china-flanks-freeport-to-further-consolidate-the-lithium-ion-battery-business>

<http://www.dailymail.co.uk/sciencetech/article-3540360/Faraday-Future-reveals-Nevada-megafactory-hopes-topple-Tesla-1billion-facility-build-mystery-electric-car-2018.html>

Total buys lithium battery maker SAFT

<http://www.bloomberg.com/news/articles/2016-05-09/total-to-buy-french-battery-maker-saft-in-1-1-billion-deal>

Saudis Go Solar

<http://www.theatlantic.com/magazine/archive/2015/07/saudis-solar-energy/395315/>

"Quietly, the prince is helping Saudi Arabia—the quintessential petrostate—prepare to make what could be one of the world's biggest investments in solar power.

Near Riyadh, the government is preparing to build a commercial-scale solar-panel factory. On the Persian Gulf coast, another factory is about to begin producing large quantities of polysilicon, a material used to make solar cells. And next year, the two state-owned companies that control the energy sector—Saudi Aramco, the world's biggest oil company, and the Saudi Electricity Company, the kingdom's main power producer—plan to jointly break ground on about 10 solar projects around the country."

PG&E wants to own solar charging stations

<http://ww2.kqed.org/science/2016/05/23/utilities-want-to-plug-in-more-electric-drivers/>

Southern California Edison, San Diego Gas and Electric Car Charging

http://www.greencarreports.com/news/1102396_utilities-to-lead-surge-of-electric-car-charging-in-southern-california

China's BYD Electric Vehicle plans

<http://bigstory.ap.org/article/202ec13eda4944bda509070ca834ed20/chinese-electric-car-maker-ente>

[rs-us-market-selling-buses](#)

California Renewable Energy Plans

<http://www.energy.ca.gov/renewables/>

California Renewable Action Mechanism (RAM)

http://www.cpuc.ca.gov/Renewable_Auction_Mechanism

California's Last Nuclear Power Plant To Be Shut Down

<http://www.npr.org/sections/thetwo-way/2016/06/21/482997213/californias-last-nuclear-power-plant-to-be-shut-down>

Renewable Energy Investments: Major Milestones Reached, New World Record Set

Thur, Mar 24, 2016

“Coal and gas-fired generation attracted less than half as much capacity investment as renewables last year;
Renewables added more to global energy generation capacity than all other technologies combined;
For first time, developing world investments in renewables (up 19% in 2015) topped developed nations’ (down 8%);
World record total of \$286 billion invested in renewables last year; makes \$2.3 trillion over 12 years”

<http://unep.org/newscentre/default.aspx?ArticleID=36112&DocumentID=27068>

<http://www.bloomberg.com/news/articles/2016-02-04/renewables-top-fossil-fuels-as-biggest-source-of-new-u-s-power>

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