

Five reasons the grid desperately needs an upgrade

Ukraine's power outage was a cyber attack: Ukrenergo

#1 - the grid is frighteningly vulnerable

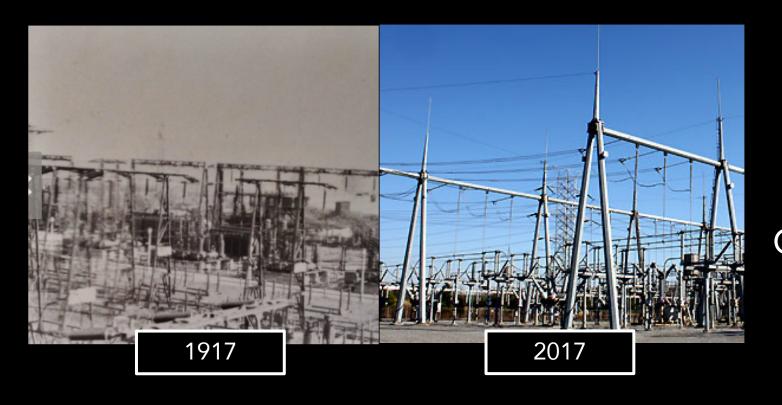
Hurricane fallout: Puerto Rico could face 6 months without power

Haley Zaremba, Oilprice.com Published 8:00 a.m. ET Sept. 30, 2017

India blackouts leave 700 million without power

Power cuts plunge 20 of India's 28 states into darkness as energy suppliers fail to meet growing demand

Monkey causes nationwide blackout in Kenya



#2 – the grid has barely innovated over the last century











#5

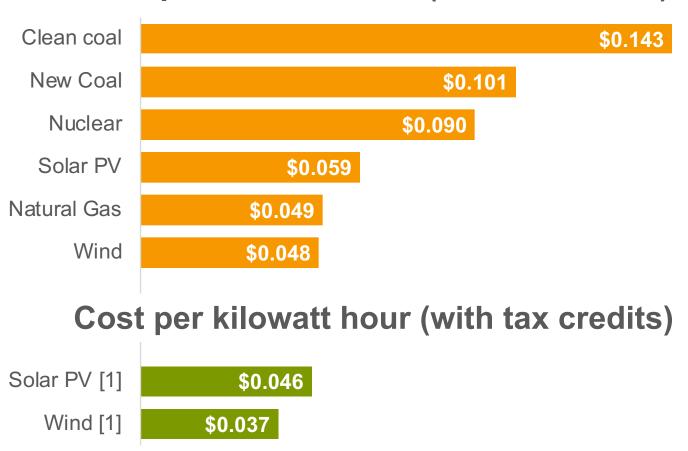
is the most compelling of all the reasons to upgrade the grid: better economics In the last two years, a tectonic shift has occurred.

New, cheaper ways to generate electricity have emerged.



Solar and Wind are now the lowest cost way to generate electricity

Cost per kilowatt hour (w/o tax credits)



All data from US Govt reporting March 2018
Other sources put solar at lower costs
[1] Clean energy tax credits are set to expire by 2021

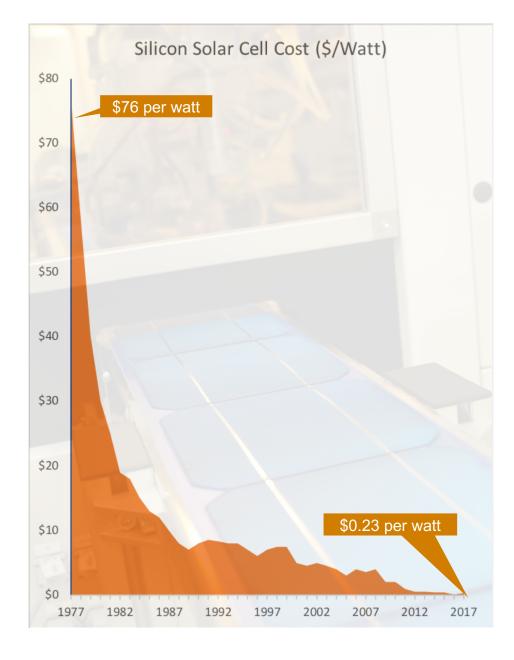
How can solar be so inexpensive?

Solar is a technology, not a fuel.

Solar cells benefit from the same massive economies of volume as microchips and hard drives.

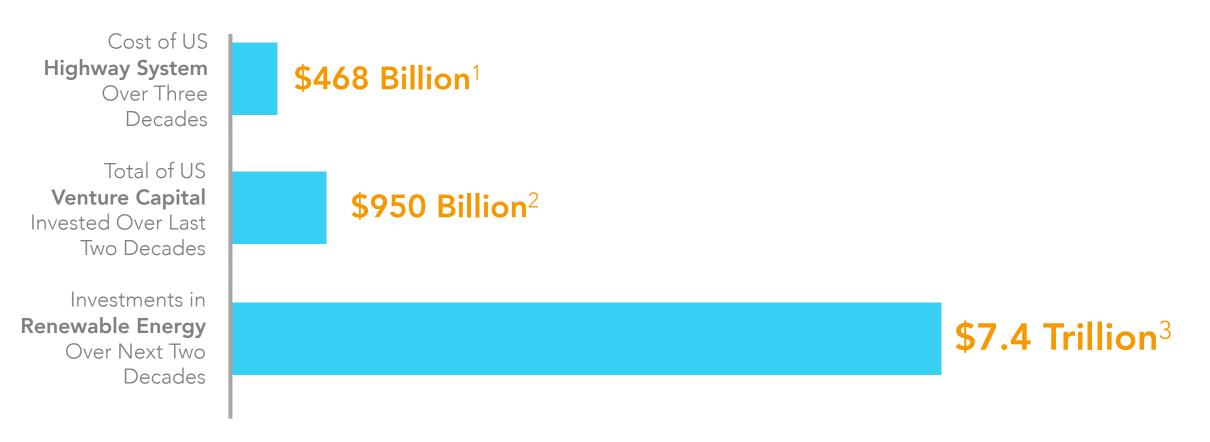
The cost of solar has dropped 300x over the last 40 years...

... and it will continue dropping



FREEING ENERGY

The economically-driven shift to solar and wind is the largest opportunity in business history



Clean energy is cheaper and safer. So, what's holding it back?

Power companies are incredibly risk averse

Reasons not to innovate

- Electricity is already affordable
- Electricity is fairly reliable for most people
- Regulators will punish utilities for any failures or missteps

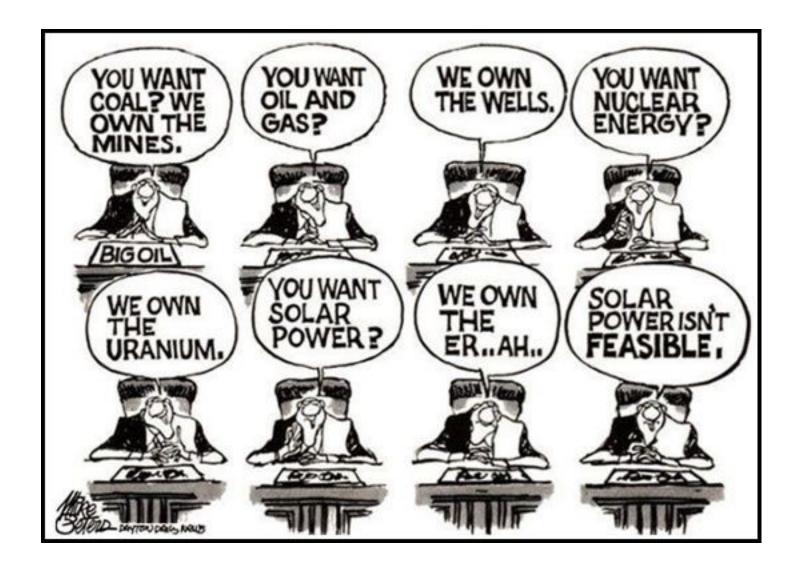
Reasons to innovate

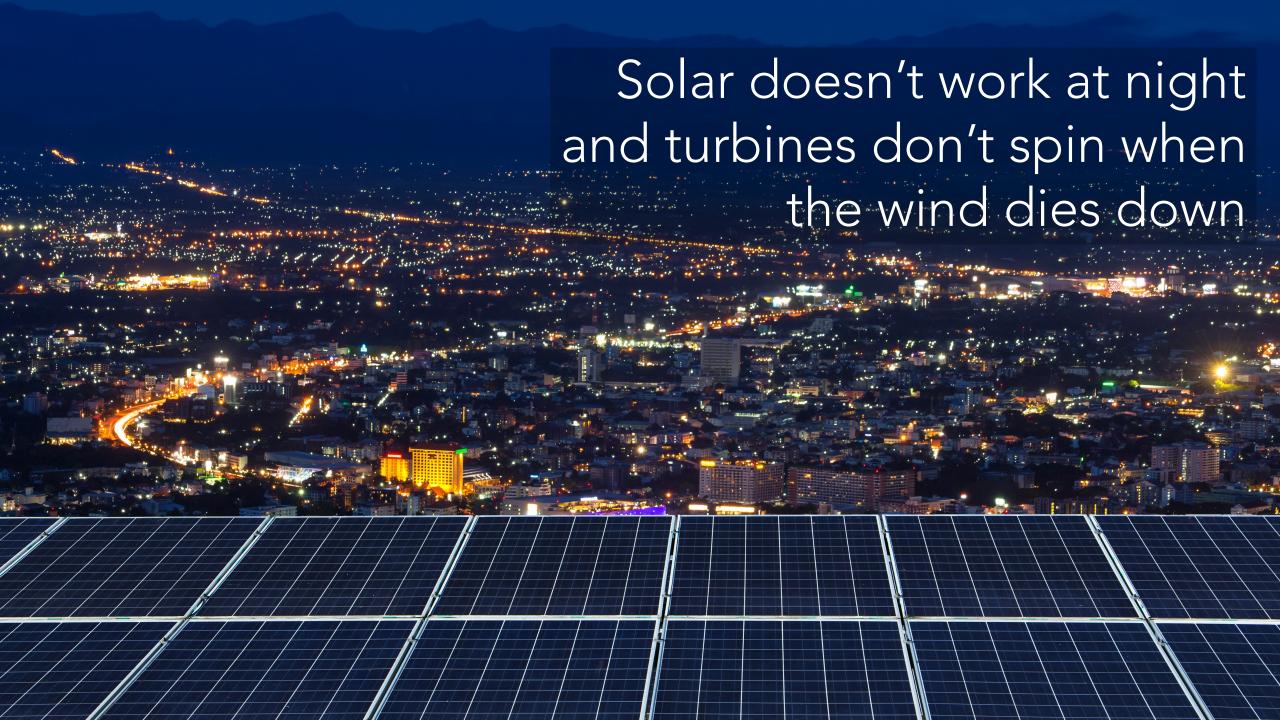
- Fear of competition
- Responding to customer requests
- Increase profits



Power plants are built on the "Gillette" business model – give away the razor and sell the blades.

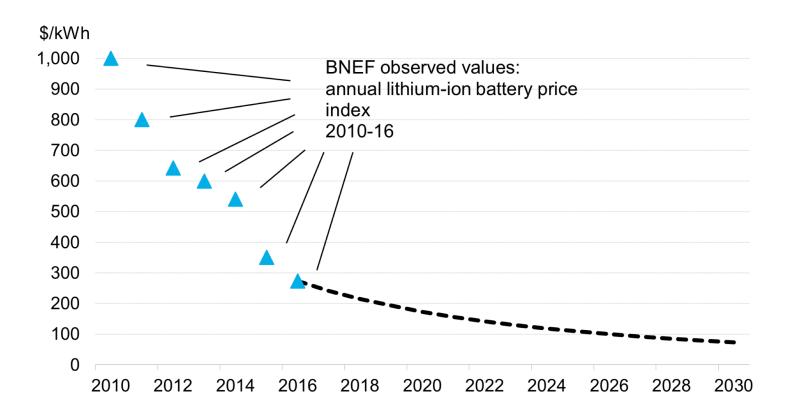
Clean energy has no blades.





The Clean Energy future requires technology and entrepreneurs

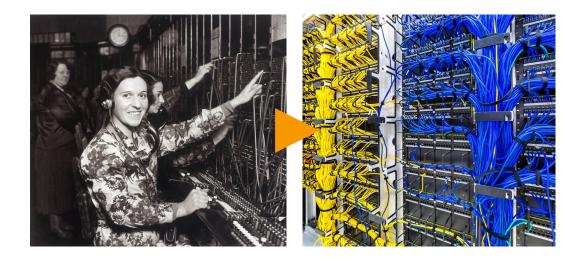
Plummeting battery prices will solve the intermittency of solar and wind



Electric vehicles will drive incredible volumes in battery production (Telsa's Gigafactory) maintaining decades of dropping prices.

Top battery competitors are already quoting deals well below the magic \$100/kwh price level.

Batteries will do for the grid what hard drives did for computers in 60's.



Digital technology transformed telephony. This change led to the internet, wireless, and smart phones.

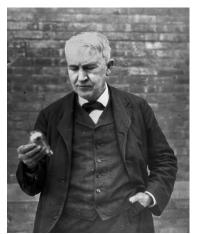


The grid remains one of the few analog industries left in the world. Digitizing the grid is an economic and technical imperative.

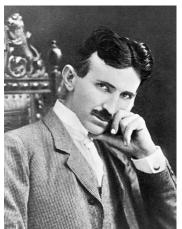
FREEING ENERGY

The grid was created a century ago by some of the greatest entrepreneurs in history. Who are the innovators that will usher in the next era?

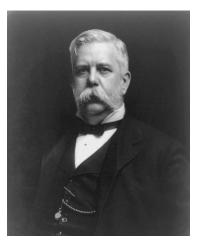
A Century Ago



Thomas Edison



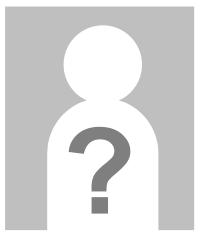
Nikola Tesla



George Westinghouse



Today

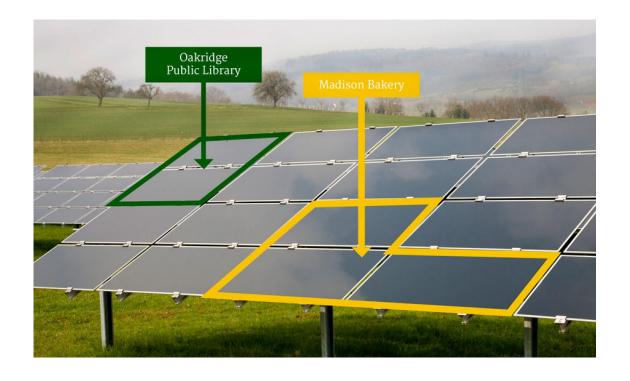


A century of monopoly regulations have driven away innovators and entrepreneurs



Allows anyone to buy community solar anywhere in the US, regardless of state regulations.

- Sophisticated digital backend connects community solar gardens built in regulatory-friendly locations to virtually generate power for anyone in the US
- Just raised \$25M





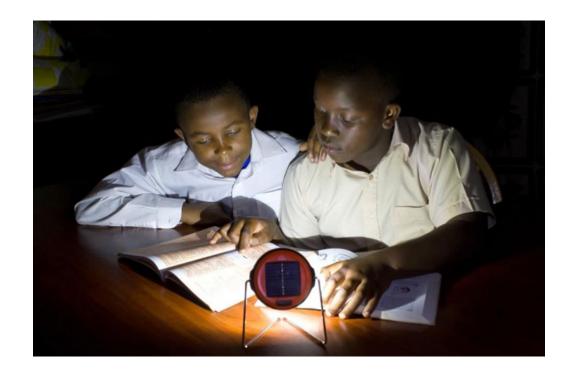
Helped create the first truly independent, clean-energy-focused small electric utility in the US

- Provided financing and contracting for Kit Carson, based in New Mexico, to break free of its choke-hold contract with its utility parent
- Building community-scale solar farms in dozens of Kit Carson towns, bringing high-paying local jobs for installation and maintenance
- Just raised \$130M to roll out their model across the US



Silicon Valley based startup has grown to "nine-figure" revenue providing solar-electricity to rural Africa

- Break-through mobile-phonebased pay-as-you-go (PAYG) model makes electricity affordable to many more people
- Raised \$50M to fund inventory and working capital



Solar Shingles

Solar shingles are less expensive than solar panels and a traditional shingled roof.

These costs will continue to drop until nearly every homeowner choses solar shingles and becomes their own electric utility.





Exciting Georgia-based Power Startups



Software for balancing an increasingly decentralized grid



Micro-hydro-power solution for 24/7 cheap hydro power anywhere there is moving water



Data and platform for electricity marketplaces



Low-cost solar solution for parking lots and other "no-other-use" land



New approach for charging electric vehicles



A new approach to solar cells that lowers costs and increases effective power output**

To Learn More About the Freeing Energy Project and Our Work



Accelerating the shift to clean energy https://youtu.be/BSXk30p4f8Y



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Thank You

(learn more on next slide)