The Biggest Disruption in the Energy Industry that No One Sees Coming Presented to Association of Energy Engineers

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The urgency to transition and upgrade our energy systems rises with each new headline

Severe weather and under investment are increasing the frequency and impact of outages

3,000 people died in Puerto Rico from a 9-month grid outage. Hundreds dies in Texas from a week-long grid outage.

"It's now or never" -IPCC Co-chair, April 4, 2022

We must cut emissions by half within this decade



But our default options to cleanly upgrade our grid are decades out.

Utility-scale solar and wind farms require 1000s of miles of new transmission. But transmission powerlines take an average of ten years to build.

The largest grid operator in the US has announced a two-year pause for reviewing new solar interconnection requests, pushing decisions out to 2027

What about nuclear power?

These plants take *decades* to build out. Other than Vogtle, no new nuclear is planned for this decade.



Vogtle, the only new nuclear plant in the US, requested its initial permit in 2006. Sixteen years and countless delays later, it is still under construction.



While we need all the transmission and large scale powerplants we can build...

The power industry struggles with innovation and remains stuck in a century-old mindset.

Technology has changed the world, but electric innovation has all but stalled for the last century





The magnitude of the coming transition is larger than anything the world has ever attempted

This is daunting to incumbents but inspiring to innovators.

The largest investments in history

Cost of US Highway "Clean energy is the System Over Three \$549 billion Decades largest investment opportunity in Total of US Venture human history" **Capital Invested** \$1 trillion **Over Last Two** Decades Investment Forecast in Clean Energy **Over Next 25 Years**

\$17 trillion



The largest business disruption in history is going to come from the humblest of places.

Traditional energy has been purely fuelsbased for more than a century

But solar and batteries are technologies, not fuels.

And unlike any previous energy system, solar and batteries are small.

Solar and batteries are cost-effective at every scale--large and small.





What if we had a solution today that was... ...Faster ...Cheaper ...More resilient ...More equitable ... More innovative?

Community solar Rooftop solar

Building integrated

Microgrids & batteries

Local Energy is...

... Faster to build ... Cleaner ... More resilient ... More innovative ... Creates more jobs ... CHEAPER than the grid

Local energy is faster to build...

Small-scale solar can be installed in weeks vs years for large-scale projects. Identical systems in Australia are built in days thanks to streamlined regulations and policies.

Local energy is more resilient...

Microgrids and residential solar+battery keep the power on in the face of increasing grid outages.

Local energy means the savings from solar go directly to families and communities

Local energy creates 10x more jobs

compared to utility-scale solar projects, per MW installed

Local energy is more innovative...

Systems like microgids are invented and sold outside utility monopolies, unleashing Silicon Valley-like innovation.

Local energy is cleaner....

One Month of Energy (1 MWh powers an avg American home)

A half-ton of coal

6 KW solar panel

"It wouldn't take that much to take the bulk of the power system down.. [But] a more distributed system is much more resilient. Millions of distributed generators can't be taken down at once."

-- Former FERC Chairman Jon Wellinghoff, 2013

Microgrids are "inherently less susceptible" to EM and other attacks. -- Retired CIA Director James Woolsey

Local energy is more secure...

Local energy is cheaper...

mini

Price of commercial-scale electricity (US cents per kilowatt hour, 2012-2050)

FreeingEnergy —

Sources: EIA, NREL (300KW and 15.2% capacity factor, 20-year, no ITC, 2018\$) (fep.link/g112)

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Local-scale solar is far cheaper in other countries; the US can catch up

Notes: Installed prices for countries other than the USA are from the International Renewable Energy Agency (IRENA)'s "Renewable Power Generation Costs in 2020" report and are derived from IRENA's Renewable Cost Database. For the Non-Residential sector, data from IRENA generally refer to systems up to 500 kW in size, and thus encompass both the Small and some portion of the Large Non-Residential segment used within Tracking the Sun.

- The largest driver of expensive US local energy is soft-costs
- US drivers of soft-costs are being addressed and will almost certainly result in far lower costs of small-scale energy systems
- California just embraced a solution called SolarAPP+ that will greatly streamline permitting and interconnection

Local energy is faster, cleaner, cheaper, and more.

It may also be one of the biggest business disruptions in history, creating unprecedented opportunities for innovators and entrepreneurs.

To learn more about local energy...

Freeing Energy is the #1 renewable energy podcast -Feedspot.com

in Energy, Solar, and Energy Policy

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