



# Perfect Storm

---

**Three Catalysts Accelerating  
the Exponential Energy Revolution**

**By James Allen and Selva Freigedo**

**BEYOND  
OIL**





# 1

## Perfect Storm: Three Catalysts Accelerating the Exponential Energy Revolution

By James Allen and Selva Freigedo

*The traditional energy market is ripe for disruption...*

*And three key trends are emerging at the same time to — finally — turn the industry on its head.*

*The collapse in renewable energy costs, scaling up of the green grid, and blockchain technology to bring it all together, make this a near unstoppable trend.*

*An exponential energy opportunity which may never again be repeated in our lifetimes.*

We talked yesterday about how outdated the electric power industry's centralised model has become over the *last* few years.

We also explained why we're so convinced the entire utilities sector will become the latest case study in business disruption over the next few years.

As we wrote, we believe that this disruption will result in a radically different energy system that will transform utility business models and open up a dizzying array of new opportunities.

You'll know now that we're convinced the power industry's business model, which has remained fundamentally unaltered over the last century, is dying.

It's a model that emerged out of the Edison age, where the

utility was responsible for generating power and selling it to the customer.

The same model is essentially still in existence today.

Customers are simply energy consumers, power flows one way from generation to load, and demand is fairly predictable.

And it worked. The global energy market is now worth around \$6 trillion.

But the market is now being fragmented as the utility model undergoes a paradigm shift.

All this you know.

But what we didn't talk about in any great detail *yesterday* are the specific changes that pose such a mortal threat to the existing utility system. These are changes that will see this entirely new electric ecosystem evolve.

You see, a perfect storm of factors have emerged that are tearing down the business models of the incumbent utility firms.

The traditional, centralised electrical system is shifting towards a more distributed, responsive grid driven by technology innovation and evolving customer demands.

This process, which has been underway for the last few years, is accelerating at an ever faster rate, driven by several technological,

# 2

regulatory and competitive forces.

Grids are becoming 'smarter' and cleaner, while technology is lowering the barrier of entry into the energy markets as a whole.

What is this perfect storm? We boil it down to three key trends that are combining to accelerate the shift to exponential energy: The collapsing cost of energy, the scaling up of renewables, and the smart grid to connect it all together.

## Renewables are coming

What keeps the traditional energy company exec up at night?

In a word, renewables.

And lots of them.

Global renewable power generation capacity rose by 9% in 2017, a fourfold increase from the start of this century, while renewable energy — for the second year in a row — accounted for more than half the new power generation capacity added worldwide.

In 2019, renewable energy was responsible for 24% of Australia's total electricity generation, an increase of 2.7% on 2018.

For the first time, wind overtook hydro as Australia's leading clean energy source. It accounted for more than 35% of Australia's renewable energy generation, with hydro power in second place, contributing 25.7%.

Australia's large-scale renewable energy capacity increased by 2.2 gigawatts (GW) across 34 projects in 2019. Large-scale solar comprised more than two-thirds of this new capacity. Rooftop solar continued to increase, as the industry's 2.2 GW of installed

capacity broke the previous year's record of 1.6 GW.

In 2019, global solar energy reached a record high of 114.5 GW, up 17.5% since 2018.

In the first quarter of 2020, China added 3.95 GW of new solar generation capacity, despite the unprecedented impact of COVID-19. Over the same time period, the US installed 3.6 GW of solar PV capacity to reach 81.4 GW of total installed capacity — enough to power 15.7 million homes.

In Germany — Europe's largest economy — roughly 27% of the country's electricity is from renewables. The goal is to reach at least 80% by 2050.

Why is this so important?

Well, the rapid rise of renewables on to the grid has crushed wholesale power prices and decimated utility margins, meaning it's no longer profitable to own generation assets.

Europe's 12 biggest utilities, failing to foresee the shift to clean power, have written off more than 100 billion euros of assets since 2010, as nuclear, coal and gas-fired plants have been closed, mothballed or — if still running — fallen in value.

The switch to green energy is not reversible, with forecasts suggesting the global capacity of renewables is set to expand by 50% between 2019 and 2024.

Wind and solar parks are being built at unprecedented rates, while demand for electric cars is seeing exponential growth, driving down the price of batteries and further unleashing new levels of green growth.

In fact, energy costs are collapsing across the board. That's our second key trend.

# 3

## Collapsing cost of energy

The cost of solar has dropped 85% in the last decade...and 99% since the early days of the industry.

Not only that, it's expected to drop another 59% by 2025.

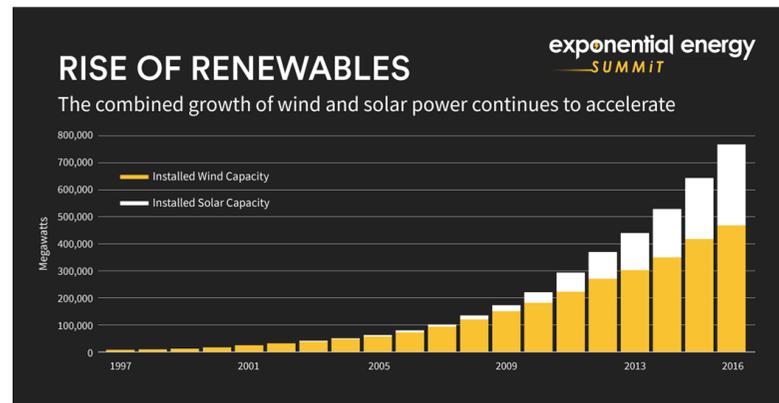
Wind power is the same...costs are expected to drop by 71% over the next 20 years.

Battery costs are collapsing, as said above. By 2040, energy storage installations are set to grow 122 times, according to Bloomberg New Energy Finance.

The falling cost of energy will lead to a further explosion of new energy sources.

It's a revolution all right.

And right now it looks unstoppable.



As the *Financial Times* put it:

*'It is early, but the evidence is mounting. Wind and solar parks are being built at unprecedented rates, threatening the business models of established power companies.'*

As explained, the renewables growth allied to low power prices has meant a significant amount of conventional generation is up for closure as it is becoming less profitable.

We believe that market forces and industry regulations will continue to drive coal off the grid, largely replaced by wind and solar capacity.

But renewables are just one part of this transformation.

Utilities are facing an existential challenge from smaller and more decentralised, distributed energy systems.

More and more homes and businesses are seeking to save money by using locally sourced power, sidestepping utilities and sparking a global market for decentralised energy.

For example, the period from 2010 to 2019 saw \$2.1 billion invested in off-grid power, of which \$470 million was invested in 2019 itself. That shows how the pace of investment is accelerating, with most of it coming recently.

An estimated 420 million people globally were using standalone off-grid solar. Another 47 million people rely on mini-grids for access to electricity, according to the World Bank and IFC's 2019 data.

## Decentralised energy is the future

Keep in mind, all of these trends are reshaping the energy world. They're wresting wealth, power and control away from the centralised models of the 20<sup>th</sup> century and creating a new kind of energy business that presents a huge opportunity for investors.

# 4

Decentralised power generation — when a few homeowners go rogue, go off the grid with home-grown energy — is a legitimate disruption.

Think about people installing solar panels on their rooftops, tapping into the base load of the energy grid for a little ‘hit’ of power when it’s cloudy, and you will get the idea about just how nervous the traditional utility should be.

That’s because decentralised power generation will further cut revenue at the biggest traditional power providers, which typically control everything from generation to distribution.

This kind of grassroots disruption ‘*could shrink the role of unwary power utility companies to operators of back-up infrastructure*’, according to PwC.

Changing, more empowered consumer behaviour is also shifting how we produce, use, value and trade electricity, undermining the dominant position of large energy enterprises.

As their traditional model becomes increasingly unprofitable, utilities are being forced to embrace an increasingly digital market that will eventually connect consumers’ demands for increased flexibility and cost control to new services and charging models based on green energy and emerging technologies.

Which brings us to our third key trend.

## The smart, connected grid

Distributed ledger technologies (DLTs) such as blockchain and smart contracts will underpin this new transactive energy ecosystem.

In fact, blockchain will enable decentralised energy and help us balance an increasingly decentralised power grid.

Originally used to support the currency bitcoin, blockchain chronologically records and links every transaction made across networks, making such deals secure and decentralised via encryption technology — properties that will certainly facilitate energy trading transactions in a distributed world.

As energy markets liberalise and renewable energy grows, blockchain offers a way to better handle the increasingly complex and decentralised transactions between users, large- and small-scale producers, retailers, and even traders and utilities, cutting costs and increasing efficiency in the process.

In practical terms, blockchain technologies have the capability to eliminate the need for all manner of paper documents — letters of credit, bills of lading and inventory receipts — by moving to a digital equivalent, potentially saving billions of dollars for firms across the supply chain.

By making a trading chain fully transparent, blockchain is able to verify transactions and reduce counterparty risk without the need of a broker or clearing house, enabling participants to save on market access and transaction fees via an automated system.

In fact, without the need of an intermediary, the role of the energy trader, broker or clearing house may be bypassed entirely as suppliers can connect directly with end-users.

That won’t happen next year, of course — it will probably take another five to 10 years before the transaction technology fully disrupts how power and fuel products are traded — but blockchain technology could start to make inroads into power markets in the near future.

# 5

Several European energy firms, including Uniper, Vattenfall, Endesa and Engie, have already started testing a peer-to-peer trading tool that uses blockchain.

Last year, US firm LO3 Energy and Japanese multinational Kyocera Corporation tested feasibility of a blockchain-managed peer-to-peer distributed consensus network using LO3 Energy's distributed ledger technology to log and manage energy flow.

The US company also plans to launch pilot projects in Europe, deploying LO3 technology in community peer-to-peer micro grids that will connect to the EPEX SPOT (European Power Exchange) wholesale markets.

This will mean any owners of solar power units can feed excess electricity from their panels back into the grid, and consumers can purchase shortfalls at a market price.

But blockchain is also perfect for the integration of decentralised, distributed energy, which is anticipated to grow from 5% of the market today to 25% in 2025.

## Blockchain meets the energy grid

The technology can allow millions of energy devices — such as water heaters, electric vehicles, batteries and solar installations — to transact with each other at the distribution level. It can also provide support to utilities and grid operators to integrate more utility-scale variable renewable energy capacity at much lower cost.

In particular, the blockchain software Ethereum can deal with the buying and selling of electricity generated by renewable energy, such as solar panels. It can design 'smart' contracts, whereby funds are

only transferred if both sides of the transaction sign off a deal.

Blockchain, or distributed ledger technology, could also help balance out intermittent renewables in real time with batteries, for example.

The CEO and founder of LO3 Energy, Lawrence Orsini, has described blockchain as '*one of the most disruptive applications of technologies in the power markets*'.

The company has already developed a blockchain-based microgrid in Brooklyn, New York, which effectively enables neighbours to trade electricity.

A few other peer-to-peer energy trading systems have launched since on the microgrid level in Europe, though plans are afoot to facilitate trading on a much larger scale.

Peer-to-peer systems and companies threaten the market dominance of traditional utilities in both retail and wholesale markets as they directly link producers and consumers without an intermediary.

No wonder utilities across Europe are trying to get a slice of the action.

Vattenfall, SSE and Essent are among the major utilities that have so far backed the technology, with more likely to follow suit.

Peer-to-peer trading is just one step in a multi-stage digital transformation sweeping across the industry that, according to consultancy Deloitte, will ultimately help utilities '*predict, manage, and control increasingly decentralised and complex networks, make more informed decisions, and enhance customer relationships*'.

# 6

## **New opportunities await those companies that can see the lay of the land**

For the heavyweights that are willing to adapt, change needn't be a threat. The new energy ecosystem offers the opportunities for reinvention that many energy companies have been seeking, after years of eroding revenues.

But incredible opportunities also lie in wait for a new breed of utility, as well as the tech-like firms that are nibbling away at bits of utilities' traditional business models through innovations in grid optimisation and smart-home management systems.

As generation continues to evolve towards a more diverse and decentralised network of intelligent flexible units, energy companies can help build community microgrids, connecting and managing the energy inputs from many different self-generating households.

Building a connected, digitised grid also has the potential to become a platform for applications offered by third-party providers. These apps could include services to manage the appliances in a connected home, charge electric vehicles (EVs), or conduct peer-to-peer transactions to trade solar energy with neighbours.

Utilities may not develop or run these services but instead host the platform (i.e. the digital grid) on which they are held.

Utilities could take a bigger role in the EV industry, investing in infrastructure that allows EV batteries to help stabilise the grid.

Further opportunities — some unforeseen in 2020 — will undoubtedly emerge.

The potential for new paths to growth are waiting — for those that get ready in time...

**Until next time,**

**James Allen and Selva Freigedo,  
Beyond Oil**



**All content is © 2005–2020 Port Phillip Publishing Pty Ltd All Rights Reserved**

Port Phillip Publishing Pty Ltd holds an **Australian Financial Services License: 323 988**, | **ACN: 117 765 009** **ABN: 33 117 765 009**

All advice is general advice and has not taken into account your personal circumstances.

Please seek independent financial advice regarding your own situation, or if in doubt about the suitability of an investment.

**Calculating Your Future Returns:** The value of any investment and the income derived from it can go down as well as up. Never invest more than you can afford to lose and keep in mind the ultimate risk is that you can lose whatever you've invested. While useful for detecting patterns, the past is not a guide to future performance. Some figures contained in this report are forecasts and may not be a reliable indicator of future results. Any potential gains in this letter do not include taxes, brokerage commissions, or associated fees. Please seek independent financial advice regarding your particular situation. Investments in foreign companies involve risk and may not be suitable for all investors. Specifically, changes in the rates of exchange between currencies may cause a divergence between your nominal gain and your currency-converted gain, making it possible to lose money once your total return is adjusted for currency. The Reader acknowledges that the contents of this newsletter and all associated intellectual property rights of Port Phillip Publishing Pty Ltd (PPP) including copyright, design rights, property rights, rights to data and databases, trademarks, service marks and any other rights created or developed in the course of the provision of the newsletter shall be and remain the sole and exclusive property of PPP. No person is permitted to copy, forward or reproduce the newsletter and/or its contents without express consent of PPP. Subscribers to the newsletter are permitted to use this material for their own personal and investment use.

If you would like to contact us about your subscription please call us on 1300 667 481 or email us at [cs@portphillippublishing.com.au](mailto:cs@portphillippublishing.com.au)

Port Phillip Publishing Attn: Beyond Oil 96-98 Bridport St, Albert Park VIC 3206 | Tel: 1300 667 481