

POWER SYSTEM DISRUPTION

Disruption in transport is not unfolding in a silo, but rather in concert with disruption in the other core areas of the economy, such as power.

To see how, let's take a trip to South Australia, where in 2016 a superstorm suddenly left 1.7m people without power.³³ This came at a sensitive time as the region had just phased out its last remaining coal plant in favour of wind and solar facilities. Public debate turned to whether this had been a wise decision with extreme weather events becoming the norm.³⁴ It didn't take long for Tesla CEO Elon Musk to tweet an answer: yes.

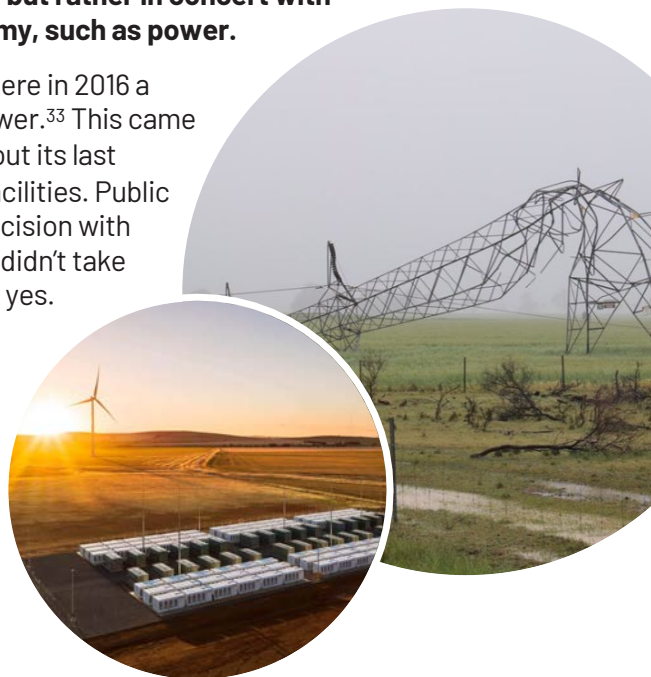
To prove it, he offered to build a record-breaking battery to solve grid stability problems within 100 days, otherwise the installation would be free.³⁵



Elon Musk
@elonmusk



@mcannonbrookes Tesla will get the system installed and working 100 days from contract signature or it is free. That serious enough for you?



It took just 63-days to complete the 129 MWh Hornsdale Power Reserve.³⁶ Once connected, the system displaced 55% of natural gas peaker plants previously providing frequency controlled ancillary services (FCAS), resulting in cost reductions of up to 90%.³⁷ Copycat Hornsdale Power Reserves have subsequently popped up across Australia and around in the world, with California now serving as home to the largest installations.³⁸

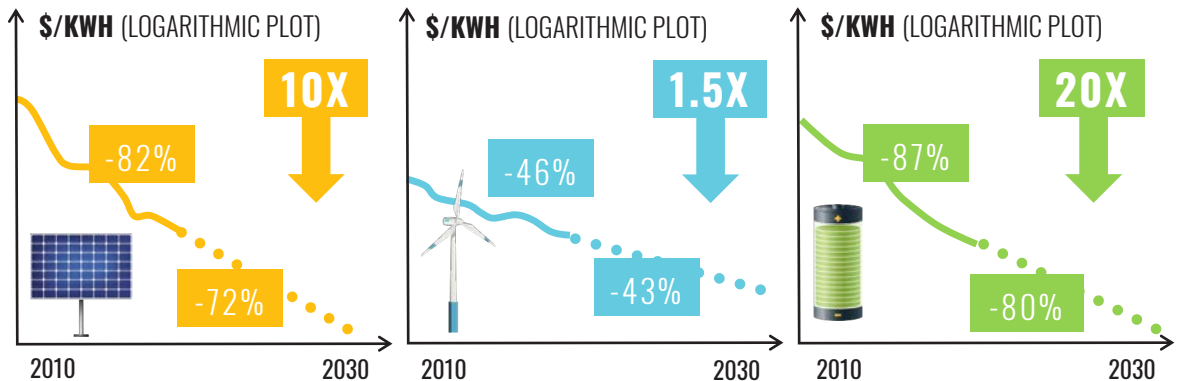
This example not only highlights the competitiveness of **substituting** coal for wind or natural gas for batteries, but more importantly, how these developments are converging to form a modern power **system**. Compared to the **industrial power system** of centrally generating power from fossil fuels for distribution across long-distance grids, the **modern power system** produces power by harnessing infinite flows of electrons from modular wind/solar and storage systems, dispatchable on-demand across decentralised, digital networks.³⁹

Modern power is already cheaper than industrial power in many places in the world and we are only just at the beginning. The exponential cost declines in solar, wind and batteries experienced in the 2010s are set to continue in the 2020s.⁴⁰



EXPONENTIAL COST DECLINE IN SOLAR, WIND AND BATTERIES

ACTUAL (2010-2020) AND EXPECTED (2020-2030)



Source: RethinkX

At the same time, the cost of distribution and maintenance is also declining with grid decentralisation and digitalisation. These savings make the system more affordable, enabling greater capacity build, including in places where power is not yet available.⁴¹ This includes parts of Southeast Asia and Sub-Saharan Africa where the adoption of off-grid, pay-as-you-go solar systems has reached 420 million users.⁴² Greater accessibility is just one of several relative benefits, ranging from lower emissions to greater flexibility. While the modern power system no doubt has many shortcomings, its overall value proposition is increasingly competitive.



FOOD SYSTEM DISRUPTION

Would you rather eat a burger made the synthetic or regenerative way?

This is a question many of us will have to answer as we shape the **modern food system**, centred on designing foods from the molecule up with ingredients from a range of organisms and cells cultivated locally through precision resource use.

It contrasts with the **industrial food system**, which much like the greater industrial economy, is no longer sustainable. For example, this system is both a villain and victim of the climate crisis, releasing an estimated 20% of emissions while contending with weather extremes.⁴³

