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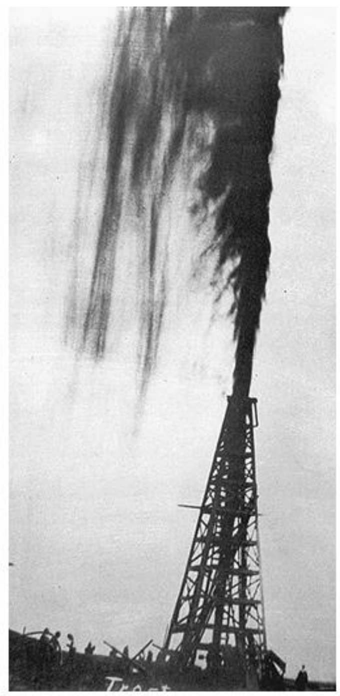
In U.S. Oil Country, Renewables Reign

A Texan Lesson in Energy Markets for Australia

Executive Summary

The Australian Government is contemplating subsidising fossil gas as an alleged pathway out of the current economic downturn. But the U.S. state of Texas—in many ways similar to Australia, in both population size and total economic output—reveals the pitfalls of overreliance on the oil and gas sector as an economic engine in the 21st century.


Spindletop blows in. File photo.

Early in the 20th century, the Texas oil boom became the stuff of legend, minting oil tycoons and spawning globe-spanning oil conglomerates. Starting in the 1970s, however, the state's oil and gas sector gradually declined as oil and gas output fell.

Then, in the early 2010s, the state re-emerged as a major oil and gas producer, as the combination of horizontal drilling and hydraulic fracturing (fracking) unleashed a massive boom in fossil gas and oil output. This second boom, however, proved to be financially unsustainable: U.S. fracking-focused companies typically spent far more on drilling than they generated by selling oil and gas. And once COVID-19 hit the global economy, the Texas industry suffered a catastrophic financial collapse, shedding tens of thousands of jobs amid a steep drop in drilling, cancelled pipeline projects, and dozens of energy sector bankruptcies, spurring a massive yet futile financial bailout by the U.S. Government.

In the midst of the fracking boom and bust, Texas's energy sector underwent a second transformation—this time, with wind and solar at the helm. In a deregulated electricity market with little government intervention, renewables have emerged as the clear winner, with private investors pouring money into wind and solar projects even as they increasingly shun fossil investments. This trend is now being mirrored elsewhere in the country. One of the nation's largest investor-owned utilities, Con Edison, has announced it will no longer invest in gas pipelines. And many U.S. utilities are starting to skip gas, recognising that it is no longer a financially viable transition fuel-and going straight to renewables.

This note compares the Texan experience with Australia and asks why the Australian Government is intervening in a market that has all the financial signals showing fossil gas is a poor bet.

Texas v Australia

More Similar Than Different

Texas and Australia have much in common. They have similar sized populations and economies, and both are hugely invested in resources extraction. (Texans should note that Australia's parliament house is taller than the Texas Capitol).

If Australia was a U.S. state, it would be the third largest behind California and Texas.

Table 1: Texas v Australia

	Texas	Australia
Population	29.9m	25.5m
Gross Product	USD1.8tn	USD1.3tn
Gas production per annum	9.6tn cubic feet	2.3tn cubic feet

Source: IEEFA research.

Another important similarity is that both Texas and Australia have excellent renewable energy generation, soaring on market investment, while gas is failing. In the September 2020 quarter, fossil gas power generation in Australia fell 18.7% yoy while wind and solar energy generation rose 14.8% yoy, overtaking gas' share.[1]

A key difference between Texas and Australia however, is that in its electricity generation sector, Texas is letting the market do its work while the Australian Government is fighting the market's clear preference.

Renewables Boom, Oil & Gas Bust

The oil and gas sector has been hit particularly hard, with employment in Texas down 32%[2] this year and bankruptcies up. Ten firms in Texas had filed for bankruptcy by May 2020[3] and by the end of August that number was 24[4] due to a combination of falling oil and gas prices.

Yet the renewables sector continues to thrive, notwithstanding COVID-19 and the fact that the Texan economy has been hit hard (with 1.8 million unemployed and

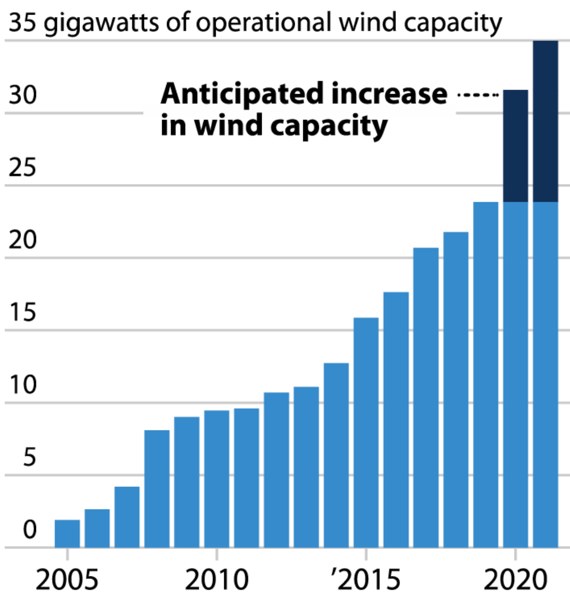
[1] Financial Review. Renewables surge, coal dips to a record low. 1 October 2020.
[2] Federal Reserve of Dallas. Your Texas Economy. 21 September 2020.
[3] The Centre Square. "Texas leads U.S. in oil and gas bankruptcies, job losses are a 'bloodbath'. June 2020.
[4] Haynes and Boone. Oil Patch Bankruptcy Monitor. 31 August 2020.

retail sales down 60% on pre-COVID levels[5] in the second quarter before rebounding in August and September).

While 118 oil and gas companies filed for bankruptcy in Texas between 2015 and 2020, wind developers expanded capacity.

The wind generation pipeline[6] has tripled since 2010 and virtually doubled since 2015 to 11.1 gigawatts (GW) in 2020 and 2021, delivering 35GW of capacity. That's more than double Australia's installed capacity.

Figure 1: A Record Increase in Wind Power Generation Capacity in 2020 – More Than in Any Other Year



Source: IEEFA, As Oil and Gas Wane, Texas Wind Industry Ascends, August 2020.

The growth in Texan capacity has come with a significant fall in electricity cost from wind power. The Lazard unsubsidised price range for U.S. wind is US$28-54 per megawatt hour (MWh), 35% lower than gas-fired power and less than half the cost of coal-fired power.[7]

Net of the production tax credit, the best priced wind power purchase agreements in Texas in the first quarter of 2020 were below US$20/MWh, according to S&P.[8]

[5] Federal Reserve of Dallas. Your Texas Economy. 21 September 2020.
[6] In ERCOT, the Electric Reliability Council of Texas, comprising 75% of Texas and 90% of its electricity.
[7] Lazard Levelized Cost of Energy Analysis version 13.0. November 2019.
[8] SPGlobal. US wind power PPA prices rise in Q1, solar PPA prices fall slightly: report. 23 April 2020.

As detailed in a recent IEEFA report looking at changing energy demand across the U.S., Texan counties that have wind power have seen:

- tax revenues increase;
- employment rise, including wages; and
- the development of wind power related business sectors, including services business and education.

In addition, the utility-scale solar power market has started to grow and solar power purchase agreement (PPA) prices are heading below US$30/MWh.

In Texas, energy is a bipartisan industry. There is broad support for the economic and jobs growth that accompanies renewable energy. In the state's electricity sector, gas and renewables are on a relatively even footing from a regulatory and subsidy perspective.

The point is, in Texas the market lets energy companies succeed or fail based on whether they can make it on their own. And even as the oil and gas industry has suffered a catastrophic collapse in the wake of COVID, renewables continue to grow.

Path To a Competitive Market

Texas began de-regulating its electricity markets in the late 1990s, breaking apart former monopolies into separate companies for generation, transmission, and retail sales.[9] Under the old rules, local utilities typically sourced power from nearby generators, but the new system allowed electricity retailers to buy power from wherever it was cheapest. This put new strains on the state's power grid but also created powerful incentives for retail electricity providers to seek out the lowest-cost supplies of power.

Deregulation spawned a vigorous debate over whether cost savings are actually passed onto consumers after independent analysts found that regions of the state that opted out of deregulation had lower retail electricity prices.[10] Nonetheless, as of mid-2020, Texas had the 9th lowest overall electricity prices among the 50 U.S. states.[11] And since their mid-2008 peak, retail electricity prices in Texas declined by 28%, even as overall U.S. power prices gradually rose.[12]

Texas benefits not only from abundant sun but also from some of the most robust wind resources[13] in the U.S. With power sources in the state competing on a relatively even economic footing—and with the cost of wind installations falling

[9] Houston Chronicle. Texas' deregulated electricity market, explained. June 2016.
[10] Texas Coalition for Affordable Power. Deregulated Electricity in Texas. March 2014.
[11] EIA. Electric Power Monthly.
[12] EIA. Electricity Data Browser.
[13] Wind Exchange. U.S. Average Annual Wind Speed at 30 Meters.

rapidly over the last decade—Texas quickly transformed itself into a renewable energy powerhouse.

The state now stands as the top wind-power generator in the nation, with nearly 3 times as much wind power as the next most wind-friendly state.[14] In fact, if Texas were an independent country, it would now rank 5th in the world in total wind installations, topped only by China, Germany, India, and the U.S. itself.[15]

Texas is the top producer of both oil and gas in the U.S. and has earned a reputation as one of the most pro-fossil fuel states in the country. Yet over the last 15 years, wind and solar have emerged as the fastest-growing power sources in the state's electricity portfolio. Despite phenomenal growth in the state's fossil gas output, gas-fired power has grown only modestly in the state's generation mix, rising from 51% in 2002 to 54% in mid-2020. Over the same period, wind and solar generation grew from nearly nothing to more than one-fifth of the state's total power output, as renewables steadily pushed coal out of the generation mix.[16]

In short Texas, sitting in the heart of America's booming oil and gas industry, has a deregulated electricity market which has forced fossil fuels to compete against renewables on a reasonably level economic playing field—and even absent a price on carbon emissions, renewables are winning handily.

Economics Is the Driver

Why Intervene in the Market?

The Hunter Valley in New South Wales (NSW) is a fossil fuel hub. Recently the Australian Government proposed intervening in the market to fund a gas-fired peaking power station unless the private sector provides a gas solution by April 2021. In addition, the Prime Minister promoted the idea of subsidising the opening up of five new gas fields around the country.

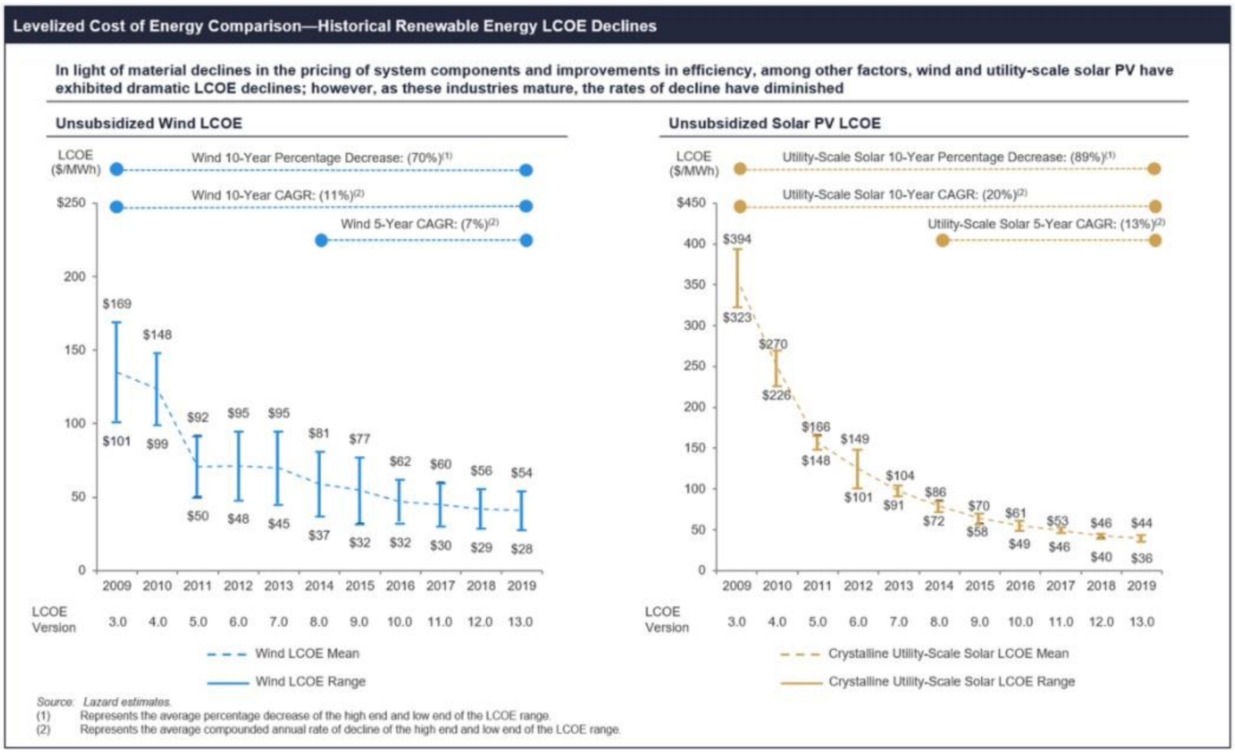
The economic rationale is supposedly to provide internationally competitive energy prices to East Coast heavy industry and to make up for a gap in supply caused by the closure of Liddell Power Station in 2023. With gas prices of over 2.5 times the Henry Hub price, it is hard to see how a gas fired power station can deliver anything like the electricity pricing heavy industry needs in the Hunter Region to be competitive, let alone powering exports like aluminium that increasingly needs to compete with decarbonising international competition. The cost of delivering gas from proposed new fields in Narrabri is estimated to be over A$8;[17] opening up gas fields that have not previously been considered economically viable (and that require more than 200kms of new pipeline for delivery) will need permanent subsidisation.

[14] World Economic Forum. This American state is the 'wild west' of wind power. January 2020.
[15] Wind Energy International. Global Wind Installations.
[16] EIA. Electricity Data Browser.
[17] $6.40 at the well head, according to Santos and an estimated $2 to pipe to customers. Other estimates suggested the cost could be significantly higher: Renew Economy. Santos accused of misrepresenting costs of Narrabri gas in new modelling. 24 August 2020.

At the scale required to supply the Hunter Region's heavy industry (2-3GW), and the cost of equity and debt achievable at that scale with the right kind of offtake commitment, wind and solar is 32% and 40% cheaper, respectively, than gas-fired power (combined cycle) and 76% and 79% cheaper, respectively, than gas peaking generation.[18]

The combination of technology enhancement to improve cost efficiency and scale benefits, solar and wind module production costs will continue to fall, at least in line with the trend over the last ten years (see Figure 2).

Figure 2: Falling Wind and Solar Costs



Source: Lazard Levelized Cost of Energy Analysis version 13.0, November 2019.

Battery storage prices have been falling more rapidly—halving in the last two years—and are predicted to continue to do so as global manufacturing capacity increases and technology improves. BloombergNEF noted in April 2020 that it is "already cheaper to install new-build battery storage than peaking plants."[19] Battery storage has reached a benchmark price of US$150/MWh for 4-hour duration storage. In gas importing countries such as China and Japan, battery storage is now the cheapest form of electricity firming for up to 2-hour duration storage.

This shows that the scale benefits as global production grows. What also should be noted by gas exporters is that in such an environment, market demand for LNG may

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[18] Lazard Levelized Cost of Energy Analysis version 13.0. November 2019.
[19] Energy Storage News. BloombergNEF: 'Already cheaper to install new-build battery storage than peaking plants'. April 2020.

soften. The Henry Hub price collapsed in 2020, fluctuating between US$1.50-2.20 for most of this year, and reaching a year high of US$2.39 at the end of August.[20] The Energy Information Administration (EIA) forecasts that gas consumption in the U.S. will fall in 2020 and 2021.

Investors Are Pivoting Away From Fossil Gas

Elsewhere in the U.S., Con Edison has announced it will no longer invest in long-haul fossil gas pipelines and may sell its existing portfolio. It will, instead, adopt alternative energy technology.

> *"I don't expect we'll be making any further investments in those types of gas transmission assets [pipeline and storage],"* CEO John McAvoy said during an August 26 investor presentation about environmental, social and governance issues.
>
> *"We made those investments five to seven years ago, and at that time we—and frankly many others—viewed natural gas as having a fairly large role in the transition to the clean energy economy,"* McAvoy said. *"That view has largely changed, and natural gas, while it can provide emissions reductions, is no longer... part of the longer-term view."*

As highlighted in an IEEFA report[21] published July 2020, U.S. utilities are "skipping the gas bridge." Tucson Electric Power (TEP) will replace all of its coal-fired power stations (by 2031) and is investing in 2,457MW of solar and wind generation and 1,400MW of battery storage. The company announcement stated: "TEP's Preferred Portfolio does not include the addition of any fossil-fuel resources."

Two other utilities, Colorado Springs Utilities and NextEra's Florida Power & Light made similar announcements. NextEra, now a leading clean power provider, has announced it will invest US$1bn in battery storage in 2021 in addition to adding 5.5GW of solar and wind generation during 2020-21.[22]

NextEra, which recently overtook ExxonMobil as the most valuable energy company in the U.S, has outperformed the stock market. By comparison, Texas-based EOG Resources, known as the 'Apple of oil' for its use of the latest technology in its shale fields, has seen its share price more than halve in value over the same period, highlighting the ongoing underperformance of fossil fuel companies.

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[20] US Energy Information Administration. Short-term Energy Outlook. 9 September 2020.
[21] IEEFA. Utilities are now skipping the gas 'bridge' in transition from coal to renewables. 1 July 2020.
[22] Greentech Media. NextEra Looks to Spend $1B on Energy Storage in 2021. 22 April 2020.

Figure 3: Share Performance of NextEra v EOG Resources

IEEFA has documented many issues arising from the industry claim that gas is a transition fuel and a "cleaner" fossil fuel in its report, Is the Gas Industry Facing its Volkswagen Moment?[23] Leaving aside recorded emissions showing that in the short term, methane is far worse for the climate than coal, the economics alone don't support fossil gas as a transition fuel.

Gas is not necessary for firming—at the rate battery prices are falling, large scale battery storage already makes more financial sense than gas-fired power. Further, no gas investor will make the returns the Hornsdale battery in South Australia is generating. And more will follow. AGL has plans for a battery five times the size of the "Big Tesla" battery to provide firming for Newcastle in NSW.

The Economic Path

The Australian Government Is Skewing the Market

Left to market economics, Australian renewables would grow, and gas would wane.

The Australian Government's argument that gas is needed in the long term for heavy industry is specious. For industries where the transition from gas or other fossil fuel energy to electricity is very difficult, green hydrogen produced by renewable energy-powered electrolysis will be very attractive once it reaches scale. A single major gas user like Orica could provide that scale. Hydrogen electrolysis is capital intensive, but because its main input cost is electricity, low-cost renewable electricity would improve its path to commercial viability.

Gas will continue to be a source of energy for heavy industry for many years but, left to the market, investors would *not* back increases in gas investments in Australia.

As Texas shows, the renewables sector and related industries can more than replace jobs lost in oil and gas. More importantly, internationally competitive energy prices

[23] IEEFA. Is the Gas Industry Facing Its Volkswagen Moment? Gas Is More Emissions Intensive Than the Gas Industry's Marketing Arm Suggests. March 2020.

support and attract heavy industry and manufacturing, which is where the bulk of Australia blue collar jobs are.

At the State level, the NSW and Queensland governments have committed to Renewable Energy Zones[24]. The Central West REZ in NSW attracted 27GW of proposals, multiples more project interest than anticipated[25], showing that if the Government is prepared to provide the connections and policy clarity, investment will flow into renewables, even in these difficult COVID times.

Other than protecting gas industry interests, why would the Australian Government intervene in the market? If it wants to support growth in the energy sector, while providing reliable power at low prices, the Government should address network connection issues—and then stand back and let the market do the rest. Like in Texas.

[24]Energy NSW. Renewable Energy Zones; Queensland Government Department of Natural Resources, Mines and Energy. Queensland Renewable Energy Zones. Accessed 30 September 2020.
[25]Renew Economy. NSW first renewable zone attracts stunning 27GW of solar, wind, storage proposals. 23 June 2020.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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