



The Economic Case for Adani To Lead India's Domestic Energy Strategy

A Coal Power Phaseout to Align the Group's ESG Commitments With India's Renewables Future

Executive Summary

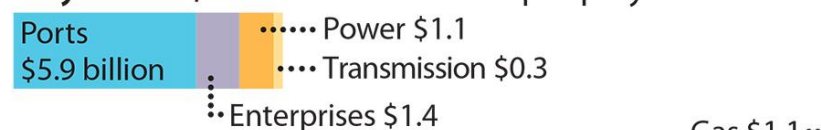
The Adani Group has transformed dramatically over the last five years, with total assets of the now six listed entities collectively exceeding US\$50bn. The Adani family equity stakes have a combined equity value of US\$26bn at current prices, a trebling relative to the US\$8.7bn estimated value back in May 2015 after the deconsolidation of Adani Enterprises Ltd (AEL) was complete.

The composition of the Adani Group has also transformed, with the most valuable stake being in Adani Green Energy (44% of the Adani family equity value total), almost double Adani Ports (23%), whilst Adani Transmission (10%) has likewise had a stellar performance. After a decade of losses, Adani Power (12.4 gigawatts [GW] of coal-fired power generation) is much diminished at just 5% of the total.

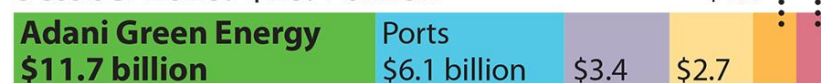
Adani Green Energy Leads Group's Equity Value

Since May 2015, the value of Adani's renewable business has swelled to 44 percent of the Adani Group's total value.

May 2015: \$8.7 billion total Group equity value



October 2020: \$26.4 billion



Source: IEEFA calculations

IEEFA

Adani Green, Adani Ports and Adani Transmission all have significant access and standing in global financial markets (both debt and equity), leveraging an unparalleled financial strength in India the Adani Group is using to full advantage. However, with this comes a significantly higher profile. With environmental, social and governance (ESG) risk evaluation never more prominent in global financial markets, the Adani Group has much to leverage, but also much to lose.

With the Adani Group unable to attract independent debt or equity investors into the Carmichael thermal coal mine and rail proposal in the Galilee Basin, in Queensland, Australia, Adani Ports has just become directly involved in financing and operating the rail haulage works for the globally controversial Carmichael.

IEEFA sees an opportunity for the Adani Group to align and continue to lead India's energy strategy of domestic self-reliance by committing to an orderly coal power phaseout. This would in reality be a commitment to closing coal plants when power purchase agreements (PPAs) expire, knowing the massive ongoing renewables deflation means these coal plants will be unviable and obsolete. Gautam Adani penned a May 2020 op-ed forecasting exactly this outcome, marking a strategic pivot in his thinking, and in November announced a new green hydrogen focus.

As an Indian first, such a commitment would enhance the Adani Group's ESG standings, lower the cost and raise the access to international capital and allow the group to continue to prudently fund its aggressive growth plans. It would also be entirely aligned with – and lead – India's energy strategy, and put Prime Minister Narendra Modi's decarbonisation vision firmly on the global stage.

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1. Introduction

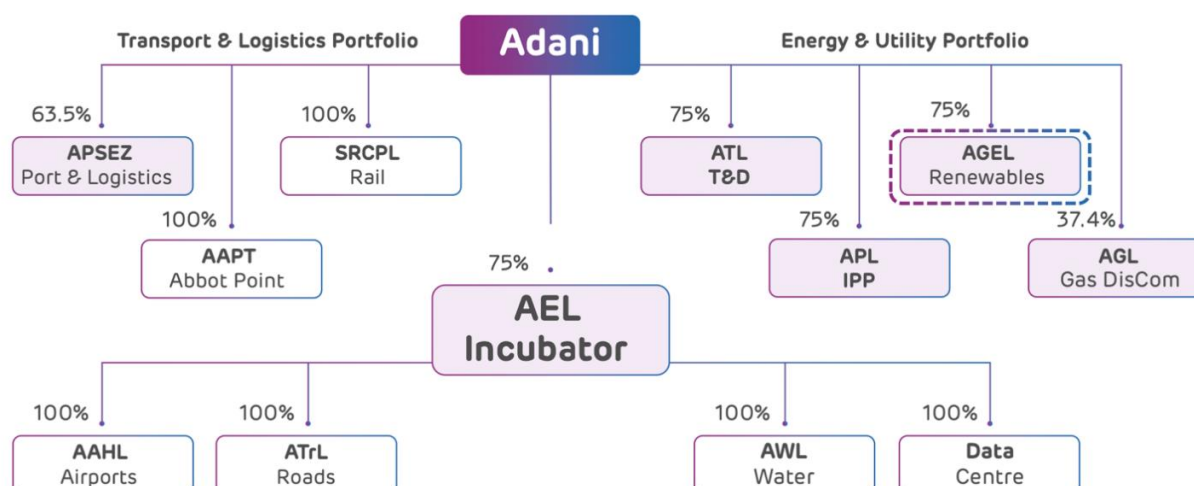
More than any other group in India, the Adani Group has grown dramatically in breadth and depth of business exposures across the country over the last decade.

The Adani Group has six Bombay Stock Exchange (BSE) listed public companies. As detailed in Figure 1 (listed firms are highlighted in purple), these are:

1. Adani Ports & SEZ (APSEZ) – India's largest private port owner;
2. Adani Transmission Limited (ATL) – India's largest private grid transmission and distribution (T&D) company;
3. Adani Green Energy Limited (AGEL) – India's leading renewable energy infrastructure developer, operator and owner (refer Section 2);
4. Adani Power Ltd (APL), owner of 12.4GW of coal-fired power plants;
5. Adani Gas Limited (AGL), a gas pipeline and distribution utility; and
6. Adani Enterprises Limited (AEL).

AEL is described by the Adani Group as their incubator entity, with new business diversifications including airports, toll roads, water and datacentres. AEL also operates the legacy imported-coal trading unit, and thermal coal mining in India. For a decade now AEL has also been trying to develop the controversial Carmichael thermal coal mine and rail proposal in the Galilee Basin, Queensland, Australia.

Figure 1.1: Adani Group Structure



Source: Adani Green Energy Investor Presentation, September 2020.

Note: AEL is also the owner of the Carmichael Coal Mine proposal in the Galilee Basin, Queensland (omitted from the chart).

The private Adani family entity also holds a long lease on the 50 million tonnes per annum (Mtpa) Abbot Point Coal Terminal (APCT) in Queensland. September 2020 saw APSEZ announce it would start a new coal haulage unit to cater for the Carmichael coal mine.¹

The combined equity capitalisation of the six listed Adani companies is a record high US\$38.1bn and the combined enterprise value (equity + debt) totals US\$53bn.²

The Adani Group's gross equity share of its six listed entities has a capitalisation of US\$26.4bn. The Adani Group's share of listed net debt is US\$10.7bn by comparison (Figure 1.2). In addition, the Adani Group does have margin lending against this equity in its private holding company, but this debt value is not disclosed.

Adani Green Energy is now a top 25 listed company in India with a market capitalisation of Rs1,168bn (US\$15.6bn), 50% bigger than the foundation business and original crown jewel of the Adani Group, that being Adani Ports & SEZ Ltd (Adani Ports). Adani Green Energy's success reflects the combination of: the huge investment potential of disruptively low-cost renewable infrastructure in India; access to land and PPAs; Adani's vast political connections; and the group's ability to access virtually unlimited domestic and global debt and equity capital.

Adani Green Energy represents US\$11.7bn or 44% of the Adani Group's total equity share of its six listed entities. Adani Green shares have grown a staggering 2,400% since listing in June 2018 to be one of the best performing shares in Indian history.

Figure 1.2: Adani Group Energy Share of Listed Entities

	Share price Rs	Market Cap. US\$bn	Net Debt US\$bn	Market Cap. Rsbn	Net Debt Rsbn	Adani Group Share holding	Adani Group Equity Share (US\$bn)	Adani Group Share of Equity %	Adani Group Share of Debt (US\$bn)	Adani Group Share of Debt %
@ 5 Oct 2020										
Adani Green Energy	747	15.6	1.8	1,168	134	75.0%	11.7	44%	1.3	13%
Adani Ports	354	9.6	2.7	719	205	63.5%	6.1	23%	1.7	16%
Adani Power	37	1.9	8.0	143	600	75.0%	1.4	5%	6.0	56%
Adani Transmission	247	3.6	0.9	271	66	75.0%	2.7	10%	0.7	6%
Adani Gas	193	2.8	0.0	213	3	37.4%	1.1	4%	0.0	0%
Adani Enterprises	310	4.5	1.3	341	95	75.0%	3.4	13%	1.0	9%
Total		38.1	14.7				26.4	100%	10.7	100%

Source: Adani Group Financial Accounts, IEEFA Calculations.

Adani Ports is US\$6.1bn or 23%. Adani Transmission, spun out and listed from AEL in July 2015, represents US\$2.7bn or 10% of the Adani Group gross equity.

The wealth destruction at Adani Power stands in stark contrast. Adani Power shares were listed in 2009 at Rs100 per share, peaked in 2010 at Rs141 and are now just Rs37, down 63% in just over a decade. The group's coal exposure is the key flaw

¹ ABC. [Adani launches own rail company to haul coal from Carmichael mine](#). 10 September 2020.

² All prices as of 5 October 2020, converted at Rs75/US\$.

undermining the Adani Group's apparently unstoppable rise. Adani Power is down to just 5% of the Adani Group's gross equity exposure in listed entities.

Adani's Strategic Alignment with India's Future

The Adani Group's listed entities have almost 100% of their operating assets invested in India (AEL has one small, underperforming thermal coal export mine in Indonesia).³

The Adani Group has very successfully aligned its investments in support of the strategic interests of the Government of India:

- Adani Power built coal-fired power plants a decade ago when that was a strategic priority, including the largest coal plant in India i.e. the 4.6GW Mundra facility.
- A decade ago Coal India Ltd's inability to sustainably grow domestic coal production saw AEL become the largest procurer of imported coal into India. Today AEL is also the largest private coal mine operator in India. AEL also acquired in 2010 the Carmichael coal mine proposal (a decade and A\$2bn later, this mine is still far from producing a single tonne of coal). However, the Indian government's more recently stated desire to reduce reliance on thermal coal imports has left the Carmichael proposal out-of-step with India's energy strategy, particularly with the government now looking to private Indian firms like AEL to develop domestic Indian coal mines.
- Adani Ports started with a single port at Mundra, Gujarat and is now the country's largest port operator, owning 10 ports across India (with two more under construction) of 490Mtpa capacity, a dominant infrastructure portfolio enabling the import and export of key commodities and goods.
- Adani's commitment to build an additional 2GW of Indian solar module manufacturing capacity under the 'AtmaNirbhar Bharat Abhiyan' (Self-Reliant India program), having already built a 1.2GW module factory at Mundra, Gujarat in 2017.⁴
- Adani Green Energy was created when Prime Minister Narendra Modi committed to build 175GW of renewables by 2022 under the Paris Agreement, and it is now the second largest owner / operator of renewable assets in India (rated by installed capacity).
- Building out and modernising the capacity of India's national grid has been, and remains, a key priority for India's 100% electrification target. The Adani Group started ATL, which is now the largest and most successful private grid transmission and distribution (T&D) group in the country.

³ The private family Adani Group owns the 50Mtpa Abbot Point Coal Terminal and the [65MW Rugby Run solar project](#) in Queensland.

⁴ Economic Times. [Adani Green wins world's largest solar bid worth \\$6 billion](#). 9 June 2020.

- The Government of India set a target to diversify India's energy reliance by doubling fossil gas to 15%. Adani Gas was created, and five years later is India's largest private gas distribution company.
- India's economy has grown for a decade as a global hub for the IT sector, and in 2020 Adani has set its sights on being one of the major providers of datacentres across India.
- At least prior to COVID-19, domestic and international passenger travel was a key growth sector for India, requiring ongoing investment to build out capacity. In 2019 AEL acquired the rights to six airports across the country.⁵
- Green hydrogen and associated downstream manufacturing (like green ammonia fertiliser) is a potentially massive new energy investment field, and India is well placed to be a world leader. In November 2020 Adani announced a strategic collaboration with Snam of Italy to pursue this.

While fully acknowledging and endorsing the 'Common but Differentiated Responsibilities' principle of the Paris Climate Agreement, IEEFA sees India as holding one of the global keys to the success – or failure – of this global treaty.

Fortunately for India, and the world, the economics of renewable energy are now entirely aligned with the capacity and domestic resources of the country.

And the economics of renewable energy, batteries, electric vehicles and green hydrogen are all on a mutually reinforcing path of ongoing profound cost reductions that will make energy even lower cost and more sustainable as this coming decade unfolds.

It is entirely economically rational for India to stand alongside the European Union, China, Japan, South Korea and now (again) the U.S. united on global climate action.

For India, this means accelerating the deployment of domestic renewable energy investment and electrification strategies. This serves multiple objectives: improving India's energy security by reducing reliance on expensive imported fossil fuels; driving new investment and employment to stimulate sustainable economic growth post COVID-19; driving deflation by introducing low cost, domestic renewable energy; starting to address India's chronic and unsustainably bad air and water pollution; and driving decarbonisation of energy and industry.

IEEFA would argue that it is also entirely economically rational for the Adani Group to take a national leadership position and accelerate investment aligned with India's sustainable economic growth. This means more investment in renewable energy and more investment in solar and battery manufacturing as well as grid T&D. And in order to accelerate India's progress on a sustainable low-cost energy trajectory, the Adani Group should commit to a progressive coal-plant closure program.

⁵ Hindustan Times. [Adani Group set to begin airport operations in 3 new cities, including Ahmedabad](#). 23 October 2020

2. Adani Green: India's Largest Energy Company

Adani Green Energy's share price has surged over 2020, doubling and then doubling again (Figure 2.1). The 2,400% rise since its 2018 IPO has given it a market capitalisation of Rs1.17 trillion (US\$15.6bn), 40% more than NTPC Ltd at Rs839bn (US\$11.2bn). Adani Green is now the largest listed energy company in India.⁶

This valuation is a perfect reflection of the pivotal nature of the energy-system disruption: Adani Green Energy has just 2.8GW of capacity operational (and with an equity share of operational capacity of just 1.7GW, given Total of France owns a 1.1GW equity share⁷), as against NTPC Ltd, a firm with 62.9GW of energy capacity, 22 times as much.

Adani Green's market capitalisation of US\$15.6bn is 40% above NTPC, a firm with 22 times as much capacity.

Adani Green's success reflects the combination of: the huge investment potential of disruptively low cost renewable infrastructure in India; Adani's vast political connections giving favourable regulatory and bidding outcomes; and the group's ability to access virtually unlimited domestic and global debt and equity capital.

Figure 2.1: Adani Green Energy Share Price: 2018-2020



Source: Yahoo.

⁶ Adani Green Energy is largest listed energy company in India.

⁷ Total press release. Total expands its partnership with Adani to renewables and acquires 50% of a 2 GW solar portfolio. 6 February 2020.

Adani Green Energy's Leading Indian Renewables Profile

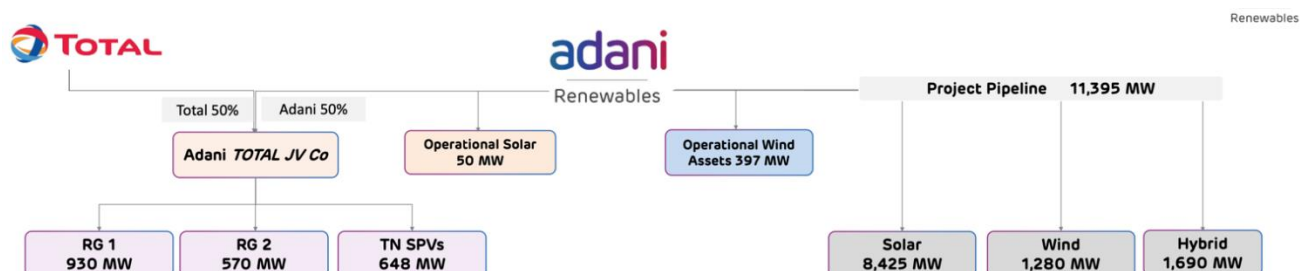
Adani Green Energy in substance was created just five years ago (in 2015 Adani had only 40MW of solar operational), and spun out of AEL and listed in June 2018. It has grown both organically and by acquisition to now operate 2.6GW_{AC} of renewable energy assets across India with a further 11.4GW pipeline of projects in planning and development. The company aims to achieve 25GW of renewable power by 2025.

The 2.6GW portfolio is all in India, with an average tariff of Rs3.24/kWh. While this is materially higher than the Rs2.50-2.70/kWh averaged for new Indian solar contracts over 2018-2020, it includes the landmark 648MW_{AC} Kamuthi, Tamil Nadu solar project (at the time of commissioning in 2016, it was the largest solar project in the world, and it holds a Rs5.98/kWh average legacy tariff). Nonetheless, even Adani Green's average tariff on historic contracts is well below the Rs3.60/kWh average power purchase cost in India, reflective of expensive thermal power contracts that mostly range from Rs3-5/kWh.

Adani Green Energy's portfolio is 74% solar, 12% wind and 14% wind-solar hybrid. 100% of the revenues are contracted under 25-year power purchase agreements (PPAs), of which 79% have the Government of India as counterparty, with another 14% secured by state discoms. The average solar capacity utilisation rate was 23% (on an AC basis [18.2% on a DC basis]⁸).

As of March 2020 Adani Green has US\$1.8bn net debt, with an average loan tenor of 10.9 years carrying an average interest rate of 10.4% p.a., backed by an investment grade rating (BBB-). In December 2019 Adani Green raised US\$362m of US\$-denominated 20-year global bonds (with an average tenor of 13.5 years).

Figure 2.2: Adani Green Renewables Portfolio



Source: *Adani Green Energy Investor Presentation*, September 2020.

Note: RG 1 & 2 are solar project groupings, and TN SPVs = Tamil Nadu Special Purpose Vehicles

Adani Green reports it has committed to Science Based Targets initiative (SBTi), is a supporter of Task Force on Climate-related Financial Disclosures (TCFD) and is a signatory to UN Global Compact (UNGC) and is committed to a strong governance framework with documented policies and rigorous audit process (refer Section 7).⁹

⁸ For consistency, all further references to solar capacities are on an AC basis.

⁹ *Adani Green Energy Investor Presentation*. September 2020.

2020 Has Been a Landmark Year for Adani Green

February 2020 saw Total invest Rs3,707 crore (US\$500m) to secure a 50% share of 2.15GW of operating renewable energy projects owned by Adani Green Energy.¹⁰ Total has the right to co-invest in additional Adani Green Energy developments.

March 2020 saw Adani Green Energy's operating capacity reach 2,395MW, with the commissioning of 375MW during fiscal year (FY) 2020. Another 150MW of operational wind farms were under acquisition from Inox Wind.

May 2020 saw Adani Green Energy win a 600MW wind-solar hybrid renewables tender at a tariff of Rs2.69/kWh to be established in Rajasthan.¹¹

June 2020 saw Adani Green Energy win a 8GW solar bid from Solar Energy Corporation of India (SECI) with a premium 25-year PPA of Rs2.92/kWh (at a time when standard solar projects were being regularly awarded by SECI at Rs2.60/kWh), tied to Adani's commitment to build 2GW of Indian solar module manufacturing capacity under the 'AtmaNirbhar Bharat Abhiyan' (Self-Reliant India program).¹²

June 2020 saw Adani Solar recognised as the top performer in PVEL's annual PV Module Reliability Scorecard for the third year in row.¹³

September 2020 saw Adani Green announce it had a US\$1.8bn revolving construction debt facility under development with 10 international banks for renewable energy construction projects in India.

Prime Minister Narendra Modi's election in 2014 marked the beginnings of an Indian energy system transformation.

October 2020 saw Adani Green complete the acquisition of 205MW of solar projects from Essel Group in October 2020.¹⁴ As a confirmation of Adani Green's ability to access global debt and equity capital, the firm on-sold a 50% equity stake in these projects to Total.

October 2020 saw Adani Green reach a market capitalisation of over US\$15bn, becoming the largest Indian power company on this measure.

¹⁰ Total Press Release. [India: Total expands its partnership with Adani to renewables and acquires 50% of a 2 GW solar portfolio](#). 6 February 2020.

¹¹ Mercom India. [CERC Approves a Tariff of ₹2.69/kWh for Adani's 600 MW of ISTS Solar-Wind Hybrid Projects](#). 26 May 2020.

¹² Economic Times. [Adani Green wins world's largest solar bid worth \\$6 billion](#). 9 June 2020.

¹³ Adani Solar. [It's a hat-trick - Adani Solar wins top performer at PVEL PQP awards for 3rd consecutive year](#). 8 June 2020.

¹⁴ PV Magazine. [Adani Green completes acquisition of 205 MW operating solar assets from Essel](#). 1 October 2020.

India's World Leading Energy Transformation

Prime Minister Narendra Modi's election in 2014 marked the beginnings of an Indian energy system transformation. The embracing of the opportunities of transparent, reverse auction renewable energy tenders, the commitment to 100% electrification (both in terms of expanding the grid to the entire population, and transportation electrification to reduce reliance on oil imports) and the government endorsement of the Supreme Court's rescinding of illegal private coal deposit allocations in 2014¹⁵ combined to mark a dramatic shift in India's energy direction.

Prime Minister Modi has set a very ambitious renewable energy target of 450GW by FY2030, or 510GW including large-scale hydro-electricity, building on India's Nationally Determined Contribution (NDC) Paris target of 175GW by 2022.¹⁶ IEEFA notes that the premise of this forecast was economic growth of 7-8% and electricity demand growth of 6-7% annually.

However, like all forecasts, these have been superseded by changing circumstances. Indian electricity demand grew just 0.5% in FY2020 and in the first half of FY2021 is down 11.1% year-on-year (yoy). Within this, coal-fired power generation is down 15.7% in the first half of FY2021 (Figure 2.3), putting the country on track for the fifth consecutive year of falling average coal plant utilisation rates, from a peak of 58% in FY2016 to an unsustainably low 51% average in the first half of FY2021.

The first half of FY2021 also marked a record high 11.2% share from renewable energy (27.4% share including large-scale hydro), up from 10.6% the previous corresponding period (24.9% including hydro).

While still the dominant, expensive, highly polluting legacy electricity fuel source, coal-fired power generation hit a decade-low 65.4% share, down from over 75% just four years earlier. As a key stranded asset risk, we note 100% of the national electricity demand destruction during COVID-19 was worn by coal power plants.

Figure 2.3: India's Electricity Generation in 1H FY2021 vs 1H FY2020

MWh	1H FY2021	1H FY2020	Change yoy	1H FY2021 share %	1H FY2020 share %
Renewable Energy (RES)	70,335	74,350	-5.4%	11.2%	10.6%
Nuclear	19,040	19,488	-2.3%	3.0%	2.8%
Hydro	101,312	101,009	0.3%	16.2%	14.4%
Gas, Naptha and Diesel	25,687	23,183	10.8%	4.1%	3.3%
Coal & Lignite	409,424	485,675	-15.7%	65.4%	69.0%
Total Generation	625,798	703,705	-11.1%	100.0%	100.0%

Source: *CarbonCopy*, IEEFA Calculations.

¹⁵ The Hindu. [Supreme Court quashes allocation of 214 coal blocks](#). 24 September 2014.

¹⁶ The Economic Times. [Clean energy capacity: India to have 60% renewable energy by 2030, says power minister](#). 21 July 2020.

IEEFA models India's electricity-sector transformation over the coming decade (Figure 2.4). We assume electricity demand picks up 5.0-5.5% annually from FY2022, mirroring a recovery in GDP to 6.0% annually in this period. We assume AT&C losses are progressively wound back to 14.3% by FY2030 (vs 18.8% in FY2020) as India introduces a smart, two-way flow electricity grid.

On the generation front, IEEFA models 21-22GW annually of renewable energy installs over the coming decade (noting this is almost half the aspirational run rate of the Indian government).

IEEFA also forecasts the rebuild of India's existing stranded 'baseload' gas-fired power plants as flexible, on-demand peaking power plants, with the scope to blend in green hydrogen with fossil gas becoming commercially viable by the end of this coming decade as peaking-power tariffs are introduced.

Despite optimistic government forecasts, IEEFA notes the buildout of large-scale hydro-electricity and nuclear consistently run at a fraction of the expected rates, and we assume this trend will continue.

IEEFA sees India's 'One Sun, One World, One Grid' initiative as being progressively ramped up, facilitating hydro imports for peaking supply from Bhutan and Nepal, along with green electricity exports to Bangladesh and beyond (refer Section 5).¹⁷

IEEFA assumes the completion of 40-50GW of under-construction coal-fired power plants (mostly by NTPC) offsetting the closure of 3GW annually of end-of-life coal-fired power plants as emissions-control regulations kick in. This leaves the average coal plant running in a semi-firm peaking role averaging a 54.8% utilisation rate.

Figure 2.4: India's Potential Electricity Sector in FY2030

	---- Capacity ----		-- Generation --		Capacity	Increase
	GW	%	TWh	%	Utilisation	GW vs FY20
Coal-fired	220.0	35.9%	1,055.9	52.8%	54.8%	14.8
Gas-fired peakers	28.0	4.6%	49.1	2.5%	20.0%	3.1
Diesel-fired	0.0	0.0%	0.0	0.0%	0.0%	-0.5
Large Hydro	53.0	8.6%	157.9	7.9%	34.0%	7.3
Nuclear	12.0	2.0%	78.7	3.9%	75.0%	5.2
Renewables	300.0	48.9%	643.5	32.2%	24.5%	213.1
Bhutan/Nepal/Bangladesh (net)	n.a.	n.a.	14.8	0.7%		
Total	613.0	100.0%	2,000.0	100.0%		243.0
Battery Storage	30.0					
Captive thermal power	55.0					
Total	668.0					

Source: Central Electricity Authority (CEA), IEEFA estimates.

¹⁷ IEEFA India: Prime Minister Narendra Modi's new 'One Sun One World One Grid' vision positive. 12 June 2020.

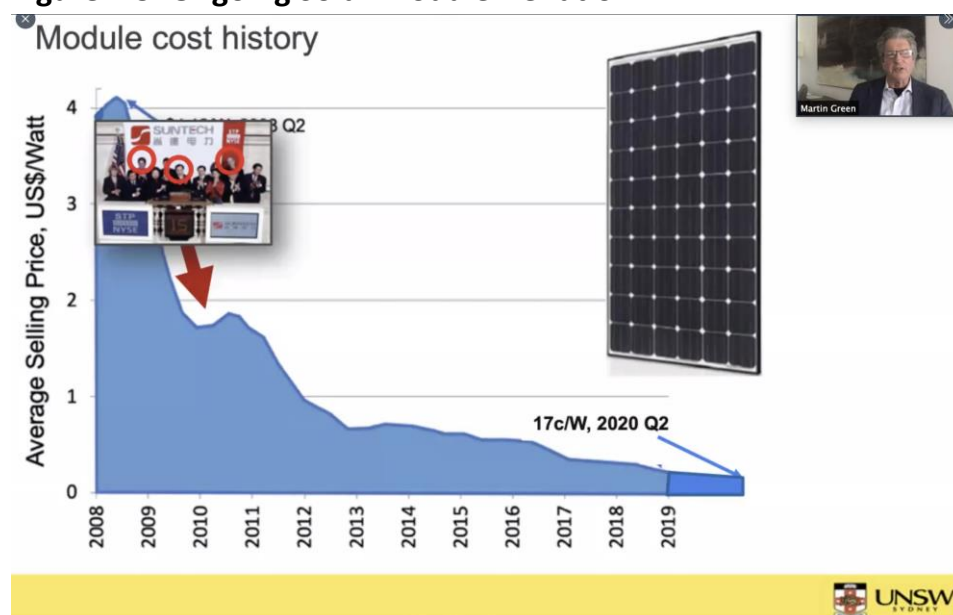
The Domination of Domestic Renewable Energy in India

Despite the setbacks in installation rates over the last three years, it is quite foreseeable that our model assumptions for renewable installs prove entirely conservative at 22-23GW annually for the nine years to FY2030, with India reaching an estimated 300GW of cumulative capacity (353GW including large hydro), and representing over 90% of net new capacity additions this coming decade.

IEEFA expects Indian solar tariffs to decline by 5-10% annually from the most recent record low set in June 2020 of Rs2.36/kWh (with zero escalation contracted in for the full 25-year term).¹⁸ This will be driven by continued technology improvements and manufacturing scale benefits for modules (as outlined by [Swanson's Law](#), similar to Morse's Law for semiconductors), plus similar gains in associated componentry and balance-of-system costs. IEEFA expects the introduction of bi-facial modules of ever larger size, plus tracking will enhance the capacity utilisation rate of solar from the current 19% to 24-25% by FY2030.

Solar module prices have declined by 96% over the last 12 years (Figure 2.5).

Figure 2.5: Ongoing Solar Module Deflation



Source: Dr Martin Green, University of NSW.

China's new solar factories have triple the capacity of factories built only 2-4 years ago, and China's total capacity could double in the next two years alone.¹⁹ The first half of 2020 saw China commit to US\$17bn for an unprecedented 111GW of new cell

¹⁸ Economic Times. [India achieves historic low solar tariff of Rs 2.36 per kWh for 2-GW ISTS tender](#). 30 June 2020.

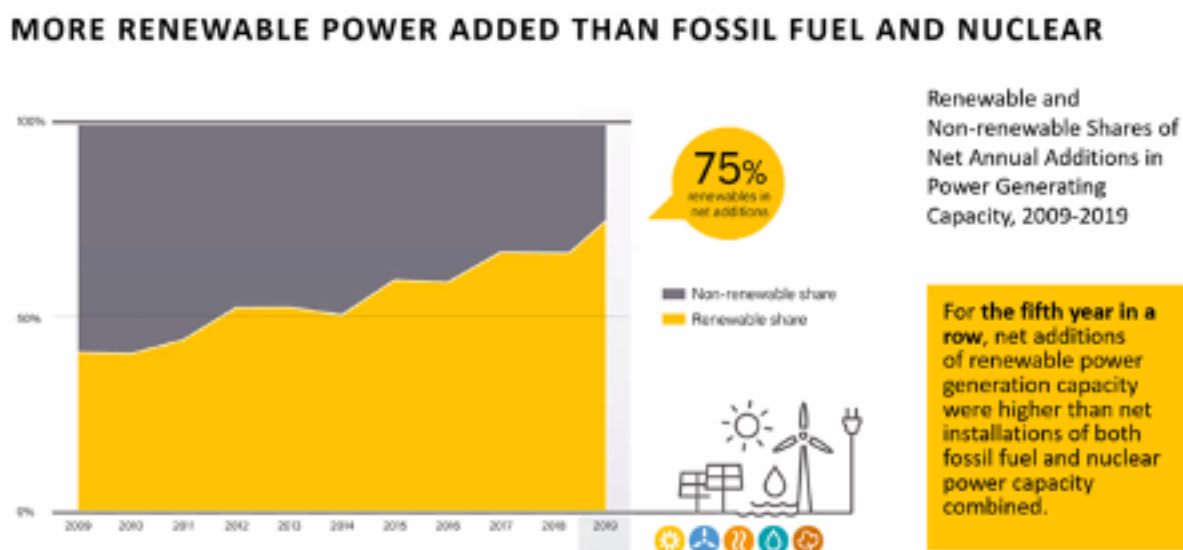
¹⁹ Bloomberg. [The solar-powered future is being assembled in China](#). 15 September 2020.

and 104GW of new module manufacturing capacity. If delivered, this would double global solar manufacturing capacity by one country in just six months.²⁰

We see increasingly widespread recognition of this thinking – an inevitable ongoing dominance of new investment going into ever-lower cost domestic renewables in India, with this trend being replicated across the world in the coming decade.

As detailed in Figure 2.5, the acceleration of coal plant closures in Europe and the US in recent years meant that 75% of *net* electricity capacity additions globally were in renewable energy in 2019, a decade-high share and well on the way to 100% and then beyond in the coming decade.

Figure 2.6: Renewable Energy is the Dominant Global Investment Destination



Source: IRENA.

This report notes what IEEFA sees as a strategic pivot in thinking in the Adani Group in 2020. In May 2020 Adani Group founder Gautam Adani hammered home this point:

“... a recent MIT research paper notes that the price of solar modules has dropped 99% over the past 40 years. Given what I see, I expect prices to drop by an additional 99% over the next 40 years – probably reducing the marginal cost of electricity to zero. Such a reduction, in turn, will mean the coexistence of two business models – one based on fossil fuels and the other driven by renewables – both supplementing each other in the near future but the pendulum swinging decidedly in favour of renewables in the long-term.”²¹

²⁰ PV Magazine. [The visible hand heralds a new dawn](#). 3 October 2020.

²¹ LinkedIn, Gautam Adani. [The green energy acceleration in the post Covid world](#). 28 May 2020.

This in turn saw the Adani Group Chief Financial Officer Jugeshinder Singh in August 2020 say that thermal coal mining would play a significantly reduced role in the Adani Group as a support function to Adani Power:²²

“Coal-related and mining-related businesses are becoming an increasingly insignificant part of the group’s portfolio. Carmichael rather than being a mining business is now a support business for Adani Power.”

The collapse in value of fossil fuel ‘assets’ (like Peabody Energy, Whitehaven Coal, Duke Energy, ExxonMobil (refer Annexes 1 & 2)) and massive ongoing rerating of renewable energy leaders (like NextEra Energy and Orsted) has accelerated in 2020.

Financial markets in India are clearly replicating this global trend: Adani Power has halved while Adani Green Energy has quadrupled in value in 2020 to date.

The virtually unlimited potential of solar power was evidenced in the Indian government’s September 2020 announcement of a 41.5GW hybrid renewable energy park at Kutch in Gujarat covering 60,000 hectares).²³ This would be a twenty-fold expansion. The largest two operational solar projects in the world today are the 2.25GW Bhadla solar park in neighbouring Rajasthan²⁴ and the 2.2GW solar-plus-storage park in Qinghai province, China, owned by Huanghe Hydropower Development.²⁵

**Adani Power has halved
while Adani Green Energy
has quadrupled in value
in 2020 to date.**

For onshore wind power, IEEFA expects installs to more than double to reach 90GW by FY2030. Given wind is a more mature technology, the rate of tariff decline is expected to be limited from India’s already world record lows. But IEEFA does expect an ongoing technology improvement, combined with a ‘repowering’ of end-of-life antiquated wind turbines with dramatically larger, more efficient new designs (replacing 0.2-0.3MW turbines with new 3.0-4.0MW designs giving a tenfold increase in windfarm capacity even with fewer turbines), taking average capacity utilisation rates from 20% in FY2020 to an estimated 26% by FY2030 (despite the significant monsoonal / seasonal lulls India experiences).

IEEFA expects offshore wind to start to play an increasingly important role in semi-firm power capacity additions from 2030, starting in Gujarat and Tamil Nadu.

²² Reuters. [India's Adani not interested in domestic coal mine auctions – CFO](#). 7 August 2020.

²³ Saur Energy. [Proposal for 41.5 GW Hybrid Renewable Park in Kutch Approved](#). 10 September 2020.

²⁴ IEEFA India: [World-leading solar parks kick-start India’s dynamic clean energy transition](#). 13 May 2020.

²⁵ PV Magazine. [World’s largest solar plant goes online in China](#). 1 October 2020.

Who Would Still Fund a New Coal Plant in India?

Indian solar auctions, backed by SECI and NTPC Ltd counterparties, in 2020 have regularly seen tariffs of just Rs2.36-2.60/kWh (US\$31-35//MWh). Taking into account the zero indexation contracted for the full 25-year term, this translates into an Indian solar levelised cost of energy (LCOE) to discoms of below US\$20/MWh.

There is not a new minemouth coal-fired power plant in the world that can deliver a commercial tariff able to compete with solar costs in leading renewables states in India today, particularly if there are no government export credit agency (ECA) capital subsidies available (some 90% of all coal-fired power plants proposed in Asia over the last decade were backed by ECA subsidised government finance).

We note that Adani's proposed Godda import coal-fired power plant in Jharkhand has a likely contracted tariff of well over double this renewables rate. And even then, Godda was unable to secure any private-sector financing, and was only able to proceed to financial close due to a lifeline from the state-owned Power Finance Corporation (PFC),²⁶ combined with a gift from the Modi Government of a permanent 'Special Economic Zone' tax subsidy worth an estimated US\$1bn to the Adani Group in terms of the exemption from import duties, the Rs400/t coal cess, GST and corporate tax.²⁷

This trend away from loss-making thermal power plants has been clearly underway for some time. FY2018 saw a net capacity expansion of thermal power plants across India of just 5.0GW, down 75% from the 20.5GW installed just two years earlier. FY2019 saw a further 35% decline to just 3.5GW of net new thermal capacity adds, albeit with a slight recovery to 4.4GW in FY2020.

One of the strongest signals came in April 2019 from Tata Power, declaring it would never again build a new coal-fired power plant and committing to a pivot to renewable-energy investing.²⁸ Tata Power is one of the leading tender winners for new solar infrastructure in 2020, having secured close to 1GW of new proposals. October 2020 saw Reliance Group has likewise flagged a shift to renewables.²⁹

September 2020 saw the majority state-owned NTPC announce it will stop pursuing new greenfield coal-fired power projects and release land acquired for this purpose as part of an ongoing strategic shift to build 30GW of renewable energy by 2032 by India's largest thermal power generation company.³⁰ Back in August 2019, NTPC announced plans to set up a 5GW ultra-mega industrial solar park in Kutch, Gujarat, with an investment of Rs20,000 crore (US\$2.7bn).³¹

²⁶ IEEFA. [IEEFA report: Is India's PFC financing a herd of white elephants?](#) 7 May 2020.

²⁷ Scroll.in. [In final days of Modi government, Adani project in Jharkhand becomes India's first power sector SEZ.](#) 25 March 2019.

²⁸ Economic Times. [Tata Power to focus on clean energy, won't build new coal-fired plants: Report.](#) 23 April 2019.

²⁹ Reuters. [Reliance says India will fully shift to renewables in next few decades.](#) 20 October 2020.

³⁰ Economic Times. [NTPC stops land acquisition for greenfield coal-based power projects,](#) 27 September 2020.

³¹ Saur Energy. [NTPC Planning 5 GW Solar Park in Kutch Worth Rs 20,000 cr.](#) 20 August 2019.

Will Adani Green Lead India Into Green Hydrogen?

One of the key technical issues increasingly facing the Indian energy system is that of grid balancing the exceptionally low-cost but intermittent nature of renewable energy. There is a growing need for flexible power capacity, and a clear time-of-day peaking power price signal is needed to incentivise new investment for on-demand capacity. This is likely to take the form of a combination of hydro-electricity, pumped hydro storage, battery storage and demand response management, lower utilisation rate coal-fired power plants plus fossil and/or green hydrogen gas-fired peakers. India has some 25GW of largely stranded gas-fired power plants, built to be 'baseload' generation capacity but now unviable against lower cost alternatives and given fossil-gas fuel constraints.

In contrast, IEEFA sees a growing value and need for on-demand gas peakers. Whilst delivering electricity at a higher per kWh cost, these purpose-built or reconfigured facilities also provide higher value electricity because it is available on demand to help manage the peak power, particularly into the early evening as solar turns off.

IEEFA sees a huge investment opportunity emerging in green hydrogen globally next decade, and we have identified over 50 pilot proposals as of 2020.³²

In September 2020 IEEFA published our electricity system study on Rajasthan, one of the leading renewable energy states in India.³³ In FY2020 Rajasthan sourced 17.6% of its total electricity generation from variable renewable energy (18.3% including large hydro). The average thermal power tariff in FY2020 was Rs4.20/kWh, and new solar tenders in 2020 have averaged Rs2.50-2.80/kWh, 35% lower than the average (and 45% below the more expensive coal tariffs of Rs4.60/kWh at the JSW Barmer Jalipa Kapurdi and Kota power plants in Rajasthan).

Given that this massive cost advantage for solar will only widen over the coming decade, IEEFA sees variable renewable energy reaching 63% of total generation as soon as FY2030 (and 73% of installed capacity). As a state, Rajasthan is set to move from an electricity importer to a major net electricity exporter. This gives rise to the question of how best to deal with the likely massive spillage of excess solar generation in Rajasthan in the middle of the day, particularly in summer. Given interstate grid capacity limitations, there is likely to be significant curtailment at times of peak solar generation. This is where electrolyzers can play an integral role in ensuring grid stability and reliability.

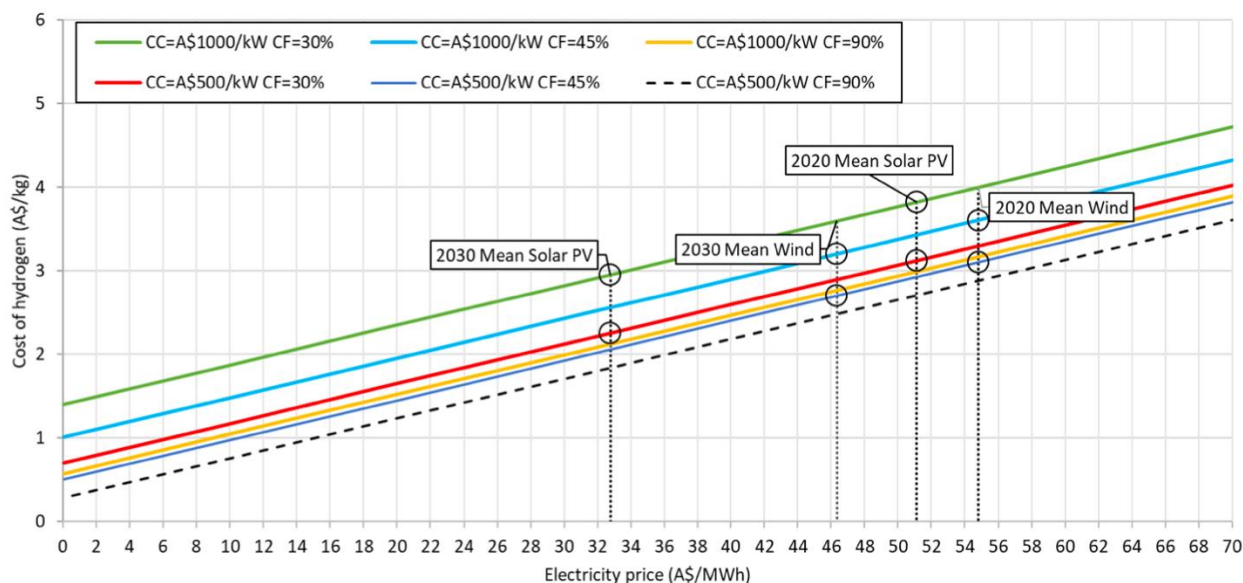
By 2030 we expect the capital cost of electrolyzers to more than halve to US\$350/kW of capacity. This means green hydrogen could well be produced at scale using otherwise spilled or curtailed solar electricity at well below US\$2/kg (Figure 2.7 provides this in A\$ terms). This could be stored and then used to run blended green hydrogen / fossil-gas peakers into the evening peak demand period.

³² IEEFA: 50 new green hydrogen projects show Europe, Australia, Asia are lead players but US\$75 billion in costs and government inaction could create delays. 24 August 2020.

³³ IEEFA India: Renewables-rich Rajasthan has potential to lead India's energy transition. 17 September 2020.

Figure 2.7: Production Costs of Green Hydrogen at Different Electricity Costs, Utilisation Rates and Electrolyser Costs (A\$/kg)

Source: Longden T., Jotzo F., Prasad M. and Andrews, R. (2020), *Green hydrogen production costs*



in *Australia: implications of renewable energy and electrolyser costs*, CCEP Working Paper 20-07, August 2020. Crawford School of Public Policy, The Australian National University.

Note: CC = capital cost, CF = capacity factor

Back in June 2015 Adani Green Energy announced it had inked a joint venture with the Rajasthan government to set up 10GW of solar parks in the state,³⁴ making Adani a leading solar investor / developer in the state, and an ideal partner for India's first commercial-scale green hydrogen project.

October 2020 saw Bloomberg New Energy Finance report that green hydrogen could be US\$1.33/kg within the decade, falling to US\$0.76/kg by 2050, stating: "We think electrolyzers can get much cheaper much sooner than most expect."³⁵

November 2020 saw the Adani Group announce a strategic collaboration with Italy's Snam on exploration and development of the green hydrogen value chain, biogas, biomethane and low-carbon mobility in India, with Adani stating:³⁶

"The ability to simultaneously decentralise and decarbonise energy production and be able to provide clean energy and cooking fuel to rural India is a national need that we must fulfil and technologies that can help economically produce biogas and biomethane are optimal choices."

³⁴ Press release. [Adani Targets Solar Power Capacity Of 10GW](#). 15 June 2015.

³⁵ The Guardian. ['Green hydrogen' from renewables could become cheapest 'transformative fuel' within a decade](#). 3 October 2020.

³⁶ Economic Times. [Adani announces strategic collaboration with Italy's Snam on energy transition](#). 6 November 2020.

3. The Rapid Realignment of the Adani Group

Aligned with the growth of the Indian economy overall, coupled with aggressive financial leverage and astute investment management, the Adani Group has seen an unprecedented wealth accumulation over the last decade, accelerating in the last five years due to the phenomenal value accretion in Adani Green Energy, whose shares have risen 2,400% since listing in mid 2018 (Section 2).

Adani Ports' share price has risen by ~10% over the last five years, but this is offset by the 16% depreciation of the Indian Rupee (Rs63 to the US\$ in May 2015, Rs75/US\$ in October 2020) when viewed in US\$ terms (Figure 3.1). This has seen Adani Ports move from being *the* Adani family crown jewel to playing (a still very strong) second string to the rise and rise of Adani Green.

Adani Green Energy virtually didn't exist in May 2015, and now the Adani family's 75% equity stake is worth US\$11.7bn or 44% of the group's listed equity exposure. Likewise Adani Transmission has risen from a minnow in May 2015 to now represent US\$2.7bn of family wealth (10% of the total).

Despite more than US\$10bn of capital being invested in new power plant investments by Adani Power over the last two decades, the family's equity has been progressively diminished by a decade of substantial, ongoing net losses, to the point where the family proposed delisting this entity – removing the public spotlight on a rare failure in the Adani Group's otherwise ongoing rise. It also probably reflects Adani Power's dramatically reduced access to new debt or equity capital.³⁷

Adani Green, Adani Ports and Adani Transmission are each of serious global investor interest, and as such are materially exposed to the wider Group's ESG standing. A negative rating will increase borrowing costs and diminish investor interest, while a positive effort will benefit the Adani Group, if credible. The move by Adani Ports into directly funding the Carmichael coal project is a new key risk.

Figure 3.1: Adani Family Value of Listed Equities (2015 vs 2020)

	2015 May US\$bn	Share Total %	2020 October US\$bn	Share Total %
Adani Green Energy	n.a.		11.7	44%
Adani Ports	5.9	68%	6.1	23%
Adani Power	1.1	12%	1.4	5%
Adani Transmission	0.3	4%	2.7	10%
Adani Gas	n.a.		1.1	4%
Adani Enterprises	1.4	16%	3.4	13%
Total	8.7		26.4	

Source: IEEFA Calculations.

³⁷ Economic Times. [Adani Power gets shareholders' nod for delisting](#). 24 July 2020.

Peak Thermal Coal Use in India Is Close

It is IEEFA's long held contention that the Adani Group's foray into high ash, low energy (HALE) coal mining in the Galilee is a stranded asset, unbankable and unviable. A decade on, the proposal is almost a decade behind schedule. Having sunk A\$2bn (US\$1.4bn) into this stranded coal and rail proposal, the Carmichael mine delays have materially undermined the A\$2bn initial value of the Adani Abbot Point Coal Terminal (APCT), acquired in June 2011. If it were not for the collateral damage to the Adani APCT (refer Section 6), we are of the view the Adani Group would have walked away from this coal mine proposal some time back (indeed, that Adani Group floated an indicative bid for BHP's Mt Arthur thermal coal mine in the Hunter Valley mid year 2020 could be construed to support this line of thinking³⁸).

As to current Adani Group thinking on Carmichael, the recent comments by Jugeshinder Singh, Adani's CFO that coal mining investment would be restricted to mining services and not commercial coal,³⁹ suggest coal mining is viewed as a necessary support function to the Group's coal-fired power plants.

IEEFA views AEL's bidding for 12 coal deposits in the government's auction as something of a national service, to provide domestic investment and employment in replacing coal imports, given the complete lack of foreign investor interest in coal.⁴⁰

To be clear, while coal-fired power generation is in a steady terminal trajectory in most developed economies, IEEFA does *not* see domestic coal mined in India in absolute terms declining materially this decade. But the market consensus is that on-grid thermal power demand will plateau this coming decade. In contrast, with rising domestic mining capacity, much of India's ~150Mtpa of thermal coal imports are absolutely structurally challenged.

IEEFA does view demand projections for India to double or treble energy use in the next two decades to be massively over-inflated, with demand flat-lining in 2019/20 and declining 11% yoy in 1HFY2020/21 vs consensus forecasts for 6% pa growth (putting demand up to 17% below estimates made only two years earlier⁴¹).

Further, IEEFA does expect the vast majority of incremental demand growth in electricity in India to be met by renewable energy over the coming decade, meaning absolute thermal coal use for electricity generation is close to a peak, or already past its 2019/20 peak. Import replacement still leaves room for domestic coal production nationally to rise 20% in the next 5-6 years without materially exceeding the peak thermal coal use in India reached in 2018/19.

There is no debate within India with the fact that variable renewable energy is the least cost, cleanest source of new electricity supply. There is also a growing

³⁸ IEEFA Report: BHP coal assets worth a billion less than just two years ago. 10 August 2020.

³⁹ Reuters. India's Adani not interested in domestic coal mine auctions – CFO. 7 August 2020.

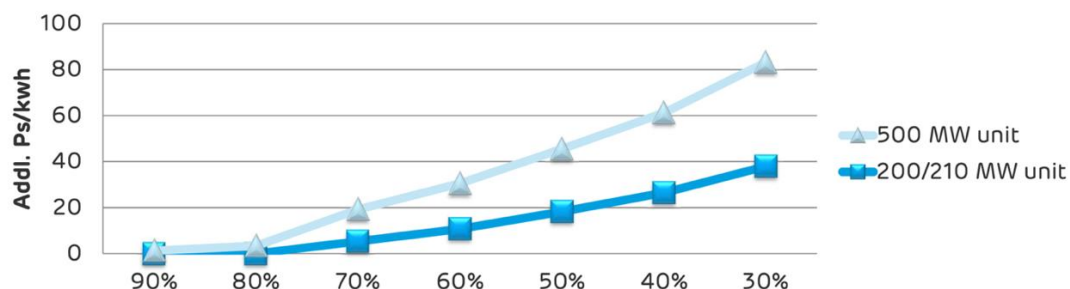
⁴⁰ Scroll.in. Why Adani Group has placed highest number of bids in India's coal mine auctions. 3 November 2020.

⁴¹ TERI. Bending the curve: 2025 forecasts for electricity demand by sector and state in the light of the COVID-19 epidemic. 7 July 2020.

discussion about whether new coal-fired power can be cost-effectively modified to operate flexibly at utilisation rates of 40-50%, thereby using India's existing domestic resources to complement low cost but intermittent renewable energy.

IEEFA contends that a peaking or time-of-day price in India is key, and once provided, new flexible coal plants will prove inferior economic solutions to peaking fossil / hydrogen blended gas plants, batteries, hydro-electricity, interstate and international grid connectivity as well as demand response management. Existing coal plants will maximise their residual value by balancing demand needs against low cost but intermittent renewables. Adani references an additional Rs0.50/kWh tariff (+20% vs the current solar tariff of Rs2.40-2.60/kWh) would compensate for the higher capital cost per kWh and lower thermal efficiency that results from a 40-50% utilisation rate vs the expected 70-80% (Figure 3.2).

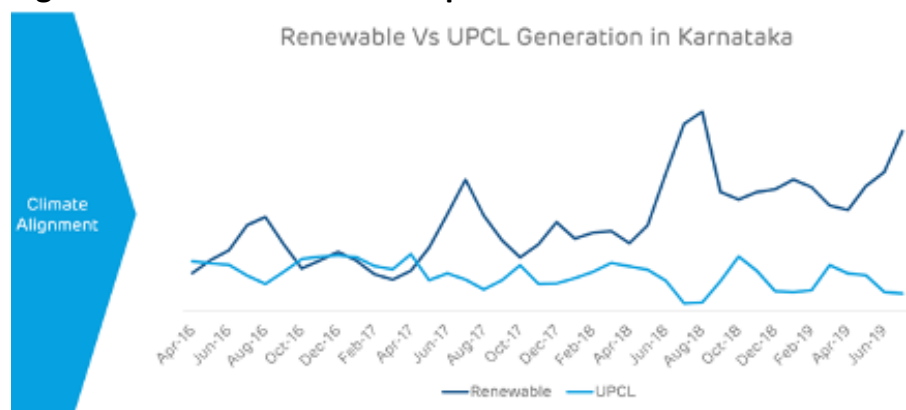
Figure 3.2: Lower Coal Plant Utilisation Raises Unit Costs Materially



Source: Adani Green investor presentation day, CEA, September 2020.

Adani's Udupi import coal plant is doing precisely this in Karnataka, providing an inverted generation pattern to that of renewables, albeit supported by an expensive Rs5.50/kWh tariff that helps cover the high cost of imported coal and the high capital cost per kWh that results from the lower utilisation rate (Figure 3.3).

Figure 3.3: Adani Power's Udupi Generation Profile



Historically, UPCL's generation pattern* follows an inverted relationship with the renewable source generation → enabling renewable generation

Source: Adani Power investor presentation, December 2019.

Adani Could Commit To Coal Power Phaseout

Adani operates 6 coal-fired power plants across India with a combined capacity of 12.4GW (14.0GW if Godda is commissioned). As per Figure 3.4, these plants are backed by long term PPAs that progressively expire over 2035-2045. Many Indian coal power plants have been built with imported and sometimes second-hand Chinese equipment (Mundra, Godda) and with an engineered / construction design life of 25-30 years, consistent with the 30 year life evidenced in China over the last decade, rather than the 40-year life average witnessed by coal plant closures experienced in Australia over the last decade (by comparison).

Given Adani Power has lost money almost every year over the last decade, and Indian electricity prices have been falling in real terms in the last five years, and on IEEFA's expectations for significant further renewable energy deflation this next two decades, it is feasible that Adani Power's coal plants will be entirely uneconomic at the end of their PPA terms given the rapidly declining trajectory of solar tariffs out to 2035-2040.

As such, a commitment by the Adani Group to phase out all coal power generation as PPAs expire would be a major strategic announcement for the group, and a leadership position for India of global significance. Given the rate of technology disruption underway, and likely to accelerate this coming decade, such a globally important pledge might have limited cost to the group, but would dramatically improve the group's brand, and materially allay growing ESG concerns relating to the group's Carmichael involvement. Such a pledge could materially shift the national conversation, but also allow the Adani Group to do a strategic rethink of how best to minimise the climate / financial risks to Adani Ports, AEL, APCT and Adani Green.

Even if the Godda power plant is completed, its 25-year PPA expires in 2047. And by then solar tariffs are likely to be way below Rs1.00/kWh (assuming just 5% annual solar tariff cost reductions by then, half the decline rate evidenced in the last decade), making Godda an expensive and likely stranded asset well before the expiry of its contract with the Bangladesh Power Development Board. Alternatively, the Group could either cancel the proposal, or shift to a domestic profile (Section 5).

Figure 3.4: Adani Power's Generating Capacity Profile

	MW	Technology	Commissioning	PPA Expiry estimated at 25 years	---- Closure ---- 30 years	40 years
Raikheda power station	1,370	SC	2015-2016	2040	2045	2055
Raigarh Energy Generation	600	Subcritical	2015	2040	2045	2055
Mundra Thermal Power Project	4,620	Subcritical/SC	2009-2012	2035	2040	2050
Udupi Power Station	1,200	Subcritical	2010-2011	2036	2041	2051
Tiroda Thermal Power Project	3,300	SC	2012-2014	2038	2043	2053
Kawai Thermal Power Project	1,320	SC	2014	2039	2044	2054
Godda Power Station	1,600	SC	Under construction	2047	2052	2062
Total Operational	12,410					

Source: *Adani Power investor presentation*, September 2020, IEEFA calculations.

A Key Adani Competitive Advantage Is Global Capital Access

The Adani Group has been on an aggressive expansion program on multiple fronts concurrently over the last decade, and has used financial leverage to the maximum possible to fuel this growth.

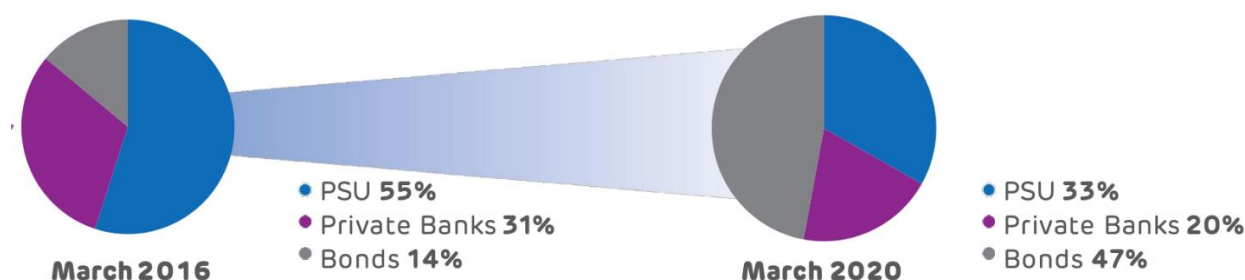
The group is now far more diversified in 2020 than it was a decade ago, with a predominant reliance on regulated or government-backed infrastructure assets (ports, airports, grid transmission, gas transmission, renewable energy).

The Adani Group has leveraged this infrastructure profile to best advantage, tapping into global capital markets at increasing frequency, both in terms of equity and debt.

The US\$760m sale of 37.4% of Adani Gas Ltd to Total in October 2019⁴² followed by the US\$500m sale of 50% of 2.1GW of solar assets to Total in February 2020 has been very astute, leaving the Adani family cashed up as COVID-19 unexpectedly hit soon after, temporarily collapsing global financial market confidence.

The Adani Group has rapidly diversified its debt access, taking global bond markets from 14% of total group borrowings in March 2016 to 47% by March 2020 (Figure 3.5). Given the relatively closed, shallow Indian financial markets, and ongoing Indian financial institutions debacles (IL&FS October 2018,⁴³ PMC Bank,⁴⁴ Yes Bank, March 2020⁴⁵ and Lakshmi Vilas Bank, September 2020⁴⁶), this has proven to be a key strategic strength for the Adani Group. However, with ongoing ESG issues and Globally Significant Financial Institutions (GSFI) increasingly introducing coal exclusion policies, this could prove an Achilles heel (refer Section 4).

Figure 3.5: Adani Group Debt Exposure



Source: *Adani Ports Debt Presentation*, September 2020.

Note: PSU = Public Sector Undertakings

⁴² Adani Gas press release. [TOTAL joins Adani to create India's premier integrated gas utility](#). 14 October 2019.

⁴³ Economic Times. [IL&FS: The crisis that has India in panic mode](#). 3 October 2018.

⁴⁴ Economic Times. [What steps have been taken to help PMC Bank depositors, HC asks RBI](#). 4 November 2019.

⁴⁵ Hero Future Energies press release. [Crisis at YES Bank limits green financing avenues](#). 6 March 2020.

⁴⁶ Bloomberg Quint. [Lakshmi Vilas Bank: A Stitch In Time](#). 22 September 2020.

4. Adani Ports' ESG Ratings Backlash Risk

Adani Ports is a central part of the Adani Group, and a central vehicle for accessing global capital, both debt and equity. Central to this is the independence of Adani Ports as a separate listed entity. This separation was enhanced with the May 2015 restructuring that saw Adani Enterprises Limited deconsolidate its key subsidiaries, spinning off to existing shareholders AEL's shareholding in Adani Ports, Adani Power and Adani Transmission⁴⁷ (this was followed by the subsequent spin-outs and separate listings of each of Adani Green Power and then Adani Gas).

Importantly, this doubled the 'free float' (shares owned by investors other than the Adani family promoter group's combined 63.5%) of Adani Ports to 36.5%. Increased liquidity, size and independence materially improved the global investor interest.

This 'independence' has been occasionally put at risk by related party transactions and undue inter-group financings, at times driving down the share price (once by 8.4% in one day).⁴⁸ Adani Ports has provided legal policies to highlight its independence and integrity, and avoidance of non-arm's length transactions without appropriate independent review.⁴⁹ Adani Ports also provides detailed annual disclosures of related party transactions.

The global investor, insurer and banking backlash against the Adani Group with respect to its globally controversial Carmichael coal mine, rail and port project in the Galilee Basin has built dramatically since the group first acquired this stranded asset back in 2010. The Carmichael proposal has been approved as a HALE export thermal coal mine⁵⁰ with up to 60Mtpa capacity and a life of 60+ years. This proposal is of global concern because it would open up the largest new coal basin in the world to mining (given no infrastructure exists, the development of Carmichael could well enable up to eight other mega-thermal coal mines for export).

Global investor concern has centred on Adani Enterprises, owner of the mine and rail proposal. Adani Ports has been largely uninvolved since investor financing concerns forced the 'divesting' of its 100% shareholding Adani Abbot Point Coal Terminal back in 2013 to private Adani family interests in the Cayman Islands.

Adani Ports Invests in the Galilee Thermal Coal Project

However, after a growing global campaign to ensure no financial institution is involved in this proposal's development, the Adani Group has had to confirm it had been unsuccessful in procuring any investor interest, and so the group had to resort to 'self-financing'. In September 2020 it was revealed that Adani Ports has 'agreed'

⁴⁷ IEEFA Report. [An overview of Adani Enterprises' Corporate Restructuring](#). May 2015.

⁴⁸ LiveMint. [Related-party transactions return to haunt APSEZ shareholders](#). 26 February 2019.

⁴⁹ Adani Ports. [Policy of Related Party Transactions for Acquiring and Sale of Assets](#), accessed 9 October 2020.

⁵⁰ The Carmichael coal deposit is HALE – 'High Ash, Low Energy' – that being 4.950kcal 26% raw ash content thermal coal. It is isolated 400km from the Queensland coastline.

to set up a new Australian subsidiary to undertake rail haulage for Carmichael.⁵¹

That the entity launched branded the 'Bowen Rail Company' and with no reference to its Adani Ports parent, is to IEEFA a clear reflection of the brand damage the Carmichael proposal has done to the wider Adani Group. This entity will use Adani Ports' balance sheet to fund investments – IEEFA estimates this at up to A\$500m (US\$350m) for 27Mtpa of rail haulage capacity – for locomotive and coal wagon purchases, plus associated maintenance facilities and equipment.

October 2020 also saw the rebranding of the private Adani family owned "Adani Abbot Point Coal Terminal Ltd" to "North Queensland Export Terminal Pty Ltd".⁵²

Combined with the ongoing heavy exposure to thermal coal across the entire ports business, this related party transaction and renewed involvement in the Carmichael project should raise significant ESG red-flags for global investors.

Even prior to this new related party disclosure, Adani Ports reports its credit rating as Baa3/BBB-/BBB-, but that its ESG rating was a very low CCC, the worst of its peer group (Figure 4.1), despite generally superior revenue growth and profitability, and equal to lower financial leverage.

Figure 4.1: Adani Ports Credit and ESG Ratings

Name	Credit Rating	ESG Rating
APSEZ**	Baa3/BBB-/BBB-	CCC
Peer 1	Baa1/A-/-	BB
Peer 2	Baa3/-/BBB	BB
Peer 3	Baa1/BBB/-	CCC
Peer 4	Aa1/AA/-	N.A.
Peer 5	A1/A+/-	BB

**APSEZ underlying rating is BBB/Baa2

Source: *Adani Ports Debt Presentation*, September 2020.

While Adani Ports reports its "adherence to global environment guidelines like Disclosure in CDP – Climate Change and Water Security, SBTi; Supporter of TCFD, Member of IUCN" and an optimal Scope 1 carbon intensity, clearly its scope 1-3 carbon emissions intensity is exactly the opposite, given its excessive reliance on thermal coal imports as its second largest revenue source.

⁵¹ ABC. [Adani launches own rail company to haul coal from Carmichael mine](#). 10 September 2020.

⁵² [North Queensland Export Terminal Pty Ltd](#)

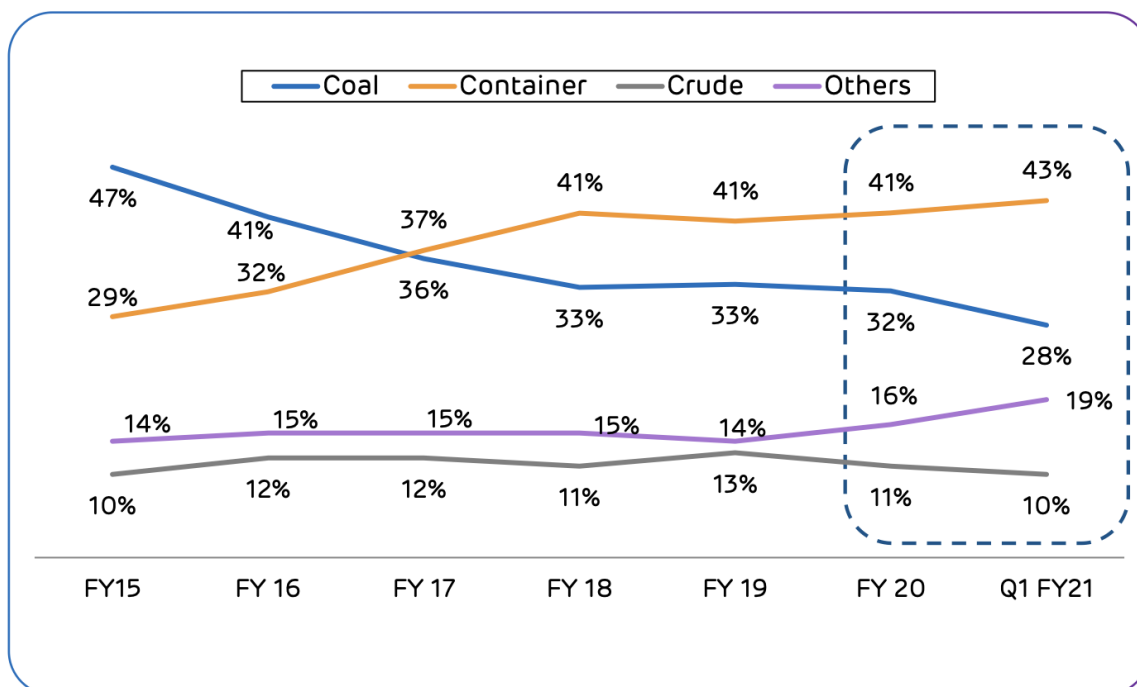
Adani Ports also claims it follows a rigorous audit process, maintains board independence and strict implementation of its related party transactions policy. There is a clear need to match rhetoric with reality if this leading Indian group is to maintain or improve its ESG ratings.

Adani Ports Is Talking of Its Transition Path From Coal

When Adani Ports was founded two decades ago, the Mundra port in the special economic zone (SEZ) was the crown jewel of the Adani Group. Adani Power's 4.6GW Mundra coal-fired power plant was built in the SEZ, leveraging its access to adjacent port facilities to import 15Mtpa of thermal coal. Combined with the imported coal needs of Adani Power's Udupi coal-fired power plant in Karnataka (acquired from the financially distressed Lanco Infratech in 2015), Adani Enterprises Ltd was built into the leading thermal coal import agent in India over the last decade.

Since FY2015, Adani Ports' exposure to coal has been diluted from 47% of total cargoes to a decade low of 28% in 1QFY2021. This is a deliberate strategic realignment, reflecting both the reduced volume of Indian thermal coal imports (Section 8) and ongoing investment to diversify into LNG import and containers, leveraging India's long-term economic growth prospects and the Government of India's stated target to double fossil gas' share of the Indian energy mix to 15%.

Figure 4.2: Adani Ports Cargo Composition (FY15-1QFY21)



Source: *Adani Ports Debt Presentation*, September 2020.

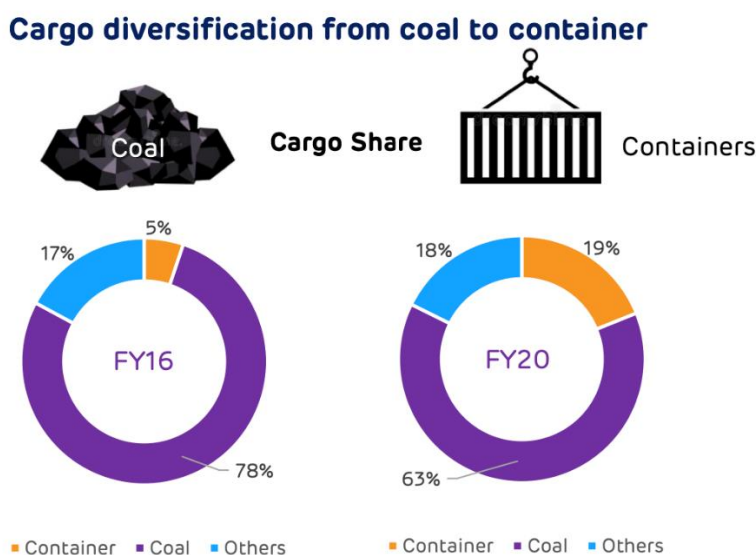
Karan Adani, CEO of Adani Ports, stated in the FY2020 annual report:⁵³

“Considering the Government of India’s major emphasis on domestic coal production and development of enabling infrastructure, long term sustainable EXIM coal volume growth is challenging in India. Besides, considering the enhanced focus on renewable energy due to climate change awareness, a long-term plan for sustainable growth of these fossil fuel commodities would be challenging.”

The acquisition of Krishnapatnam Port by Adani Ports in October 2020 highlights the Adani Ports business continues to expand its aggregate coal handling exposure in absolute terms, with the newly acquired port in Andhra Pradesh generating 63% of its volume throughput in FY2020 from coal imports, a sector strategically challenged if the Government of India is to achieve its object of ceasing discretionary thermal coal imports.

However, Adani Ports acquisition rationale is that they see significant scope to continue to diversify through organic expansion from coal to container volumes (Figure 4.3). Coal volumes at this port were -9% yoy in FY2020. In contrast, container volumes rose 6% yoy in FY2020.

Figure 4.3: Adani Ports Looks To Diversify Its Excessive Coal Profile



Source: Adani Ports Krishnapatnam Port Transformational Acquisition, October 2020.

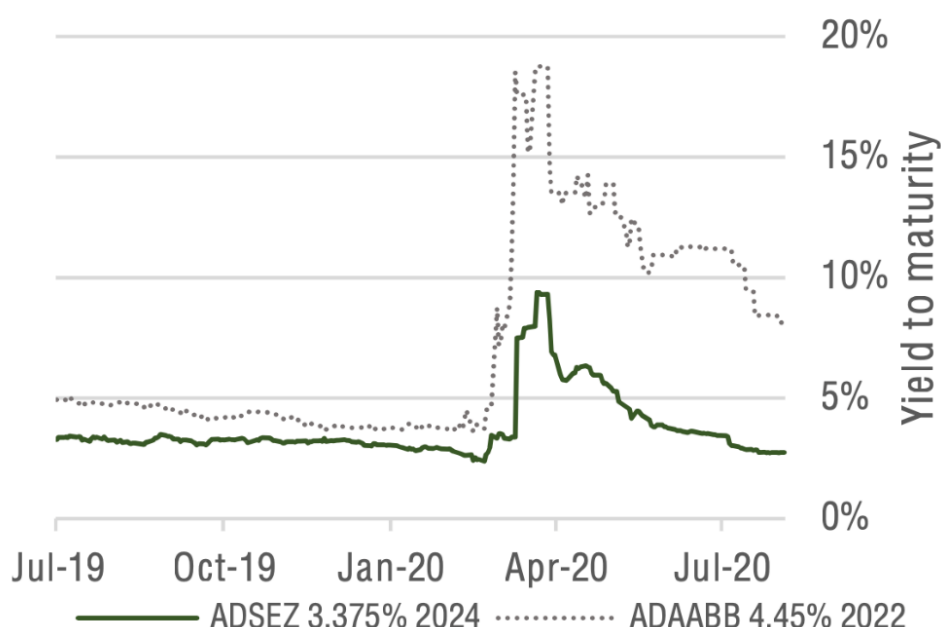
Debt Pricing Case Study: Adani Ports vs APCT

Adani APCT has a US listed US\$143m 5.43% US private placement bond maturing September 2021 (Code: ADAABB). Adani Ports & SEZ has listed a 3.375% bond maturing in 2024. Figure 4.4 highlights the massive spread widening on APCT debt

⁵³ Adani Ports Annual Report FY2020.

relative to ADSEZ early in 2020, which has remained now for the last six months, highlighting the bond markets are pricing in climate risks materially more in 2020 relative to 2019. The more Adani Ports increases its exposure to the Carmichael coal, rail and port business, the more climate risk is likely to be priced into Adani Ports' bonds, particularly as more globally significant financial institutions (GSFI) are specifically excluding thermal coal exposures entirely.

Figure 4.4: Adani Ports and APCT Yield Blows out in 2020



Source: *Anthropocene Fixed Income Institute*, September 2020.

October 2020 saw Fitch lower Abbot Point's ESG score, stating:

*"The financing options are limited by lenders' increasing concerns relating to ESG considerations over coal assets, compounding the structural refinancing risk of AAPT's bullet debt maturities. As a result, Fitch has revised AAPT's ESG Relevance Score for Governance: Management Strategy from a '4' to a '5'. AAPT has an ESG Relevance Score of '5' for Management Strategy. The elevated score reflects the company's bullet-amortisation debt structure which creates refinancing risk and is compounded by the exposure to coal markets and lenders' increasing environmental concerns about such assets. Management strategy is a key rating driver that has a significant impact on the rating on an individual basis."*⁵⁴

Adani Port has a credit rating in line with the Indian government itself (S&P BBB-Stable, Moody's Baa3 Neg, Fitch BBB- Neg), implying that there is effectively very little room for improvement (companies with significant domestic activities, such as ADSEZ, tend to rarely have higher ratings than the domestic economy out of which

⁵⁴ Fitch Ratings. [Fitch Affirms Adani Abbot Point Terminal at BB+; Outlook Stable](#). 6 October 2020.

they operate). This also puts the company at risk for downgrades of India's ratings, if such were to happen. For Adani Ports, at the cusp between investment grade and high-yield, this could effectively move it across that important divide. The very significant funding cost effects were illustrated in Figure 4.4 of the funding spread between ABABB and ADSEZ following the junking of ADAABB in March.

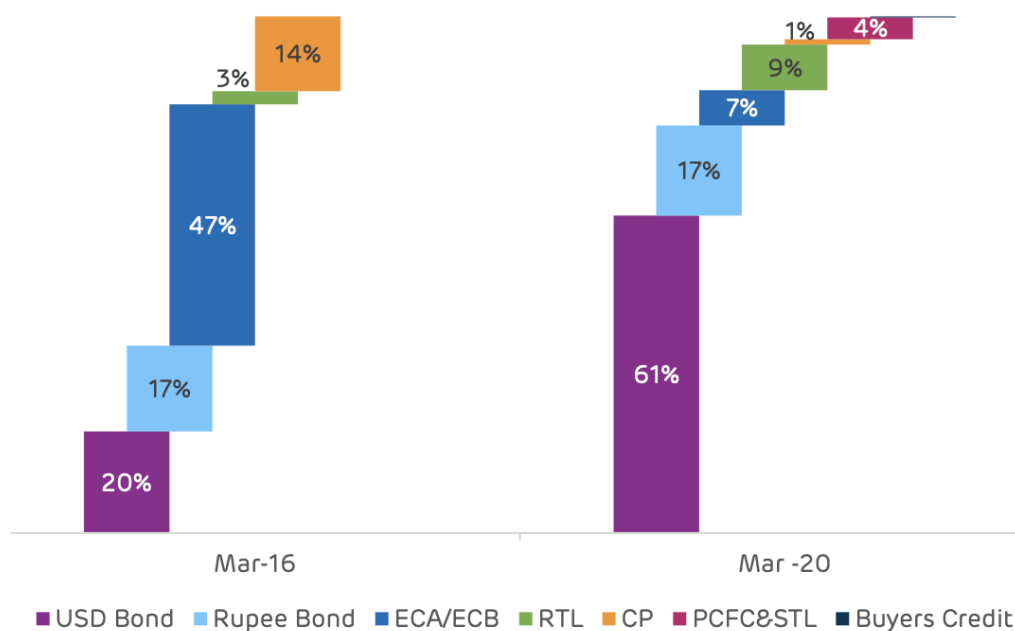
On the flip side, we believe that in such downgrade risk scenario, an entity with a clear 'green' profile could be given benefit of a doubt, as rating agencies could view their international funding base positively. We actually would like to express the opinion that Adani Ports greatest chance to avoid a high-yield status if the Indian economy underperforms, would be to go green.

A Key Strategic Advantage of Adani Ports Is Its Global Capital Markets Access

As discussed for the Adani Group generally (Section 3), India's largest port owner / operator, the BSE-listed Adani Ports has a wide range of top global equity investors on its share register.

Additionally, as of March 2020 Adani Ports has 68% of its total debt exposure in foreign currency denominations, including 61% in US\$ bonds (US\$2.65bn) – Figure 4.5. 71% of total Adani Ports debt is unsecured, and 95% long term.

Figure 4.5: Adani Ports Debt Exposure



Source: *Adani Ports Debt Presentation*, September 2020.

Note: ECA = Export Credit Agency, ECB = Export Credit Bank, CP = Commercial Paper, PCFC & STL = Packing Credit Loan in Foreign Currency & Short Term Loan

5. The Godda Power Plant Should Do More To Support Indian Jobs

Construction of Adani's 1,600MW Godda imported coal-fired power plant has begun amidst India's accelerating transition away from coal and towards renewable energy.

In late September 2020, NTPC – the largest operator of coal-fired power in India – announced it was ceasing to acquire land for greenfield coal power projects. It is also targeting the addition of 32GW of renewable energy to its portfolio by 2032.⁵⁵ This announcement was shortly followed by a statement from Power Minister R. K. Singh highlighting that India's ageing coal-fired power plants will be replaced by renewable energy, not new coal plants.⁵⁶

Given the speed with which India is turning away from new coal-fired power plants and towards renewable energy, Godda is likely to be the last coal power plant Adani ever builds, and probably one of the last built in India entirely.

Construction at Godda has not escaped the widespread impact of COVID-19. The pandemic has caused a construction delay,⁵⁷ not least because work on the project is being done by a Chinese contractor using Chinese power technology. The delay does provide an opportunity however – it is possible for the Godda project to be reset to better support the Indian economy as it recovers from the pandemic.

**Godda is likely to be
the last coal power plant
Adani ever builds,
and probably one of the
last built in India entirely.**

Bangladesh Power System Entering Financial Crisis

The global downturn in power demand amid the COVID-19 pandemic has also further highlighted a growing crisis within Bangladesh's power system. Bangladesh has overbuilt well beyond actual demand growth and now has too much capacity. The addition of power supply from the Godda project, once completed, would only make that situation worse.

Overall power capacity utilisation in Bangladesh for FY2019 was just 43%, while capacity payments to plants lying idle much of the time reached Tk90bn (US\$1.1bn).

⁵⁵ The Business Standard. [NTPC proposes to stop land acquisition for greenfield coal-based projects](#). 26 September 2020.

⁵⁶ Reuters. [India to replace coal fired power plants with renewables – minister](#). 7 October 2020.

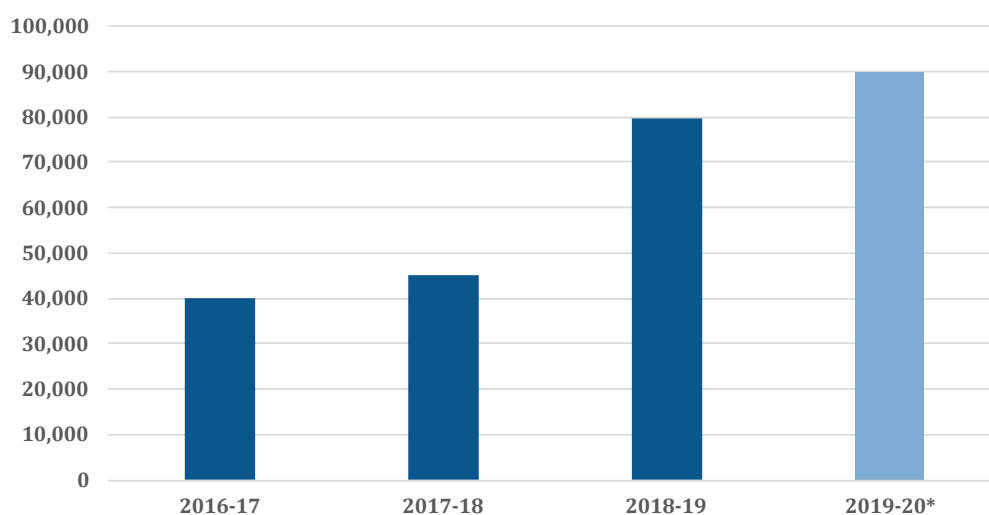
⁵⁷ The Business Standard. [1,600MW Jharkhand project delayed amid Covid-19 lockdown: Adani Power](#). 1 June 2020.

The nation's current power capacity addition plan set out in its Revisited Power System Master Plan 2016 looks certain to lock in even more overcapacity out to at least 2030.⁵⁸ This suggests that there will be further capacity payments to idle plants for the long term if the planned power plants come online.

Increased overcapacity and a rise in associated capacity payments will increase the financial burden on the Bangladesh Power Development Board (BPDB) and raise the likelihood of higher government subsidies or power tariffs for consumers to reduce the BPDB's losses. It is the BPDB that signed a power purchase agreement with Adani for electricity generated by the Godda project.

Even before COVID-19, BPDB was making significant losses. In FY2019, the government subsidy required to compensate BPDB for selling power below cost, and to avoid a major cash flow shortfall, rose again to reach Tk80bn (US\$936m) – see Figure 5.1. Before the COVID-19 pandemic struck, BPDB expected that the subsidy required in 2019-20 would rise again to Tk90bn (US\$1.1bn). This will now likely need to be even greater due to lower-than-expected demand.

Figure 5.1: Bangladesh Power Development Board Subsidies (Tk millions)



*Expected 2019-20 subsidy.

Source: Bangladesh Power Development Board Annual Reports.

Although initially replacing expensive oil- and diesel-fired generation, in the longer term Bangladesh's plan to rely on imported LNG- and imported coal-fired power generation (including Godda) will also replace cheap domestic gas in the power system. The overall cost of generation will therefore rise, leading to a need for higher subsidies or additional tariff increases, or both, increasing financial stress on government budgets and power consumers.

⁵⁸ IEEFA. [Bangladesh Power Review: Overcapacity, Capacity Payments, Subsidies and Tariffs Are Set to Rise Even Faster](#). May 2020.

Rather than focus on securing more power generation that will increasingly sit idle, Bangladesh would be better off investing in grid infrastructure to make better use of the capacity already available along with an increased focus on smaller, modular renewable energy additions to reduce the risk of further overcapacity from adding large fossil fuelled power plants with long construction times. With some question over how much land is available in Bangladesh for renewable energy installation, the prospect of importing renewable energy from India where wind and solar are cheap should be part of the solution.

There are now indications that the Bangladesh government is changing its mind on the role coal-fired power will play. With concerns over the environmental impacts of coal and the increasing difficulty in financing coal power as more and more banks pull away from the sector, the power ministry has reportedly requested authorisation to cancel 13,000MW of proposed coal-fired power plants in favour of LNG.⁵⁹

Opportunity To Re-Configure Godda To India's Benefit

As Bangladesh considers abandoning its coal power expansion, Adani has an opportunity to reset the Godda project to both help Bangladesh and better meet India's needs, and protect Indian jobs, in the wake of the COVID-19 pandemic-induced economic downturn. This would better align the Godda project with the overall energy strategy of the Indian government which is seeking to reduce reliance on thermal coal imports in the long term amidst the COVID-19-induced downturn in power demand.⁶⁰ This move is designed to protect Indian coal mining jobs as well as improve India's energy security.

Firstly, the project could be re-configured to use Indian power technology rather than Chinese. Bharat Heavy Electricals Ltd – India's largest power generation equipment manufacturer – could be tasked with providing power equipment for Godda, helping to protect Indian manufacturing jobs. This makes even more sense considering that the Godda project has been publicly funded by India's Power Finance Corporation and Rural Electrification Corporation and therefore should have always prioritised Indian power technology.

Secondly, the Godda project plan should be changed to supply India with power, not Bangladesh which already has too much capacity sitting idle much of the time. As the Indian economy recovers from COVID-19 and power demand grows, the Godda project could then help power that revival. Furthermore, air pollution is a growing concern in India and the process of land acquisition for the Godda project has been controversial. Given that Indians bear the brunt of the social and environmental impacts of the coal project, they ought to at least benefit from the power that is generated.

Thirdly, as a domestic power supplier the Godda project would be eligible to use domestic rather than imported coal. This makes particular sense given the Godda project is situated within Jharkhand state, a major Indian coal producer. Use of

⁵⁹ The Business Standard. [Bangladesh plans to abandon coal, go for LNG](#). 25 August 2020.

⁶⁰ Reuters. [Indian plans deep cut in thermal coal imports in coming years](#). 25 August 2020.

domestic coal would better align the project with the Indian government's energy strategy that seeks to improve energy security whilst protecting mining jobs.

These changes need not put an end to ATL's planned transmission link connecting the project to Bangladesh border. Increased transmission linkage between India and Bangladesh would allow more power trade and better use of existing, under-utilised power capacity on both sides of the border, and helps build Prime Minister Modi's ambitious plan for India to become an exporter of low-cost green electricity to its neighbours under OSOWOG.⁶¹

Although these changes are significant at this stage of the project, they would be in the best interests of both Bangladesh and India. The last coal plant Adani ever builds should be better aligned to India's energy strategy and do more to protect Indian jobs, rather than supplying expensive, polluting, carbon intensive power to Bangladesh.

⁶¹ Renew Economy. [The One Sun, One World, One Grid vision from India's Narendra Modi](#). 14 June 2020.

6. Abbot Point Port Is India's Key Coking Coal Asset

The Indian government is increasingly focused on reducing coal imports to improve energy security, drive local investment and protect domestic jobs. However, it is acknowledged that this re-emphasised strategy relates to thermal coal, of which India has large domestic reserves. It is accepted that India will need to continue to import coking coal as its domestic coal is not of sufficient quality to meet demand.

As such, Adani's APCT, which currently ships more coking coal (60%) than thermal coal (40%), is India's key coking coal energy security asset internationally.

In terms of Indian coking coal investment overseas to secure supply, there is little else to speak of. Coal India has for a number of years suggested that it is seeking to invest in coking coal mines overseas in order to improve coking coal security, but with no result to date.⁶²

Additionally, other Indian private company investments in coking coal overseas have been disastrous. Jindal Steel and Power Ltd's (JSPL) 2013 majority stake investment in Australian coking coal miner Wollongong Coal Ltd (WCL) has returned total losses up until 31 March 2020 of over A\$1bn. Both the coking coal mines that WCL owns are currently care and maintenance and not producing any coal. With debts now in excess of A\$1bn, WCL de-listed from the Australian stock exchange having been suspended from trading since December 2018.⁶³

JSPL also owns a mine notionally termed a coking and thermal coal mine in Mozambique. Initially planned to be producing 10Mtpa by 2015⁶⁴, JSPL's 2020 annual report disclosed that the mine produced just 2.5Mt of run-of-mine coal (actual product coal would have been significantly less than 2.5Mt). In addition, the annual report disclosed that just 0.49Mt of coking coal was produced.⁶⁵

As a result, APCT is India's most prominent coking coal asset as long as it remains a majority coking coal port. However, the current plan is to transition the port to a predominantly thermal coal terminal as the Carmichael mine comes on line, ships via APCT and ramps up production. This will see the port's value as a coking coal asset eroded as it becomes less aligned to Indian government energy strategy, and as GFSI accelerate their divestment of thermal coal exposures (Section 9).

⁶² The Hindu BusinessLine. [Coal India to enter advance agreements overseas for coking coal](#). 6 November 2019.

⁶³ ABC. [Shareholders left frustrated as mining company in more than \\$1bn debt delists from ASX](#). 19 August 2020.

⁶⁴ Jindal Africa. [Mozambique](#).

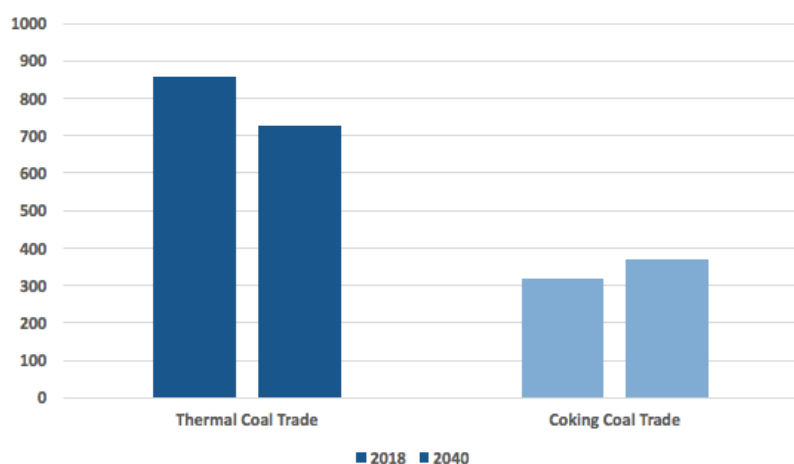
⁶⁵ Jindal Steel and Power Ltd. [Annual Report 2020](#).

Queensland Coking Coal Outlook Brighter Than Thermal Coal

The Queensland government released a long-term coal demand study in September 2020.⁶⁶ Largely based on the International Energy Agency (IEA) World Energy Outlook 2019 report, the study highlighted a contrasting outlook for thermal and coking coal trade under the IEA's central, Stated Policies Scenario (Figure 6.1).

Global trade in thermal coal declines out to 2040 under this scenario and, while overall production of coking coal falls, the trade in coking coal increases over the same period due to scarcity of quality coking coal reserves. More specifically, the study concluded that any potential fall in demand for Queensland coking coal from China will be offset by rising demand from India.⁶⁷

Figure 6.1: Global Thermal and Coking Coal Trade 2018 and 2040 Under the IEA Stated Policy Scenario (Million tonnes coal equivalent)



Source: Queensland Treasury, International Energy Agency.

Under this scenario, the coal ports of a high-quality coking coal producer like Queensland would be set to fare better over the long term than the Port of Newcastle – the major thermal coal terminal of New South Wales. Unsurprisingly, the Port of Newcastle is focused on diversifying port throughput away from thermal coal as it expects demand to fall going forward.⁶⁸

In an indication of the lower obstacles that Queensland coking coal faces compared to thermal coal, the 15Mtpa Olive Downs coking coal project received approval to begin construction in late September 2020.⁶⁹ Olive Downs is set to become Queensland's third-largest coal mine and has encountered almost no environmental opposition, in contrast to Adani's Carmichael thermal coal mine proposal.

⁶⁶ Queensland Treasury. [A Study of Long-Term Global Coal Demand](#). September 2020.

⁶⁷ Argus Media. [Queensland concerned about Chinese coking coal demand](#). 2 October 2020.

⁶⁸ Newcastle Herald. [Port of Newcastle says Hunter needs container fee lifted to allow region to diversify economically](#). 25 September 2020.

⁶⁹ ABC. [Queensland government grants approval for state's third-largest coal mine with 1,000 jobs promised](#). 29 September 2020.

Abbot Point Downgraded To 'Junk' Status

In March 2020, global credit rating agency Fitch downgraded Abbot Point from BBB- to BB+, taking it from an investment grade rating to a non-investment grade or speculative rating, otherwise known as “junk”.

The downgrade followed the cancellation of a bond issuance that was meant to refinance existing debt.⁷⁰ With banks and investors increasingly distancing themselves from thermal coal, successful debt issuance for thermal coal assets (or those that are set to become thermal coal assets) is increasingly difficult. APCT instead refinanced using Adani Group funds.

One of the ratings drivers identified by Fitch is that Dalrymple Bay, a coal terminal 200km south of Abbot Point, is effectively fully contracted and so competition with Abbot Point for new tonnage is currently limited. Furthermore, the construction of new coal terminal capacity in Queensland looks unlikely – Abbot Point could have an opportunity to contract further coking coal throughput if more mines continue to get approved in Queensland and the port has spare capacity.

Although Dalrymple Bay ships some thermal coal, it is more dedicated to coking coal than Abbot Point and therefore benefits more strongly from coking coal's brighter outlook than thermal coal. On the same day Fitch downgraded Abbot Point, it affirmed Dalrymple Bay's investment grade credit rating at BBB-.⁷¹

In October 2020 Fitch revised down its ESG score for the port from a '4' to a '5'. Fitch stated that Abbot Point's ESG score “has a negative impact on the credit profile and is highly relevant to the rating, resulting in the ratings on AAPT's bonds being downgraded and placed on Rating Watch Negative in March 2020.”

By contrast, the more coking coal-dedicated Dalrymple Bay remains on the higher ESG score of '4'.

While discussing Abbot Point's lower ESG score, Fitch noted that “Management strategy is a key rating driver that has a significant impact on the rating on an individual basis.” If Abbot Point proceeds to become more of a thermal coal port as planned, not only will it fall out of line with Indian government energy strategy, it will continue to attract lower ESG scores than ports more dedicated to coking coal. With ESG concerns on the rise, it will then only get harder to finance the port than it already is.

Abbot Point would have a better outlook by focusing on coking coal, a move that would bring it in line with Indian energy strategy and reinforce its position as India's best coking coal security asset.

⁷⁰ Fitch. [Fitch Downgrades Adani Abbot Point Terminal to 'BB+'; Ratings on RWN](#). 31 March 2020.

⁷¹ Fitch. [Fitch affirms DBCT Finance Pty Limited at 'BBB-'; Outlook Stable](#). 31 March 2020.

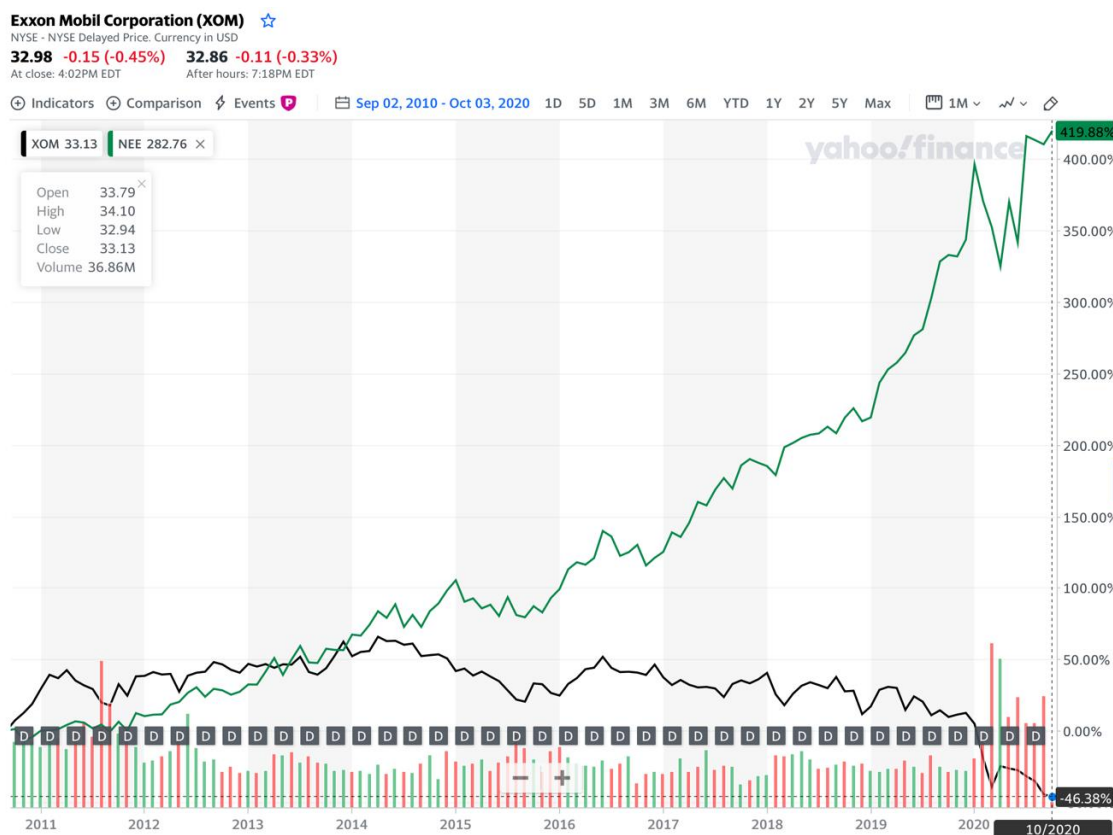
7. Net Zero Emissions Commitments Are Building, Rapidly

The first statement by the incoming CEO of the world's largest sovereign wealth fund, Nicolai Tangen in October 2020 was to highlight the power of ESG aligned firms' superior risk-return metrics.⁷² This is increasingly driving global capital flows, as BlackRock's "A Fundamental Reshaping of Finance" concluded in January 2020.⁷³ Climate finance risk is one of the key ESG issues of this century.

Ongoing Underperformance Drives Utility Decarbonisation

October 2020 saw the stock market capitalisation of NextEra Energy, the world's largest renewables investor, overtake that of ExxonMobil (Figure 7.1).⁷⁴

Figure 7.1: Exxon Entirely Eclipsed by NextEra This Decade



Source: Yahoo.

⁷² Financial Times. [Norway's new oil fund chief seeks more ESG-driven divestments](#). 7 October 2020.

⁷³ BlackRock. [A Fundamental Reshaping of Finance](#). January 2020.

⁷⁴ FT. [Clean energy group NextEra surpasses ExxonMobil in market cap](#). 2 October 2020.

September 2020 saw Vistra, Ameren Corp. and Entergy Corp. each pledging to eliminate carbon emissions from their U.S. generation fleet, joining a growing wave of utilities that includes Xcel Energy Inc., Southern Company, Dominion Energy and Duke Energy Corp.⁷⁵

October 2020 saw Uniper of Germany announce it will close 3GW of coal-fired power plants, halving its coal generation capacity by 2025 and to be carbon neutral by 2035.⁷⁶ This follows the successful pivots of all leading EU utilities, led by Engie and EDP of France, ENEL of Italy, Iberdrola of Spain, and Orsted of Denmark.

European Oil & Gas Majors

February 2020 saw Bernard Looney, the incoming CEO of BP Plc commit this oil & gas major to target a dramatic carbon emissions reduction program over the coming 30 years to 2050.⁷⁷ Whilst most commentators were initially sceptical of this repeat announcement of green pivot, the company's actions since provide strong evidence of the economic imperative. BP started the year committing to invest US\$500m annually in renewable infrastructure, but as COVID-19 really hit and oil, gas and coal firms globally were decimated, BP lifted their ambition to a new target for renewables investments of US\$5bn annually.⁷⁸

Near net zero emissions targets have now been announced in the last year by Total of France, Shell of Netherlands, Repsol of Spain, ENI of Italy and Equinor of Norway. Actions have followed, with a string of billion-dollar investments being announced in renewables across Europe, Asia and the Americas in 2020. Total's investment of US\$500m to acquire a 50% stake in 2.1GW of renewable infrastructure owned and operated by Adani Green Energy is just one example.

September 2020 saw Macquarie Group and Total commit to a US\$5-6bn investment to develop a portfolio of 2GW of floating offshore wind in South Korea.⁷⁹

China Commits To Net Zero before 2060

September 2020 saw President Xi Jinping commit China to peak carbon emissions before 2030 and target net zero by 2060 during a speech to a virtual meeting of the United Nations General Assembly.⁸⁰ IEEFA expects the new Five-Year Plan to provide clarity on the interim steps to progress this globally critical vision. The Institute of Climate Change and Sustainable Development at Tsinghua University models a 96% reduction in coal use in China by 2060, offset by a near 600%

⁷⁵ Bloomberg. [US Coal Suffers 1-2 Punch as Plants Shut, Miner Deal Nixed](#). 30 September 2020.

⁷⁶ Fortum / Uniper. [Uniper will gradually phase out coal](#), accessed 3 October 2020.

⁷⁷ Financial Times. [New BP boss Bernard Looney pledges net zero carbon emissions by 2050](#). 13 February 2020.

⁷⁸ Renewables.biz. [BP unveils 50GW by 2030 renewables goal](#). 4 August 2020.

⁷⁹ Total press release. [Total and Macquarie partner to develop 2GW floating offshore wind portfolio in South Korea](#). 1 September 2020.

⁸⁰ Renew Economy. [A rapid Chinese energy transition is far more feasible than you think](#). 30 September 2020.

expansion in solar and threefold expansion in wind power as the likely path forward.⁸¹

Foreshadowing this intent, in August 2020 PetroChina, China's largest oil and gas firm, announced to its investors it would boost investments in renewable infrastructure as part of a new target of near zero emissions by 2050.⁸²

This was followed by Sinopec and CNOOC Ltd committing to invest in green hydrogen and renewables in September 2020.⁸³

The largest solar company in the world is LONGi Green Energy Technology Co., Ltd. Shares in LONGi have doubled in the last six months, and increased fivefold in the last two years. To IEEFA, this is a clear reflection of the financial markets' growing confidence that China is set to dramatically accelerate its already world-leading deployment of solar infrastructure.

General Electric, Samsung, KEPCO & JERA To Stop Building New Coal Plants

September 2020 saw General Electric (GE) surprise the energy world by announcing it would exit the market for new coal-fired power plants and increase its prioritisation of renewable energy.⁸⁴ GE also committed to net zero Scope 1 by 2030 for its global footprint.⁸⁵ This was followed by a similar new coal exit announcement by Black & Veatch, one of the largest EPC firms globally.⁸⁶

October 2020 saw Samsung C&T and KEPCO commit to build no new coal power plants during a South Korea government audit hearing in the Trade, Industry, Energy, SMEs and Startups Committee.⁸⁷

October 2020 also saw Japan's JERA commit to net zero by 2050 and to close all outdated subcritical and supercritical coal-fired power plants it owns 2030.⁸⁸

Heavy Industry

Global investors, global banks and insurers, as well as leading corporates are all moving to work to the Paris 1.5 °C target. A steadily growing number of initiatives are well underway, including Climate Action 100+, RE100, [Investor Group on Climate Change](#), Science Based Targets initiative.⁸⁹ And October 2020 saw the

⁸¹ Bloomberg. [China Aims to Cut All Greenhouses Gases by 2060, Researcher Says](#). 12 October 2020.

⁸² Reuters. [PetroChina posts \\$4.4bn H1 loss, pledges near-zero emissions by 2050](#). 27 August 2020.

⁸³ Ewind. [PetroChina, Sinopec & CNOOC to invest in hydrogen and wind](#). 3 September 2020.

⁸⁴ BBC. [GE: Industrial giant will stop building coal-fired power plants](#). 21 September 2020.

⁸⁵ Bloomberg. [GE Targets Carbon Neutrality for Its Own Operations by 2030](#). 16 October 2020.

⁸⁶ Power. [Black & Veatch: No More Coal Construction](#). 29 October 2020.

⁸⁷ Global Construction Review. [Samsung admits brand damage in building coal plant, won't build another](#). 8 October 2020.

⁸⁸ Economic Times. [Japan's JERA to shut inefficient coal power plants by 2030](#). 13 October 2020.

⁸⁹ Science Based Targets. [SBTi Finance Tool for Temperature Scoring & Portfolio Coverage](#).

newest initiative, launched by the Net-Zero Asset Owner Alliance (backed by asset managers with US\$5 trillion AuM).⁹⁰

[Climate Action 100+](#) is an investor initiative launched in 2017 to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. More than 500 investors with over \$47 trillion in assets collectively under management are engaging companies to: curb emissions; improve governance; and strengthen climate-related financial disclosures.⁹¹

In addition to the huge commitments seen by world leading oil & gas majors (refer above), heavy industry is increasingly committing to net zero, and investing to deliver on this. We detail four recent examples:

[LafargeHolcim](#), the world's biggest cement maker, in September 2020 promised to cut its carbon dioxide emissions one-fifth by the end of this decade and is developing the first "net-zero" cement production facility by 2030.⁹² LafargeHolcim is also working with the Science Based Targets initiative and has pledged to work to the Paris 1.5 °C target.

[ArcelorMittal](#) in September 2020 announced: "a group-wide commitment to being carbon neutral by 2050, building on the commitment made in 2019 for its European business to reduce emissions by 30% by 2030, and be carbon neutral by 2050."⁹³

[Worley](#) is a global engineering giant that used to focus on oil and gas. But referencing BP's "incredibly progressive" CEO Bernard Looney, new CEO Chris Ashton says its future lies in "delivering a more sustainable world. That's why I put delivering a more sustainable world at the centre of our strategy, because I'm not waiting for regulatory or policy frameworks coming down from a government."⁹⁴

[HeidelbergCement](#) in September 2020 presented its new strategy "Beyond 2020" and pushed climate goals, pulling forward its goal to reduce emissions by 30% by 2030 to 2025 (vs its 1990 benchmark) and "aims to offer CO₂-neutral concrete by 2050 at the latest." This builds on the second pilot cement CCS project being built in Heidelberg in 2020.⁹⁵

With momentum building on coal exit policies from GSFIs, Climate Action 100+, RE100 as well as net zero by 2050 commitments and growing discussion of carbon border taxes adding another layer of pressure on global corporates to act on climate, as noted by Australia's largest asset owner, AustralianSuper in October 2020.⁹⁶

⁹⁰ UNEP Finance Initiative. [Net-Zero Asset Owner Alliance Sets Unprecedented 5-year Portfolio Decarbonisation Targets](#). 13 October 2020.

⁹¹ [Climate Action 100+](#)

⁹² FT. [LafargeHolcim pledges 20% cut in CO₂ emissions](#). 21 September 2020.

⁹³ Press release. [ArcelorMittal sets 2050 group carbon emissions target of net zero](#). 30 September 2020.

⁹⁴ AFR. ['Capital is getting a conscience': Worley CEO's new approach](#). 9 October 2020.

⁹⁵ Calix press release. [Final project agreements executed for LEILAC-2 CO₂ capture facility](#). 30 March 2020.

⁹⁶ AFR. [AustralianSuper chair warns companies vulnerable to EU carbon tax](#). 15 October 2020.

8. Thermal Coal Follows Oil and Gas Down in 2020

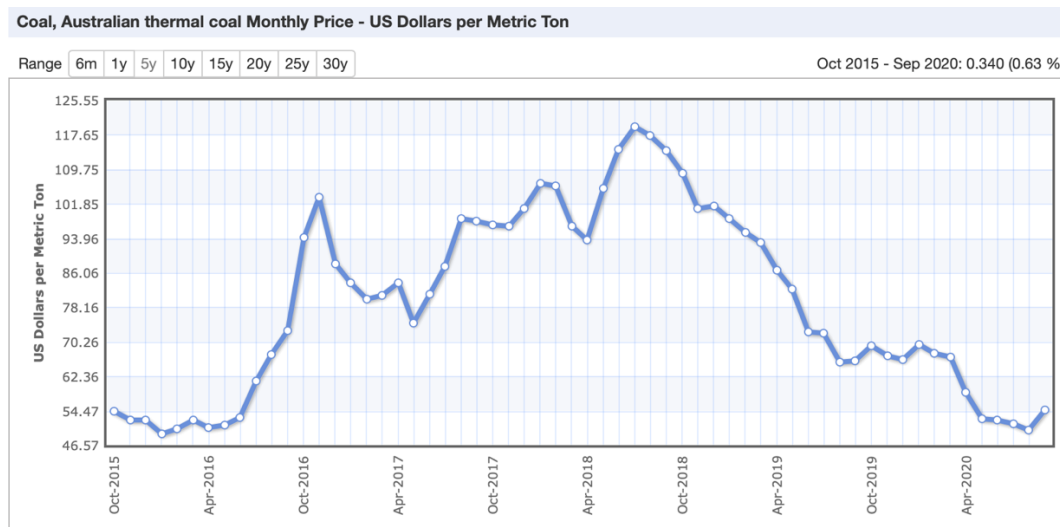
As per Figure 8.1, the thermal coal export price for 6,300kcal GAR benchmark coal was close to a decade low of US\$50/t as of August 2020. This reflects the combination of dramatic declines in oil and LNG prices as a result of the Saudi-Russian price war and demand destruction globally with COVID-19. The four largest coal import markets globally are reporting major reductions in demand.

In May 2020, Chinese coal imports declined 20% year-on-year, reversing the trend of increasing imports earlier this year.⁹⁷

In July 2020, the Chinese Energy Minister announced China will build 85GW of renewable energy in 2020, a near record high, as part of China's ongoing commitment to drive the global energy transition and decarbonisation.⁹⁸

In September President Xi pledged to target zero emissions in China before 2060, with speculation this would bring a doubling of annual renewables installs over coming decades.⁹⁹

Figure 8.1: Newcastle Thermal Coal Export Price (US\$/t)



Source: [Indexmundi.com](https://www.indexmundi.com).

Indian coal imports also declined 42% year-on-year in the June 2020 quarter.¹⁰⁰ This is a direct result of record high domestic coal mine and power plant coal stockpiles due to electricity demand declining 11% year-on-year during the lockdown. Coal-fired power generation has worn 100% of the demand loss due to its high marginal cost position. The Coal Minister Pralhad Joshi has repeatedly called

⁹⁷ Reuters. [China's coal imports fall nearly 20% in May even as demand rises](#). 7 June 2020.

⁹⁸ IEA. [Energy Transition Summit](#). July 2020.

⁹⁹ CarbonBrief. [Influential academics reveal how China can achieve its 'carbon neutrality' goal](#). 14 October 2020.

¹⁰⁰ Reuters. [India's June qtr thermal coal imports down 42% - govt data](#). 16 September 2020.

for India to cease all discretionary thermal coal imports by 2023/24.¹⁰¹ And India's Environment Minister Prakash Javadekar called for the closure of 60-70 end-of-life coal plants over the next two years in October 2020.¹⁰² This was followed by India's largest electricity generator, NTPC Ltd, announcing it will stop building new coal power plants and refocus on renewable energy, batteries and green hydrogen.¹⁰³

And Japan in July 2020 proposed it would close 100 of the 140 coal-fired power units in the country by 2030 as part of its commitment to move away from coal and align with the Paris Agreement.¹⁰⁴ October 2020 saw Japan commit to a net zero by 2050 target.¹⁰⁵

And September 2020 saw President Moon Jae-in announce that South Korea will shut down 30 additional coal power plants by 2034 and cease all new coal plant developments, in line with the country's ambitious Green New Deal and target to cut greenhouse gas emissions to zero by 2050 and promote eco-friendly energy sources.¹⁰⁶ October 2020 saw KEPCO¹⁰⁷ and Korea Development Bank¹⁰⁸ reported to be exiting new coal plant development and financing respectively.

Coal lobbyists have tried to distract attention from the terminal trajectory of seaborne thermal coal over the coming two decades, first looking to China, then India, and more recently the ASEAN region to save this highly subsidised, carbon intensive, highly polluting and increasingly obsolete product. Vietnam is the largest and fastest growing ASEAN economy.

In July 2020, the Vietnamese Ministry of Industry and Trade continued to develop the Power Development Plan (PDP8) to accelerate the deployment of domestic renewable energy as a way of curbing the energy security and economic risks of continuing to grow reliance on imported thermal coal.¹⁰⁹ This involves a dramatic reduction in previous plans for unbridled growth in expensive new import coal-fired power plants underwritten by subsidised Japanese and Korean ECA capital.

October 2020 saw Thailand's PDP cut coal capacity by 2030 targets to just 5%.¹¹⁰

The Australian Federal Treasury uses current spot prices of US\$54/t as the best perspective of future prices,¹¹¹ given the historic unreliability of forecasts in light of extreme commodity price volatility.

¹⁰¹ ETEnergyWorld. [Need to consume domestic coal instead of imported fuel to cut forex costs: Coal India tells NRS](#). 3 June 2020.

¹⁰² ETEnergyWorld. [60-70 polluting power plants to be closed soon: Javadekar](#). 19 October 2020.

¹⁰³ India Climate Dialogue. [India's largest power firm moves away from coal](#). 23 October 2020.

¹⁰⁴ Bloomberg. [After Coal Battle, Koizumi Aims to Raise Japan's Emission Goals](#). 15 July 2020.

¹⁰⁵ Nikkei Asia. [Japan to reduce greenhouse-gas emissions to net zero by 2050](#). 21 October 2020.

¹⁰⁶ Korea Herald. [Moon vows to shut down 30 more coal plants to bring cleaner air and battle climate change](#). 8 September 2020.

¹⁰⁷ Korea Times. [Investors unsatisfied with KEPCO, Samsung's coal exit plans](#). 9 October 2020.

¹⁰⁸ Eco-Business. [Korea Development Bank mulls end to coal financing](#). 21 October 2020.

¹⁰⁹ Vietnamese Ministry of Industry and Trade. Report in PDP8 Workshop. July 2020.

¹¹⁰ Power Technology. [Thailand's low carbon goal to hinge on gas-based generation and renewables expansion](#). 28 October 2020.

¹¹¹ Australian Government. [Economic and Fiscal Update](#). Page 31 note (i). July 2020.

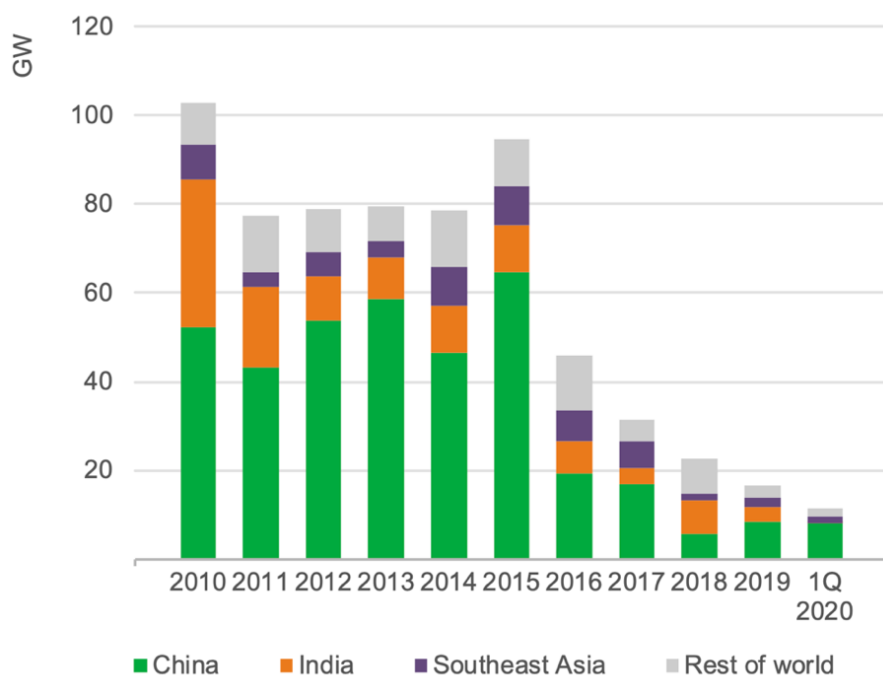
Final Investment Decisions for Coal Hit a Decade Low

The IEA's World Energy Investment 2020 report highlights final investment decisions for new coal-fired power plants globally hit a decade low of 18GW in 2019, down more than 75% from the level of new commitments evident in the first half of the decade.

With coal plant closures globally averaging 35GW annually over 2015-2019, and global coal-fired power plant utilisation rates hitting a decade low in 2019, global coal use in the power sector could well have peaked back in 2018.¹¹²

**Investment decisions
for new coal-fired
power plants globally
hit a decade low of
18GW in 2019.**

Figure 8.2: Coal-fired Power Plant Final Investment Decisions



Source: IEA World Energy Investment 2020.

¹¹² Ember. 2020 Global Electricity Review. April 2020.

As Global Majors Progressively Exit Coal, What's Next?

Global coal majors are either exiting the industry, collapsing or both.¹¹³

Having lost US\$4bn in a totally failed Mozambique coal expansion, Rio Tinto started selling off its global coal portfolio in 2014 and exited its last coal mine in 2018.¹¹⁴

BHP Group has progressively reduced its coal exposure by the 2015 spin-off of South32 then in 2019 flagged it would no longer invest in any new expansionary thermal coal projects. This was followed up at the start of 2020 by putting its last two projects – Mt Arthur in the Hunter Valley, Australia, and a one-third stake in Cerrejon, Columbia up for sale. Absent any viable indications of interest, BHP announced in September 2020 it was considering a spin-off to existing shareholders.

Anglo American has spent the last two years progressing the sale of its coal mining assets, and in August 2020 reported it had reduced its coal footprint by 55% and was progressing to a full exit.¹¹⁵

Japanese commodity trading houses have likewise progressively announced coal restriction policies and/or full exited coal over the last two years, including Marubeni Corp ([September 2018](#)), Itochu ([February 2019](#)), Sumitomo Corp ([April 2019](#)), Mitsubishi ([February 2020](#)) and Sojitz ([April 2020](#)), plus JBIC ([April 2020](#)). This has been followed by coal power exit pledges by Mitsui & Co. ([October 2020](#)) and JERA ([October 2020](#)).

In the U.S., a regularly repeating string of Chapter 7 bankruptcies over 2015-2020 has entirely failed to address this key legal issue, whereby a major industry sector is now a financially distressed group of unloved minnows. Peabody Energy went into Chapter 7 in 2016 and looks to be headed there again (refer Annex 1).

CNX Resources Corporation completed the spin-off of CONSOL Energy Inc. in November 2017,¹¹⁶ and CONSOL shares have subsequently collapsed more than 90%.

Australia has already seen its share of financial market failures. July 2020 has seen headlines of Japanese majors Sumitomo and Kansai Electric unwilling to refinance the financially distressed Bluewaters Power Plant in Collie, Western Australia, given an inability to source coal.¹¹⁷ This continues a string of collapses stemming back to the bankruptcy of Ric Stowe's empire in 2010 and the subsequent return to bankruptcy of Griffin Coal in 2015, along with its Indian parent, Lanco Infratech after a totally failed A\$740m buyout.

¹¹³ Quartz, [Even coal companies are now divesting from coal](#), 1 October 2020

¹¹⁴ ABC, [Rio Tinto completes its exit from coal with sale of Queensland mine](#), 28 March 2018

¹¹⁵ Australian Mining, [Anglo American flags thermal coal exit](#), 4 August 2020

¹¹⁶ Press Release, [CNX Resources Corporation Completes Spin-Off of CONSOL Energy Inc.](#), 29 November 2017

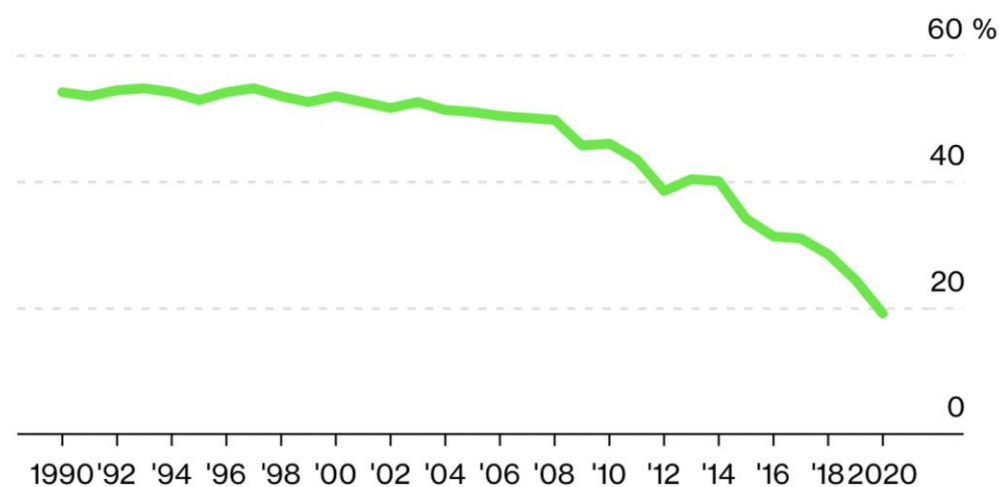
¹¹⁷ Australian Financial Review. [WA coal in crisis as Griffin accused of contract breaches](#). 21 July 2020.

The Australian Stock Exchange (ASX) has seen a range of coal mine bankruptcies in the last decade, including Bandanna Energy (2016) and Cockatoo Coal (2015, and again in 2017), both to ANZ Banking Group's cost.¹¹⁸ The rolling A\$4bn financial disaster of the Wiggins Island Coal Export Terminal (WICET) in Queensland has been a coal industry wealth hazard for most of this decade, smashing New Hope Corporation, Wesfarmers, Bandanna Energy and even Japanese bank Mitsubishi UFJ Financial Group (MUFG)¹¹⁹ over the years.

Jindal Steel's Australian subsidiary, Wollongong Coal, was ASX-listed until July 2020 despite a decade of losses, no revenue, and no ability to repay liabilities approaching a billion dollars, with rehabilitation liabilities only covered at 5 cents in the dollar.¹²⁰

Figure 8.3 highlights the terminal trajectory of coal-fired power generation in the U.S., which has dropped from a 50% market share last decade to 19% to date in 2020 (with coal consumption -26% yoy year-to-date¹²¹). Coal plant closures are being announced near weekly, and there is not even a single coal unit being considered by investors.

Figure 8.3: Coal's U.S. Electricity Market Share is Plummeting



Source: EIA, Bloomberg.¹²²

¹¹⁸ Australian Financial Review. [ANZ Banking Group to coal miners: Clean up your act](#). 5 November 2017.

¹¹⁹ Australian Financial Review. [Coal play WICET back in focus as lender bails](#). 18 March 2020.

¹²⁰ Lock the Gate. [Woeful Wollongong Coal can't pay basic ASX fees, so shouldn't be allowed to put Sydney water at risk](#). 16 July 2020.

¹²¹ Energy Information Administration (EIA). [Weekly Coal Report](#). 8 October 2020.

¹²² Bloomberg. [U.S. Coal Suffers One-Two Punch as Plants Shut, Miner Deal Nixed](#). 30 September 2020.

9. Global Finance's Coal Divestment Accelerates

Despite or maybe in acknowledgement of the lessons learnt during the global pandemic, there has been significant global capital momentum away from thermal coal and coal-fired power generation in 2020. This is a reflection of the rapidly diminishing economic merits of thermal coal and the growing understanding that an alignment with the Paris Agreement invariably leaves many coal projects as stranded assets, unable to deliver a viable return over their proposed design life.¹²³

Indeed, the trend of finance exiting coal has accelerated in 2020, with the number of new or improved policies running at 50% more than the run rate of 2019.

Having commenced the year referencing “A Fundamental Reshaping of Finance” in terms of the urgent need to align with the Paris Agreement and accept stranded asset risks,¹²⁴ BlackRock completed its divestment of thermal coal miners in May 2020.¹²⁵ BlackRock also put KEPCO on notice for continuing to invest in new coal power plants¹²⁶ as well as putting Siemens on notice for its continued involvement in Adani's Carmichael coal proposal in the Galilee, Queensland.¹²⁷

In total, IEEFA has tracked 143 globally significant banks, insurers, and asset managers / asset owners that have implemented substantial formal coal policies since 2013. This year has seen 56 new or updated policy statements (Figure 9.1).

October 2020 saw Aviva set a net zero target for its default pension funds by 2050 as yet another uplift to its fossil-fuel exclusion policy framework.¹²⁸

October 2020 also saw JPMorgan Chase pledge to push clients to align with the Paris Agreement, similar to pledges from NatWest Group and Barclays PLC earlier this year. This builds on JPMorgan's February 2020 pledge to undertake \$200bn in green financing and make its own operations carbon neutral this year.¹²⁹

Figure 9.1: Global Coal Policy Exits (2018-2020 to date)

Total announcements in	2018	2019	2020
Announcements	31	46	56
Weeks	52	51	43
Announcements per week	0.6	0.9	1.3

Source: Financial Institutions' websites, IEEFA calculations.

¹²³ The Age. Bob Carr. [While the world looked the other way, corporate giants abandoned coal](#). 15 May 2020.

¹²⁴ CEO Letter. [A Fundamental Reshaping of Finance](#). January 2020.

¹²⁵ BlackRock. [Helping our clients invest sustainably](#). May 2020.

¹²⁶ Bloomberg. [BlackRock Warns Korea's Power Giant on Overseas Coal Plant Push](#). 28 May 2020.

¹²⁷ Financial Times. [BlackRock rebukes Siemens on its environmental record](#). 6 February 2020.

¹²⁸ Business Green. [Aviva targets net zero for its default pension funds by 2050](#). 2 October 2020.

¹²⁹ The Wall Street Journal. [JPMorgan Pledges to Push Clients to Align With Paris Climate Agreement](#). 6 October 2020.

Annex 1: Share Performance of Coal Stocks

The two charts below detail the two-year share price performance of Peabody Energy listed in the U.S. and Whitehaven Coal Ltd, listed in Australia (both predominantly thermal coal mining companies). Both have massively underperformed their respective share market benchmarks.

Peabody Energy: Two Year Share Performance vs the S&P500 Index



Source: [Yahoo Finance](#).

Whitehaven Coal: Two Year Share Performance vs the All Ords Index

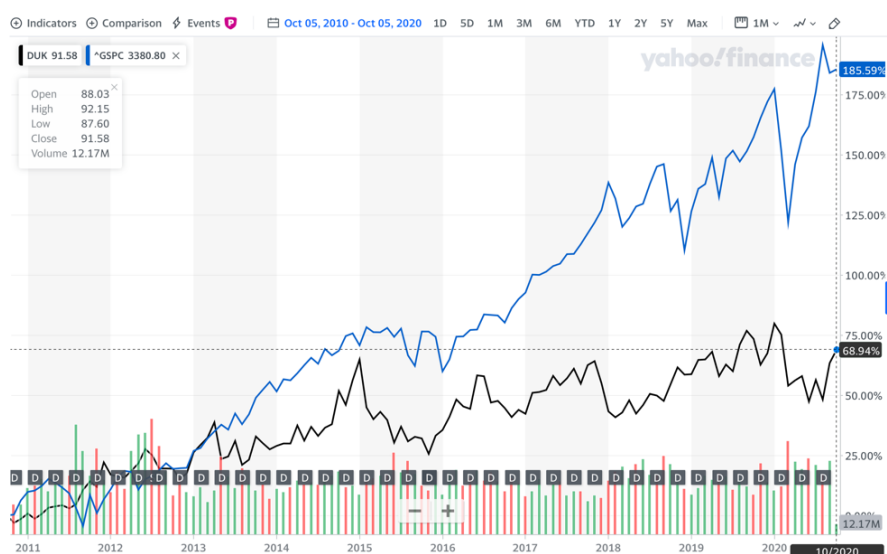


Source: [Yahoo Finance](#).

Annex 2: Share Performance of Utilities and Oil & Gas Majors

The two charts below detail the 10-year share price performance of Duke Energy and ExxonMobil (listed in the U.S.). Both have massively underperformed the share market benchmarks. Maybe in an effort to relieve Duke shareholders of suffering continued market underperformance, the market in October 2020 speculated on a NextEra Energy takeover to put Duke onto a rapid decarbonisation trajectory.

Duke Energy: Decade Share Performance vs the S&P500 Index



Source: [Yahoo Finance](#).

ExxonMobil: Decade Share Performance vs the S&P500 Index



Source: [Yahoo Finance](#)

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

About the Authors

Tim Buckley

Tim Buckley, IEEFA's director of energy finance research, Australasia, has over 30 years of financial market experience covering the Australian, Asian and global equity markets from both a buy and sell side perspective. Tim was a top-rated Equity Research Analyst and has covered most sectors of the Australian economy. Tim was a Managing Director, Head of Equity Research at Citigroup for 17 years, as well as co-Managing Director of Arkx Investment Management P/L, a global listed clean energy investment firm that was jointly owned by management and Westpac Banking Group. tbuckley@ieefa.org

Simon Nicholas

Simon Nicholas is an Energy Finance Analyst with IEEFA in Australia. Simon holds an honours degree from Imperial College, London and is a Fellow of the Institute of Chartered Accountants of England and Wales. He has 16 years' experience working within the finance sector in both London and Sydney at ABN Amro, Macquarie Bank and Commonwealth Bank of Australia. snicholas@ieefa.org

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