Kashish Shah, IEEFA Research Analyst
September 2019

Institute for Energy Economics and Financial Analysis
IEEFA.org

IEEFA India: NTPC spearheads electricity sector transition in India

Sustained profitability with 90% reduction in imported coal and vertical integration with its own mining capacity

The majority state-owned NTPC, the largest thermal power generation company in India, is a key player driving the transition in India's electricity sector in line with the Government of India's long-term objectives.

IEEFA attended its annual analysts and investors meet for FY2018/19 in Mumbai in August 2019, where NTPC's long-term target of about 40 gigawatts (GW) of renewables by 2032 (30% of its total planned capacity of 130GW) was reinforced with the announcement of a 5GW ultra-mega industrial solar park in Kutch, Gujarat.

NTPC's healthy profitability was discussed at the meeting, attained via its sustained net positive gap between average revenue realised versus average costs of supply per unit of electricity.

Some of the key contributing factors for NTPC's success includes a more than 90% reduction in expensive imported coal (in alignment with Indian government's long-term aim of zero thermal coal imports), the vertical integration of its generation business with its new inhouse coal mining capacity, lower coal transportation costs, and the blending of its thermal power supply with cheaper renewable energy power.

NTPC's proactive approach on emission control implementation is benefiting the country.

NTPC's proactive approach on emission control implementation is also benefiting the country by curbing air pollution while also delivering economic benefits going forward for its thermal assets.

Long term power capacity targets

NTPC's long term power capacity target of 130GW by 2032 envisages 30% of total installed capacity coming from non-fossil fuel resources including wind, solar and hydro. This was just 2% in FY2018/19.

At the end of FY2018/19, NTPC had 55.7GW of installed generation capacity which formed 15% of India's total installed capacity and 22% of total generation. NTPC had also commissioned ~2GW of new coal-fired capacity, falling well short of its plan to add 4.7GW of new coal-fired capacity. In lieu, NTPC had acquired 3.3GW of coal-fired capacity from state power companies.

NTPC also reported a massive 19.3GW of coal-fired capacity under construction at the investor meeting, out of which 5.2GW is targeted to be commissioned in FY2019/20. IEEFA expects NTPC will experience a material shortfall again, given the increasingly challenging risk-return metrics of new coal-fired power plants as well as the slowly building financial pressures on NTPC (discussed below).

Additionally, NTPC reported 6GW of renewable capacity under various stages of development. Once fully commissioned, this will be a massive jump in the thermal giant's renewable installed capacity, compared to 0.9GW at the end of FY2018/19.

NTPC also unveiled its latest plan for building a 5GW ultra mega solar park in Kutch Gujarat in western India. It would share the stage as the world's largest solar park with another 5GW solar park in the Dholera Special Investment Region (DSIR) in Gujarat, developed by the state government. NTPC aims to utilise superior solar and wind power potential in Kutch to implement least cost solar and wind hybrid generation to optimise usage of its generation and transmission infrastructure.

In September 2019, the company also commissioned its first electric vehicle (EV) charging station in partnership with Indian Oil in Noida, Uttar Pradesh.

Stable Financial and Operational Growth

IEEFA notes NTPC continues to be one of India's best thermal power operators in contrast to the ongoing operational and financial distress being experienced in India's thermal power sector.

NTPC's profits rose to Rs12,442 crore (US$1.72bn) in FY2018/19, up 18.7% from Rs10,418 crore (US$1.47bn) in FY2017/18, assisted by a significant tax credit. Earnings before interest and tax (EBIT) grew 8%.

Figure 1: Six Year NTPC Financial Performance: FY2014-FY2019

	FY2013/14	FY2014/15	FY2015/16	FY2016/17	FY2017/18	FY2018/19
Plant Availability Factor (PAF) (A)	91.8%	88.7%	91.9%	91.6%	86.0%	87.1%
Plant Load Factor (PLF) (B)	81.5%	80.2%	78.6%	78.6%	77.9%	76.8%
Capacity Utilisation (A*B)	**74.8%**	**71.1%**	**72.2%**	**72.0%**	**67.0%**	**66.9%**
Shareholder's funds (Rs crore)	**87,003**	**82,094**	**88,782**	**96,231**	**104,511**	**107,408**
Net Income (Rs crore)	11,404	9,986	10,183	10,714	10,481	12,442
RoE	**13.1%**	**12.2%**	**11.5%**	**11.1%**	**10.0%**	**11.6%**
Net debt (Rs crore)	**51,859**	**73,117**	**81,977**	**97,409**	**111,220**	**133,057**
Cash equivalents	15,311	12,878	4,406	2,930	3,977	2,143
Long term borrowing	62,406	78,532	85,083	97,339	108,697	119,698
Short term borrowing	4,764	7,463	1,300	3,000	6,500	15,502
EBIT (Rs crore)	17,689	14,027	14,244	22,463	23,979	25,905
Enterprise Value (Rs crore)	123,551	142,333	166,353	190,710	211,754	238,322
EBIT / Enterprise Value	**14.3%**	**9.9%**	**8.6%**	**11.8%**	**11.3%**	**10.9%**
Debt to Equity	**0.77**	**1.05**	**0.97**	**1.04**	**1.10**	**1.26**
Tax rate (%)	**21.3%**	**4.4%**	**-0.6%**	**22.1%**	**20.7%**	**-23.5%**

Source: NTPC, IEEFA calculations

NTPC has a regulated equity base of ~Rs54,500 crore (US$7.5bn). Given the majority of NTPC's revenue comes from a regulated stream, the return on equity (ROE) should continue to remain rangebound. Despite this, the thermal power headwinds are clear: ROE has trended down from 13.1% in FY2013/14 to 11.6% in FY2018/19 (with the latest year buoyed by a one-off tax credit).

NTPC has done well in managing to avoid unsustainable financial leverage, unlike most other Indian thermal power operators. Nevertheless, the upward trend in debt-to-equity from 0.77 times to 1.26 times in FY2018/19 compounds the decline in return on investment (ROI) from 14.3% in FY2013/14 to just 10.9% in FY2018/19. IEEFA notes continued heavy capex in the face of a progressive decline in ROI is undermining NTPC's superior financial profile.

NTPC's thermal utilisation rate – the plant load factor (PLF) - has been consistently high, sitting above 75% between FY2013/14 and FY2018/19, whereas coal-fired PLFs across India have averaged just 60% for the last three years. However, NTPC's plant availability factor (PAF) dropped below 90% over the last two years due to unavailability of coal, suggesting that NTPC is mothballing some of its coal-fired capacity. Multiplying PLF and PAF gives the effective capacity utilisation rate, which has fallen from 74.8% in FY2013/14 to 66.9% in FY2018/19. Combined with declining real electricity tariffs, this is the key factor driving the declining ROI trend.

Emission Controls

NTPC's presentation also revealed significant progress in emission controls for its entire coal-fired plant fleet.

NTPC ordered implementation for flue-gas desulphurisation (FGD) - used to remove sulphur dioxide (SO2) from exhaust flue gases of fossil-fuel power plants, as well as from the emissions of other sulphur oxide emitting processes - in 24.5GW of its thermal capacity during FY2018/19, and plans to implement the same for an additional 31.5GW of its thermal capacity in FY2019/20, with progressive installation over the coming three years.

IEEFA acknowledges NTPC's leadership in adopting this critically important initiative. Indian coal-fired power plants missed the Government's December 2017 deadline for the implementation of emission controls mandated back in 2015. This deadline has now been pushed back to December 2022, although there is a likely risk even with this date.

Implementation of FGD will have huge environmental benefits for India as well as financial implications. NTPC noted early implementation has been cost-effective, with bids rising in the latest FGD contracts. Moreover, FGD enabled plants will rank ahead in the dispatch merit order as the Ministry of Power is expected to tighten emissions control compliance. Also, non-compliant capacity risks being decommissioned, so there will be room for NTPC's power plants to increase their utilisation if the private sector continues to fail to comply with the new regulations.

Profitability

NTPC's sustained profitability is reflected in the material gap between average cost of supply (ACS) and average revenue realised (ARR) for the sale of its electricity. Despite inflation pressures and real tariff declines over time, NTPC's ARR-ACS gap remained in the range of Rs0.89/kWh to Rs1.01/kWh between FY2013/14 and FY2018/19, evidence of effective cost management initiatives.

Figure 2: NTPC ACS-ARR gap FY2013/14 to FY2018/18

	FY2013/14		FY2014/15		FY2015/16		FY2016/17		FY2017/18		FY2018/19	
	Bn Rs	Rs/kWh	Bn Rs	Rs/kWh	Bn Rs	Rs/kWh	Bn Rs	Rs/kWh	Bn Rs	Rs/kWh	Bn Rs	Rs/kWh
Commercial generation (BU)	233.0		240.8		240.8		250.1		265.0		273.5	
Total expenses related to generation (A)	542.4	**2.33**	574.9	**2.39**	531.9	**2.21**	569.9	**2.28**	604.7	**2.28**	648.2	**2.37**
Fuel	458.3	**1.97**	488.5	**2.03**	437.9	**1.82**	475.7	**1.90**	483.2	**1.82**	524.9	**1.92**
Employee benefits	38.7	**0.17**	36.7	**0.15**	36.1	**0.15**	43.2	**0.17**	47.3	**0.18**	47.8	**0.17**
Generation, administration and other expenses	45.4	**0.20**	49.8	**0.21**	57.9	**0.24**	50.9	**0.20**	74.2	**0.28**	75.5	**0.28**
Average tariff (B)		**3.30**		**3.28**		**3.18**		**3.30**		**3.23**		**3.38**
ARR-ACS gap (B - A)		**0.97**		**0.89**		**0.97**		**1.02**		**0.95**		**1.01**

Source: NTPC

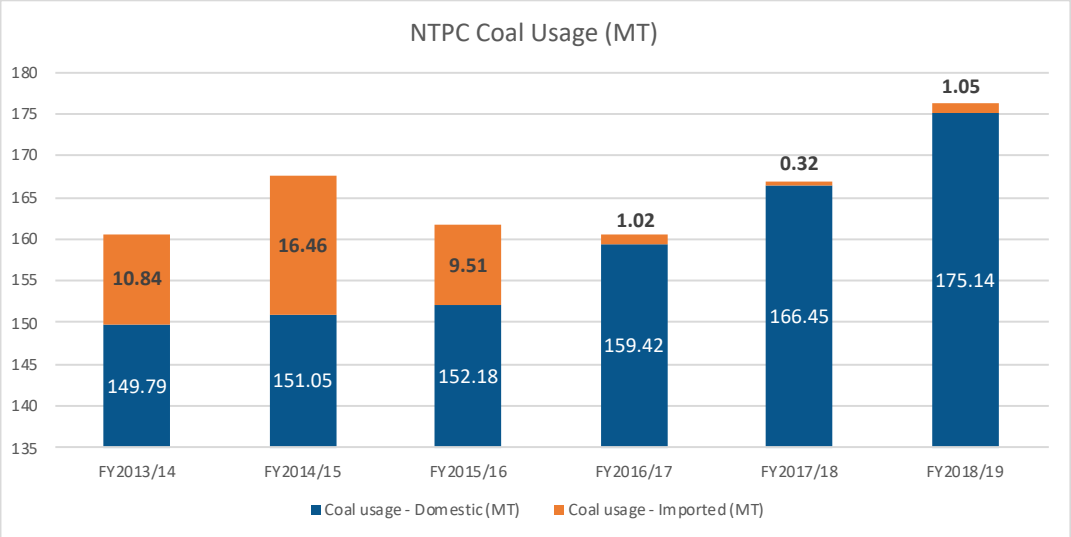
NTPC's per unit fuel expenses declined from Rs1.97/kWh in FY2013/14 to Rs1.92/kWh in FY2018/19 whilst average nominal tariffs did not materially change — from Rs3.30/kWh to 3.38/kWh during the same period. Coal India Ltd's (CIL) after-tax coal prices increased at 4.1% compounded annual growth rate (CAGR) between FY2013/14 and FY2018/19. In light of ~5% in annual consumer price index inflation, no material change in NTPC's average tariff reflects a deflation in real terms.

Total commercial generation increased 17% in the last five years from 233.0 billion units (BU) in FY2013/14 to 273.5BU in FY2018/19. Coal-fired capacity accounted for 95.6% of total generation in FY2018/19 with smaller contributions from NTPC's gas-fired capacity (2.7%), renewables (1.1%) and large hydro (0.6%).

NTPC's declining real tariffs can be attributed to four factors:

1. **90% decline in coal imports during the last five years —** NTPC's coal imports declined from 10.8 million tonnes (MT) in FY2013/14, down to 1MT from FY2016/17 onwards. As imported coal is more expensive than Indian domestic coal, the reduction in imported coal has restricted average tariffs from rising in nominal terms (declining in real terms) through reduced fuel expenses.

Figure 3: NTPC Coal Sourcing



Source: NTPC

2. **Vertical Integration** — In FY2018/19, NTPC supplied 7.3MT of coal from its new captive mines initiative, with a long term target capacity of 111 million tonnes per annum (MTPA). IEEFA notes the vertical integration of NTPC's power and mining business is already reaping fuel cost benefits and this benefit should continue to growth

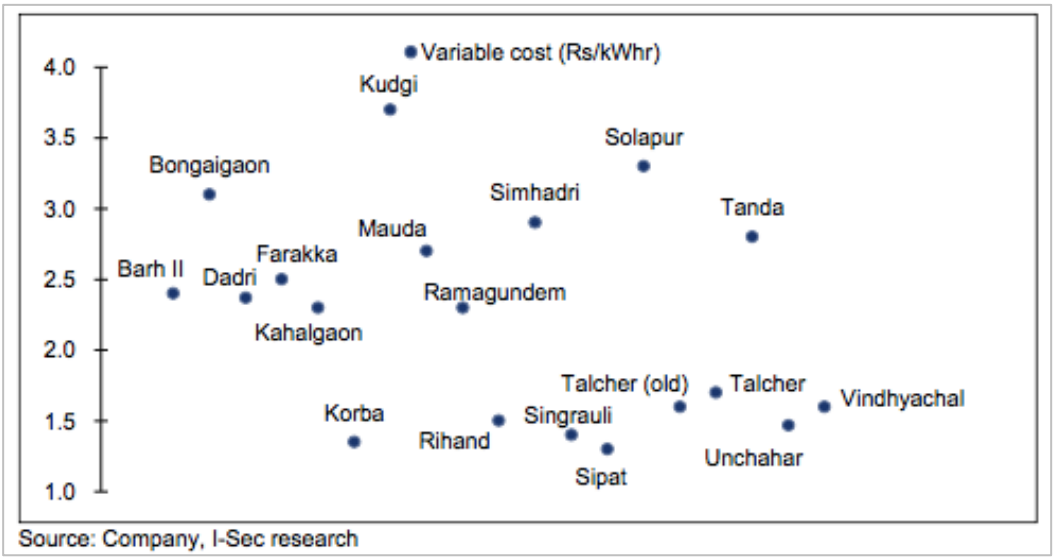
3. **Lower fuel transportation costs** — 64% of NTPC's coal-fired capacity is close proximity mine-mouth which uses conveyor belts to transport coal from nearby mines. This results in reduced transportation costs, a key NTPC advantage relative to its Indian competitors. IEEFA estimates transporting coal via Indian Railways over distances of 200km, 700km and 1,200km pushes up variable tariffs by Rs0.39/kwh, Rs1.06/kWh and Rs1.66/kWh respectively.

4. **Blending renewable power with thermal power –** The benefits of tariff differentials in low-cost renewable power versus expensive thermal power is equally shared between the power off-taker and NTPC. This currently has relatively immaterial impact on NTPC's average tariffs as renewables formed only 1.1% of NTPC's total generation as of FY2018/19. However, as NTPC builds more renewable energy capacity, its average cost of power supply will decline through this mechanism.

NTPC recently rolled out a 1.2GW solar tender which mandated interested developers to build solar capacity near NTPC's existing thermal power plants, so as to provide transmission infrastructure from its existing sub-stations. This tender received no bidders as the industry viewed the tariff cap of Rs2.78/kWh to be unviable for the location constraints specified in the tender. NTPC have extended the bid submission deadline for this tender.

As exhibited in figure 4, NTPC's variable coal-fired power plant costs (with the exception of four plants) is below the threshold of Rs3/kWh, meaning almost all of NTPC's existing plants remain competitive with renewable energy on a marginal cost of operation (i.e. ignoring fixed, contracted capital costs). However, IEEFA notes this is one of the long term threats to NTPC – even as a least cost thermal power producer like NTPC, the all-in cost of new renewables in India is already equal to or lower than that of domestic coal, and well below that of gas-fired power plants and imported coal. As renewable energy deflation continues, this financial risk will only rise materially.

Figure 4: Plant-wise Variable Costs for NTPC



Source: Company, I-Sec research

NTPC have secured long term fuel supply agreements with Coal India Ltd and Singareni Collieries Company Ltd (SCCL) for 172MTPA. This assures long-term reliable domestic fuel supply at cheaper prices.

Transition Leader

NTPC has managed to drastically reduce thermal coal imports, successfully reflecting the Indian government's long term ambition to reduce thermal coal imports towards zero. Expensive energy imports are detrimental to India's trade account deficit, undermining the currency, boosting inflation and hence interest rates, and poorly affecting India's energy security.

In IEEFA's view, prudent planning and investment for emission control implementation is another key area where NTPC is leading, setting the example for other thermal power operators in the country.

NTPC, along with Solar Energy Corporation of India, has been playing an important role in facilitating renewable energy tenders by being a guarantor between renewable power producers and discoms. However, NTPC's intention to build its own ultra-mega solar park in Gujarat could be a transformational pivot. It also plans to gradually expand into EV charging infrastructure, and in so doing develop its

strategic awareness of the building convergence of India's power and transportation industries.

NTPC, with its financial and operational capabilities as well as its political clout, is one of the last entities in India that can still procure sufficient capital access to risk building new coal-fired capacity amidst the ongoing distress in the thermal power sector.

While it will continue to deliver thermal power for decades to come, NTPC's ongoing strategic shift to concurrently expand into renewable energy is timely and makes the company a key facilitator of Prime Minister Narendra Modi's ambitious goal of 523GW of renewables and hydro by 2030.

NTPC's target of 40GW of renewables (including hydro) by 2032 represents a material component of India's overall renewable target, driving both deflation and a progressive decarbonisation while working to reduce India's air pollution and water scarcity pressures.

About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Author

Kashish Shah

IEEFA Research Analyst Kashish Shah has a master's degree in economics from the University of Sydney and an engineering degree from NMIMS University in Mumbai. He has worked in the Global Analytics Division of the Royal Bank of Scotland with a focus on regulatory policies. Kashish has research experience in India's public sector in his work for a member of Indian Parliament and a University of Sydney-based research group.