Coal Power Plants in Tamil Nadu - a decade of false starts and falling performance

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Executive Summary:
The past decade saw Tamil Nadu go from being power deficit to power surplus- a change made possible by significant capacity addition. With a zeal to provide energy security for the state (which was a rallying point in the state elections this decade), the State Government pulled no stops at capacity addition using coal. As a result, the state more than doubled its installed capacity in this period, with coal-based power plants continuing to be the mainstay. This report looks at the progress of the plants envisioned in this decade, through the status of their Environmental Clearance.

The decade saw several private players enter the fray in the electricity sector of the state. In all, about 39 projects with a cumulative capacity nearing 50 GW were proposed in the decade, besides the 8 GW that was installed in the same period (but initiated earlier). Significantly, all three private players who managed to commission coal-based power plants have landed in financial turmoil, resulting in the plants being placed on the block.

Numbers say a story like nothing else. It is observed that of the 39 plants proposed, only one plant has been commissioned, that too, for less than half its approved capacity. So much for hurried and plagiarised EIAs, and rushed through public hearings.

A couple of years ago, a power project proposed in 2010 for 4,000 MW had to be scrapped since the proponent- NLC India- found it unviable, given the coal transportation costs involved. This adds credence to reports indicating that coal is an unfeasible option in the state, for non-pithead plants, given the higher availability and lower tariffs for renewables.

Keeping aside the very real and threatening environmental and health impacts of coal, it today makes very less financial sense to invest in coal, given its prohibitively high tariffs and undue delay in getting commissioned. It would do well for TANGEDCO- which owns solely or as a joint venture, nearly 55% of the state's installed capacity - to learn from this decade of false starts, shelved projects and stranded power assets to focus on the other sources of its diverse electricity fleet.

Introduction

About a decade ago, in 2009, when Tamil Nadu was reeling under an acute power crisis, the unbundling of Tamil Nadu Electricity Board, into the TANGEDCO (for generation and distribution), and TANTRANSCO (for transmission) was still being operationalised. This had been long coming, necessitated by the Electricity Act of 2003 which required a distinction between the entities engaged in generation, distribution and transmission. The Act also delicensed electricity generation and allowed more players to enter the fray.

In the same year, the state also issued Letters of Facilitation to 10 private companies, inviting them to set up coal-fired power plants in the state, with a combined capacity of 18,140 MW, thus virtually opening the floodgates for private players- hitherto inexperienced- to venture into power generation[1]. In the assembly elections that would follow later in 2011, electricity was a major poll issue.

In the decade since, several power plants were proposed for Environmental Clearance, a statutory requirement ahead of setting up a thermal power plant under the Environment Impact Assessment Notification, 2006. Tamil Nadu was declared to be power surplus in 2016.

Cut to 2019, and Tamil Nadu continues to be power surplus and the plant load factor (PLF) hovering lately in the 55 - 65% range. It has doubled its installed capacity in the decade, even as several proposed projects have been cancelled or are yet to see the light of day. This report seeks to present an overview of the proposed and actualised power projects in Tamil Nadu, in this period, viewed through the status of their statutory Environmental Clearances.

Details of the proposed power plants have been sourced from the website of the Ministry of Environment, Forests and Climate Change, besides through filing of RTIs with the relevant public authorities at the state and national level. For the purpose of this report, only power plants with a capacity over 100 MW have been considered. The report also relies on information provided for Category A projects- usually projects with a capacity equal to or over 500 MW, which are appraised by the Centre. Some of the projects included are of lesser capacity, but had to be appraised by the centre for other reasons such as being situated in inter-state borders, or applying when the State Environment Impact Assessment Authority had not been constituted or was dysfunctional for want of members.

[1] These letters were later cancelled by a GO. http://cms.tn.gov.in/sites/default/files/gos/energy_e_97_2009.pdf.

Since 2010- Pushing for more coal power

As of March 2009, the state of Tamil Nadu had an installed capacity of 15,100 MW, which included coal and lignite's share of 5,610 MW (37%). Later, in March 2012 the state government unveiled a Vision 2023 document- outlining targets for different sectors for holistic infrastructure development, including Rs. 1,10,000 crore investment for new thermal generation capacity of 20,000 MW[2].

It was in this context that several power projects were proposed- by the centre, state public utility and the newly empowered private sector, to enhance power generation in the state. 39 projects were proposed and sought prior environmental clearance in this period, proposing a capacity addition of nearly 50 GW. These were proposed along the coast, primarily in the districts of Thoothukudi, Nagapattinam, Cuddalore, and Thiruvallur. For details about the spatial distribution of these projects, refer Figure 1. Among the projects proposed, 29 were by the private sector, totalling 34,385 MW.

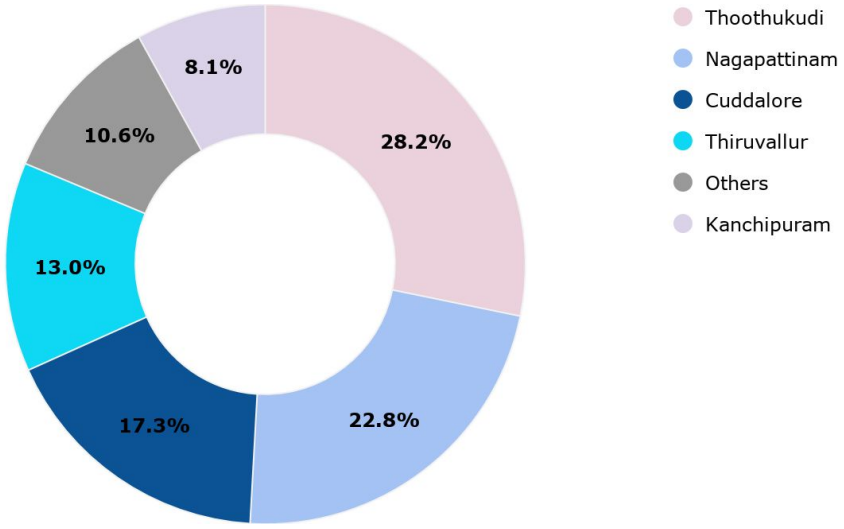


Fig 1: Spatial distribution of TPPs proposed in Tamil Nadu

Abysmal Plan-to-Plant Conversion

Significantly and fortunately, only one of the projects that obtained Environmental Clearance after the year 2010 has been commissioned, that too, for less than half the planned capacity. The power company, IL&FS Tamil Nadu Power Company

[2] http://www.spc.tn.gov.in/pdfs/TN_Vision_2023.pdf

Limited, obtained Environmental Clearance in May 2010 for 3,180 MW, of which 1,200 MW has been commissioned. Environmental Clearances continue to be valid for plants with a capacity of 12,385 MW, while for a majority of the plants proposed this decade, totalling 33,370 MW, there are no valid Environmental Clearances or Terms of Reference as on date. The ECs- when obtained- were either struck down by judicial intervention or the ECs lapsed as the projects were not commissioned within its validity period. ToRs lapsed without the proponent conducting a public hearing, and submitting a Final EIA to the Ministry. This implies that if these project proponents decide to set up the project, they will have to start the Environmental Impact Assessment process afresh, with new feasibility studies. For status of proposed plants in the state, refer Figure 2.

An EC is valid for a period of 7 years, after which a 3-year extension can be sought. A ToR is valid for three years and can be extended by 1 year

Only 10 of the proposed 39 plants have valid Environmental Clearances, while on about 11 projects work was either not started or they remain incomplete for various reasons, even after they obtained an EC. At the Ennore Thermal Power Station, where an expansion has been in the works for more than a decade now, an EC was issued in 2009 but only 17% of the work has been completed so far. Since the EC is due to expire in June 2019, the proponent has applied afresh for clearance, and was awarded Terms of Reference in January this year[3].

Reasons for proposed projects not coming up include project relocation by the proponent, and vigilant citizenry and effective judicial intervention resulting in the ECs being struck down for some, like in the case of the Chettinad Power Corporation's project in Nagapattinam. An increase in the cost of imported coal is also expected to have caused some projects to become financially unviable to pursue. In several cases, project proponents mentioned lack of Fuel Supply Agreement as reasons for delay, besides issues in acquiring land.

3 http://www.newindianexpress.com/cities/chennai/2019/apr/15/tangedco-gets-reprieve-for-two-power-projects-at-ennore-1964443.html

The EC/ToRs of these 25 projects have lapsed, and the proponent will have to restart the EIA process. As mentioned earlier, this has been the case with the Ennore Thermal Power Station-expansion. The biggest (and most contentious) power project proposed in the state, the Ultra Mega Power Project in Cheyyur, was originally proposed on imported coal, and was later reimagined to operate through Indian coal, due to which its existing EC is not valid anymore[4].

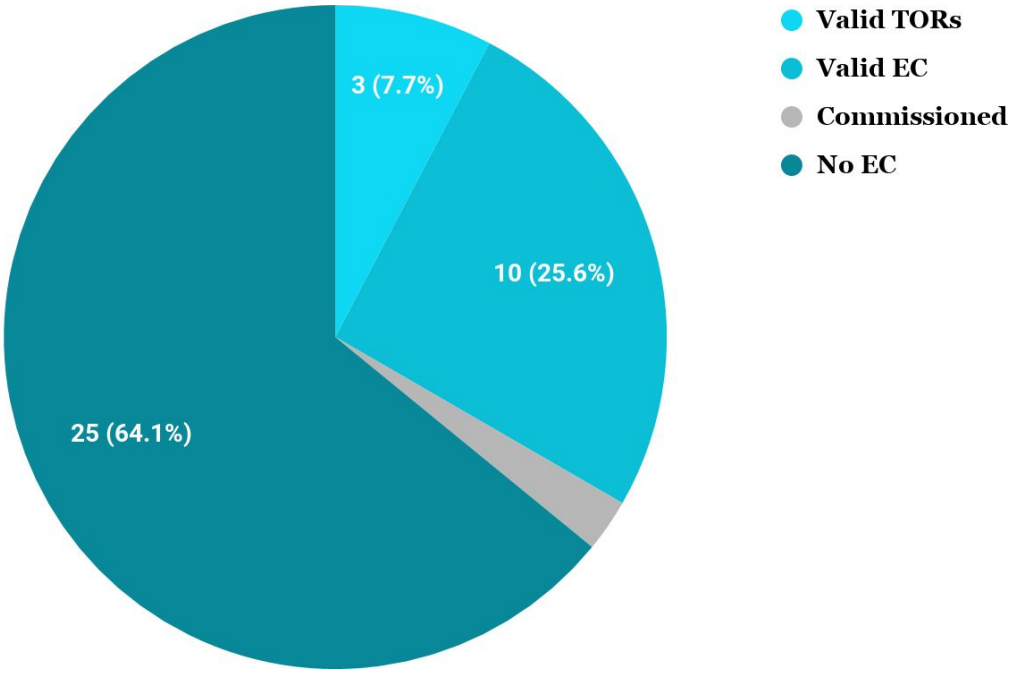


Fig 2: Status of the 39 coal power plants proposed in Tamil Nadu since 2010

Failed Starts and Plummeting PLFs

Even as newer power projects initiated in this decade failed to take off, projects proposed at the turn of the last decade were commissioned in the state, totalling 8 GW. These include three private power plants, with a total capacity of 2,700 MW. All three power plants ran into financial trouble- the smallest among these- IndBharath's Thermal Power Plant in Thoothukudi (300MW), has not been generating power since 2016 for want of a Power Purchase Agreement. The 1,200 MW ITPCL plant of the IL&FS group has been put on the block for sale recently.

4 http://www.newindianexpress.com/cities/chennai/2019/feb/13/proposal-to-build-tns-largest-power-plant-rejected-1938177.html

Coastal Energen's 1,200 MW is another stranded asset, looking for a buyer.[5] The last two have Power Purchase Agreements with the TANGEDCO for 50% of their installed capacity. It can be observed that the cost of running a second unit- without a firm power purchase mechanism- resulted in operational and financial unviability.

Among the plants commissioned in this period, one is by NLC India Limited (NLCIL), two by TANGEDCO, while the third is a joint venture between the two. TANGEDCO and NTPC jointly operate another plant at Thiruvallur, for 1,500 MW.

In the same period, the Ennore Thermal Power Station, with a capacity of 450 MW, was decommissioned (in 2016). The power station, the first unit of which was commissioned in 1970, had hit rock-bottom efficiency rates, operating at a PLF of 14.8% in the year preceding its shut down.

Even as the state significantly increased its thermal power generation in the decade, a worrying trend could be observed in terms of the plummeting Plant Load Factors (PLF). A report on Electricity Sector Transformation in India (a case study of Tamil Nadu) by IEEFA notes that the PLFs could fall to as low as 45% in Tamil Nadu by 2026-27, making coal plants entirely unfeasible. The poor utilisation of existing resources calls for correction before proposing a slew of newer projects. While coal availability is cited as the cause for falling PLFs, it also needs to be mentioned that nearly one-third (3,800 MW) installed capacity in the state is operating beyond the standard useful life of 25 years, possibly necessitating longer annual maintenance shutdowns and some may even be facing unscheduled shutdowns due to the old equipment. It is the need of the hour to institute plans for the decommissioning of these plants. This also affords the state an opportunity to replace them with renewable energy projects, paving the way for a decarbonised energy economy.

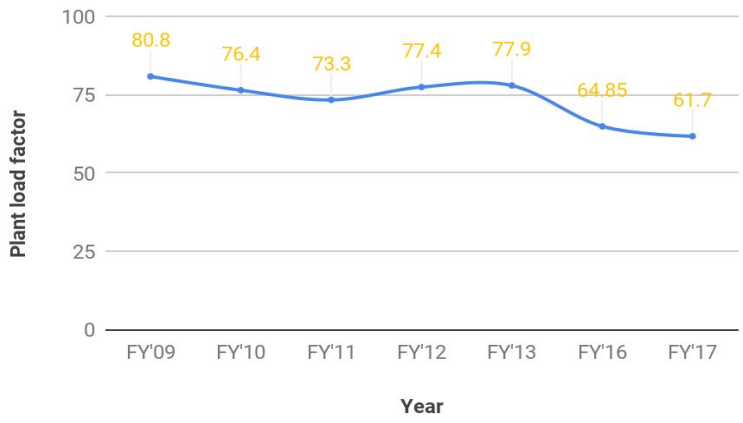
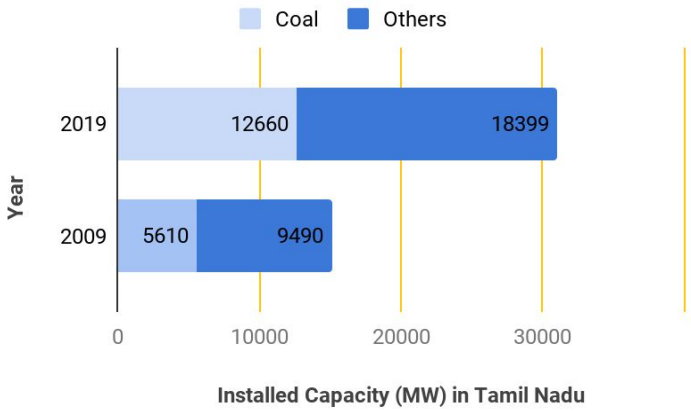


Fig 3: Plant Load Factor of power plants in Tamil Nadu
(Data unavailable for FY'14, FY'15 & FY'18)

5 https://www.business-standard.com/article/companies/adani-group-may-pick-51-lenders-stake-in-tn-s-power-firm-coastal-energen-119010901349_1.html

Past Imperfect, Future Tense

According to the Central Electricity Authority, as of March 2019, coal, lignite and gas account for over 63% of India's installed capacity, and contribute 81% of the total electricity generation[6]. In Tamil Nadu, nearly 49% of the installed capacity is coal, lignite and gas-based. As of January 2019, the state has an installed capacity of 31,059 MW, with coal and lignite contributing 12,660 MW. Of these, as mentioned earlier, IndBharath's Thermal Power Plant (300 MW) has not been operational for the want of a Power Purchase Agreement. TANGEDCO's installed coal plants in the state total 4320 MW, apart from the joint ventures it has with NTPC (in Vallur) and NLC (in Thoothukudi).



For list of coal-based power projects operating in Tamil Nadu, refer here.

Fig 4: Installed capacity in Tamil Nadu in 2009 & 2019

Even as India has committed to transition to a non-fossil fuel energy economy up to 40% of its installed capacity as part of the Paris Agreement, the state speaks a different language of increasing capacity in coal. In the state's Energy Policy Note for 2018-19, the state government listed five new coal projects, totalling 8,900 MW, apart from pipeline projects totalling 5,700 MW.[7] Among the new projects, a 4,000 MW power project by NLCIL in Nagapattinam district had to be cancelled, owing to its unviability.[8] Coal has already become an unviable fuel source in Tamil Nadu, when not for a pithead plant, according to the IEEFA report. The report says the tariffs for such non-pithead plats could be higher than Rs. 5.50/kWh, making them inherently unviable. This however has had no bearing in public utility TANGEDCO's

[6] http://www.cea.nic.in/reports/monthly/installedcapacity/2019/installed_capacity-03.pdf
[7] http://cms.tn.gov.in/sites/default/files/documents/energy_e_pn_2018_19.pdf
[8] https://www.thehindubusinessline.com/companies/nlc-drops-power-project-in-sirkali-plans-supercritical-lignitefired-plants/article9674762.ece

plans to increase its coal fleet, declaring an assumed PLF of 85% for upcoming projects[9].

Leaving aside acute environmental and health concerns plaguing coal-based power plants, falling Plant Load Factors, increasing financial unviability of coal, and an existing robust renewable fleet and policy in the state should act as levers for TANGEDCO to rethink the future of existing coal plants, and those in the pipeline. It is hoped that the public utility will invest in introspecting its current energy security strategy and course-correct, as appropriate to ensure energy security for the people living in the state as also their health and overall well-being.

[9] http://www.tnpcb.gov.in/pdf_2017/ExecuSummaryEng_tangedco.pdf

Coal Power Plants commissioned since 2010 in Tamil Nadu

No:	Power Station	Capacity	Ownership	District	Commissioned in
1	NLC Tamil Nadu Power Limited	1,500	JV- Centre & State	Thiruvallur	2010-2014
2	NTPC Tamil Nadu Energy Company	1,500	Centre	Thiruvallur	2010-2012
3	Ind-Bharath*	300	Private	Thoothukudi	2013
4	Mettur Thermal Power Station	600	State	Salem	2013
5	North Chennai Thermal Power Station- Stage 2	1,200	State	Thiruvallur	2014
6	Muthiara (Coastal Energen) Thermal Power Plant	1,200	Private	Thoothukudi	2014, 2016
7	IL&FS Tamil Nadu Power Company	1,200	Private	Cuddalore	2015-2016
8	NLC Thermal Power Station- IInd Expansion	500	Centre	Cuddalore	2015
	TOTAL	**8,000**			

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Thermal Power Plants Operating in Tamil Nadu

No:	Name	Location	Capacity
1	Mettur Thermal Power Station	Salem	1,440
2	North Chennai Thermal Power Station	Athipattu	1,830
3	NTPC Tamil Nadu Energy Company (Vallur)(NTPC + TANGEDCO)	Athipattu	1,500
4	Muthiara Thermal Power Plant (Coastal Energen Pvt)	Thoothukudi	1,200
5	NLC Tamil Nadu Power Limited (NLC TANGEDCO)	Thoothukudi	1,000
6	Thoothukudi Thermal Power Station	Thoothukudi	1,050
7	Il&FS Tamil Nadu Power Company Ltd	Parangipettai	1,200
8	Neyveli-Thermal Power Station 1	Neyveli	500
9	Neyveli Thermal Power Station 1- extension	Neyveli	420
10	Neyveli Thermal Power Station 2	Neyveli	1,470
11	Neyveli Thermal Power Station 2- expansion	Neyveli	500
12	ST-CMS (TAQA)	Neyveli	250
	TOTAL		**12,360**

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Power Plants with valid Terms of Reference

No:	Name	Capacity	District	Ownership	ToR valid until
1	ETPS Expansion	660	Thiruvallur	State	2022
2	ETPS Replacement	660	Thiruvallur (Ernavur)	State	Public hearing held, additional studies to be undertaken by proponent
3	Chennai Power Generation Limited	1,030	Thiruvallur	Private	ToR valid until June 2019; No Public Hearing
	TOTAL				**2,350**

Power Plants with Environmental Clearance

No:	Name	Capacity	District	Ownership	EC Valid until
1	NLC Phase II Second Expansion	1,000	Cuddalore	Centre	2024
2	NLC	1,000	Cuddalore (Neyveli)	Centre	2019 (Oct)
3	Ennore SEZ	1,600	Thiruvallur	State	2021
4	KU Thermal	1,320	Thoothukudi	Private	2023
5	Uppur Stage III	1,600	Ramnad	State	2023
6	Udangudi Power	1,600	Thoothukudi	State	2020
7	SPIC Electric	525	Thoothukudi	Private	2020
8	IndBharath	660	Thoothukudi	Private	2020
9	North Chennai TPP	800	Thiruvallur	State	2023
10	IL&FS	1,980	Cuddalore	Private	2020
11	Nagai Power	300	Nagapattinam	Private	Applied for EC renewal in December 2018 Status unknown
	TOTAL				**12,385**

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Shelved/ stopped projects (which applied for EC after 2010)

No:	Name	Capacity	Location	Ownership	Stage of cancellation
1	NTPC	2000	Villupuram (Marakanam)	Joint Venture-S-C	ToR expired
2	PPN Power	320	Nagapattinam (Tharangambadi)	Private	EC expired
3	Cauvery Power	160	Thiruvallur (Gummidipoondi)	Private	ToR expired
4	Periyar Energy Ltd	600	Thoothukudi(Melmandai)	Private	ToR expired
5	Sai Jyothi Infrastructure Ventures	1620	Sivaganga	Private	ToR expired
6	Jaya Thermal	320	Thoothukudi	Private	ToR expired
7	ST-CMS	250	Cuddalore (Neyveli)	Private	ToR expired
8	AES	1320	Nagapattinam (Sirgazhi)	Private	ToR expired
9	Vainateya	2640	Thoothukudi	Private	ToR expired
10	Coastal Energen	1600	Thoothukudi	Private	ToR expired
11	Accord	300	Thiruvallur (Gummidipoondi)	Private	EC expired
12	Sindya Power Generating Co.	1980	Nagapattinam (Sirgazhi)	Private	EC expired
13	India Integrated Energy	2000	Sattankulam, Thoothukudi	Private	ToR expired
14	Empee Power	1320	Nagapattinam (Neidavasal)	Private	ToR expired
15	OPG	720	Thiruvallur	Private	ToR expired
16	ARS Metals	480	Thiruvallur (Gummidipoondi)	Private	ToR expired
17	NC Energy	2640	Thoothukudi (Athiyakurichi)	Private	ToR expired
18	Chettinad Power Corporation	1320	Nagapattinam	Private	EC struck down by NGT
19	Cheyyur UMPP	4000	Kancheepuram	State	EC invalid for change in fuel

20	Tridem	2140	Nagapattinam	Private	EC expired
21	Patel Power	1050	Nagapattinam	Private	EC expired
22	NSL	1320	Nagapattinam	Private	EC expired. Project relocated
23	Cuddalore Power Co	1320	Cuddalore	Private	EC expired
24	Nagapattinam Energy	150	Nagapattinam	Private	EC expired
25	SRM Energy	1,800	Cuddalore (Chidambaram)	Private	EC expired
	TOTAL	**33,370**			

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