Improving electricity regulation in Tamil Nadu

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Abstract

Electricity reform in Tamil Nadu faces many difficulties. One element of this is the problem of regulation. The anticipated behaviour of the regulator in the future constitutes one element of the negative environment which shapes the hesitation of the private sector to invest. In this paper, we bring knowledge from the field of regulatory theory, which has been developed in India over the last 20 years, to shed new light on the problems of electricity regulation in Tamil Nadu. Some of the problems identified here are rooted in the drafting of the Electricity Act, 2003, which cannot be changed by policymakers in Tamil Nadu. However many of the problems can be addressed using policy levers available to policymakers in Tamil Nadu.

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1 Introduction

To achieve a transition to clean energy in Tamil Nadu, new energy generation capacity must reflect the twin goals of economic growth and the energy transition to renewables. Considerable investments will have to be made to reflect the needs of the renewable energy industry. Given the constraints that the Indian state faces when it comes to fiscal capacity, a substantial proportion of the investments required in the Tamil Nadu energy sector over the coming decade will need to come from the private sector.

Projects in emerging economies such as India face a cost of capital disadvantage (International Energy Agency, 2024). Private sector firms have to achieve some minimum required rates of return (*cost of capital*), which is known to be many times higher in emerging market economies as compared to advanced economies. In the case of some nascent energy technologies, this disadvantage is 2x when compared with advanced economies. Hence, India has mainly relied on domestic sources to fund renewables so far. This will not suffice going forward, considering the scale and pace of transition required.

The cost of capital problem manifests itself in several ways. It deters investors from taking long-term bets, and results in the larger challenge of *investibility*. "Investibility" describes incentives of a market-oriented policy framework that emphasises competition and the price system, a sound mechanism for electricity regulation, reduced policy risk and safety from expropriation. Section 2 demonstrates how the Tamil Nadu State Electricity Regulatory Commission (TNERC) does not check any of these boxes.

The Electricity Act, 2003 governs the regulation of electricity in India, and by extension, in the states. Many features of electricity regulation in any state including Tamil Nadu are coded into the Act, which often places reforms outside the control of the policy makers in the state. In this context, Section 3.1 applies learnings from the toolkit of regulatory theory to the electricity sector, to obtain a root cause analysis of these difficulties. Section 3.2 identifies a set of mechanisms where there are levers through which Tamil Nadu can make progress and develop a regulatory reform strategy that is feasible for Tamil Nadu.

We note that Tamil Nadu has recently made some fundamental changes to its state-controlled electricity generation and distribution entity, TANGEDCO. Previously, the TNERC regulated the Tamil Nadu electricity market which was dominated by the sole state generation and distribution entity i.e., TANGEDCO. However, in January 2024, the state government proposed to demerge the entity that is TANGEDCO into three separate entities: (i) Tamil Nadu Power Generation Corporation Ltd. (TNPGCL) which will operate and maintain TANGEDCO's thermal power plants, (ii) Tamil Nadu Power Distribution Corporation Ltd. (TNPDCL) which will function as the state government's sole distribution entity, and (iii) Tamil Nadu Green Energy Corporation Ltd. (TNGECL) which will operate and maintain TANGEDCO's existing hydel, solar and wind generation assets as well as build new renewables-based generation capacity.

The demerger scheme was given legal effect in March 2024, though the full demerger has not yet concluded (Government of Tamil Nadu, 2024). The enactment of these reforms also tells a story about the state and the sector. Tamil Nadu was among the only states remaining in India where a single state entity was responsible for both generation and distribution functions. Many states have multiple generation and distribution entities based on geographical distribution and/or type of generation (thermal, renewable, hy-

del, etc.). TANGEDCO's sheer scale also presented operational and political challenges. Most importantly, the state government notes that "new age power sector dynamics" are at play. The "clean energy transition" requires restructuring of business operations to "maximize value" with "minimized environmental impact".

These are significant changes in the right direction that will serve to improve investibility. However, the role of the (TNERC) has not been commensurately emphasised as part of these reforms. Section 4 presents a strategy for implementing reforms. Improvement of regulatory conditions in the state is timely, to ensure the re-designed institutions inspire private sector confidence. This is central to the evolving needs of the sector and financing for the energy transition.

2 Evidence of failures in electricity regulation

The passage of the Electricity Act 2003 and the establishment of electricity regulators at the union and state level were seen as landmark reforms for the sector. However, differential tariff-setting led to a deterioration of the finances of power distribution companies (DISCOMs), leading to a cycle of debt and operational inefficiencies. Even though transmission and distribution of electricity remained in government control in most states in India, independent regulators were expected to combat political interference. Essential functions, such as granting licenses to generators or transmission utilities, determining tariffs, and facilitating intra-state transmission and wheeling, were intended to be overseen by an independent regulator, thus reducing the impact of electoral politics.

In Tamil Nadu, the TNERC (established under Section 17 of the Electricity Regulatory Commission Act, 1998 read with the provisos to Section 82 of the Electricity Act, 2003), is responsible for legislative, executive and adjudicatory functions as they relate to electricity in the state. The TNERC functions in an environment where distribution and transmission are wholly state-owned, with some private sector presence only in the generation space. In this section, we identify clear failures of electricity regulation in Tamil Nadu, and highlight the poor outcomes of the failures.

2.1 Unfair consumer tariff philosophy

There are two kinds of price distortions in the Indian electricity system: (i) There is a *within*-electricity tax-and-subsidise system, where some buyers are charged too much (effectively, *taxed*), and other buyers are given a lower price (effectively, *subsidized*); and (ii) When the above tax-and-subsidise regime is not self-contained, the electricity system in aggregate has a shortfall. This is met through two means: present resources (i.e. transfers from the exchequer) and future resources (i.e. borrowing by the electricity system).

There is a distinction between the tariff-setting function of the electricity regulator vs. the decisions of any external organisation to grant subsidies to consumers. The role of the regulator must be to achieve a regulated rate of return on equity, based on the average cost of supply and other factors that help maintain the financial stability of the DISCOM. Governments may choose to extend subsidies to certain consumer categories, which are on-budget, and fully funded through the exchequer, and all-in-all the revenue avenues of

Table 1 Consumer category-wise tariffs in Tamil Nadu

This table shows a comparison of the tariffs paid by different consumer categories across 2012-13 and 2020-21 in Tamil Nadu. While the average cost of supply remains constant for all categories consuming electricity, the tariffs differ on account of subsidies and cross-subsidies.

Category	2012-13		2020-21	
	ACS	Tariff	ACS	Tariff
Agriculture	6.42	0.00	8.58	0.00
Domestic	6.42	2.50	8.58	2.26
Commercial	6.42	5.54	8.58	9.58
Industrial	6.42	8.93	8.58	6.21

Source: Power Finance Corporation of India Ltd. (2012–13, 2020–21)

tariffs and subsidy payments from the exchequer should fulfill revenue requirements for a distribution utility.

Subsidised electricity is a feature of the sector in Tamil Nadu. There are big differences in the tariffs paid by C&I users versus domestic and agriculture consumers. The electricity regulator is the one who should see this problem and put an end to this practice. However, as Table 1 shows, this has not taken place. The divide between domestic and agriculture consumers and the commercial and industrial segment has remained wide across the years, despite the cost of supply being uniform across categories; the cost of supply has also grown over the years, but the tariffs do not reflect this.

As is well known in the economics of controlled prices, e.g. from diverse areas ranging from petroleum products to the exchange rate, it is much better to accommodate market price fluctuations every day, rather than undertake big changes occasionally. As an independent regulator, TNERC was required to establish electricity prices that continuously reflect the cost of supply (while standing aloof from on-buget subsidy decisions by the state government). The experience of the last decade shows that the TNERC has not been able to discharge this function.

2.2 Non-compliance with tariff revision requirements

The TNERC is obliged to periodically revise tariffs for electricity consumption across all the multiple price categories. The process for tariff setting or revision is standardised all across India. The DISCOM files a petition with the State Electricity Regulatory Commission (SERC) requesting a tariff adjustment and the request is assessed on various grounds. If found reasonable, the SERC will issue an order to give effect to the revision (Singh, 2023). Further, there are incentives attached to periodic tariff revisions that reflect the cost of supply.[1] However in Tamil Nadu, tariffs have been revised only four times: 2012, 2017, 2022 and 2024. In 2017, TNERC chose to reduce tariffs, despite the cost of supply constantly rising.

[1]Ministry of Power had issued Standard Operating Procedures (SOPs) in 2022 under the Revamped Distribution Sector Scheme (RDSS) in 2022. Under this scheme, financial assistance is provided to DISCOMs for the upgradation of distribution infrastructure and prepaid smart metering. For this, they have to meet certain pre-qualifying criteria, one of which is that DISCOMs have to file annual tariff revision petitions reflecting changes in the cost of supply and that tariffs are to be determined on a "full-cost" basis i.e., minus subsidy from state government.

In the 2000s, many SERCs were not fulfilling their tariff-related mandates, resulting in revenue gaps and financial implications for states. Therefore, in 2011, the Appellate Tribunal For Electricity (APTEL) initiated a suo moto proceeding under Section 121 of the Electricity Act, 2003 based on guidance from the Union Ministry of Power. This was done to curtail the practice of non-filing of tariff-revision petitions by distribution utilities which served to postpone tariff increases at the SERC. The order required DISCOMS to (i) present status reports of their tariff revision petitions to date, and (ii) submit annual tariff revision petitions on time in the future.[2]

Given that state ownership of discoms may interfere with the independence and functioning of regulators, the APTEL order of 2011 effectively granted an SERC the power to supersede the decision-making of the DISCOM which might (under conditions of government control) reflect the decision making of the state government. Chapter II, clause 6.8 of the TNERC (Terms and Conditions for Determination of Tariffs) Regulations 2005 states:

> *In case the licensee does not initiate tariff filings in time, the Commission shall initiate tariff determination and regulatory scrutiny on a suo motu basis.*

Under Section 65, of the Electricity Act, 2003, the State Government is required to pay the amount of subsidy promised against set tariffs in advance to the distribution companies. APTEL was called in to decide the legality of state governments interfering with tariff determination by the SERC, whilst also not paying the determined subsidy upfront. In a judgment dated 31 January 2011 in Appeal No. 4 of 2010, APTEL held that such policy directions of State Governments under Section 108 of the Electricity Act, 2003, curtailing the powers of the State Commission in the matter of determination of tariff were not binding on the State Commission, further empowering SERCs to exercise suo-moto powers in the case of tariff determination, especially when non-revision of tariffs was impacting state finances (Mehta et al., 2024). The TNERC has issued five *suo moto* orders in the last five years.[3] Only one of these orders, passed on 30 June 2023, was on determination of tariff.

Further, on 15 July 2024, the TNERC passed its latest tariff order for generation companies (Tamil Nadu Electricity Regulatory Commission, 2024a). While the order was passed on 15 July 2024, the new tariff regime is applicable retrospectively starting from 1 July 2024. The Supreme Court in *Binani Zinc Ltd. vs. Kerala Electricity Regulatory Commission* held that electricity tariff orders cannot be applied retrospectively unless the statute conferring such powers to the ERC allows such retrospective application.[4] The Electricity

[2] See O.P. No. 1 of 2011, APTEL.

[3] The suo-moto orders passed are as follows:

1. Suo Motu order no. 6 of 2023 dated 30 June 2023 on determination of tariff for distribution for FY 2023-24.
2. Suo Motu order no. 7 of 2023 dated 30 June 2023 on non-tariff related miscellaneous charges.
3. Suo Motu order no. 1 of 2024 dated 3 January 2024 on TANGEDCO's insistence on collecting Building Completion Certificate before changing the tariff rate for the building.
4. Suo Motu order no. 2 of 2024 dated 13 February 2024 on notification of threshold limit for award of transmission projects on tariff-based competitive bidding (TBCB) process.
5. Suo Motu order no. 7 of 2024 dated 15 July 2024 on non-tariff related miscellaneous charges.

[4] 2009 (11) SCC 244

Act, 2003 does not envisage any such retrospective application.[5]

2.3 Restricting open access uptake

The high tariffs borne by C&I consumers make it unprofitable for them to continue consuming from the state DISCOM, and hence they migrate to captive power plants or purchase via open access facilities. Even in this situation, C&I consumers are expected to compensate DISCOM's for the loss of their share of the revenue, and pay a "cross-subsidy surcharge".

The regulator is responsible for reducing cross-subsidy surcharges to encourage open access development and usage by consumers. We may speculate that the increase in cross-subsidy surcharge is on account of the financial difficulties of TANGEDCO. However, the regulator's mandate should be to carry out technically sound regulation and further the interests of electricity consumers (including C&I consumers), and not to protect TANGEDCO. By not reducing the cross-subsidy surcharge, the TNERC is falling short of its commitments to open-access development (Jaitly, 2019).

Promoting open-access and the freedom to purchase across borders is the stated mandate of electricity regulators in India. However, several governments have been identifying levers through which to contain the loss of C&I consumer revenues. The Government of Tamil Nadu has, on several instances, invoked Section 11 of the Electricity Act, 2003 to restrict either the sale of power outside of the state in times of shortages, or the purchase of power from outside the state in times of surplus.[6] Section 11(1) of the Act says:

> Appropriate government may specify that a generating company shall, in 'extraordinary circumstances' operate and maintain any generating station in accordance with the directions of that Government.
>
> Here, the expression "extraordinary circumstances" is defined as circumstances arising out of threat to security of the State, public order or a natural calamity or such other circumstances arising in the public interest.

The use of this power reflects a failure of electricity regulation (Sane, 2023). The Central Electricity Regulatory Commission (CERC) has on numerous occasions issued orders declaring that Section 11 cannot be used to restrict open access. But this has not filtered through into the working of TNERC.

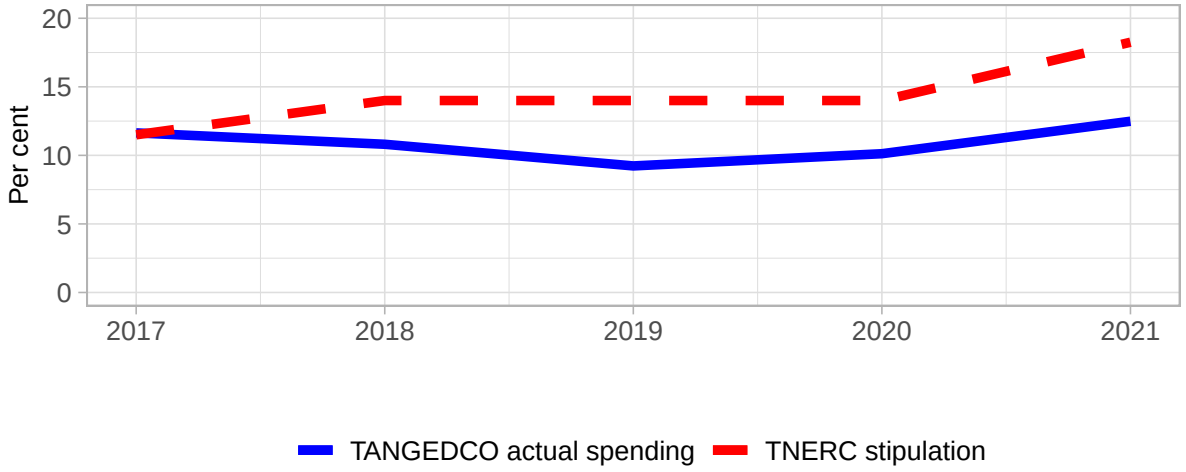
2.4 Regulatory assets

A 'regulatory asset' denotes the amount that the regulator owes to the DISCOM because it approved a tariff lower than what the discom petitioned for, keeping the cost of supply in mind. Regulatory assets are created when the regulator acknowledges that the set tariff does not reflect the costs of supply, but does not increase the tariff to prevent a tariff shock. Regulatory assets created impose a "carrying cost" on the DISCOM, who face heightened losses because the tariff petitioned for was not granted. Hence, tariff regulations explicitly

[5] See *Chhatisgarh State Power Distribution Co. Ltd. vs. Chhattisgarh Biomass Energy Developers' Assocation*, Order in APTEL Appeal no. 164 of 2010 dated 8 February 2011.

[6] See Government of Tamil Nadu (2014), Government of Tamil Nadu (2016).

Figure 1 TANGEDCO's RPO obligations: stipulated vs. actuals.



Source: Tamil Nadu Electricity Regulatory Commission (2022)

allow the inclusion of carrying costs on the regulatory assets created while submitting tariff petitions for forthcoming years. However, many SERCs (including TNERC) have been silent on this issue while approving the average revenue (ARR) (CRISIL, 2011).

States and DISCOMs are required to ensure compliance with pre-qualifying criteria under Revamped Distribution Sector Scheme (2022), which prevent the creation of regulatory assets by SERCs, to put an end to the practice of deferring tariff hikes. The creation of regulatory assets has been deemed a bad regulatory practice, with an emphasis on the need for a timeline to clear off existing regulatory assets (Regy et al., 2021).

At present, regulatory assets in Tamil Nadu run to the tune of INR 89,400 crore (Tamil Nadu Electricity Regulatory Commission, 2022). This also signals the TNERC's apprehension towards tariff hikes and the state government's influence on matters of subsidies and tariffs.

2.5 Renewable purchase obligations

Under Section 86(e) of the Electricity Act, 2003 the Electricity Regulatory Commissions have the responsibility of promoting renewable energy uptake in the state. The commissions hold powers to specify Renewable Purchase Obligations (RPO) in the area of a distribution company. This obligation has often been violated across the country: SERCs have continued to specify the RPO but they are not enforcing them or penalising DISCOMs upon non-compliance. SERCs are known to relax the RPO at the end of the year in a "business as usual" scenario. In response to these problems, APTEL, by order dated 20 April 2015, gave directions under Section 121 to all SERCs for strict enforcement and compliance of the RPO as per their regulations.

In Tamil Nadu, the Tamil Nadu Electricity Regulatory Commission (Renewable Energy Purchase Obligation) Regulations, 2023 ('RPO Regulations') are the determinants of RPO targets. As an example, in contrast, in 2017-18 Gujarat achieved an actual RPO spend of 9.54% against the set stipulation of 10% (GERMI, 2021). In Maharashtra, for the same year, the actual RPO spend was 11.26% against a target of 13.75% (Prayas Energy

Group, 2020).

However, TANGEDCO has failed to meet its RPOs in recent years. Figure 1 shows that while TANGEDCO was able to meet its RPOs in 2017, subsequent expenditure patterns have not kept up with the increases in the stipulated rates. By 2021, the actual rate of spending fell short of the stipulated rate by more than 30% (of the stipulated rate).

2.6 Adjudicatory capacity

The TNERC, like many other regulators in India, has fused legislative, executive and judicial functions in contravention of the doctrine of separation of powers. One measure of the quality of a regulator is the number of its orders that the Appellate Tribunal for Electricity (APTEL) upholds. Patel and Sane (2024) analysed all appeal orders from 2013 onwards where the TNERC was either an appellant or respondent at APTEL. They find:

1. Most appeals are filed by non-state entities against orders where the regulator ruled in favour of state entities.
2. The regulator was not able to hold its ground in 65% of the appeals. In addition, 25% of the appeals are "remanded" back to the TNERC suggesting that it did not do a good job of ensuring that all the evidence necessary to decide a matter was brought on record, despite being conferred the powers of a Civil Court for such purposes under Section 94 of the Electricity Act, 2003.
3. TNERC lost 70% of tariff-related orders, 78% of its orders on RPOs and 75% of orders related to completion/delay. However, in matters involving non-payment and open-access the TNERC's decisions are generally upheld in appeal.
4. The TNERC lost 89% of matters that involved issues related to how it uses its regulatory powers.

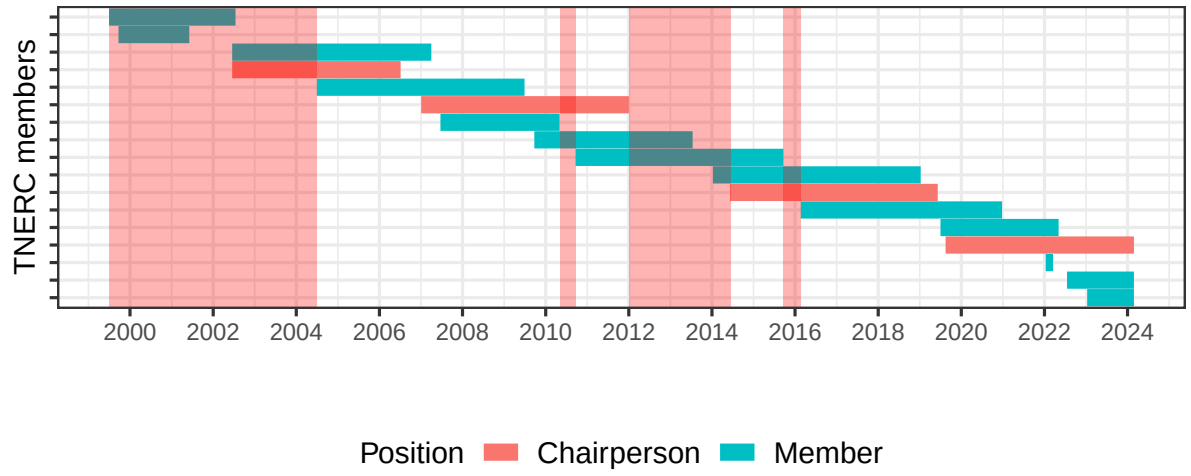
This evidence suggests that the adjudicatory capacity at the regulator is inadequate, resulting in poor performance of the regulator at judicial fora.

2.7 Staffing and selection of members

There are several problems with staffing and selection of members at the TNERC. The TNERC has not always been at full strength. Clause 12 of the TNERC Conduct of Business Regulations, 2004 requires a quorum of two members.

In the period between 2010 and 2016, there were several instances where the commission was not at full capacity — Figure 2 shows periods where the TNERC had only two members instead of the three required. Section 85 of the Electricity Act, 2003 states that the state government shall make a reference to the selection committee within six months of the superannuation of the chairperson or member's term and the selection committee shall finalize the selection of their successor within three months of this date. There have been significant periods of time where the state government has not appointed a new member to succeed an outgoing member. This reduces the capacity of the TNERC to function effectively.

Figure 2 Timeline of the tenures of TNERC members.



The shaded region shows periods where the TNERC was not at its full strength. Source: Tamil Nadu Electricity Regulatory Commission (2024b)

Further, under the TNERC Powers and Duties of Secretary Regulations, 2004 the Secretary has the authority to make appointments for regular staff. This is a crucial function to fulfill adequately because it impacts the ability of the regulator to duly fulfill its role. In the absence of regulations that create a permanent cadre of staff, it has been a routine practice that employees are either on deputation from another department or on contract. There is also a significant vacancy problem. All the vacancy notices found on TNERC's website are filled either through contractual appointments or deputation. Since the TNERC does not have a dedicated cadre of officers for its functions, it has to rely on officers deputed from TANGEDCO, TANTRANSCO or other state PSUs/ departments, or on officers hired on a contractual basis. Compromised staffing over a prolonged period of time is likely to hinder the regulator's functioning and performance.

The problem of non-permanent cadre and staff also leads to inconsistent staffing and appointments processes. This is unlike other states such as Gujarat[7] and Delhi[8] which, in addition to contractual hires and deputed officers, also have their own independent set of officers who discharge the regulator's key functions.

Further, in Tamil Nadu, the state government makes Government Orders for sanctioning posts within the TNERC, in contrast to Gujarat and Delhi. This means that the state government has complete control over the number of staff that the TNERC has, as well as their method of recruitment.[9] In the absence of staff and officers hiring regulations, the appointment of consultants has become the norm.

[7]Gujarat Electricity Regulatory Commission (Recruitment and Service Conditions of Secretary and Staff) Regulations, 2010.

[8]Delhi Electricity Regulatory Commission (Management and Development of Human Resources) Regulations, 2001.

[9]See TNERC - Sanction of regular staff - opening the second post of Deputy Director (Engineering) in the TNERC. Job advertisements for these roles make it clear that they either seek deputation from other departments or they hire on contract basis.

2.8 Public finance stress

The purpose of price regulation in a regulated industry is to establish prices that deliver a fair risk-adjusted return on equity. State coercion of prices is viewed as necessary to ensure consumer welfare and prevent overcharging of certain consumer categories. For many decades now, financial discipline at the Tamil Nadu Electricity Board (TNEB) has been deteriorating, with free electricity for irrigation, the introduction of flat-rate meters, and growing electricity diversions. This resulted in low quality of supply and even more cross-subsidies for certain consumer categories (Ramakrishnan, 2018). There are also additional impositions on consumers who wish to exit the state-managed electricity distribution system, making it even more expensive to migrate.

In recent work, Mehta et al. (2024) undertook a 'debt sustainability analysis' (DSA) of Tamil Nadu. If the present trajectory of revenue shortfalls and borrowings continue, a debt/GDP ratio of 36.03% and an IP/RR ratio of 21.46%, is expected by FY 2028. The research goes on to consolidate the electricity utilities into the state government. Once this is done, the two values worsen materially to 43.53% and 26.12% respectively.

The failures of regulation have thus amounted to a situation where the electricity sector is no longer contained within the sector, and materially impacts the broader public finance conditions in Tamil Nadu.

3 Improving regulation in Tamil Nadu

The TNERC, as discussed earlier, was created in the process of reforming the electricity sector in the early 2000s. However, there are significant issues with its design and performance. The recent announcements of demerging TANGEDCO into separate generation and distribution entities is a step in the right direction, as far as the TNERC is concerned, it only makes the need for its reform all the more urgent. To be able to effectively regulate the dynamic and vibrant electricity market that Tamil Nadu seeks to foster, the TNERC would need to fundamentally reshape its regulatory processes. The purpose of regulatory reform at the TNERC is to ensure that Tamil Nadu's new institutions are not mired in the same problems that the old TANGEDCO suffered from.

In this section, we highlight the flaws in the TNERC's regulatory processes, after which we discuss how the TNERC could use the principles of regulatory theory to improve investibility in Tamil Nadu's electricity sector.

3.1 Sources of regulatory failure

In India, a new field i.e., Indian regulatory theory has emerged out of the contributions of various root cause analyses (see, among others, Government of India, 2010; Government of India, 2015; Government of India, 2013; Chatterjee and Roy, 2011; Sahoo, 2012; Roy, Shah et al., 2019; Jaitly and Shah, 2021; Asthana et al., 2021; Bailey et al., 2021; Kelkar and Shah, 2022; Jaitly, 2019). This field is characterised by nine important benchmarks. We first evaluate the design of the Electricity Act, 2003 and the TNERC's performance, with each of these nine benchmarks. A summary of our evaluation of the TNERC is presented in Table 2.

Table 2: Regulatory issues with the TNERC: a summary

Principle	Practice followed by TNERC
Clarity of purpose	The Electricity Act itself fails to link its multiple objectives with the relevant market failures. However, other states are able to successfully balance the multiple objectives prescribed by the Act, while Tamil Nadu is unable to do so.
Composition and role of the board	Despite the latitude given by the Electricity Act, TNERC appoints a large majority of its members with a background in either TANGEDCO or TANTRANSCO.
Separation of powers	The Electricity Act itself fails to demarcate adequate separation between the legislative, executive and judicial functions of the regulator.
Legislative functions	The TNERC's regulations do not explicitly address any questions of market failure. They also do not contain a cost-benefit analysis.
Executive functions	Until recently the regulator was effectively regulating one state-owned entity each in the transmission and distribution sub-sectors. As a consequence, the consequences of the market power problem persist.
Judicial functions	TNERC's orders are frequently struck down in the appellate tribunal and the state DISCOM has failed to meet the RPO targets.
Principles for punishment	The Electricity Act prescribes fixed-sum penalties which have been framed in an unscientific manner.
Transparency and accountability	TNERC does not have evaluation criteria for its own regulatory performance.
Interface with government	TNERC does not have sufficient safeguards from the state government to prevent undue influence on matters of staffing, hiring and salary decisions, etc.

Clarity of purpose A regulator's purpose must emerge from the need to correct existing market failures (Government of India, 2015; Krishnan, 2022). In the electricity sector, there are two market failures (Jaitly and Shah, 2021). The transmission sector, and in Tamil Nadu, the distribution sector are public monopolies. As a consequence, customers do not have alternative options when the quality of the electricity supply suffers. This causes information asymmetry and concentration of power.

In the electricity sector in India in general, the process of establishing regulators "was remarkably devoid of reflection on whether and how these bodies would be able to achieve their core design objective of depoliticizing decision-making in the sector" (Dubash, 2013). This affects final outcomes — it breaks apart the principal-agent relationship by allowing the agent to explain failure in one area by claiming to pursue another objective. This can be seen playing out in section 61 of the Act which requires SERCs to "safeguard consumer interests", "recover the cost of supply of electricity", and "reduce cross-subsidies" at the same time. While most SERCs have at some point faced the challenge of reconciling these interests, the magnitude of tariff-related problems in Tamil Nadu is worse. Policies to safeguard the interests of 'one or two categories of consumers' end up defeating all three objectives.

Composition and role of the board A regulator is headed by a "board". It should ideally

be comprised of two executive members, one representative of the parent department of the government, and five independent members. The chairperson must be an independent member. The presence of independent members brings an external perspective and improves the quality of the decision-making process. The selection process of board members should be fair and transparent (Krishnan, 2021).

Under the Electricity Act, 2003 a selection committee consisting of a judge of the state High Court, the Chief Secretary of the state, and the current chairperson of the SERC select the members of the SRC.[10] The criteria for their selection are broad.[11] State commission members need to be "persons of ability, integrity and standing who have adequate knowledge of, and have shown capacity in, dealing with problems relating to engineering, finance, commerce, economics, law or management".

However, more than half of the TNERC's members so far have served either at TANGEDCO, TANTRANSCO, or the erstwhile TNEB.[12] Despite the latitude conferred to them by the Act, the TNERC does not have members with a diverse set of backgrounds. There are also several infirmities when it comes to the role of the members as well as their appointment process as described in the previous section.

Separation of powers Separation of powers is part of the "basic structure" of the Constitution of India.[13] Fusing legislative, executive and judicial functions within a single agency can lead to concentration of power by creating a "mini-state", reduces accountability and overly centralises decision-making (Goyal and Sane, 2024; Roy, Shah et al., 2019) Even if legislative and administrative functions were to be combined, the judicial wing must function separately.

The design of ERCs under the Electricity Act (union and state) is such that the executive, legislative and judicial functions are fused. Lack of separation of powers results in the concentration of power, the creation of wrong incentives and the regulator being unchallenged. Evidence of poor adjudicatory performance from section 2 only serves to justify the case for separating the judicial functions from the executive and legislative functions performed by the regulator.

Legislative functions Delegating law-making power to an executive body requires commensurate checks and balances (Roy, Shah et al., 2019; Pattanaik and Sharma, 2015). Arbitrary exercise of these functions creates uncertainty in the market and has adverse consequences for regulated entities (Goyal and Sane, 2024; Roy and Shah, 2015).

Under section 86 of the Electricity Act, 2003 the state ERCs are required to make rules and regulations on (i) determination of tariffs, (ii) regulating the purchase of power, (iii) issuing licenses to those seeking to generate, transmit, and distribute power and adjudicate disputes concerning these licensees, and (iv) specifying and enforcing standards with respect to quality, continuity and reliability of electricity service. The CERC has framed its Conduct of Business Regulations, which includes the "Procedure for Framing Regulations" which details out the scope and process for its regulatory functions (CERC, 2022).[14] The TNERC's regulations do not explicitly address any such questions. While

[10] Section 85 of the Electricity Act, 2003

[11] Section 84 of the Electricity Act, 2003

[12] There have been 17 individuals chosen to serve as chairperson or member of the TNERC so far. 9 out of the 17 have worked with the public sector entities. The others include a professor at IFMR, a former member of Delhi Electricity Regulatory Commission, two retired judges, and four retired civil servants.

[13] *Kesavananda Bharti vs. Union of India*, SUPREME COURT OF INDIA, 1973 (4) SCC 225.

[14] The procedure requires the CERC to (i) upload draft regulations on its website and invite public comments, (ii) allow a minimum of 30 days to submit comments, (iii) provide an explanatory memorandum explaining the draft regulations, if necessary, (iv) conduct a hearing if required, and (v) publish a state-

TNERC does put out its draft regulations for public comment and allow sufficient time for them, it is unclear if they incorporate these comments into the final regulations.

Executive functions Executive functions of the regulator emerge from its function of promoting consumer interest and include supervisory powers and the power to conduct inspections, enforce orders and process complaints. Arbitrary exercise of these functions creates uncertainty in the market and has adverse consequences for regulated entities (Goyal and Sane, 2024; Roy and Shah, 2015). The Electricity Act grants various powers to the SERCs to fulfill its consumer protection mandate.

In the case of the power sector in Tamil Nadu, until recently, the regulator was effectively regulating one state-owned entity each in the transmission and distribution sub-sectors. On matters such as the enforcement of RPOs, lowering cross-subsidy surcharges and promoting the development of renewables, the TNERC is not fulfilling the mandate as required. In Tamil Nadu, licensing functions for each of three segments are fragmented,[15] reducing the role that TNERC is able to play on supervision, investigation, licensing, etc. Perhaps as a consequence of these failures, some aggrieved consumers approached the Competition Commission of India (CCI) alleging "abuse of dominant position" by TANGEDCO. They allege that TANGEDCO engaged in "inequitable distribution of load shedding", "differential tariff for users" based within and outside Chennai, and other restrictions that violate the Competition Act, 2002. The Madras High Court has allowed the CCI to continue with its investigation.[16]

Judicial functions Regulators have wide-ranging administrative powers to assess regulated entities' compliance with the law's provisions and impose penalties in the event of a breach. For example, the principle underlying adjudication stipulates the conduct of a fair hearing wherein a neutral party listens to both the prosecution and the accused. The problem stems from the potential for bias and concentration of power, given the involvement of administrative bodies in governance decisions.

The Electricity Act grants the chairperson of the SERCs the power to appoint one of the two other members of the Board as an adjudicating officer. This adjudicating officer is vested with the power to conduct inquiries, summon individuals, ensure attendance, and possess other necessary powers akin to those required for judicial proceedings. The adjudicating officer is also responsible for resolving contractual disputes that may arise between private power generators and state distribution utilities. However, the member appointed as an adjudicating officer also plays the role of a regulator and enforcer, directly violating the principle of separation of powers. This practice has led to several instances of failure in the judicial function. For example, as shown in section 2, TNERC's orders are frequently struck down in the appellate tribunal and the state DISCOM has failed to meet the RPO targets.

Principles for punishment The purpose of punishment is to generate deterrence, not to exact retribution. The fundamental economic thinking on punishment is that if the

ment of reasons elaborating the rationale for the regulations if it deems appropriate. There are issues with the CERC process as well: it does not require the CERC to publish an explanatory memorandum in all cases, there is no requirement for a cost-benefit analysis, and states are not obliged to follow the CERC process.

[15] The Tamil Nadu Electricity Regulatory Commission (Licensing) Regulations, 2005 govern the licensing and supervisory powers of the TNERC over the distribution and transmission segments while generation is licensed by the Electrical Inspector of the state who is housed within the Tamil Nadu Electrical Inspectorate (TNEI) Department.

[16] *Tamil Nadu Generation and Distribution Corp. Ltd. vs. Competition Commission of India*, Order in W.P. No. 35047 of 2013 dated 22 December 2021, MADRAS HIGH COURT.

probability of getting caught is p, and if the ill-gotten gain is X then a penalty of about pX should suffice (Becker, 1968). Penalty amounts should also vary based on whether the action was deliberate or resulted from negligence. Rather than a statutory limit on the amount of penalties, the legislation should codify a system to guide the use of penalties.

The ERCs must consider two factors while deciding the quantum of penalty: (i) the amount of disproportionate gain or unfair advantage and (ii) the repetitive nature of the default.[17] However, many of the penalties mentioned in the Electricity Act are fixed amounts. Moreover, the Act does not require the regulator to make an effort to determine the illegitimate gains made by the violator or provide for a threshold (such as x times the illegitimate gain). The Act also does not require the regulator to constitute detailed regulations that will specify the process for calculating and enforcing penalties.

Transparency and accountability Effective regulatory processes require establishing two forms of accountability: performance and financial. Evaluating regulators' performance based on predetermined goals and targets is essential. Regulators should ideally be self-funded and possess flexibility to allocate their resources efficiently. Nevertheless, it is important to maintain oversight over their budgets and expenditures, given that their money constitutes public funds.[18]

TNERC has been placing its approved budgets, annual reports, etc. in the public domain in a timely manner. However, neither the Electricity Act nor the TNERC itself has prescribed a set of regulatory performance evaluation criteria.

Interface with the government There are many aspects of contact and relationship between the regulator and the state government, which determine the independence, integrity and role of the regulator, including many facets of its performance. From a public choice perspective, the government department is the principal and the regulator is the agent. One should constantly ask how the principal-agent relationship is working, constantly modify the contract (i.e. the law), and modify the work given to different agents (Shah, 2016; Bhandari and Sane, 2019). Two critical aspects are the financial interface and the functional interface.

Financial interface: Financial independence of regulators is crucial to maintaining independence over a range of core functions (Roy, Shah et al., 2019) (Rangarajan, 2022). While many regulators depend on government grants, generating revenues from regulatory fees is a useful way to build financial capacity, without compromising autonomy or efficiency. The TNERC is fully funded through government budgets. This raises questions about the regulator's ability to retain autonomy and make independent decisions.

Functional interface: A unique aspect of the interface between the state government and the regulator in the power sector is the establishment of an Advisory Committee, under section 87 of the Act.[19] The composition of the advisory committee from diverse technical, academic, legal and professional backgrounds can help diversify the membership and push policy reform.

Each of the nine pillars are key levers through which the workings of a regulator can be improved. In the case of the power sector, the role and jurisdiction of the union-

[17] Section 144 of the Electricity Act 2003.

[18] For example, the IBBI recently performed an evaluatory audit of its regulatory functions (National Council of Applied Economic Research, 2021).

[19] The Chairperson of the SERC shall be the ex-officio Chairperson of the State Advisory Committee and the Members of the State Commission and the Secretary to State Government in-charge of the Ministry or Department dealing with Consumer Affairs and Public Distribution System shall be the ex-officio Members of the Committee.

level Electricity Act imposes several restrictions the state government's ability to make sweeping changes to the regulatory framework. Our assessment of problems at TNERC across each of the nine benchmarks reveals that while some of the underlying problems are a result of the constraints that the Act imposes, many problems are because the TNERC lacks sound regulatory frameworks.

3.2 Opportunities for regulatory reform

The design, powers and structure of regulatory authorities, including who forms these regulatory bodies, their appointment process, the extent of their authority, and mechanisms for public accountability, are embedded in the Electricity Act, 2003. When done correctly, reviews of regulatory performance can provide insights into their success and failures and provide the feedback loop for course correction. There is an opportunity for state governments and SERCs to improve the regulatory structure and performance in a state by expanding mandates for transparency and accountability of the regulator. Table 3 highlights a set of reforms that address the sources of regulatory failure outlined in Table 2.

While much of the change would need to be driven by amendments to the Electricity Act itself, the Act provides leeway to state governments to spearhead their reforms. This may be a feasible strategy for state governments to improve the functioning of their electricity regulators within the confines of the existing mechanisms prescribed by the Electricity Act, 2003. Despite state ownership, some regulatory process improvements are likely to improve the current situation.

Improving competition in markets is a fundamental tenet of the price system, to deliver on consumer welfare through effective price discovery.[20] The demerger of TANGEDCO, which is currently in progress, is the right step towards improving competition. The unbundled entities will promote ease of private sector entry and greater competition. However, increased private sector participation implies the need for a fair and transparent regulator, which upholds rule of law uniformly. The following are detailed actions that the state/regulator can take, to enhance fairness and transparency in the process, which will in turn inspire greater confidence amongst private participants.

3.2.1 Making rules on terms and conditions of service by the Chairperson and Members

As highlighted earlier, there are three concerns with the board in TNERC: (i) several periods without a quorum and full strength of the commission (vacancies), (ii) that most board members have earlier worked with TANGEDCO or TANTRANSCO, and (iii) the board has not taken steps to institutionalise the commission ie. the lack of a permanent cadre or staff.

This has to be remedied by the state government and the TNERC board. It should fill vacancies promptly to avoid non-compliance with section 85 of the Act and submit names

[20]The Competition Act, 2002 lays out its objective for establishing the Competition Commission of India as *"An Act to establish a Commission ... to promote and sustain competition in markets, to protect the interests of consumers and to ensure freedom of trade carried on by other participants in markets, in India"* (Ministry of Corporate Affairs, 2002).

Table 3 Reforming TNERC: recommended legal and institutional changes

This table highlights certain key levers for introducing electricity regulatory reforms in the state. It indicates the responsibilities of the state government and TNERC towards a reform process.

Theme	Sections of the Electricity Act that empower the state government/ SERC	Points of action
Clarity of purpose	87, 88, 166	Promoting fair competition
Composition & role of board	84, 85	- Appointing of independent members - State government to fill up vacancies as per the Act - TNERC to issue regulations for dedicated staff
Separation of powers	180(2)(d)	Improving the rules on terms and conditions of service by Chairperson and Members
Legislative functions	180(2)(o)	Promoting a consultative process of making regulations
Executive functions	181(2)(zl)	New regulations for dedicated staff, improvements in the conduct of business regulations
Judicial functions		Designate the legal member as the adjudicating officer
Principles for penalties		Changes are possible only by amending the Electricity Act
Transparency and accountability	180(2)(i), (g) & (j)	Use the Act to expand disclosure mandates
Interface between government and regulator		Mobilize the State Advisory Committee Exploring revenue generation methods for financial independence

of people with diverse backgrounds — something already allowed under section 84 of the Act.

The TNERC needs to issue regulations similar to Gujarat and Delhi, ie. Service Regulations for the staff of the Commission, to create a permanent cadre of officers and reduce dependence on deputed staff and consultants. Second, the hiring practices of board members need to undergo a shift, with more independent members being selected. This was the case previously when retired judges, academics from institutions such as IFMR, and others were selected to be on the commission. Third, the regulations on appointment of consultants can be used to build an in-house strategy team that comprises of domain experts.

3.2.2 Promoting a consultative process of making regulations

Under Section 180(2)(o) of the Electricity Act, the state can mandate the publication of draft regulations, including an explanation memorandum. Furthermore, under section 92, the SERC itself could specify rules of procedure for the transaction of business, including the drafting of regulations. We note that the TNERC regularly publishes draft regulations and invites comments on its website.

Promoting public consultations can help resolve many of the present problems faced by TNERC. Consultations need not only be the invitation of comments on draft regulations, they must include industry and stakeholder consultations too on a regular basis. The Coordination Forum, which is mandated under section 166(4) of the Electricity Act, can be a useful platform to bring diverse stakeholders together. The Coordination Forum consists of the SERC chairperson, members and representatives of the generating companies, transmission companies and distribution licensees for "smooth and coordinated development of the power system in the State". While the TNERC has a Coordination Forum, there is no record of how frequently the consultations are held and what the objectives of the forum meetings are. Such a platform can be used to promote a continuous feedback loop between industry persons and the TNERC.

3.2.3 Designate the legal member as an adjudicatory officer

The minimum quorum under the TNERC Conduct of Business Regulations is 2 members. It has not been specified if the legal member must be present to constitute the quorum. The Chairperson is required to designate one of the three members as the adjudicatory officer.

The inadequate adjudicatory capacity at the TNERC signals the need for improvement within the judicial wing. One way to improve the judicial functioning of the regulator is to amend the Conduct of Business Regulations to mandate that the legal member has to be the adjudicatory officer. While this approach does not solve the problems of fused powers within a regulator, it may improve the legal capacity and performance of TNERC in forums such as the APTEL.

3.2.4 Mobilize the State Advisory Committee for policy matters

Section 87(2) of the Electricity Act empowers the SERC to *advise* the state government on (i) promotion of competition, efficiency and economy in activities of the electricity industry, (ii) promotion of investment in the electricity industry, (iii) reorganisation and

restructuring of the electricity industry in the State, and (iv) matters concerning generation, transmission, distribution and trading of electricity.

Sections 87, 88 and 166 of the Electricity Act also empower the state government to set up a State Advisory Committee (SAC), which is designed to be a high-level policy-oriented body, to help navigate some of the reforms that require a broader political consensus. The SAC advises the State Commission on "major questions of policy, matters relating to quality, continuity and extent of service provided by the licensees, compliance by licensees with the conditions and requirements of their licence, protection of consumer interests, and electricity supply and overall standards of performance by utilities".[21] The SAC is an important method of mitigating the principal-agent problem between the state and the regulator and it should be convened more often and for the purposes of driving broader state-level sectoral policy reforms.

3.2.5 Expand disclosure mandates

Under section 180(2)(i), (g) & (j) of the Electricity Act, the state can specify the form of annual accounts and budgets. The TNERC is also required to lay its annual statement on the floor of the Tamil Nadu state legislature. TNERC regularly does this.

Several important forums such as the (i) co-ordination forum and the (ii) state advisory committee are constituted under the Act. However, there is low visibility of these committees in the public domain, thus reducing the effectiveness of their role. Minutes of the meeting must be made public soon after.

4 Implementing regulatory reforms in Tamil Nadu

The economic policy strategy in Tamil Nadu will require improvements in investibility in the Tamil Nadu electricity sector. The ball has been set in motion with the long awaited de-merger of TANGEDCO. However, the work program for improving investibility has many components. One of those components is improvements in electricity regulation. There are fundamental failures that are evident within Tamil Nadu's electricity sector and TNERC which have been explained in Table 2. The regulator's performance on each of its core functions demonstrates several lapses, signalling the need for urgent reform. Without these, the benefits from the policy reforms and de-merger will not bear fruit.

We propose an implementation plan for enhancing the regulatory capacity of the state regulator by adopting first principles approach. Challenges such as low finance availability for the energy transition, and the high cost of capital in emerging economies place a greater emphasis on electricity regulators to modernise, sooner rather than later. We propose the following steps:

Signal intent for reforms Private participation in generation and distribution has been the stronghold of the state in Tamil Nadu. To signal that things are changing, the Tamil Nadu state government should release a strategy paper about the ideas animating the

[21] Its ex-officio chairperson is the chairperson of the State Commission and its ex-officio members are the members of the State Commission and the Secretary of the Department of Energy. In addition to these members, the state government may nominate up to a maximum of 21 members to "represent the interests of commerce, industry, transport, agriculture, labour, consumers, non-governmental organisations and academic and research bodies in the electricity sector".

rationale for change and the expected impact from these regulatory reforms. This goes hand-in-hand with the institutional reforms initiated for TANGEDCO.

Create legal instruments for reforms A set of changes in the laws, rules and regulations should proceed afterwards. We suggest some of changes that are low-hanging fruits in Table 3.

A working group to implement these reforms Once the legal changes have been made, a working group of individuals with experience across different domains, from both government and private sectors, should be constituted. This group should include eminent industry experts, bureaucrats, lawyers, financial experts and external consultants. This working group will put together the process of implementing these legal reforms.

Organisational design On the basis of the recommendations of this working group, the TNERC should be re-designed to establish sound processes, systems and training, so as to successfully deliver on a modern regulatory mandate.

Many aspects of regulatory reform require amendments to the Electricity Act, and hence the problem statement lies in identifying the levers available to make progress in Tamil Nadu. We are convinced that the state government has many levers and mechanisms it can use, well within its powers under the Electricity Act, to make Tamil Nadu a turnaround story and a model for good electricity regulation nationwide. When these improvements are put into motion, they will materially change the views of private investors on the feasibility of investment in the Tamil Nadu electricity sector. This paper offers ideas on how this can be done.

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