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Building a Robust Intra-State Transmission Sector To Achieve India's Renewable Energy Goals

Increasing Competition Would Accelerate Development of Transmission Infrastructure

Introduction

The increase in Indian electricity demand and corresponding generation capacity addition has driven transmission network expansion at a fast pace in the last few years. For reliable delivery of power, it is critical that transmission infrastructure is developed in a coordinated fashion to match growth in demand and generation. But as a social good, grid expansion must also be delivered in a cost-competitive way.

Over the years, the government has initiated various programs, such as Integrated Power Development Scheme (IPDS) and Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), to build and strengthen the distribution and sub-transmission network in India. A key strength is that India now has a single national synchronous grid with limited inter-regional congestion, and with scope for expanded international connectivity as well. However, important state transmission lines across India remain congested and constrained.

In July 2012 half of India's population experienced grid failure. In October 2020, Mumbai was left in the dark after grid failure resulted in massive power outages, affecting homes and businesses across the financial capital. To ensure better quality and higher reliability of power into the future, transmission investment is needed to augment and strengthen the system.

With the rising share of renewable energy (RE), transmission infrastructure development will be critical to optimally balance ever-higher levels of increasingly low cost but variable RE. Most of the RE generation capacity is connected to state transmission utilities (STUs) so the efficiency and reliability of intra-state transmission networks will be key for evacuation of power.

Despite tremendous growth, the state-level transmission sector continues to be plagued by issues such as right of way, inadequate investment, lack of financing access for state discoms and lack of competition in intra-state transmission development. The intra-state network development is lagging as development is based on a cost-plus regime due to various factors. It is necessary to augment and improve reliability at the state grid level. Unless the weakest link of state-level transmission grid is addressed, there is no point solely investing upstream as the network infrastructure will remain under-utilised.

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Barriers To Development of the Intra-State Transmission Sector

Lack of Competition

Intra-state transmission development is largely done by STUs under a cost-plus regime. Whereas, as per Section 5.3 of the Tariff Policy 2016[1], intra-state transmission system (InSTS) projects are developed by state governments through a competitive bidding process for projects costing above a 'threshold limit'. This threshold limit is to be decided by the State Electricity Regulatory Commissions (SERCs).

It is only recently that states like Uttar Pradesh, Madhya Pradesh and Maharashtra have come up with competitive bids for developing their intra-state transmission system and have successfully awarded InSTS projects at huge discounts. These bids have seen an average reduction in project tariffs of ~35% compared to the cost-plus tariffs calculated as per Central Electricity Regulatory Commission (CERC) norms.

While some SERCs, for example Bihar, Punjab and Rajasthan, have announced threshold limits for intra-state transmission projects, others such as Uttarakhand and Haryana are still working on determining their threshold limits. Moreover, in the recent tariff order Uttar Pradesh Electricity Regulatory Commission (UPERC) directed the State Transco to award new, upcoming projects only through the competitive route. The Government of Maharashtra has already passed a resolution on similar lines, awarding all new projects through the competitive bidding route and has also formed an Empowered Committee on transmission.

Although many states have initiated the process of putting the right framework in place to promote competition, the major states are yet to follow suit.

Bottleneck For RE

In the absence of competition, expansion, upgrade and modernisation of the existing transmission network would be slow and could jeopardise India's energy transition goal to build 175 gigawatts (GW) of renewable energy capacity by 2022 and 450GW by 2030, along with the balancing of peaking power supply.

India has been building renewable energy at a fast pace, with an annual growth rate of ~23% during fiscal year (FY)2015/16 to FY2019/20.[2] Unlike conventional thermal generation capacity which takes 5+ years to plan and build, renewable capacity addition takes less than 2 years to develop, and construction timelines for solar projects can be half this when optimally procured. Thus, in recent years, the lack of intra-state transmission capacity has created a bottleneck for renewable energy.

[1] National Tariff Policy. January 2016.
[2] CEA. Data collected from Installed Capacity Report of various years.

RE Curtailment

Renewable energy power plants enjoy 'must run' status[3] under the CERC (Indian Electricity Grid Code) Regulations 2010 (Grid Code).[4] Data on curtailment is not available in the public domain due to a lack of transparency on the part of State Load Despatch Centres (SLDCs) and discoms.

A Centre for Science and Environment (CSE) report[5] indicates curtailment of around 1-5% for solar power on account of commercial considerations as well grid unavailability. Based on evidence from a few projects and developer feedback, the level of curtailment can be much higher. While the rate of curtailment has gone down over the years, some projects still face this issue.

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Data shared by National Solar Energy Federation of India (NSEFI) for Wardha Solar's Nalwar Project in Karnataka shows an average curtailment of nine hours per day during June 2019. In April 2020, Andhra Pradesh STU issued a telephonic message to certain solar power generators to back down 100% of their solar generation with immediate effect till further instructions.[6]

In 2017, the situation was even worse for some solar power plants. Evidence from three solar projects in Tamil Nadu – Phoebus, Aadhavan and Aditya Shakti – owned and operated by the Greenko Group, shows curtailment was up to 100% on several days during the peak summer months of June and July.

The curtailment can be attributed to systemic issues such as lack of forecasting and dispatch; commercial consideration; demand and supply mismatch; thermal power plants' legacy power purchase agreements (PPA) with a two-part tariff structure; a lack of pumped hydro or battery storage (and green hydrogen electrolysers in years to come) to soak up power in periods of peak RE generation; and grid unavailability and management.[7]

The Forum of Regulators (FOR) 2016 report on 'Scheduling, Accounting, Metering and Settlement of Transactions (SAMAST) in Electricity' provided a roadmap for implementing a robust, scalable and dispute-free scheduling, metering, accounting and settlement system in the states.[8] Further, in January 2020, the FOR published

[3] 'Must run status' means that evacuation of power from renewable power plants (except biomass) should not be curtailed for factors other than on account of grid safety or safety of equipment or personnel.
[4] CERC. Indian Electricity Grid Code. April 2010.
[5] Down To Earth. Renewable energy: Curtailment is a bane. January 2020.
[6] ETEnergyWorld. The reality of 'must run' status of renewable energy projects in India. April 2020.
[7] CEEW. Curtailing Renewable Energy Curtailment. June 2018.
[8] Forum of Regulators. Report on Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST). July 2016.

another report on 'Intra-State Reserves and Ancillary Services for Balancing (SANTULAN)', which provides a roadmap for assessment, creation, arrangement, dispatch and settlement of reserves in the grid.[9] The implementation of the recommendations in these FOR reports at the intra-state level would strengthen grid security by establishing sustainable infrastructure, ensuring adequacy and competency of human resources, while creating a robust framework for deploying flexible resources in the Indian power sector.

Inadequate grid availability is a point of concern in RE-rich states and is slowing down commissioning of new projects. In Tamil Nadu, which has the largest wind capacity of the Indian states at 9.3GW, the intra-state grid is unable to absorb the excess generation due to low demand and is also unable to sell to other states due to limited inter-connections with the national grid. This has led to periods of heavy curtailment. Tamil Nadu, Karnataka, Gujarat and Rajasthan can look forward to moving from net electricity import states to net exporters of low cost, zero pollution, zero emissions electricity, but only with adequate transmission planning given the massive scale of RE investment in planning.

Although PPAs provide legal protection that allows for compensation to RE developers for curtailment of power, except for cases where back-down is on account of grid security or safety of equipment or personnel, the issue still persists. Curtailment leads to substantial losses for developers, who don't account for it when bidding and are often not compensated for it in practice.

A study by the Council on Energy, Environment and Water (CEEW)[10] evaluated the change in tariff due to curtailment factors of 10%, 20% and 30%, with and without 50% compensation for back-down. Curtailment by 10%, 20% and 30% leads to tariff increases of 52 paisa, 93 paisa and Rs1.44 per unit respectively. The resulting change in tariff, even with 50% compensation per unit of curtailment, is significant – 34 paisa increase in the case of a 10% curtailment and 50 paisa higher in the case of a 20% curtailment.

Payments to RE Generators

The distribution companies are under financial stress. A lack of investment to strengthen distribution networks results in the overloading of transformers and lines which makes them prone to frequent failures. Further, state transmission network development depends on the demand requirement of discoms. Due to the poor financial health of discoms, there is latent demand that is not being met and thus transmission strengthening and development by STUs does not happen.

As of July 2020, discoms owed ~Rs10,000 crore to RE generators, comprising 8.8% of the total outstanding amount owed to generators. The amount owed to RE generators increased by ~37% from July 2019 to July 2020.

[9] Forum of Regulators. Report on Intra-State Reserves and Ancillary Services For Balancing (SANTULAN). January 2020.
[10] CEEW. Curtailing Renewable Energy Curtailment. June 2018.

While the overdues are mounting, Azure Power in November 2020 reported an improvement in dues receiveable. It received payment of Rs139 million (US$1.9 million) from the Karnataka discoms following the favourable order from the Appellate Authority.[11]

Table 1: Overdues Outstanding to RE Generators in Selected States

	Amount Overdue (In Rs Crore)		Share of RE in Amount Overdue (%)	
	July 2020	July 2019	July 2020	July 2019
Andhra Pradesh	2536	2025	63.4%	47.7%
Bihar	36	34	5.7%	10.1%
Chhattisgarh	18	7	12.1%	35.2%
Gujarat	205	127	59.7%	34.8%
Karnataka	1052	602	12.1%	16.7%
Kerala	63	0	13.8%	0.0%
Madhya Pradesh	550	353	28.4%	30.8%
Maharashtra	457	233	6.0%	6.3%
Puducherry	27	0	4.8%	0.0%
Punjab	58	24	15.8%	9.9%
Rajasthan	573	345	0.0%	0.1%
Tamil Nadu	3506	2386	18.6%	18.1%
Telangana	1236	1376	24.6%	25.0%
All India	10321	7512	8.8%	9.9%

Source: PRAAPTI portal.

Green Energy Corridor Transmission Development

India is investing in transmission at both inter-state and intra-state level through its Green Energy Corridors. This project enables evacuation of power from RE-rich states to the load centres across the country, while also strengthening the enabling intra- and inter-state transmission networks.

The Green Energy Corridor project (GEC-I) was formulated in 2012 for the realisation of large-scale renewable energy installations. The InSTS project was sanctioned by the Ministry of New and Renewable Energy (MNRE) in 2015/16. The project, which was due to be completed by March 2020, includes about ~9400 ckt km (circuit kilometres) of transmission lines and substations with a total capacity of ~19000 MVA.

[11] Azure Power. Financial Result for the fiscal second quarter 2021, period ended September 30, 2020.

The project is being implemented in India's seven renewable-rich states (Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat, Rajasthan, Maharashtra and Madhya Pradesh) by their respective STUs. The purpose is to generate ~20,000 megawatts (MW) of large-scale renewable power and improve the grid in those seven states.[12] The projects were awarded on a cost-plus basis, with a total project cost of ~Rs10,141 crore (US$1.4bn). The funding mechanism consists of 40% from a Government of India grant (Rs4,057 crore), 20% from state government equity, and 40% from German state-owned development bank KfW (€500m). However, little progress has been made to date.[13]

Growth in Capex and State Contribution

India's transmission infrastructure needs to match the pace of growth in generation capacity, especially renewable energy capacity in the last few years, for the evacuation of power and to meet demand reliably.

With the expected increase in electricity demand over the coming decade, Power Grid Corporation of India (PGCIL) is calling for a US$200bn (Rs13.8 trillion) investment program through 2030 to develop and expand a smart grid system.[14] The transmission network expansion is required not only at the inter-state level but more importantly at intra-state level as most of the RE generation is concentrated in a few states.

Analysis of capital expenditure (capex) undertaken by STUs during the period 2014 to 2020 reveals that the amount has risen over the years. However, more capital needs to be invested to augment the intra-state network capability.

Telangana, Uttar Pradesh, Tamil Nadu, Gujarat and Andhra Pradesh are the top 5 states with reference to the cumulative capital expenditure by their STUs, with a 66% share of the overall capital expenditure undertaken by the 14 selected states.

[12] MNRE. Green Energy Corridor.
[13] Centre for Science and Environment. The State of Renewable Energy in India. A Citizen's Report. 2019.
[14] Mercom India. India's Transmission Infrastructure Struggles to Keep Up With Wind and Solar Additions. August 2019.

Table 2: Capital Expenditure by STUs During 2014 – 2020

#	State	Capital Expenditure – 2014-15 (Rs Cr)	Capital Expenditure – 2015-16 (Rs Cr)	Capital Expenditure – 2016-17 (Rs Cr)	Capital Expenditure – 2017-18 (Rs Cr)	Capital Expenditure – 2018-19 (Rs Cr)	Capital Expenditure – 2019-20 (Rs Cr)
1	Andhra Pradesh		2148	2200	2600	1326	1463
2	Bihar	513	1705		174	950	386
3	Chhattisgarh	568	568	392			
4	Gujarat	2717	2650	2350	2911	2757	2843
5	Haryana	632	656	462	364	842	850
6	Jharkhand	347	616	637	1651	2650	896
7	Karnataka	888	754	1279	1702	1825	2000
8	Maharashtra	1323	1226		1013	1385	1085
9	Odisha	772	1400		866	955	741
10	Rajasthan	1713	2480	2076	1541	1192	699
11	Tamil Nadu	3173	3021		2708	3743	4597
12	Telangana	1340	1730	7287	6090	3226	3968
13	Uttarakhand	243	227	181	213	175	227
14	Uttar Pradesh	1789	3282	3943	3561	3277	7170

Source: Tariff orders by SERCs approving Capital Investment Plans/MYT petitions filed by STUs.

A further breakdown of source of investment for the capital required for state transmission network expansion reveals that state contribution in the form of equity or loans by state government is as high as 90% in the state of Jharkhand.

Table 3: State Government Contribution in Capex by STUs

#	State	Status	Planned/ Projected Capital Expenditure (Rs Cr)	Period	Debt-Equity Ratio	Equity requirement (Rs Cr)	Equity contribution by State Govt. (Rs Cr)	Loan by State Govt. (Rs Cr)	State Govt. contribution in Capex by Transco
1	Andhra Pradesh	Approved in Tariff Order	10696	2019-20 to 2023-24	75:25:00	2674		279	13%
2	Bihar	Approved in Tariff Order; Approved by State Govt	1130	2020-21 to 2021-22	80:20:00	226	141	563	62%
3	Chhattisgarh	Approved	4251	2016-17 to 2020-21					
4	Gujarat								
5	Haryana	Approved in Tariff Order	2125	2019-20 to 2020-21	70:30:00	638	353		33%
6	Jharkhand	Petitioned	2701	2017-18 to 2018-19	90:10:00	270		2431	90%
7	Karnataka	Petitioned	9765	2019-20 to 2021-22					
8	Maharashtra	Approved in Tariff Order	6521	2020-21 to 2024-25	~75:25	1630			
9	Odisha	Petitioned	1156	2020-21			860	415	22%
10	Rajasthan	Petitioned	1600	2020-21	80:20:00	320	275		17%
11	Tamil Nadu	Petitioned	18370	2019-20 to 2021-22	70:30 and 10:90	6425	6425		35%
12	Telangana	Approved in Tariff Order	13644	2019-20 to 2023-24	75:25:00	3411			
13	Uttarakhand	Approved	2282	2019-20 to 2021-22	70:30:00				
14	Uttar Pradesh	Approved in Tariff Order	7170	2019-20	70:30:00	2151			

Source: Tariff Order by SERCs approving Capital Investment Plans filed by STUs.

It's clear that the state governments had to deploy significant financial resources that could have been allocated to other social sectors like health or education for development, strengthening and modernisation of the intra-state grid. State governments' limited resources could be put to better use by allowing more private sector participation in the state transmission sector.

The Standing Committee on Energy pointed out the deficiency of funds and also the mismatch between the goals set and funds allocated for deployment of transmission infrastructure. It also asked for additional funds in its findings to the Lok Sabha Parliamentary Report.[15] With the states already struggling with loss of revenue on account of the rollout of GST and with the COVID-19 pandemic health crisis, the need for competition in the state transmission sector is gaining more importance.

[15] Mercom India. Green Energy Corridor is Underfunded, Says Standing Committee on Energy. March 2018.

Efficiency Gains from Tariff-Based Competitive Bidding

The National Tariff Policy introduced competition in 2011 for the selection of transmission developers in national and state markets through tariff-based competitive bidding (TBCB). The aim was for reliable availability of electricity for all Indian consumers at reasonable rates. It was also intended to ensure the financial viability of the sector and hence, accelerate private sector investment.

The introduction of competition is yielding benefits by driving down construction costs, introducing new technology and new ways of thinking, and promoting timely completion of projects.

Reduction in Tariffs

A comparison of cost-plus tariffs for electricity against tariffs reached by competitive bidding clearly shows the benefits of competition. For cost-plus bids, the tariff-to-project cost ratio is around 14%. But in the case of competitively derived tariffs, the ratio is in the range of 8% to 11%.

Table 4: Intra-State Transmission Projects Awarded Under Tariff-based Competitive Bidding

Project Name	Winning Bidder	Project Type	Revised Cost *(Rs Cr)*	Winning Tariff *(Rs Cr)*	Cost-Plus Tariff *(Rs Cr)*	Tariff to Cost Ratio (TBCB)	Tariff to Cost Ratio (Cost-plus)	Reduction from cost plus tariff
MP – Guna and Bhind	PGCIL	InSTS	900	69	126	8%	14%	**45%**
UP – Rampur-Sambhal	PGCIL	InSTS	910	103	127	11%	14%	**19%**
UP – Meerut-Simbhavli	PGCIL	InSTS	1130	116	158	10%	14%	**27%**
UP – Jawaharpur	PGCIL	InSTS	600	54	84	9%	14%	**36%**
UP – Obra	Adani	InSTS	1100	84	154	8%	14%	**45%**
UP – Ghatampur	Adani	InSTS	2200	196	308	9%	14%	**36%**

Source: Bidding results.

Analysis of projects that were out to bid reveals that competitive bidding resulted in an average tariff up to 45% lower than normative tariffs for certain projects, while the average reduction in project tariffs is ~35% compared to the cost-plus under CERC norms.

Timely Completion of Projects

Projects secured without competition are not only likely to prove more expensive but are also more often delayed beyond the commissioning timelines. A detailed analysis of some of the projects awarded under a cost-plus basis shows that a lot of projects in various states were delayed beyond their scheduled commercial

operation date (SCOD). The Annex summarises reasons for projects awarded on a cost-plus basis, the cost of such projects, the cost overrun and the number of projects delayed from their SCOD.

The projects were delayed on account of various factors such as right of way (RoW), land acquisition, delays in granting of forest clearances etc. The delays led to cost overrun, which in some cases was approved by the SERC. In other cases, the claims are being contested at various courts for settlement.

Way Forward

The Working Group on Power for the Twelfth Plan[16] envisages a growing role for the private sector in transmission, especially in the intra-state networks. While the transmission network expansion is done through the competitive bidding route at inter-state level, expansion at intra-state level is still largely undertaken by STUs.

Competition has increased efficiency by driving down the costs and timely completion of projects. This has not only benefited private players but also the state-owned utilities. Analysis of bid data reveals that even in the competitively awarded projects, PGCIL has been able to lower costs, and return on equity (RoE) from such projects is financially more rewarding than from the cost-plus projects.

Increasing competition from private players, with their strong balance sheets and increasing access to global capital markets, has led to efficiency gains for transmission sector development. Further, global capital majors, such as Government of Singapore Investment Corporation (GIC) and KKR, are helping to drive India's power sector transformation.[17]

Increasing competition from private players has led to efficiency gains for transmission sector development.

IEEFA notes that the transmission sector must be developed in a coordinated fashion that matches increasing renewable energy generation, which is quick to install, although variable in nature. It must also factor in the likely strong growth across India in distributed energy generation, including rooftop solar and solar irrigation pumps. It should further keep pace with the need for a smart grid enabling and monitoring dynamic two-way power flows.

Conventional generation plants take 5 to 7 years to develop and the necessary transmission capacity can be built in 3 to 4 years. By comparison, renewable energy projects take just 12 to 24 months to develop. Therefore, a more responsive

[16] Government of India. Report of The Working Group on Power for Twelfth Plan (2012-17). January 2012.
[17] Financial Express. Few takers for renewable energy! Power transmission capacity addition down 31% in 2019. January 2020.

transmission and distribution (T&D) grid is critical for timely supply of intermittent but low cost clean power, as India continues to develop.

India is deploying large scale renewable energy, and these large solar or wind parks require large capital investment to build transmission lines to send power to consumers. Further, India is promoting distributed generation including rooftop and solar (agricultural) pumps. With increasing penetration of distributed generation, utilisation of the intra-state transmission systems will change.

Recovery of capital costs are distributed across low capacity utilisation from RE projects, which puts pressure on developers and investors. The economic cost of such RE projects can turn out to be four times that of conventional power projects. IEEFA notes that hybrid projects (solar+wind or RE+thermal) should be encouraged for optimal utilisation of the transmission network, thereby reducing system costs.

IEEFA further notes that with the increasing share of renewable energy, continued investment in transmission networks remains crucial to enhance trade in electricity and balancing services across states. A robust transmission system is also a pre-requisite for realising Prime Minister Narendra Modi's vision of "One Sun, One World, One Grid".

IEEFA notes that with the advent of the Real-time Electricity Market and the Green Term Ahead Market (GTAM) the availability of transmission corridors will be key for clearing of transactions on the power exchange. States need to invest resources in expansion and strengthening of the transmission network to avoid market splitting on account of congestion. The private sector can bring in much-needed capital at low cost for building transmission networks. It can also hedge investment risk for the state governments and give them more reliable and compact commissioning timelines.

Transmission is a potentially serious bottleneck to speeding up deployment of renewable energy. IEEFA notes that competition in the transmission sector can help to achieve increased absorption of renewable energy generation without compromising grid security and stability.

Annex

#	State	Reference Document	Commission's Observation/ STU's Submission
1	Bihar	Tariff Order for BSPTCL for FY 2020-21	*Commission finds that there are time overruns in the projects for which the BSPTCL has explained that the time overrun of the projects are due to technical constraints and various aspects such as problems with right of way, land acquisition, etc., requiring the co-operation of other agencies. Commission in the past has been firmly of the view that time/cost overrun must be approved by the Commission with full justification.* *The Commission has noted the reply and directs the petitioner to submit project-wise details with justification preferably before the filing of the annual tariff petition and in no case later than at time of filing tariff petition.*
2	Gujarat	Tariff Order for GETCO for FY 2020-21	*Regarding 220 kV LILO at Kukma S/S from one Ckt. of Shivlakha - Nanikhakhar line, it is observed that delay is because of severe RoW issues. The proposed schedule for commissioning was in FY 2010-11 and original estimate of works was prepared based on actual prices of FY 2008-09. The actual capitalisation for these works is 13.26 Crore as against approved amount of Rs. 6.80 Crore.* … *From the above, the Commission notes that the increase in actual cost of project, is primarily on account of RoW issues, change in scope of work and change in site conditions.*
3	Karnataka	KPTCL's response to preliminary observations of KERC on APR FY 19 KPTCL's response to preliminary observations of KERC on APR FY 18 and ARR for FY20-22	*The achievement of Transmission Lines as per target was not possible mainly due to RoW issues involving land owners demanding higher compensation and deviations of line routing. For instance, Hosdurga - Benkikere 220kV line of 94.88 km was delayed due to severe RoW issues as well as standing crops. Further the Kudgi - Vajramatti line of 158.84 km was delayed due to land owners claiming higher compensation and not allowing KPTCL to carry out the line work. These works are being contested legally at various courts for settlement.* … Multiple works of new projects as well as for augmentation, across 220kV and 400kV level, are delayed due to ROW issues, slow progress by executing agency, delays in supply of material, land acquisition issues, forest clearance delays etc.
4	Maharashtra	MYT Order for MSETCL for FY 2020-21 to 2024-25	*The Commission notes the submission of BEST regarding the increase in cost of the transmission project because of delay in execution and its impact on the end consumers. Hence, the Commission has approved the capitalisation after due diligence and take an appropriate view on time over and cost run of the transmission project. …*
5	Odisha	Tariff Order for OPTCL for FY 2019-20	*The main reasons of delay in completion of few projects (sub-station & line work) are mentioned below:* …

#	State	Reference Document	Commission's Observation/ STU's Submission
			• *Delay in obtaining advance possession of sub-station land also is one of the primary causes for delay in the completion of project. …* • *Acute RoW problems are encountered during construction of the line.* • *Non-availability of clear corridor for construction of the line due to gap between survey and execution requiring change in route alignment during execution.* • *Court cases filed by the land owners at different locations of the line during construction and status-quo maintained on the disputed land by the Court.* • *Delay in getting statutory clearances such as forest clearance etc.* *…* *Due to the above reasons, although the sub-station work is completed in all respects within the scheduled period, commissioning of the sub-station in all respects gets delayed due to delay in completion of the line work. Further, projects are taken up as per the transmission plan and business plan of OPTCL approved by the Commission which creates a gap between work-in-progress and completion, ultimately leading to inflation in cost.* *…* *OPTCL is not completing the projects approved by the Commission within the approved time frame, some being inordinately delayed due to poor monitoring mechanism and absence of accountability in OPTCL. They mentioned that the strategy of OPTCL in execution of projects is not synchronised with downstream network expansion of the state. …* *…* *OPTCL has submitted that the delayed execution of projects and cost & time overrun thereto are primarily due to severe RoW issues and court cases. The Commission also directs OPTCL to clear outstanding issues before incurring any expenditure in consultation with local elected representatives and District Administration to resolve the local RoW issues. Local/ regional benefits of better quality of supply should be informed to the public through mass communication.*
6	Rajasthan	Petition for approval of RVPNL's Investment Plan for FY 2020-21	*The reasons for delay in completion of some schemes/ projects are mainly constraints viz. forest, RoW, clearance from various GoI/ GoR agencies and some contractual issues. …*
7	Tamil Nadu	Petition for approval of TANTransco's Capital Investment Plan for 2019-20 to 2021-21	*The Thervoikandigai 400/230 KV SS is charged at 230 kV level on 15.04.16. 400 kV line works are being delayed due to RoW issues. All efforts are being taken to complete the line work early and to commission the SS by March'20.* *…* *Delay is encountered in some of the schemes under execution by TANTRANSCO. Thervoikandigai 400 KV Substation is charged at 230 KV Level on 15.04.16 due to non-completion of 400 KV line work by RoW issues*

#	State	Reference Document	Commission's Observation/ STU's Submission
			such as court cases/forest clearance. Delay is also being experienced in some of the projects due to slow progress by the Turnkey Contractors. Review meetings at headquarters and at field level are being conducted to sort out the issues and expedite the work.
8	Telangana	Tariff Order for TSTransco for FY 2019-20 to 2023-24	*The projects are generally delayed due to RoW problems, land acquisition and court cases. The details of delayed projects for the 3rd Control Period have been submitted. There has been no cost escalation for the completed projects/schemes as all the works executed as per the purchase order rates.* *…* *The 400 kV Jangaon S/s and connected 400 kV lines were planned to be commissioned during FY 2018-19, but they were delayed due to frequent hampering of works at Jangaon S/s by encroachers and local public and severe RoW issues in erection of towers and stringing of lines. However, after resolving the land issue at Jangaon S/s and RoW issues in erection of towers and stringing of lines, 400/220 kV Jangaon S/s and 400 kV Jangaon-Tippapur QMDC line were commissioned on 14.05.2019, 400 kV Jangaon-Julurupadu QMDC line was commissioned on 26.06.2019.* *Further, the lines and sub-stations of Palamuru-Rangareddy Lift Irrigation Scheme were planned to be commissioned during FY2018-19, but could not be taken up by TSTransco due to delay in payments from Irrigation & CAD Department and these works will be taken up in co-ordination with Irrigation & CAD Department.*
9	Uttarakhand	Tariff Order for PTCUL for FY2020-21	*… After detailed analysis of the reasons submitted by PTCUL for time overrun, the Commission is of the view that for some of the projects, the reasons for delay are solely attributable to the Petitioner, while for some of the projects, the reasons for delay are beyond the control of the Petitioner and for some of the projects, the reasons are a mix of both. For the projects for which the reasons for delay are solely attributable to the Petitioner, the Commission has not allowed any excess IDC pertaining to time overrun.* *…* *The Petitioner submitted that there has been a delay in completion of work on account of reasons mentioned below:* • *Delay of 2 year 5 months in design and engineering work of S/s by the firm;* • *Delay of more than 2 years 7 months in civil work, i.e. earth filling, cable trench, internal road and control room by the firm;* • *Delay due to extension of scope of work;* • *Delay due to selection of suitable type of foundation;* • *Delay due to unprecedented rain during monsoon.* *…* *… The Commission has gone through Form 9.5 submitted by the Petitioner for the said project. The Commission observed that in case of supply, the actual executed completion cost is Rs. 3.92 Crore against the contract value*

#	State	Reference Document	Commission's Observation/ STU's Submission
			of Rs. 3.84 Crore. Further, completed executed cost for erection work and pile foundation was Rs. 1.70 Crore and Rs. 1.31 Crore respectively, against the ordering cost of Rs. 1.70 Crore for erection work and Rs. 1.66 Crore for pile foundation work. Accordingly, there is cost overrun in case of 'Supply' Contract. *…* *Further, with regard to time overrun, the Commission observed that the actual completion period is 32 months against the schedule completion period of 10 months. There is a delay in completion of the project of 22 months. The Petitioner submitted that the reason for delay in commissioning of the project is change is scope and RoW related issues.* *…* *The actual completion period is 38 months as against the scheduled completion period of 18 months. There is delay in completion of the project of 20 months. The reasons for the time over-run submitted by the Petitioner are as provided below:* • *Permission for tree cutting was delayed by 6 months by the Forest Department.* • *Shifting of 33 kV line by UPCL.* • *Demonetisation.* • *Due to change in vendor, supply of cables was delayed by 5 months.* • *Restriction in mining by Hon'ble High Court of Uttarakhand.* • *First time PTCUL constructed a 220 kV S/s on GIS technology and facility for type test and high voltage test of 220 kV cable termination kit was not available in India.*

Source: Tariff Orders by SERCs approving Capital Investment Plans/MYT Petitions filed by STUs.

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