MINUTES OF THE 20TH STATE ADVISORY COMMITTEE (SAC) MEETING OF THE JOINT ELECTRICITY REGULATORY COMMISSION (FOR THE STATE OF GOA AND UNION TERRITORIES) HELD AT CARAVELA BEACH RESORT GOA ON 13TH DECEMBER, 2024 AT 11:00 HRS.

1. The 20th Meeting of the SAC of the JERC (for the State of Goa & UTs) was held under the Chairmanship of Shri. Alok Tandon, Chairperson, JERC.

   The following SAC Members were present:

1.	Shri Alok Tandon	: Chairperson, JERC
2.	Smt. Jyoti Prasad	: Member (Law), JERC
3.	Shri S.D. Sharma	: Secretary (I/c), JERC-Convener
4.	Shri Neel Ratan	: Member
5.	Smt. Neerja Mathur	: Member
6.	Shri H.L. Bajaj	: Member
7.	Shri M.G. Durairaj	: Member
8.	Shri K.C. Parekh	: Member
9.	Shri Sunil Ijari	: Member
10.	Shri Rajesh Kumar Mediratta	: Member
11.	Shri S.K. Soonee	: Member
12.	Shri Anoop Singh	: Member

2. Shri Alok Kumar and Shri Gurdeep Singh were unable to attend the meeting due to their busy schedules. Leave of absence was granted to them.
3. Prof. Anoop Singh, and Shri S.K. Soonee attended the meeting via video conferencing.
4. The Secretary (I/c)/ Convener welcomed all the esteemed members of the State Advisory Committee for 20th SAC Meeting. He briefed about the agenda of the meeting which included the highlights of tariff orders & regulations issued during the calendar year 2024-25, to be followed by the presentations by Shri. S.K. Soonee, Shri Rajesh Kumar Mediratta and Prof. Anoop Singh.
5. The Secretary (I/c)/ Convener with the permission of the Hon'ble Chairperson started the presentation on the agenda Points of the 20th SAC Meeting.

Action points

6. The Secretary (I/c)/ Convener moved to the point number 1 of the agenda which is the confirmation of minutes of 19th SAC Meeting. The Hon'ble Members of the SAC consented to the MoM of 19th SAC meeting, hence approved. The Secretary (I/c)/ Convener further highlighted the action points prepared based on the inputs from Hon'ble SAC members during 19th SAC meeting and the action taken on the same by the Commission.

   a. The Secretary (I/c)/ Convener informed that one of the action point was to ensure the timely filing of tariff petitions from all the licensees. The Commission in regards to the action point, sent letters on 20.05.2024 to the utilities by which the licensees have been directed to file their tariff petitions in a timely manner.

   b. Another action point was "*Development of due diligence process to monitor diesel consumption in island areas*". The Secretary (I/c)/ Convener informed that Diesel is main source of Electricity generation in the island regions of Andaman & Nicobar and Lakshadweep. To develop a due diligence process, the Commission via a tender, has selected Price waterhouse Coopers International Limited (PwC) to prepare the guidelines for the procurement of power from DG sets in order to streamline the procedure. The same is under process.

   c. Other action points specific to the island regions were regarding the feasibility of solar powered smart grid system and solar + BESS system. The Secretary (I/c)/ Convener informed that the letter dated 20.05.2024 regarding the same has been issued to the utilities and response on the same is yet to be received from them.

   d. One action point specific to the state of Goa was regarding the implementation of BESS system to meet the peak demand requirements in the state of Goa. The Secretary (I/c)/ Convener informed that the Electricity Department of Goa has submitted its response recently and the same is being analysed by the Commission.

   e. One action point specific to all the utilities was regarding the submission of deposit to the licensee by the consumers opting for the installation of rooftop solar. The Secretary (I/c)/ Convener

		Action points
	informed that the Commission has received the response regarding this from Electricity Departments of Goa and Puducherry respectively in which they have submitted that they are not asking for any kind of deposit from the consumers opting for the installation of rooftop solar.	
f.	Another action point specific to all the utilities was the introduction of separate consumer category for seasonal consumers. The Secretary (I/c)/ Convener informed that the Commission has asked the stakeholders to provide their suggestions/ comments on Draft JERC (Retail Supply Tariff Structure) Guidelines, 2024. The provision regarding the seasonal consumers have not been incorporated in the guidelines yet and the same may be considered at a later stage.	
g.	One action point was regarding the revival of old posts of the Commission. The Secretary (I/c)/ Convener informed that instead of revival of old posts, the Commission has sent a proposal for the creation of additional 44 number of posts. The same is under active consideration by the Ministry of Power.	
h.	One action point was regarding the additional CGRF at each licensee level. The Secretary (I/c)/ Convener informed that the Commission has recently notified their updated "*JERC (Consumer Grievances Redressal Forum and Ombudsman) Regulations, 2024*". The emphasis has been given on creation of CGRF at sub-division, division, circle, zone and company level such that maximum resolution to the retail consumers is made available.	
i.	Another action point was the review of feedback from consumers having their grievances addressed by the CGRF as suggested by Sh. Alok Kumar during the 19th SAC meeting. The Secretary (I/c)/ Convener informed that the feedback is being received by the consumers and the same is reviewed by the Ombudsman of the Commission. As of now, positive feedback has been received from the consumers.	
j.	One of the action point was to put a cap on the incremental charge on green tariff for a period of 2 years to make green power more	

economical for retail consumers. The Secretary (I/c)/ Convener informed that the Commission has amended its Open Access regulations on 13.08.2024 to incorporate the provisions of Green Tariff. Based on the same, the Commission has issued orders on incremental green energy tariff for all utilities (except islands).

k. The last action point was "*Installation of green hydrogen plants or EV charging stations to create a market for green power*". The Secretary (I/c)/ Convener informed that the Commission is in discussion with the licensees regarding its implementation. For EV charging stations category, the Commission has created the category and defined the rates for EV charging station category based on guidelines issued by the Ministry of Power.

7. The Secretary (I/c)/ Convener further briefed on insights of tariff order for FY 2024-25 through a presentation. Below are the points discussed applicable to all the utilities:

a. The Secretary (I/c)/ Convener informed that the public hearing of the tariff orders have been conducted in offline mode except for ED Lakshadweep where public hearing is conducted through online mode. He quoted that as per Section 64 of the Electricity Act 2003, the tariff order is required to be issued within 120 days after the receipt of the petition. To adhere to the model code of conduct imposed in March 2024 and ended 6th June 2024, the orders were issued in June 2024. Only Chandigarh had delayed filing the petition causing the order to be issued on 27th July 2024.

b. The Secretary (I/c)/ Convener presented the insights from the key parameters of tariff orders issued for FY 2024-25 in terms of Energy Sales, Number of Consumers, Connected Load, Peak demand, Average Cost of Supply (ACoS), Average Billing Rate (ABR), etc. for all licensees.

c. Smt. Neerja Mathur enquired whether the peak load is increasing year by year for the utilities. She suggested that if that is the case, then the utilities must draw up Power Procurement Plans, to cater to this increase in load, in the most economical and reliable manner.

Action points

1. Direct the utilities to increase their tied up capacity in case of year on year increase in peak demand.

d. The Secretary (I/c)/ Convener highlighted the commercial parameters of each utility. He mentioned that tariff hike is implemented for every utility. However, for Puducherry, tariff hike has been coupled with a regulatory surcharge of 10% in order to liquidate its regulatory asset. He mentioned that the average cost of supply (ACoS) and average billing rate is equal except for Goa, Lakshadweep, and A&N Island. The net revenue gap is supported by the government of Goa, Lakshadweep and A&N island through budgetary support.

e. Smt. Neerja Mathur enquired if there is no budgetary support for rest of the utilities. The Secretary (I/c)/ Convener confirmed the same. The Chairperson also added that the gap is smaller in the state of Goa as compared to the islands of Lakshadweep and Andaman & Nicobar. Due to larger gap for the island regions due to high ACoS, the utilities in the region asked for around 40% of tariff hike but the Commission has restricted the tariff hike to around 20%.

f. Smt. Neerja Mathur asked that a scenario may happen where a Government pays less amount to the utility to recover their gap on actual basis as compared to the gap approved in the tariff order. It may effect the capital expenditure of the utility, hence further effecting their various activities like augmentation, addition of lines, etc. It was clarified that Governments are actually providing more amount than the gap approved to the Electricity Departments such that they do not face any issues related to their capital expenditure.

g. Shri Rajesh Kumar Mediratta informed that in Lakshadweep and A&N island, ACoS revolves around Rs 48.00/kWh & Rs 36.00/kWh respectively, due to the consumption of diesel. He suggested that solar + BESS or gas will be much cheaper as compared to diesel.

h. The Chairperson informed that the Commission has formally communicated to the utilities in the island to explore the possibility of solar + BESS systems. Their plans shall be reviewed during the

Action points

upcoming RPO Suo-Moto hearing. Also, study is being under taken to estimate the standard consumption of diesel for the generation of electricity and the same is expected to be finalised within next 2-3 months.

i. Shri Sunil Ijari suggested that wind energy may be explored for island region. He also asked that if Chandigarh and DNHDD are not running in profit (based on the tariff order highlight), then why are they paying the income tax? The Secretary (I/c)/ Convener clarified if a company shows no profit but earns some revenue on account of RoE then tax liability has to be accounted for.

8. The Secretary (I/c)/ Convener explained the next agenda item on Regulations amended by the Commission during FY 2024-25 and briefed the same to the SAC members. Below are the regulation-wise important points discussed:

a. JERC (Standard of Performance for Distribution Licensees) (First Amendment) Regulations, 2024

i. The Secretary (I/c)/ Convener briefed that reliability parameters (CAIDI, CAIFI, MAIFI, SAIFI, SAIDI) are introduced in amendment of the regulation. These parameters will be filed by the respective distribution licensees in their business plan petition for approval by the Commission.

ii. The timelines for providing the electricity connections have been updated as per the directions given by the Ministry of Power (MoP) in their Rules.

iii. The compensation schedule is amended as per the latest directions given by the MoP. Earlier the mode of providing the compensation was manual which has been updated to Automatic Mode as per the MoP directions.

iv. Smt. Neerja Mathur asked if the MoP has specified the compensation parameters and rates. The Secretary (I/c)/ Convener replied that MoP guidelines have made the compensation to be implemented in automatic mode, and the compensation parameters and rates have been decided by the Commission.

Action points

v. Smt. Neerja Mathur asked that if the Commission receives any petition owing to the non-compliance of the Standard of Performance. The Secretary (I/c)/ Convener clarified that the complaint on the same is to be submitted to the CGRF to decide as per regulations. Shri Rajesh Kumar Mediratta further asked if the compensation is provided based on the final verdict of CGRF. The Secretary (I/c)/ Convener confirmed the same and added that the CGRF while making its judgement will refer to the Standard of Performance and Supply Code Regulations of the Commission. Shri Rajesh Kumar Mediratta asked if the Commission has received any such complaints recently. The Secretary (I/c)/ Convener responded that one such case has been reported for the UT of Chandigarh. ("*Chandigarh CGRF orders dated 21.11.2024 & 26.11.2024 on Complaint Nos. F-27/2024 & F-31/2024 respectively*")

vi. Shri Rajesh Kumar Mediratta asked how should consumer be made aware of such a compensation mechanism in the SoP so that they can avail it. He added that the distribution licensees may be directed to issue a notice in newspaper which may contain information related to SoP and contact details (for example email id) of the CGRF. In this way, consumer will get to know the SoP parameters and the first contact to use in order to register their compliant in case of non-compliance of SoP.

vii. Shri Neel Ratan appreciated the incorporation of automatic compensation mechanism and said that the consumer will be benefitted by the same.

viii. Shri HL Bajaj added to the suggestion of Shri Rajesh Kumar Mediratta that the SoP and contact details of the CGRF should be mentioned in the electricity bills itself. The Hon'ble Member further suggested that same shall be mentioned on the website of the distribution licensees. The Secretary (I/c)/ Convener said that in order to increase the consumer awareness, the website shall contain the details of SoP and CGRF contact, while the same

Action points

2. Utilities to be directed to publish the compensation schedule through Newspaper/Website.

3. Direct the utilities put the link of website on their electricity bills where the website will display the SoP and contact details of CGRF.

website shall be mentioned on the electricity bills of the licensees.

ix. Smt. Neerja Mathur suggested that CGRF may conduct regular meetings on consumer awareness programme. The Member (Law) confirmed that the CGRF are already doing the same.

Action points

b. JERC (Goa & UTs) (Procurement of Renewable Energy) (Fifth Amendment) Regulations, 2024

i. The Secretary (I/c)/ Convener briefed about the categories of different types of RPO, criteria of renewable energy projects and RPO trajectories from FY 2024-25 to FY 2029-30 which have been incorporated in Regulations based on the guidelines issued by MoP.

ii. The Secretary (I/c)/ Convener further added that the RPO for FY 2023-24 and action plan of RPO compliance for FY 2024-25 shall be discussed with all the utilities during the RPO suo-moto hearing that is scheduled to be conducted on 17.12.2024 and 18.12.2024.

c. JERC (Goa & UTs) (Solar PV Grid Interactive System based on Net Metering & Gross Metering) (First Amendment) Regulations, 2024

i. The Secretary (I/c)/ Convener highlighted the major change in the Amendment with respect to the Principal Regulations, which includes the introduction of gross metering and net billing/ net feed-in mechanism for the systems of size more than 500 kW.

ii. The change also includes the direction of MoP regarding the installation of solar rooftop system upto 10 kW without the requirement of any technical feasibility study.

d. JERC (Goa & UTs) (Electricity Supply Code) (Third Amendment) Regulations, 2024

i. The Secretary (I/c)/ Convener highlighted that one of the major changes incorporated in the amendment was the timeline of

providing the electricity connection which is same as the provisions incorporated in the SoP Regulations.

ii. The Secretary (I/c)/ Convener further added that the Commission has classified the connections to EV Charging Station of capacity upto 150 kW as LT connection. The LT limit for other consumers is 100 kW. He further clarified that a HT consumer pays by itself for the upgradation or augmentation of infrastructure, while the amount of the same is socialised in case of an LT connection.

iii. Shri HL Bajaj commented that the timeline of new connections may be provided to the distribution licensee in case of requirement extension or enhancement of the distribution network. The Secretary (I/c)/ Convener clarified that such provision has already been incorporated according to which a maximum of 90 days is given to the distribution licensee.

e. JERC (Goa & UTs) (Connectivity and Open Access in Intra-State Transmission and Distribution) (Third Amendment) Regulations, 2024

i. The Secretary (I/c)/ Convener highlighted the major changes of the Regulation which includes the eligibility of the consumer, Open Access Methods & Central Portal for Green Energy Open Access Application which are incorporated based on the Green Energy Open Access Rules notified by the MoP.

ii. The Secretary (I/c)/ Convener further highlighted the green energy open access charges payable by the consumer to the distribution licensee.

iii. He further highlighted the exemption provided to the consumers in Cross Subsidy Surcharge and Additional Surcharge and the banking provisions.

Action points

f. JERC (Goa & UTs) (Consumer Grievances Redressal Forum and Ombudsman) Regulations, 2024

i. The Secretary (I/c)/ Convener highlighted the creation of additional CGRF by adding the provision to create CGRF at sub-division, division, circle, zone and company level.

ii. The Forum to consist of 4 members.

iii. The Commission to nominate one independent member who is familiar with the consumer affairs.

9. The Secretary (I/c)/ Convener requested to Shri. S.K. Soonee for the presentation "*Discussion on Demand Flexibility & Demand Response*".

a. Shri S.K. Soonee started with greetings to the members present and regretted for being unable to join physically. He said that Goa's per capita consumption of electricity is almost double of India's average and DNH & DD also has a similar pattern of consumption. The peak demand of Goa and DNH & DD are around 800 MW and 1400 MW respectively. The CAGR is of the order of around 6% to 7%. These regions have few internal generation stations and mostly depend upon external sources of electricity. He referred to four documents, the Resource Adequacy Report By CEA, the Demand Pattern Analysis Report by Grid India, and vintage documents 24x7 Supply and Distribution System Operator Reports recently produced by the Department of Science and Technology. He mentioned that according to the resource adequacy report by CEA, the Expected Energy Not Served would be in the range of 40% to 45% by year 2035 in case adequate generation capacity is not added. He mentioned that only the supply-side approach is not sufficient to counter such scenario, which is neither affordable nor sustainable. Demand-side participation is a must for all utilities, particularly those utilities that are relying heavily on outside power. So the integration of demand response strategy is extremely important. He further added that he with his team have done a study for the state of Goa which can be extrapolated to regions like DNHDD and the island

Action points

regions. He invited Dr. Alejendro for the presentation on "*Demand Flexibility Regulatory Approaches for Goa*". The presentation is annexed as Annexure 'A'. He also thanked the Chair for this opportunity and showed interest for further discussion on the topic.

10. Dr. Alejendro greeted the members and presentation was made on "*Demand Flexibility Regulatory Approaches for Goa*". The details of the presentation are placed at Annexure 'A'.

11. Smt. Neerja Mathur stated that the time of use tariff and TOD is the responsibility of the Electricity Regulatory Commissions. Besides that, fixing the peak hours and off-peak hours for TOD/ToU tariffs would be a dynamic process. She added that fixing the peak hours will vary from utility to utility and day to day of each year. The DISCOMs will needs to communicate the same to the consumers. She asked that if any state in India have undertaken such kind of exercise in India.

12. Shri S.K. Soonee replied that it is a very involved exercise. He suggested that the consumers should be asked regarding the compensation they expect to reduce their demand during peak hours. Reduction in peak demand will lead to the reduction in CAPEX which will result in lower tariff for all the consumers. The Commission can direct the DISCOMs to suggest such proposals. The main idea lies in the fact that some willing consumers will participate in this process who will get financial incentives and also help the stability of the overall system.

13. The Secretary (I/c)/ Convener thanked Shri S.K. Soonee and Dr. Alejendro for their presentation and requested Prof. Anoop Singh to start his presentation.

14. Prof. Anoop Singh greeted the members and presentation was made on "*Planning for Resource Adequacy: Experience from study of Uttar Pradesh and Chhattisgarh*". The details of the presentation are placed at Annexure 'B'.

15. The Secretary (I/c)/ Convener thanked Prof Anoop Singh for his presentation and requested Shri Rajesh Kumar Mediratta to start his presentation.

Action points

4. Utilities may float the proposal to consumers to participate in load reduction programme during peak hours.

Action points

16. Shri Rajesh Kumar Mediratta started the presentations on "*Power Market Update*".
17. He highlighted the difference between the growth rate of total demand and peak demand which are 5% and 12% respectively during first half of FY 2024-25. Also, the states with highest increase in demand during the same period are Punjab, Uttar Pradesh, Haryana & Uttarakhand. He also highlighted that current share of renewable energy generation in the grid (solar, wind and hydro generation resources) is currently at a nominal value (25%) which have a large scope to grow (upto 40% in next 5 years).
18. He mentioned that the domestic coal production increased 6.06% and imported coal prices are also favourable and stable around 52$/ton which has resulted in lower prices of electricity from the power exchanges.
19. Shri Mediratta highlighted the share of various sources in the installed capacity of the country. Installed capacity renewable energy has increased from 417 GW in Apr-2023 to 454 GW in Oct-2024. The share of thermal and hydro have gone down from 57% to 53% and 11% to 10% respectively. Share of generation from Solar and Wind are growing much faster pace (from 16% to 20% and 10% to 11% respectively).
20. He also highlighted the evolving structure of products in the power exchanges. New green products have been added in the exchanges that were not present during last 3-4 years. He added that a buyer in the exchange can place its bid in Green Day Ahead Segment in the beginning and if it does not get cleared then the same bid can be placed under Day Ahead Market. This kind of product is currently found no where in other parts of the world.
21. One of the major highlights shown was Average MCP (Market Clearing Price) across the segments of GDAM, DAM and RTM from the period December 2023 to November 2024. The average MCP of GDAM segment was highest followed by average MCP of DAM and RTM segments. The average MCP of DAM was higher the average MCP of RTM for most parts of the year except the months of December 2023 and November 2024.

22. He highlighted the analysis of a typical winter day where during the evening hours, the buy bids (MW) surpass the sell bids (MW) during evening hours which lead to the higher average MCP during that time.

23. Shri Mediratta subsequently highlighted price and volume of RECs from January 2023 to the period of November 2024. It was found that the price of 1 REC was Rs 1000 until April 2023 after which its price keep declining and it has reached to a level of Rs 150 during the month of November 2024. The lower prices of RECs will make it easier for the obligated entities to comply with their RPO targets.

24. Shri Mediratta highlighted via examples that states/UT of Goa and DNHDD can optimize their power purchase cost by placing their bids in DAM segment instead of procuring power from plants having higher variable costs.

25. He concluded the presentation with key points are following:

    a. Green DAM - higher liquidity on the sale side and opportunity to procure competitive green power for RPO compliance.

    b. Low power prices lead to better coal production, lower import prices & lower demand and all leading to opportunities to optimize through exchanges.

    c. REC prices have fallen drastically less than 20 p/kWh, an opportunity to fulfill RPO compliance.

26. Shri Mediratta also commented on the importance of procurement of power from power exchanges. He explained that obligated entities may always be in shortage of renewable power since the RPO compliance trajectory is increasing. Hence they may not be able to meet their targets with tied up capacity alone. The presentation is attached as Annexure 'C'.

27. Shri S.K. Soonee appreciated the presentation of Shri Rajesh Kumar Mediratta regarding the optimisation of power purchase cost of the DISCOMS. He further added that states/UT of Goa and DNHDD while meeting their demand and satisfying all the constraints, can discover their shadow prices by running Security Constrained Economic Dispatch (SCED). After the discovery of the shadow price, power exchange can be used to procure physical power and this will reduce the overall power purchase cost.

Action points

5. Exploring the possibility of implementation of SCED in order to optimize power purchase costs.

Action points

28. The Secretary (I/c)/ Convener thanked Shri Rajesh Kumar Mediratta for his presentation.

29. The Secretary (I/c)/ Convener with the permission of the Chair presented additional agenda item on Regulations amended by the Commission during FY 2024-25 and briefed the same to the SAC members. Below are the regulation-wise important points discussed:

a. JERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2024.

i. The Secretary (I/c)/ Convener summarized the general principal of the regulation which include control period project under the Generic Tariff and Project Specific category and tariff period of each project.

ii. He then summarized the normative financial parameters like deprecation, loan tenure, etc for the renewable energy projects.

b. JERC (Generation, Transmission and Distribution MYT) Regulations, 2024.

i. The Secretary (I/c)/ Convener summarized the major changes in the current MYT Regulation as compared to previous MYT Regulation like inclusion of Mid-term review, removal of Annual Performance Review exercise, etc.

c. JERC (Medical Facility) Regulations, 2024.

i. The Secretary (I/c)/ Convener highlighted that the Medical Regulation is finalised based on the Service Regulation of JERC.

ii. The CGHS guideline has been used as a base for Indoor Treatment Reimbursement of Regular Staff of JERC.

iii. Employees may claim reimbursements from both medical insurance and the Commission provided that the total reimbursement does not exceed actual medical expenses.

iv. The Chairperson of the Commission has the authority to relax any provision of these regulations.

30. At the end of the presentations, the Secretary (I/c)/ Convener requested the members for suggestions/comments.

31. Sh. Sunil Ijari informed that he has submitted his points for the SAC meeting. These points have been mentioned below:

a. **Lack of N-1 System Concept:** The electricity network lacks the N-1 System concept, causing industries to face frequent power shutdowns for maintenance work, construction work and also during breakdown by the electricity department or DISCOM.

b. **Proper Maintenance Strategy:** The electricity department or DISCOM should follow proper guidelines or maintenance strategies for lines and substations, leading to frequent breakdowns and power disruptions that impact industries.

c. **Notification of Planned Shutdowns:** Planned shutdowns should be declared well in advance, at least seven days in advance so that affected industries can align their maintenance activities.

d. **Lack of Parallel Network Upgradation Based on Load Growth:** There is no proper system in place for parallel upgrades based on load growth forecasts. As a result, systems often run at full load, leading to more breakdowns, load shedding, higher transmission and distribution losses, and tariff increases.

e. **Equipment Replacement Based on Health and Age:** There is no proper system for timely equipment replacement based on health conditions and age. This lack of proactive replacement leads to frequent flashovers in substations.

f. **Absence of sufficient Emergency Spare Parts and Equipment:** The electricity department should maintain a sufficient stock of emergency spare parts and equipment.

g. **Lack of Relay and Protection System Expertise:** The electricity department must have a team of experts for

Action points

6. A detail reply from Licensee to be taken.

maintenance. The relays and protection system should be periodically inspected for protection of overall systems.

Experts can adjust relay settings based on load growth and system changes, and upgrade systems to incorporate the latest technology.

h. **Old Protection Systems:** Many substations operate with old protection relays, which cause false fault interruptions. An immediate upgrade is necessary for these relay and protection systems.

i. **Online Access to Tariff Meter Readings:** Consumers should have online access to real-time tariff meter data to monitor their consumption and load accurately.

j. **Delayed Availability of Tariff Records:** Detailed records related to tariffs and FPPCA are not made available on the DISCOM website promptly. The details viz. FPPCA calculations and copies of power purchase bills should be uploaded on the website promptly.

k. **Placement of Tariff Meters:** According to CEA regulations, tariff metering should be accessible at the premises entry point, where it is accessible to consumers. However, DISCOMs place meter at the transformer, substation, or supply end. Additionally, express feeder consumers have their tariff metering done from the substation or supply end.

l. **Compensation/Insurance for Power Failures:** Given the nation's growth outlook and competitive market, a provision for compensation or insurance should be introduced for industries facing frequent power failures. If there are any provisions it should be looked into.

m. **Consumer Grievance Redressal Forum (CGRF) Accessibility:** It is observed that the appointment of two members of CGRF in UTs of DNH&DD is not compliant with the guidelines contained in the Regulations. The CGRF may be constituted on an immediate basis in the UT of DNH&DD.

Action points

n. **The Criteria for LT Connection Consumers:** The Criteria for LT connection consumers at present is limited up to 95 kW in UTs of DNH. Recently the state of Gujarat has increased the LT connection load up to 150 kW the same must be implemented in DNH also since the majority of LT consumers are MSME units and they are the backbone of Industries. Hence, increasing the load of LT connections up to 150 kW in DNH may be considered.

o. **Supply Code Review Panel:** The Electricity Supply Code Review Panel constituted by nomination of three members from Industrial consumers / Chambers of commerce is not yet constituted to review the supply code 2018 on a periodic basis in the UTs. (Ref. Chapter # 3 clause no 3.1.(4) of JERC Supply code regulations, 2018) for State of Goa & UTs.) The Review Panel may please be constituted on an immediate basis in the UT of DNH.

32. Sh. KC Parikh informed that DISCOMs charged FPPCA on fixed charge and energy charged in a bill of October where the Commission's order clearly mentions FPPCA charge only on energy charges. He told that he tried to reach the DISCOM regarding the issue but the response from the DISCOMs has not been received. He suggested that the Commission should give suitable direction to the DISCOMs.

33. He also questioned the 14.7% of FPPCA charges by the DISCOM for which no clarity has been provided. He suggested that a Power Purchase Committee should be constituted by the Commission if it is not constituted already. He further demanded that members of Siddi Packers and Silvassa Industries & Manufacturers Association should form the part of the Committee.

34. He suggested that the Commission should direct the distribution licensee to put all their power purchase bill (which will contain net amount of power purchase and the amount paid by them) on the website. He explained that the DISCOMs are not transferring the rebate in power purchase cost to the end consumers.

Action points

7. Licensees to be asked regarding the methodology while charging

8. Power Purchase Committee to be formed by the Distribution Licensee which will include the Members of relevant Associations.

9. Utilities to put their power purchase bill on their websites.

35. Sh. Rajesh Kumar Mediratta suggested that whenever the Commission issues the draft Regulations, the same may be shared with SAC members.

36. The meeting concluded with a Vote of Thanks to the Chair.

(SD Sharma)
Secretary (I/c), JERC

Annexure-A

13 December 2024

Demand flexibility
Regulatory approaches for Goa

Joint Electricity Regulatory Commission (for the State of Goa and Union Territories), India

RAP

Structure

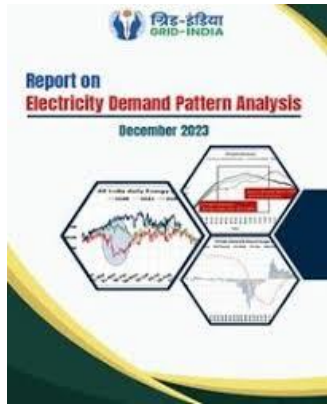
- Benefits of demand flexibility programmes
- The time is right
- Two types of demand flexibility programmes for consideration
- Peak load reduction
- Load shifting

Benefits of demand flexibility programmes

	reliability	cost	environment
Reduced load during system tightness	✓ Helps manage system without load shedding	✓ Saves on capital costs of wires and generation	✓ Peak capacity typically carbon intensive
Reduced RES curtailment		✓ Cheap RES is not wasted	✓ Clean RES is not wasted

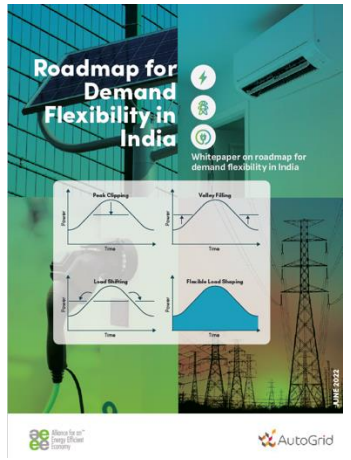
- Benefits will become more apparent as
  - peak load grows with economic growth and electrification
  - more RES is added

Demand flexibility – its time is coming



- Grid India "Report on Electricity Demand Pattern Analysis"
  - *impact of Time-of-Day (TOD) tariffs (as per MoP rules) on demand pattern would have to be studied over a longer period*

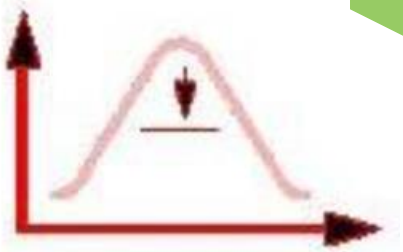
- India's Department of Science and Technology "Transforming the Indian Power Sector…"
  - *exploring and utilizing the inherent flexibility requires a tariff that will enthuse*



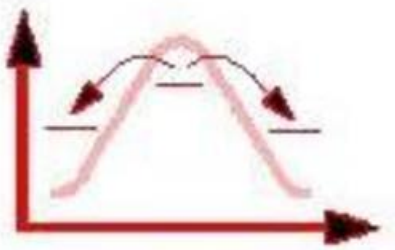
- AEEE & AutoGrid "Roadmap for Demand Flexibility in India"
  - *Case study in a single State suggested economic benefits could be a net savings of INR 120 – 175 million*

Demand flexibility programmes for consideration of JERC

Peak load reduction programme

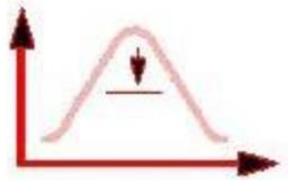


Load shifting programme

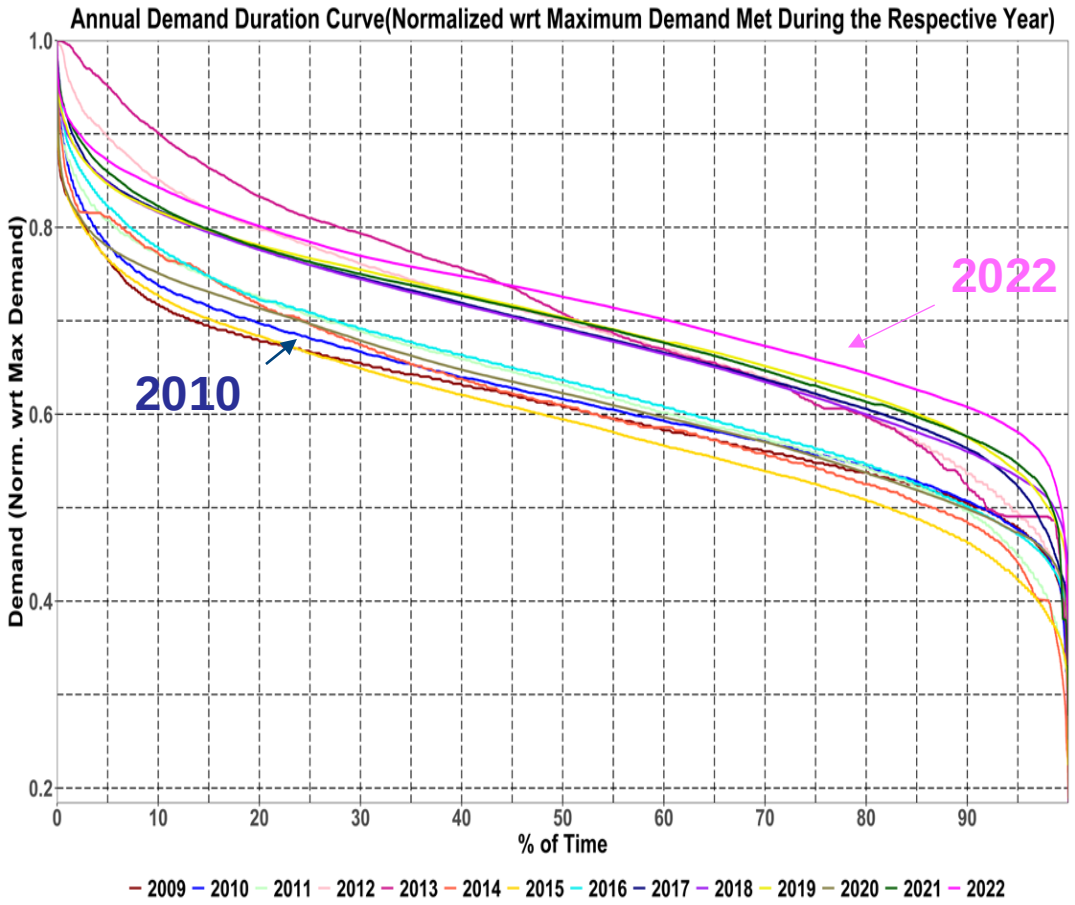


Seldom used assets are expensive

Peak load reduction programme



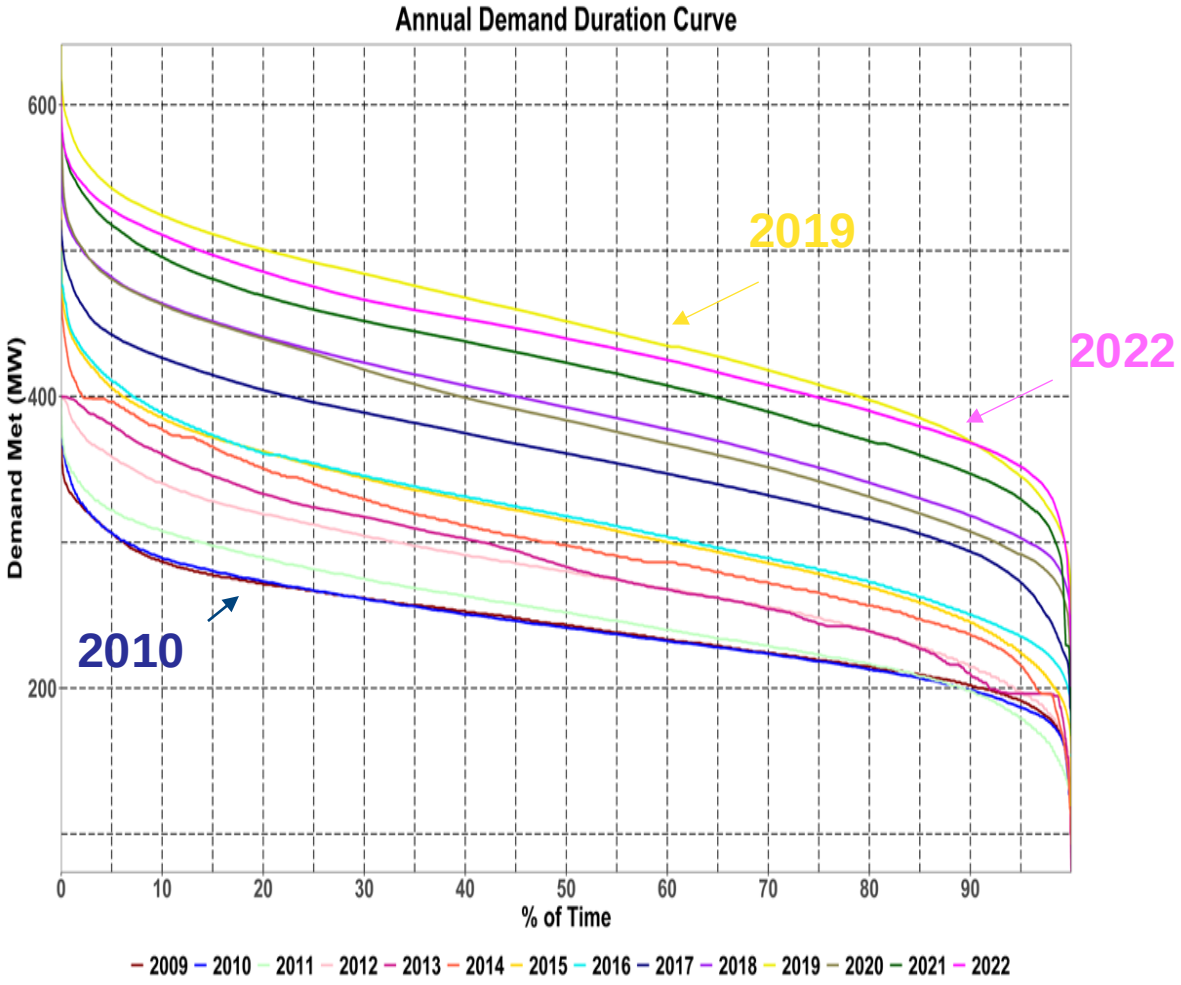
4.2. Annual Demand Duration Curve: Normalized with respect to Maximum Demand met

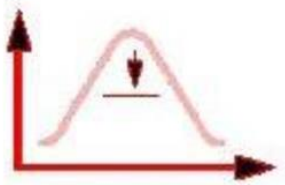


- In 2022, the 10% of capacity to meet peak load is deployed only around 2% of the year
- The assets deployed to meet these peak loads for a few hours in a year remain under-utilised for the rest of the hours in the year
- Might demand side flexibility offer a cheaper alternative?

"Electricity Demand Pattern Analysis," Volume II for Goa, published in December 2023, by Grid-India at https://posoco.in/wp-content/uploads/2024/01/States_Vol-II_v3.pdf

Peak loads expected to grow



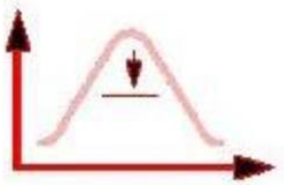


Peak load reduction programme

- Over the years, the peak has generally been growing
- With electrification and economic growth, peaks are likely to grow further
- 'Resource Adequacy' study for Goa indicates a CAGR of 7% or more in demand growth over the next decade.
- Business as usual solutions likely to be expensive
- Demand flexibility is an attractive alternative

"Electricity Demand Pattern Analysis," Volume II for Goa, published in December 2023, by Grid-India at https://posoco.in/wp-content/uploads/2024/01/States_Vol-II_v3.pdf

Recommendations

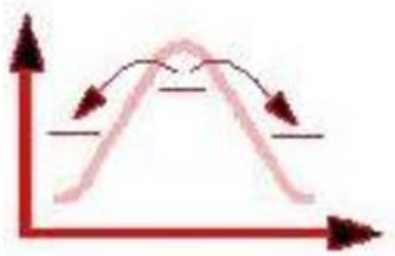


Peak load reduction programme

Recommendations

- Regulators to ask DISCOMs to develop DF programs that focus on reducing high peak loads
- Can unlock cost savings – capex for wires and peaking generation – that reduce consumer costs
- May require DISCOMs to collaborate with stakeholders in developing the DF program
- Commission can articulate some of the programme parameters such as auctions for demand reduction
- JERC can initiate a docket and require DISCOMs to develop a DF program with input from stakeholders, and file it for ERC review

Load shifting programme



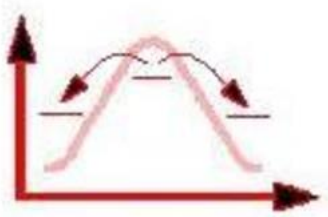
Load shifting programme

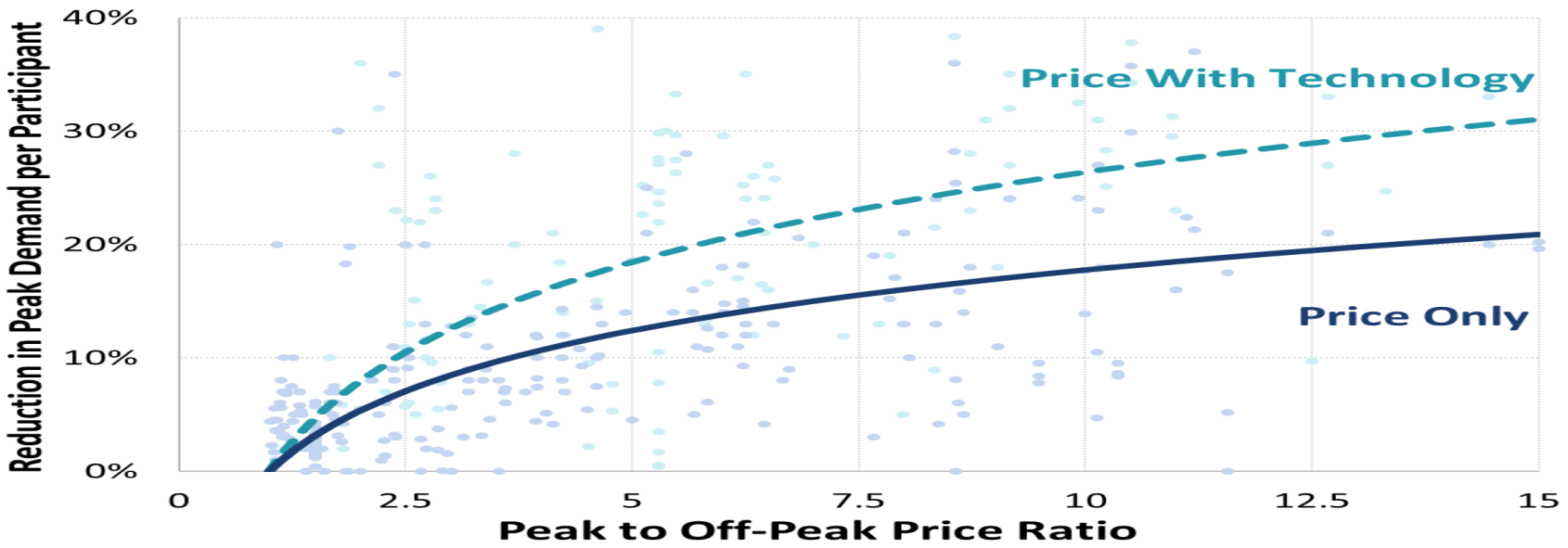
- granular price signals could be the primary tool to affect consumer behavior
- sophisticated market-based Day-Ahead market price or Real-Time market price would be ideal
- simple Time-of-Use (TOU) Tariffs could be a good start
- the bigger the peak to off-peak price ratio, the bigger the response
- shift in usage could even be larger with enabling technologies on the consumer end and consumer education

next slide

Price ratios and technology matter

Load shifting programme

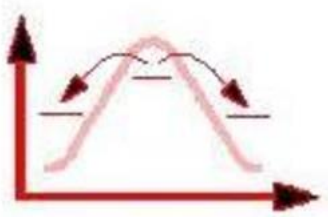


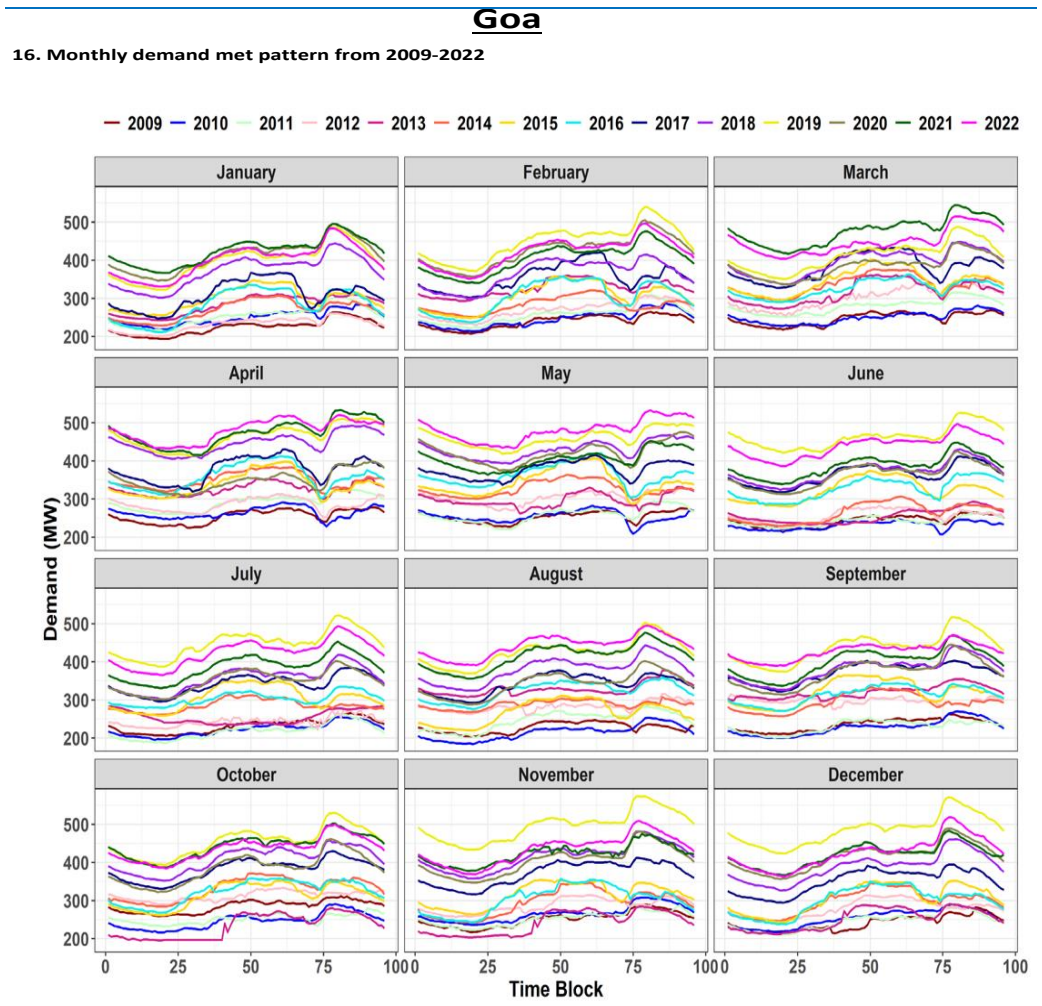


Source: https://www.brattle.com/wp-content/uploads/2021/06/21941_best_practices_in_tariff_design_-_a_global_survey.pdf

Goa peaks typically occur in evening

Load shifting programme



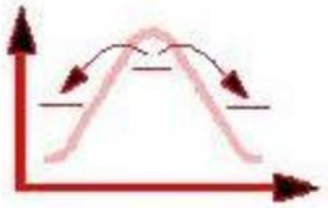


- TOU tariffs may focus on evening

Source: https://posoco.in/wp-content/uploads/2024/01/States_Vol-II_v3.pdf

Recommendations

Load shifting programme



Recommendations

- Regulators to considering requiring DISCOMs to develop more granular TOU tariffs and send strong price signals to motivate consumers to shift load
- May require DISCOMs to collaborate with stakeholders in developing the TOU programme
- Pilots
- Considerations include opt-in or opt-out, peak to off-peak price ratios, information and education, customer protection, metering
- RAP would be glad to collaborate in the design if such programmes

About RAP

Regulatory Assistance Project (RAP)® is an independent, global NGO advancing policy innovation and thought leadership within the energy community.

Learn more about our work at raponline.org

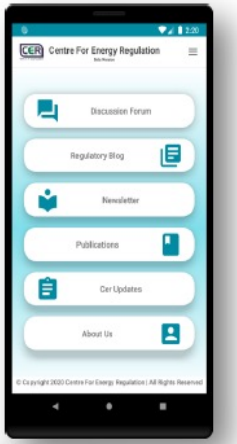
Annexure-B

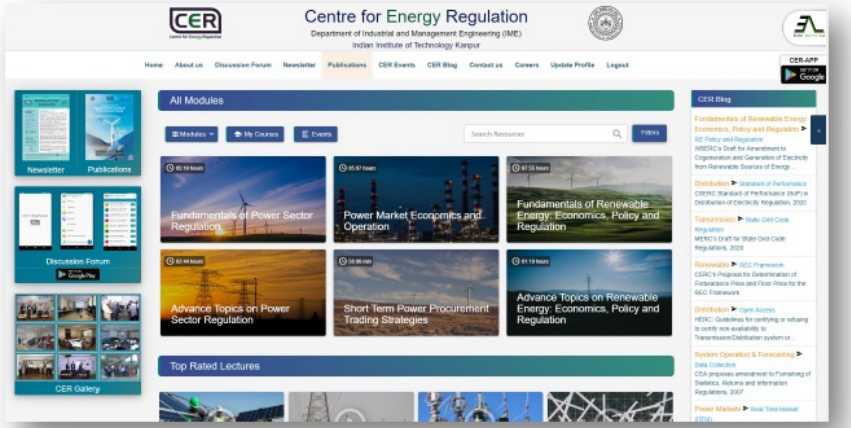
Centre for Energy Regulation
Department of Management Sciences
Indian Institute of Technology Kanpur- 208016

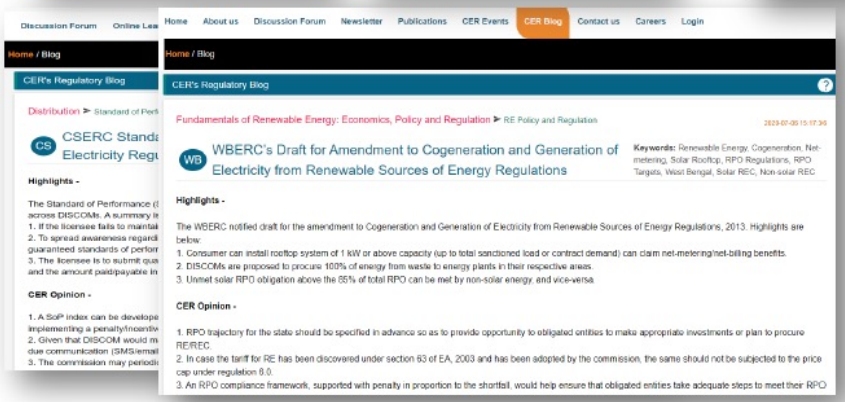
Planning for Resource Adequacy: Experience from Study of Uttar Pradesh and Chhattisgarh

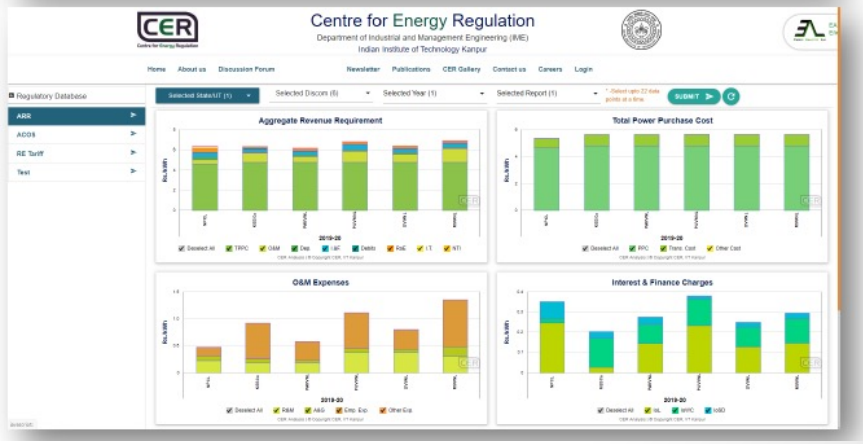
© Anoop Singh
Professor, Department of Management Sciences
Founder & Coordinator, Centre for Energy Regulation (CER) and Energy Analytics Lab (EAL)
Indian Institute of Technology Kanpur

Centre for Energy Regulation (CER) – Contributions to Regulatory and Policymaking Process (cer.iitk.ac.in)

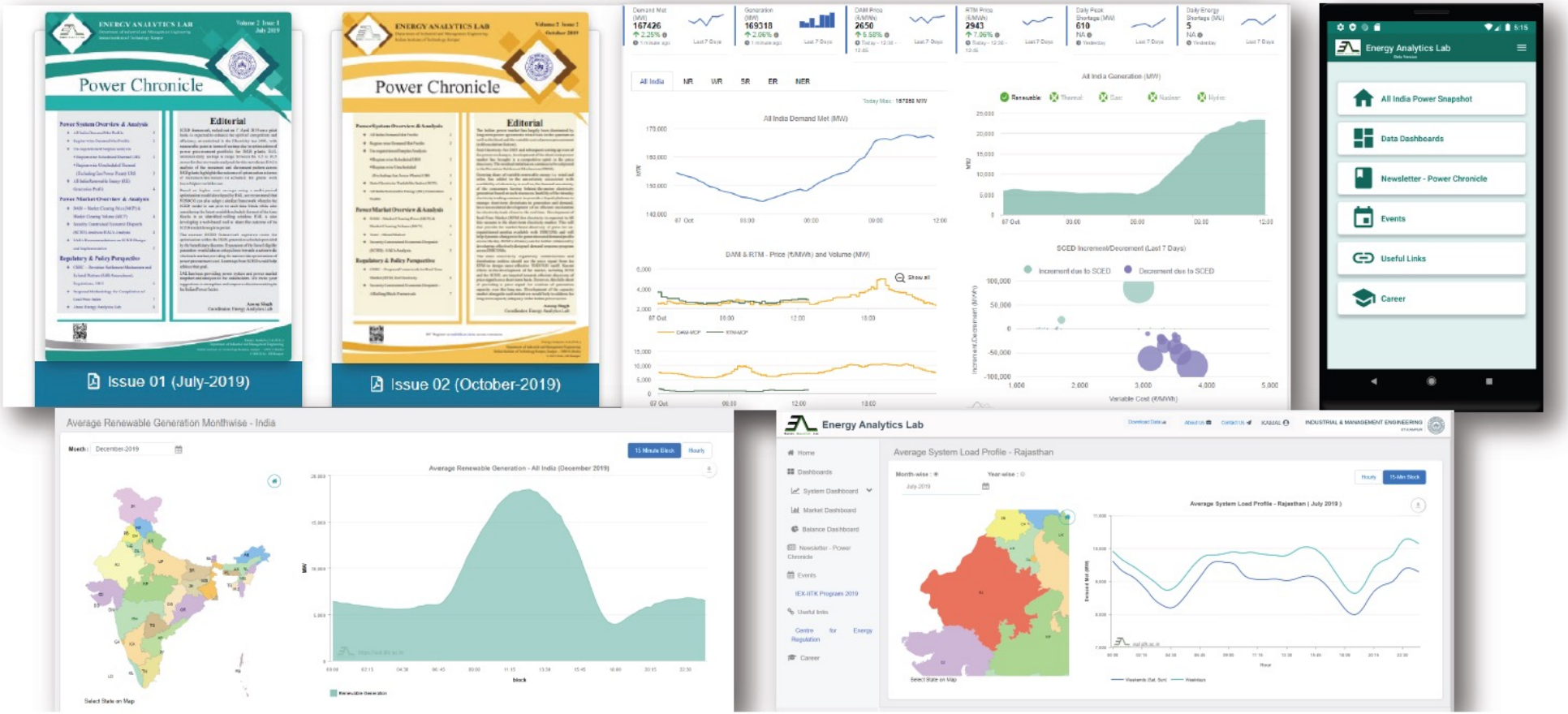








Energy Analytics Lab - Resources: Portal, Newsletter, Analytics and App (eal.iitk.ac.in)



Resource Adequacy

- **Resource Adequacy** – Ability to meet consumers' electricity requirement in future.
- Who should do it? – **Discoms Vs System Operator** Vs…

Importance of Resource Adequacy

- Growing share of VRE in the power system
- Transition away from thermal power
- Emerging market scenario
- Empowered Consumers (prosumers)

Need to foresee

- **Long-term trajectory of Demand**
- **Long-term trajectory of Capacity** and **<u>their ability to Supply</u>**

Ensuring Resource Adequacy

- Overall Scope
- Responsibility
- Forecast Horizon
- Scope of Forecast
- Supply side Vs Demand Side Resources
- Nodal Entity
- Regulatory Process
- Base Year
- Methodology

Approach to Evaluate Resource Adequacy

Demand Forecasting

- Medium to long-term approach
- State-level, discom-level
- Considering Captive and Rooftop solar
- Energy Vs Demand forecasting

Capacity Procurement

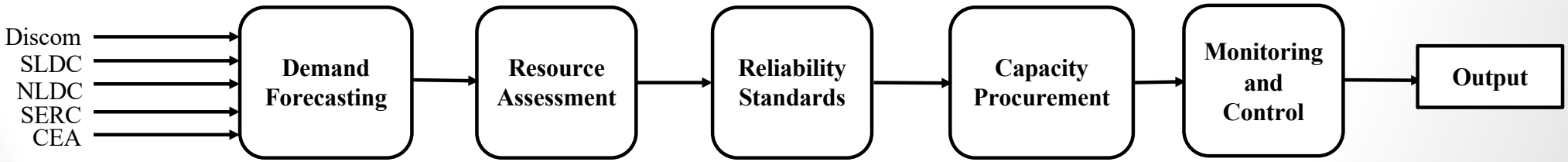
- Considering Existing PPAs
- Pipeline Capacity creation
- Market Procurement
- Planning for Energy Vs Demand

Overall perspective including availability of resources for power generation

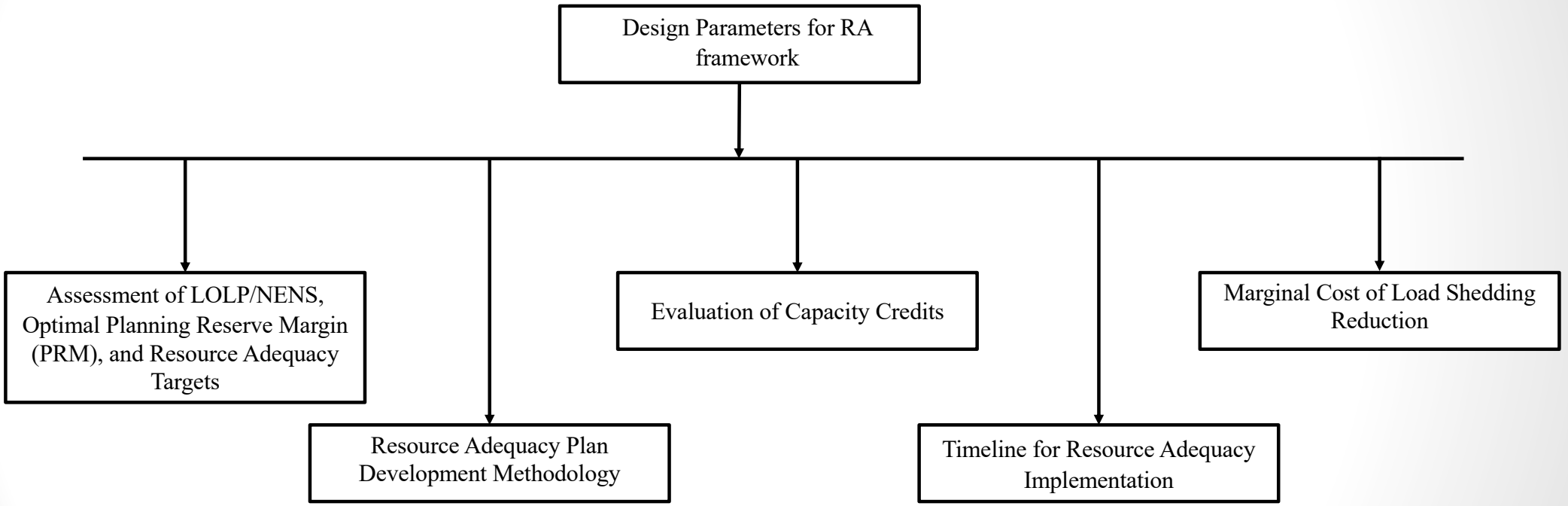
Resource Adequacy

Resource Adequacy (RA) - ensuring sufficient resources for electricity supply to meet the forecasted peak demand while maintaining the reliability and stability of the grid.

Evolving power sector with developments on demand as well as supply side, growing share of renewable energy (RE), and the associated uncertainties make planning for RA a challenging task.



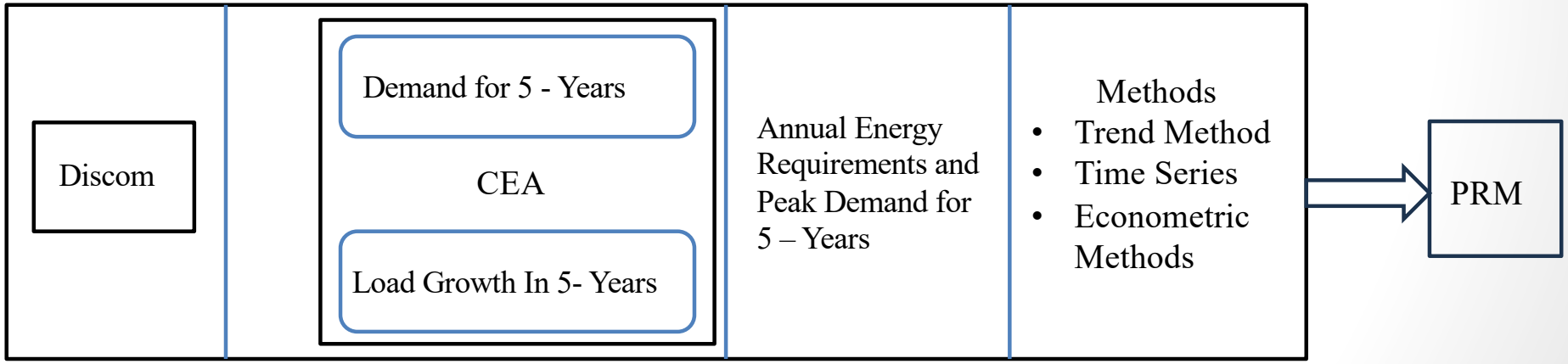
Framework for Resource Adequacy



RA Parameters for Planning

Planning Reserve Margin (PRM)

- Reserve margin required to meet the prescribed standards for **Loss of Load Probability (LOLP)** or **Net Energy Not Served (NENS)**.



Electricity Demand Forecasting and Power Procurement Planning

Legislative and Policy Framework for LT DF and PPP

Electricity Act, 2003

Section 61 (c) - …State/Central/Joint Electricity Regulatory Commissions (SERCs/CERC/JERCs) to encourage competition, and consider efficiency, economical use of resources, better performance and optimum investments while determining tariff.

Section 62 (1) empowers ERCs to determine tariff for licensees and regulate the power purchase process.

Section 73(i) entrusts Central Electricity Authority (CEA) to carry out studies pertaining to cost, efficiency, competitiveness and associated matters which implicitly refers to load forecasting and power procurement planning.

Legislative and Policy Framework for LT DF and PPP (contd.)

National Electricity Policy, 2005: NEP also directs CEA to make short-term and long-term demand projections

Tariff Policy, 2006: Silent on demand forecasting or power procurement planning.

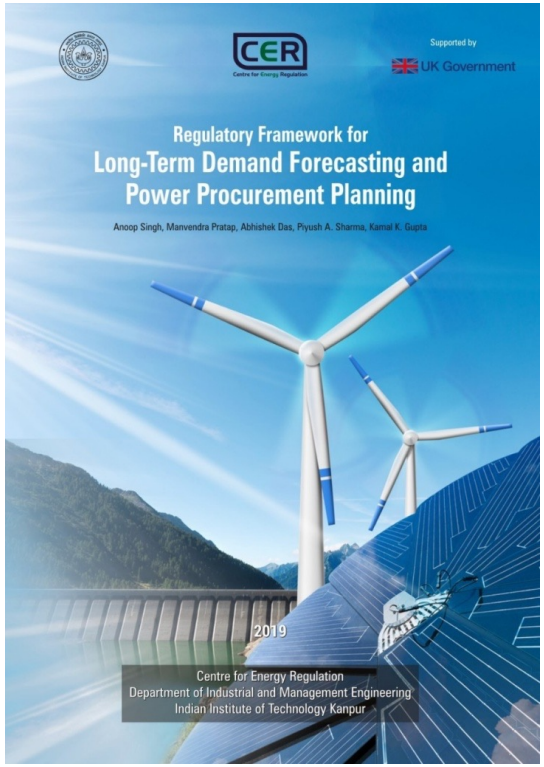
Tariff Policy, 2016:

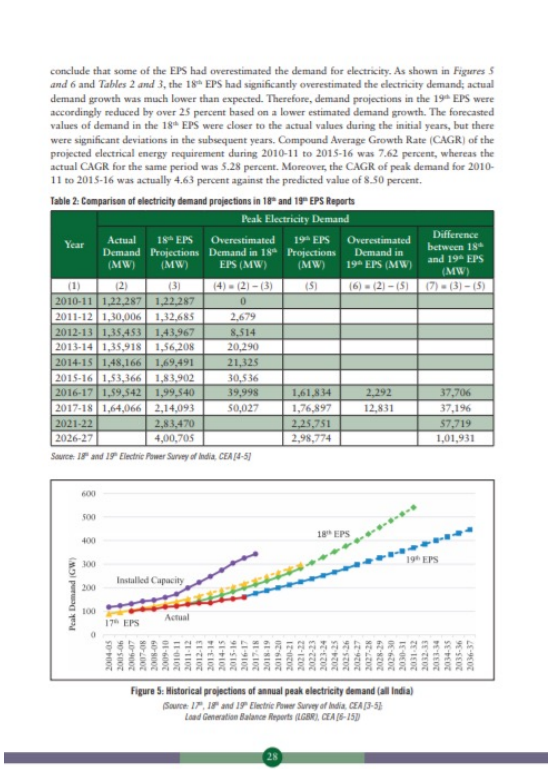
"The appropriate Commissions must mandate DISCOMs to undertake the exercise of load forecasting and power procurement planning every year"

CEA – Guidelines for Resource Adequacy Planning Framework in India

SERCs – Framework for Resource Adequacy Regulations

Monograph – *'Regulatory Framework for Long-term Demand Forecasting and Power Procurement Planning'*





conclude that some of the EPS had overestimated the demand for electricity. As shown in *Figures 5 and 6* and *Tables 2 and 3*, the 18th EPS had significantly overestimated the electricity demand; actual demand growth was much lower than expected. Therefore, demand projections in the 19th EPS were accordingly reduced by over 25 percent based on a lower estimated demand growth. The forecasted values of demand in the 18th EPS were closer to the actual values during the initial years, but there were significant deviations in the subsequent years. Compound Average Growth Rate (CAGR) of the projected electrical energy requirement during 2010-11 to 2015-16 was 7.62 percent, whereas the actual CAGR for the same period was 5.28 percent. Moreover, the CAGR of peak demand for 2010-11 to 2015-16 was actually 4.63 percent against the predicted value of 8.50 percent.

Table 2: Comparison of electricity demand projections in 18th and 19th EPS Reports

Year	Peak Electricity Demand					
	Actual Demand (MW)	18th EPS Projections (MW)	Overestimated Demand in 18th EPS (MW)	19th EPS Projections (MW)	Overestimated Demand in 19th EPS (MW)	Difference between 18th and 19th EPS (MW)
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6) = (2) – (5)	(7) = (3) – (5)
2010-11	1,22,287	1,22,287	0			
2011-12	1,30,006	1,32,685	2,679			
2012-13	1,35,453	1,43,967	8,514			
2013-14	1,35,918	1,56,208	20,290			
2014-15	1,48,166	1,69,491	21,325			
2015-16	1,53,366	1,83,902	30,536			
2016-17	1,59,542	1,99,540	39,998	1,61,834	2,292	37,706
2017-18	1,64,066	2,14,093	50,027	1,76,897	12,831	37,196
2021-22		2,83,470		2,25,751		57,719
2026-27		4,00,705		2,98,774		1,01,931

Source: 18th and 19th Electric Power Survey of India, CEA [4-5]

Figure 5: Historical projections of annual peak electricity demand (all India)

(Source: 17th, 18th and 19th Electric Power Survey of India, CEA [3-5]; Load Generation Balance Reports (LGBR), CEA [6-15])

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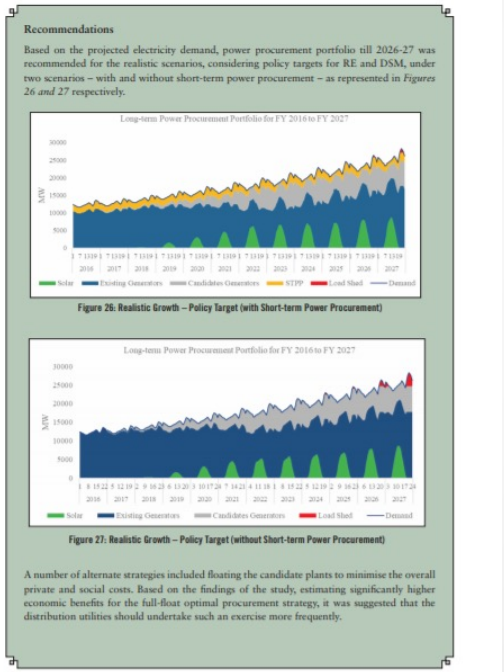

Recommendations

Based on the projected electricity demand, power procurement portfolio till 2026-27 was recommended for the realistic scenarios, considering policy targets for RE and DSM, under two scenarios – with and without short-term power procurement – as represented in *Figures 26 and 27* respectively.

Figure 26: Realistic Growth – Policy Target (with Short-term Power Procurement)

Figure 27: Realistic Growth – Policy Target (without Short-term Power Procurement)

A number of alternate strategies included floating the candidate plants to minimise the overall private and social costs. Based on the findings of the study, estimating significantly higher economic benefits for the full-float optimal procurement strategy, it was suggested that the distribution utilities should undertake such an exercise more frequently.

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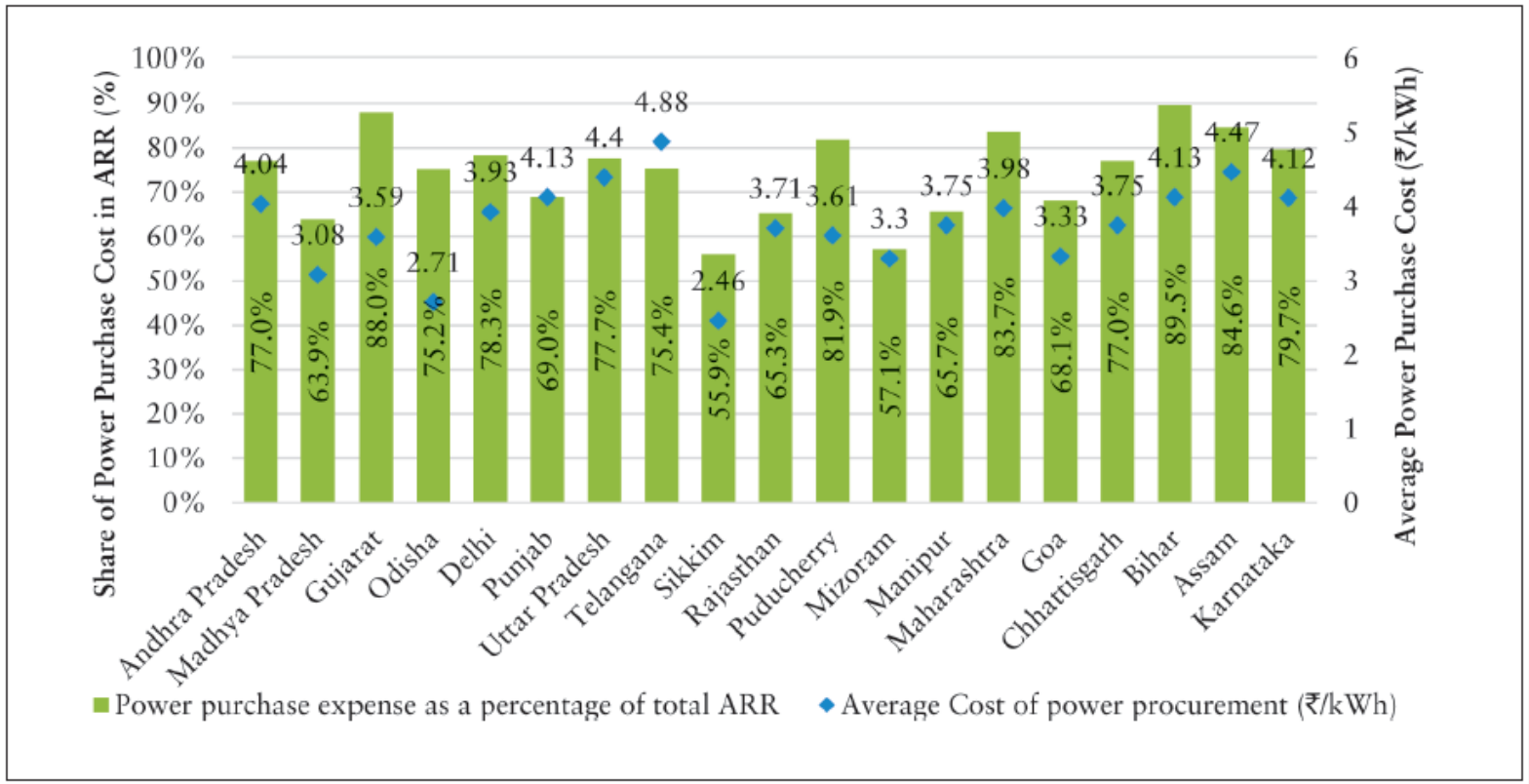
Power purchase cost and average cost of power procurement



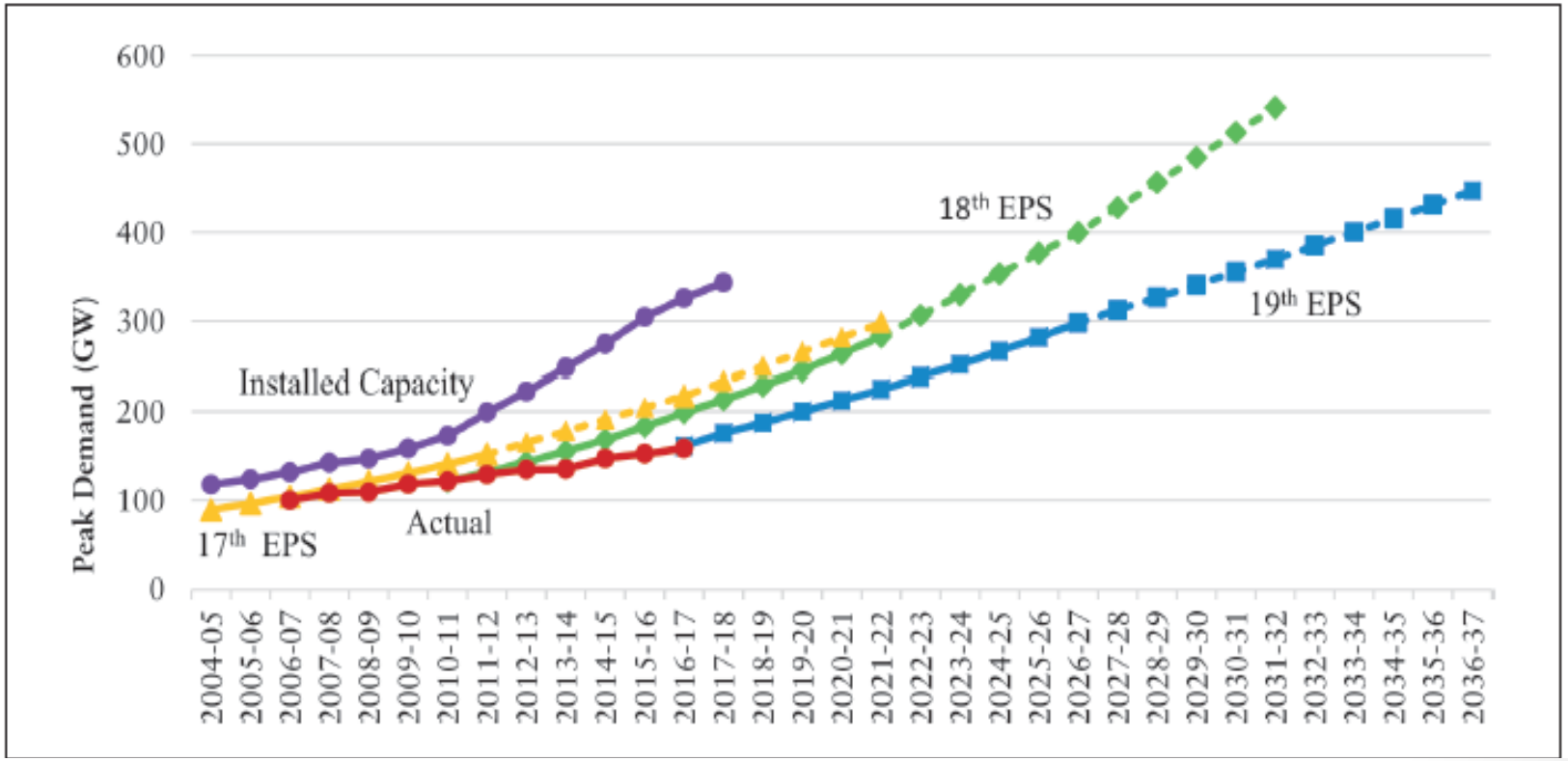
So: Singh et al. (2019), *Regulatory Framework for Long-Term Demand Forecasting and Power Procurement Planning*, Centre for Energy Regulation, IIT Kanpur (Book ISBN: 978-93-5321-969-7); https://cer.iitk.ac.in/publications

International regulations on long-term demand forecasting and power procurement planning

	Australia	Japan	Thailand	Singapore	European Countries	California	West Virginia
Objective	Network planning	3E+S (Safety, Energy security, Economic efficiency and Environment)	Energy security, Economy and Ecology	Attracting investment in generation asset	Assessment of electricity generation adequacy	Preparing Integrated Energy Policy Report	Energy security
Responsible organisation	National Transmission Planer (NTP)	Ministry of Economy, Trade and Industry (METI)	Ministry of Energy, along with the Electricity Generating Authority of Thailand (EGAT)	Energy Market Authority (EMA)	European Network of Transmission System Operators for Electricity	California Energy Commission	Public Service Commission of West Virginia
Forecast range	20 years	15 years	20 years	10 years	Seasonal, mid-term, 10 years	12 years	10 years
Frequency of forecast	Annual	Updated at least once in every 3 years	Revised in every 3 years	Annual	Updated annually	Updated annually for the next 10 years	Updated annually
Factors considered for forecast	Economic growth, weather conditions, electricity prices	Economic growth, Energy efficiency and conservation measures, population growth	Social (Population) and economic (long-term GDP) growth, Energy efficiency target, RE development target	Economic and Consumer growth	Economic growth, temperature, policy, demographics	Economics, demographics, weather, electric vehicle, etc.	Consumer growth, Annual growth rate
Peak Load or Energy	Both	Energy	Both	Both	Peak load	Both	Peak load
Forecast scenario	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Single
Corrective action(s) for forecast	Not defined	Reviewed at least once in every 3 years	Reviewed once in every 3 years	Annual forecast	Annual update	Annual update	Not defined

So: Singh et al. (2019), https://cer.iitk.ac.in/publications

Historical projections of annual peak electricity demand (All India)



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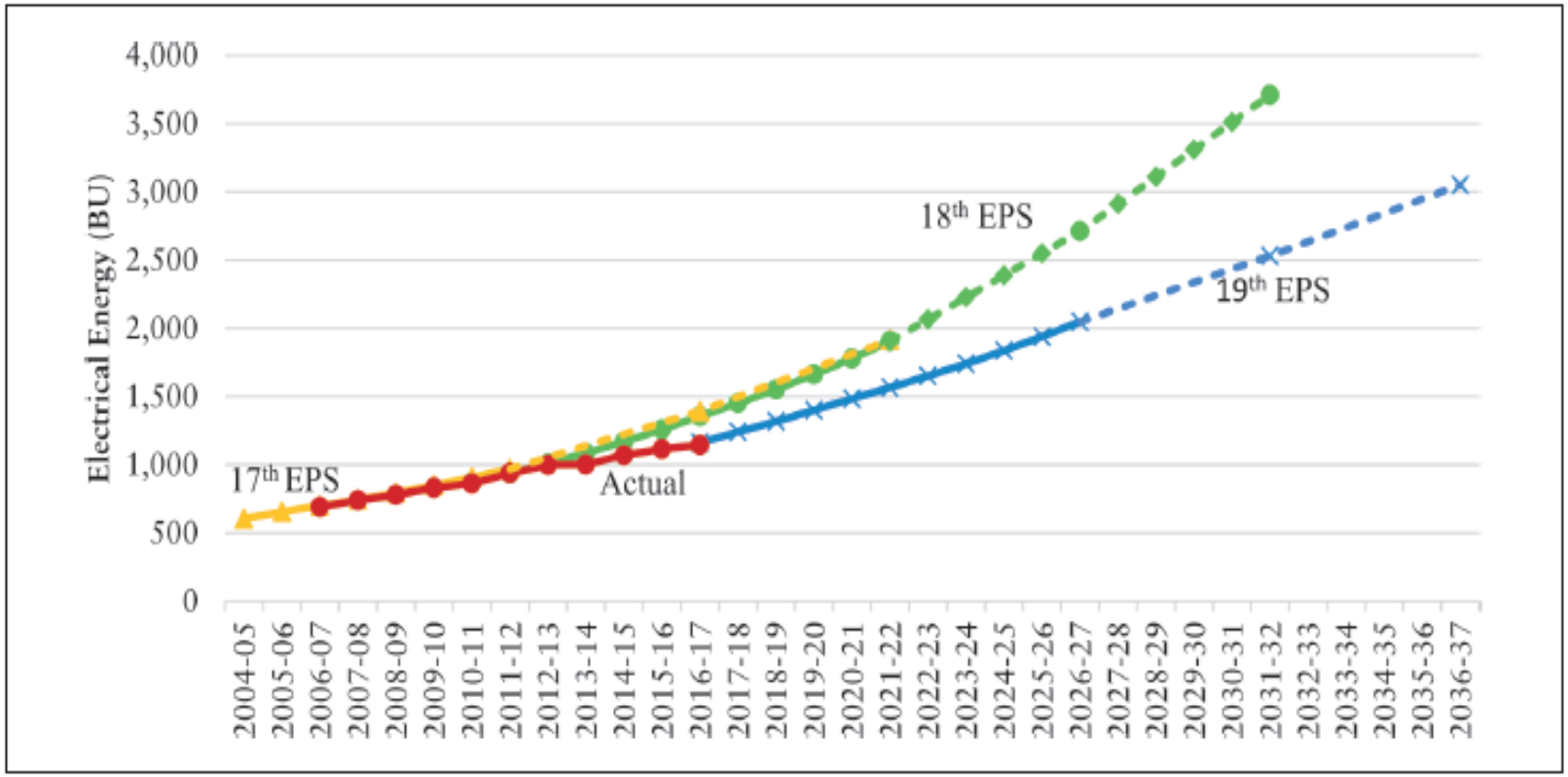
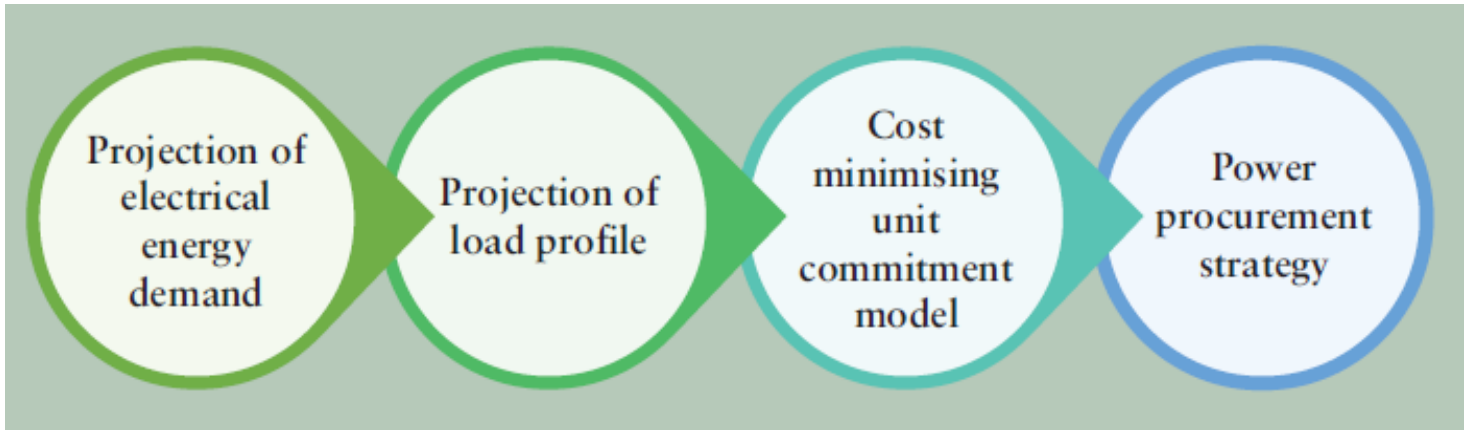
Historical projections of annual Energy Demand (All India)



So: Singh et al. (2019), *Regulatory Framework for Long-Term Demand Forecasting and Power Procurement Planning*, Centre for Energy Regulation, IIT Kanpur (Book ISBN: 978-93-5321-969-7); https://cer.iitk.ac.in/publications

Long-term Demand Forecasting and Power Procurement Planning

Approach for formulating power procurement strategy



Econometric Modelling Framework for LTDF

- *Q = ƒ (SGDP, P, U, Ps, Ss, T, D)*

- Q – Per capita Electricity Consumption
- SGDP – Per Capita SGDP (Rs.)
- P – Electricity Price (Rs./kWh)
- U – Urbanisation (%)
- Ps – Share of Primary Sector in SGDP (%)
- Ss – Share of Secondary Sector in SGDP (%)
- D - Entity fixed dummy variables (Binary)
- T - Time

- **Log-Log Model Used for Analysis**

- log(Q) = *ƒ* (log (SGDP), log(P), U, Ps, Ss, T, D)

Methodology

1. Projection of energy requirement
2. Load profile and load duration curve analysis
3. Expected demand for electricity (load curve) considering Solar gen. profile
4. GAMS Based optimisation model

1. Projection of peak load & energy requirement

Trend Analysis	• Study the past growth pattern
End Use method	• Study category-wise connected load, electricity consumption and growth pattern
Econometric Models	• Forecast considering economic change

2. Load profile and load duration curve analysis

- Inference from historical load profile and load duration curve
- Account for demand profile influenced by supply
- Projecting energy/peak load for future using statistical techniques

Methodology (continued)

3. Expected demand and load profile

- Solar capacity (RT, Ag-PV as well as Grid connected) and projected addition
- Solar generation curve and it's effect on load profile
- Impact of ToD and Demand Response

4. GAMS Based optimisation model

- Projected Load profile
- Existing and candidate power procurement sources
- Cost of power procurement variables (base charge, Escalation factor, fixed & variable cost)
- Impact of RE and RTSPV Penetration

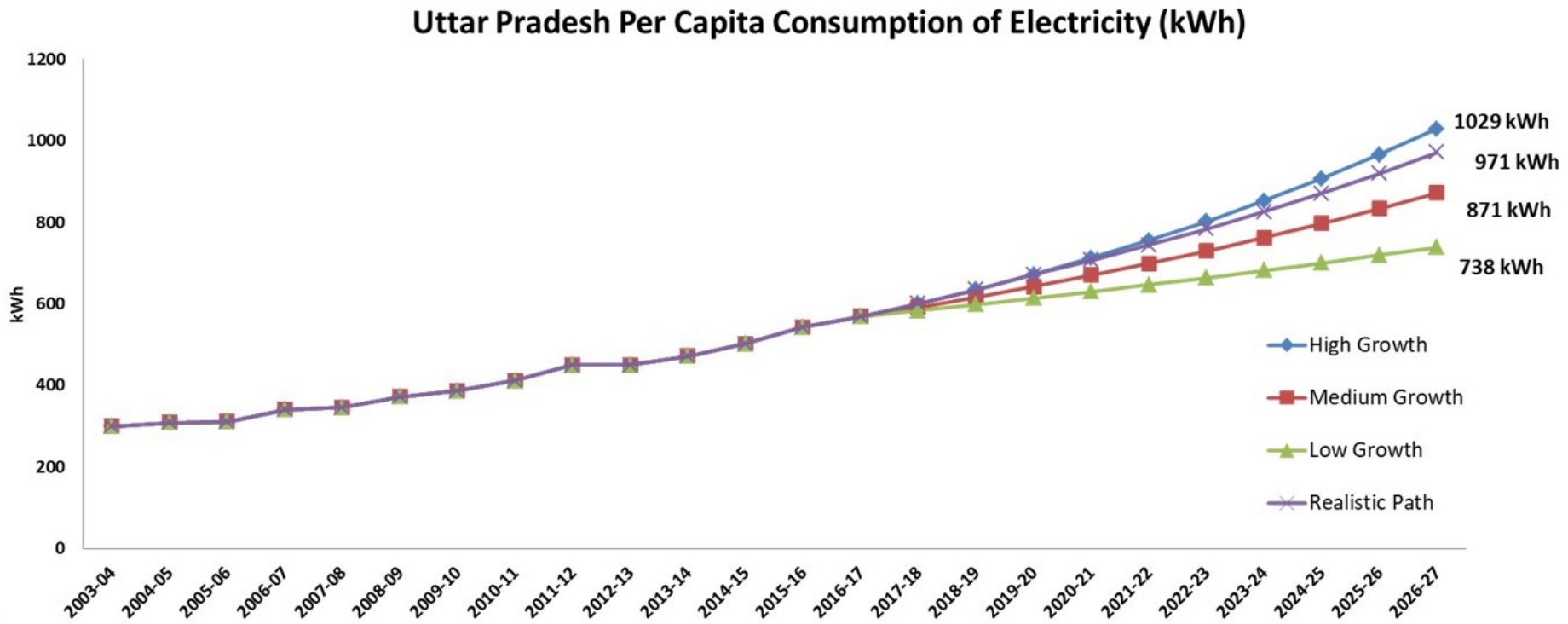
Data Used for the Model

1. Projected demand profiles (different scenarios)
2. Following information for existing plants and candidate plants
   a) Available capacity (Min & Max. limits, Ramp up ,Ramp down)
   b) Power procurement cost (fixed and variable cost)
   c) Duration of PPA's
   d) Maintenance Schedule and availability
   e) Short-term & Medium-term Contracts Details
3. Renewable Energy (incl storage) addition targets
4. DSM program
5. …….

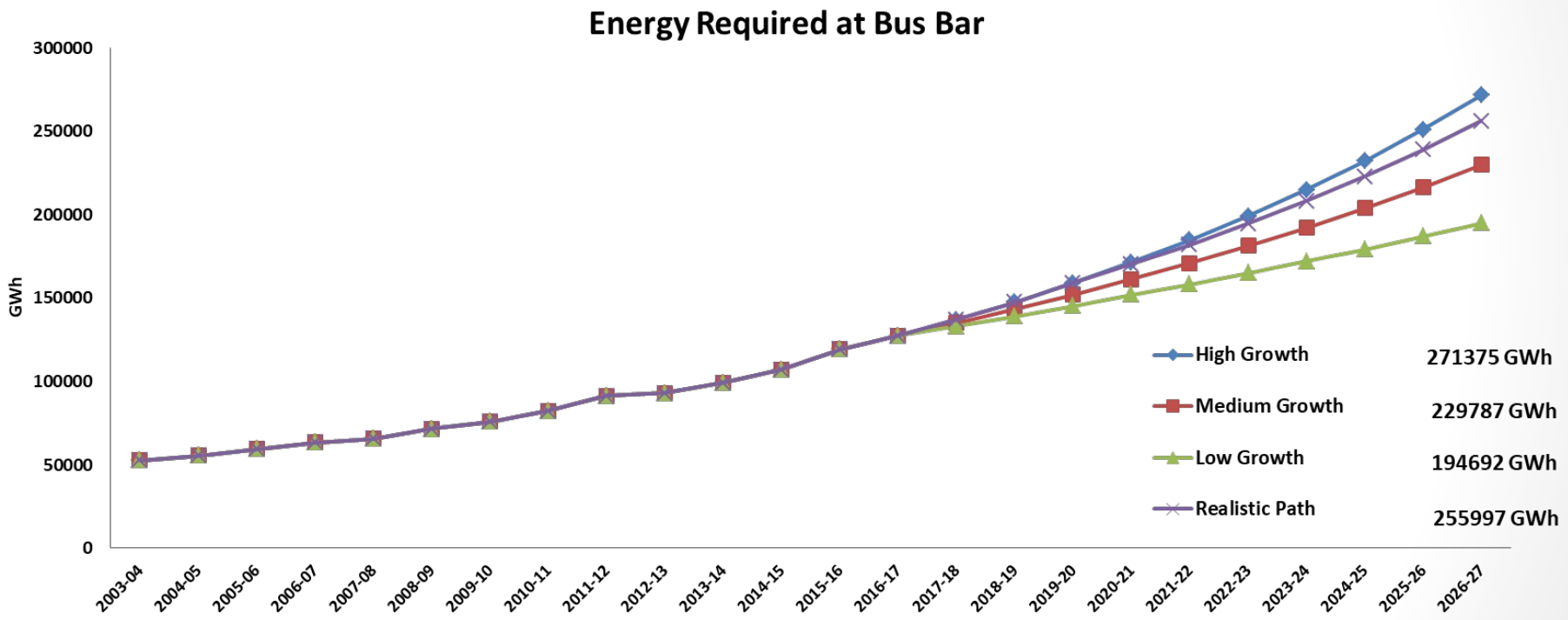
LTDF and PPP - Case Study of Uttar Pradesh

Objective – New capacity addition

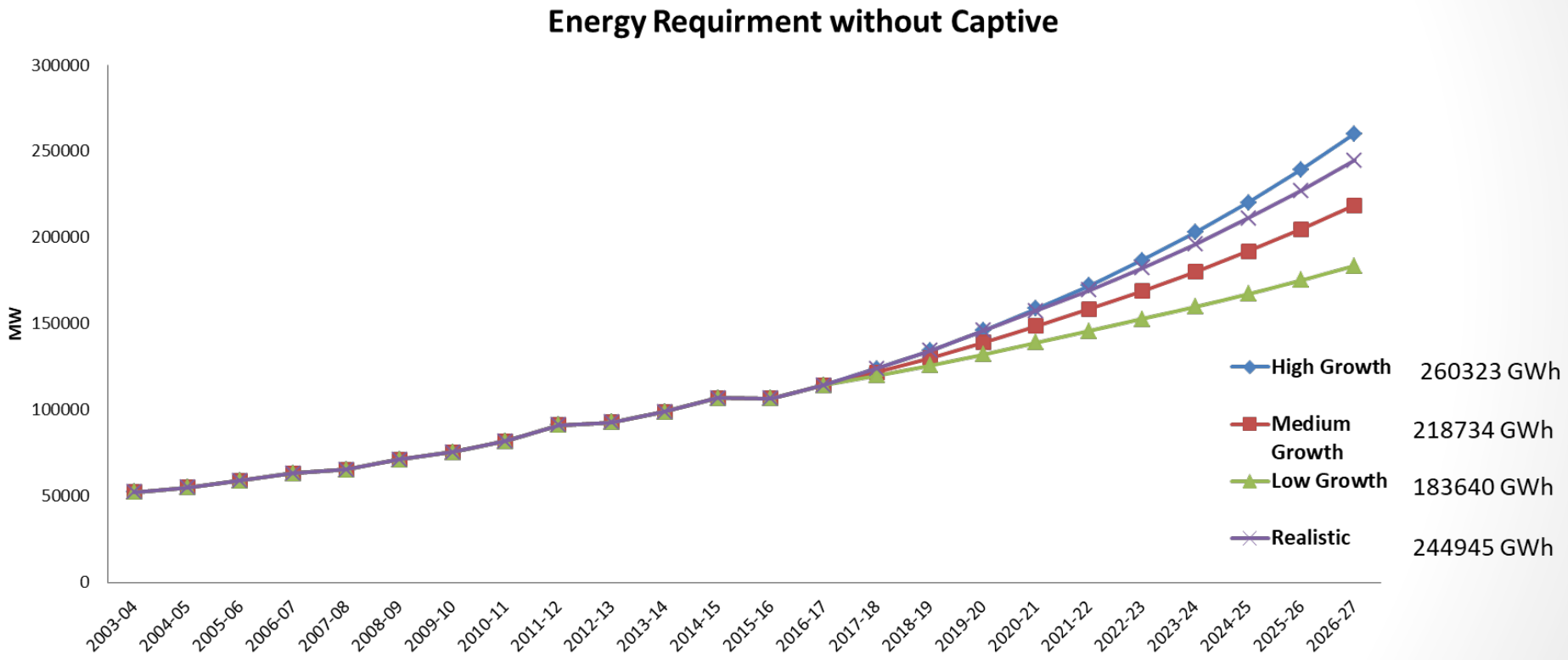
Uttar Pradesh - Projected Values at bus bar



Uttar Pradesh - Projected Energy Demand at bus bar



Uttar Pradesh - Projected Energy Demand at bus bar



UP's Projected Electricity Demand - Comparison

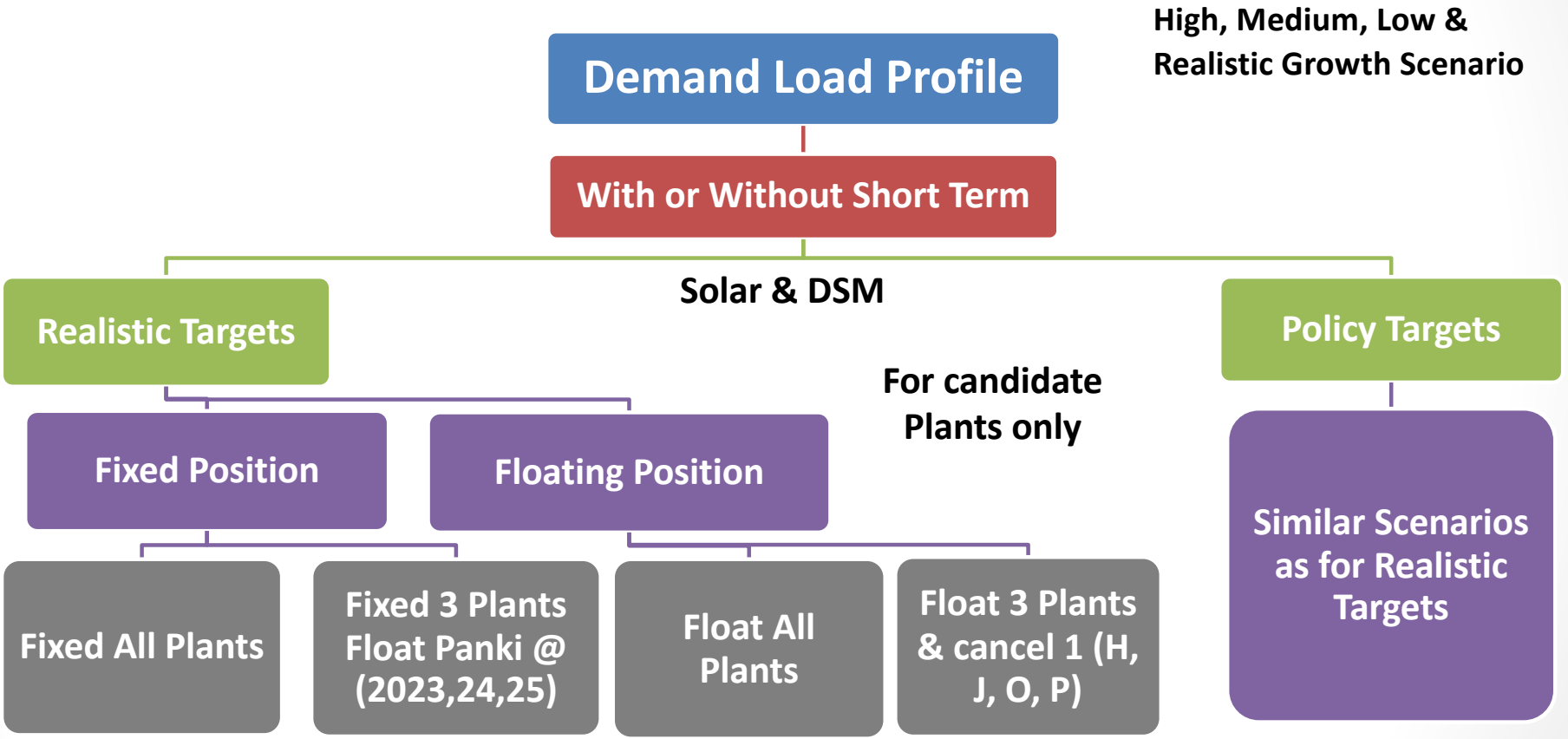
Projected Energy (19th EPS vs Estimated Value) GWh					
FY	CEA	Econometric model results (IIT Kanpur)			
	19 EPS	Realistic	High	Medium	Low
2016-17	108070	114512	114512	114512	114512
2021-22	150797	163562	166115	153757	142298
2026-27	195323	227838	244238	206808	175223

Note: For utilities only
* Without Captive Generation

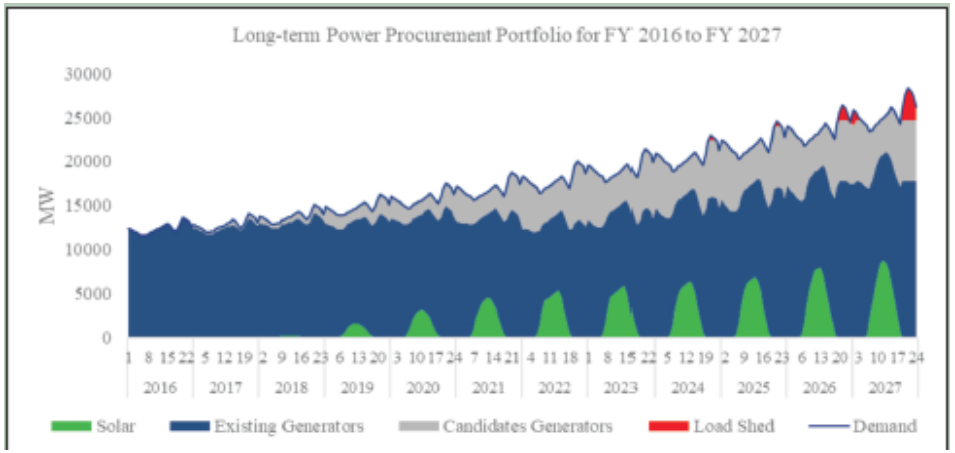
Projected Total sales (In MU)			
FY	PFA	Econometric Model	Δ %
2016-17	83,789	92882	11%
2017-18	95,131	101267	6%
2018-19	1,03,173	110511	7%
2019-20	1,16,385	120706	4%
2020-21	1,26,046	130958	4%
2021-22	1,36,700	141753	4%

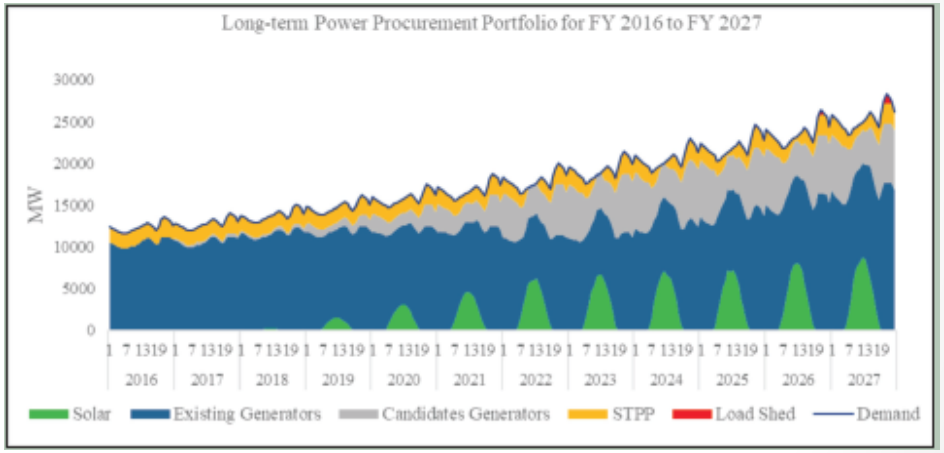
Note: Energy sold
* Without Captive and losses

GAMS Simulation for Different Scenarios

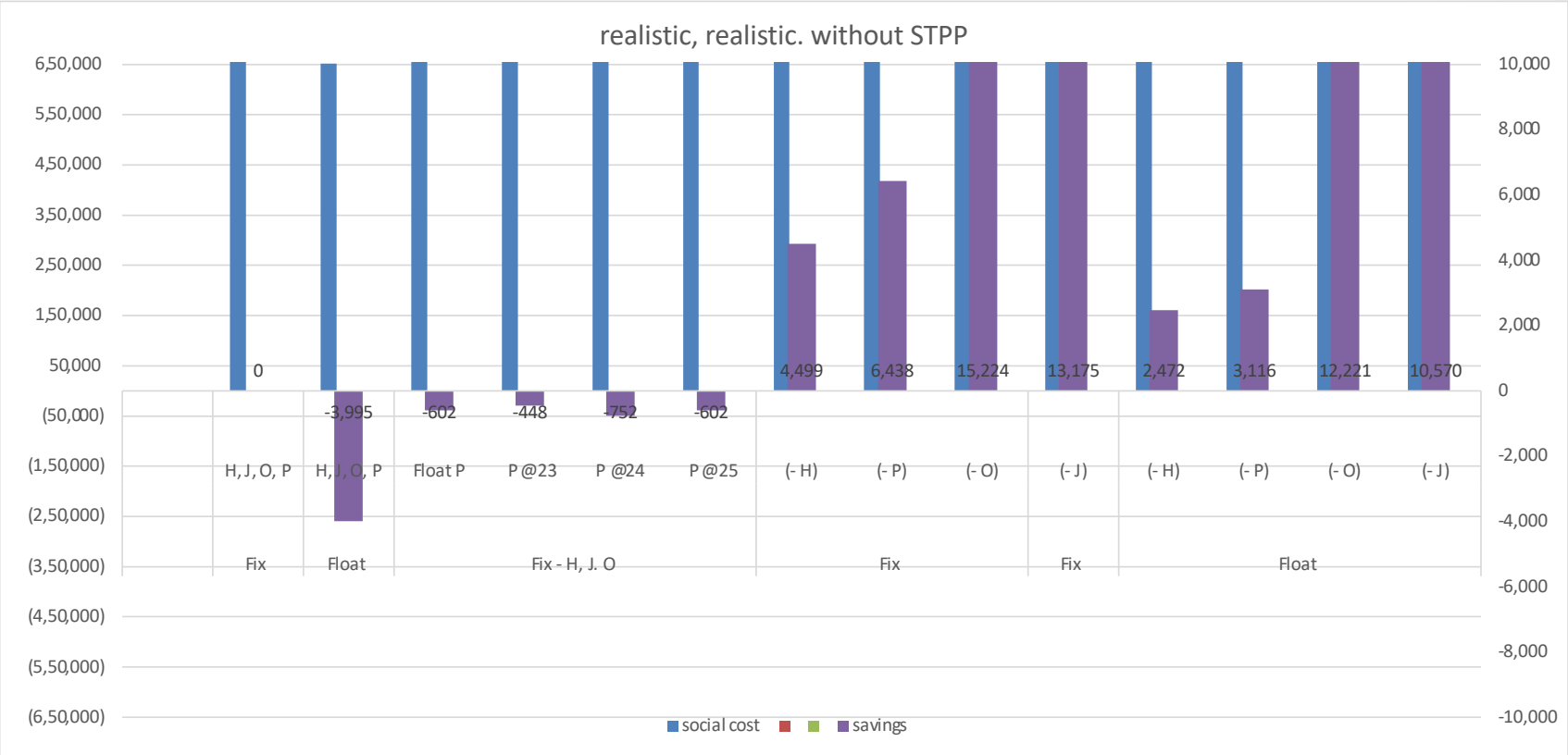


UP's LT Power Procurement Portfolio: Realistic Growth – Policy Target (w/o and w Short-term Power Procurement)





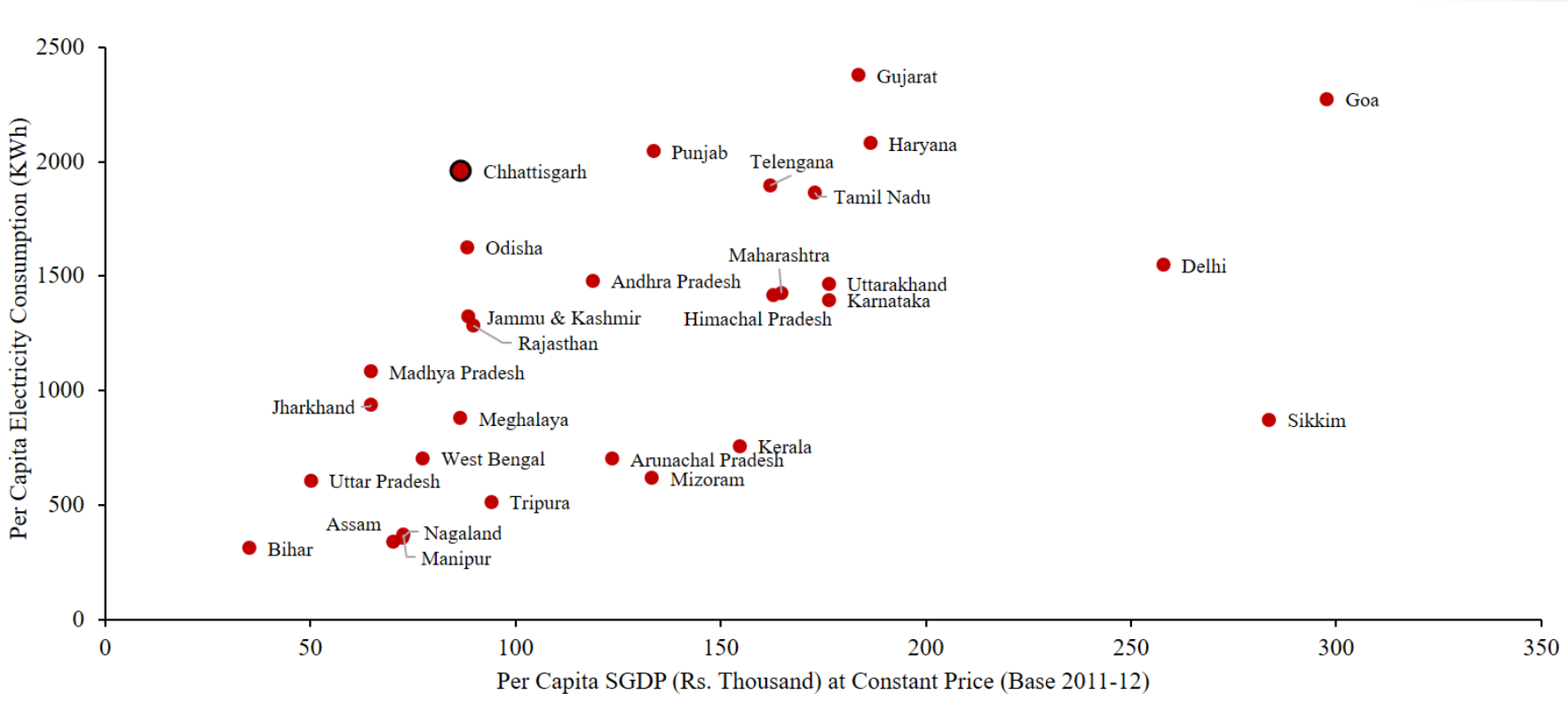
Utility Cost– Realistic Demand with Realistic DSM & Solar (w/o STPP)



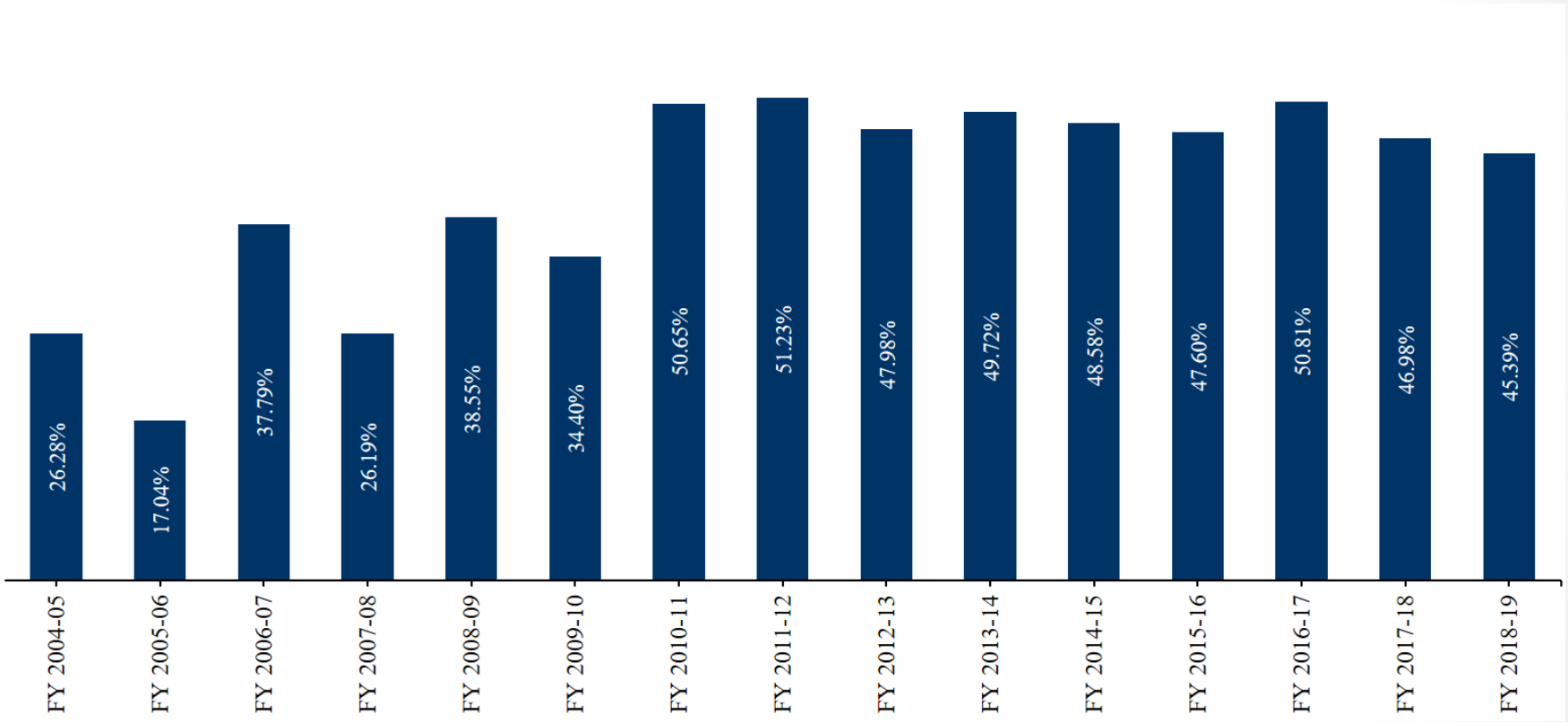
LTDF and PPP - Case Study of Chhattisgarh

Objective - Sale of surplus power in ST-MT and LT Capacity Planning

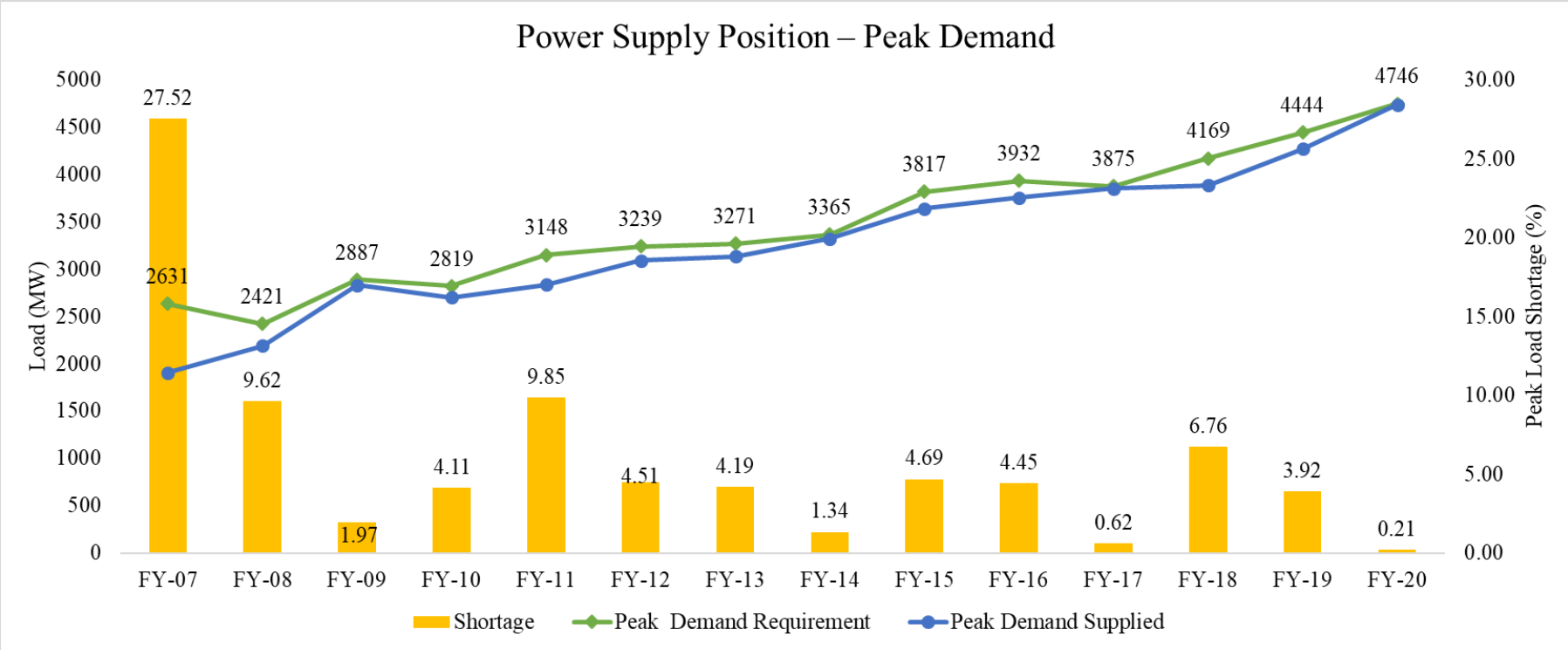
States - Per Capita Electricity Consumption with Per Capita SGDP for FY-19



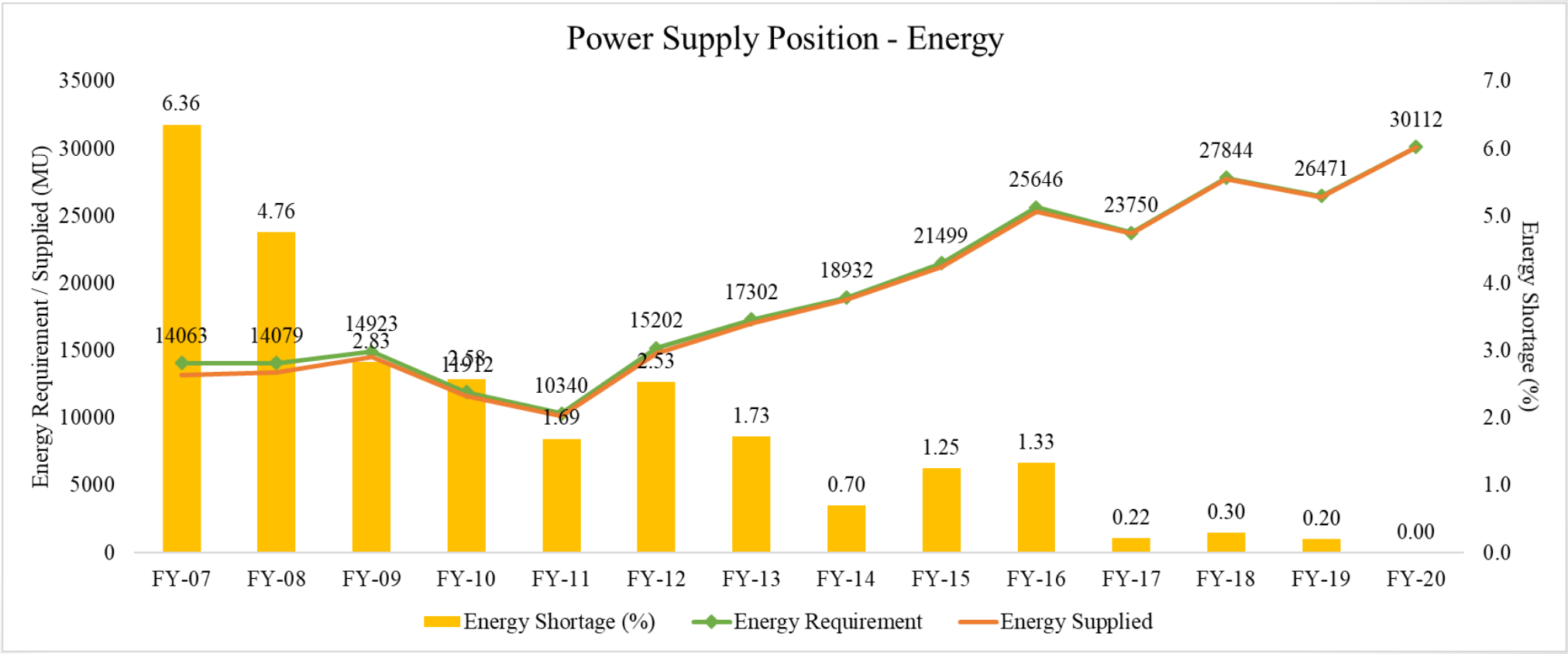
Share of Self Generating Industries in Total Energy Requirement for State



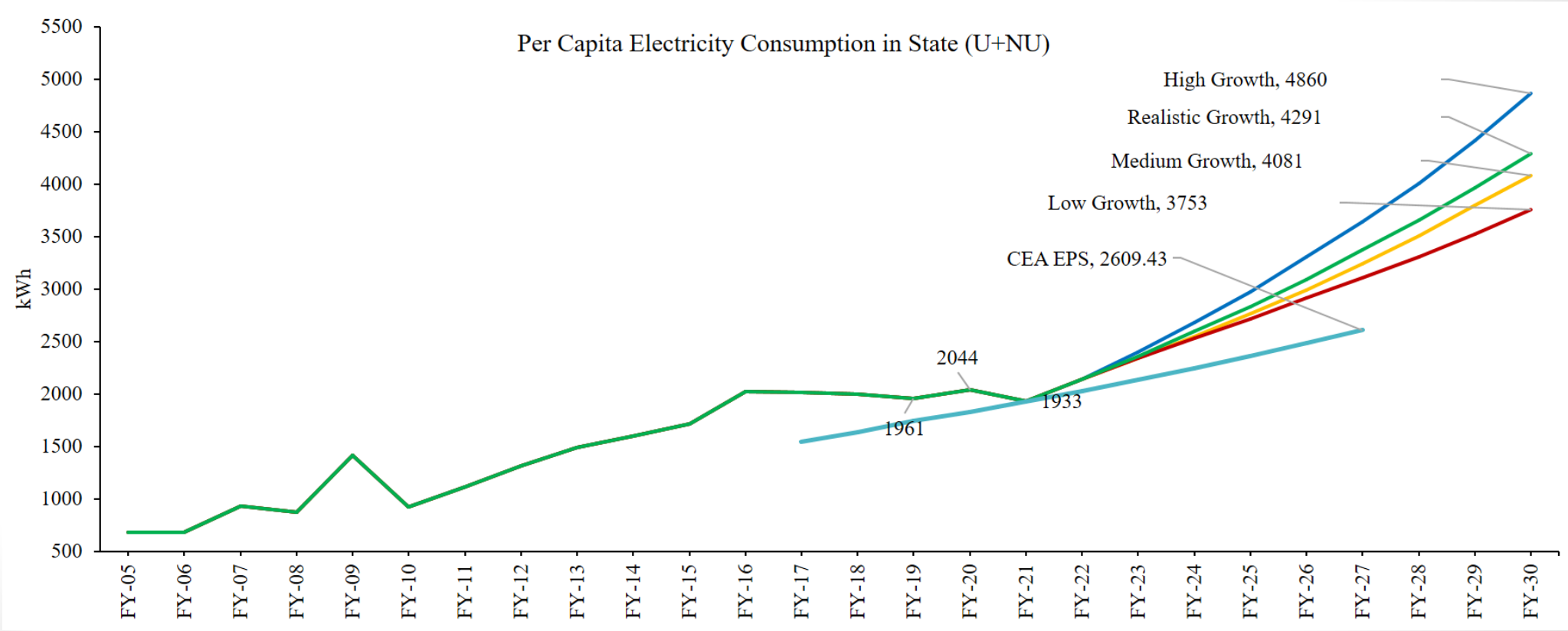
Power Supply Position – Peak Demand at State Periphery



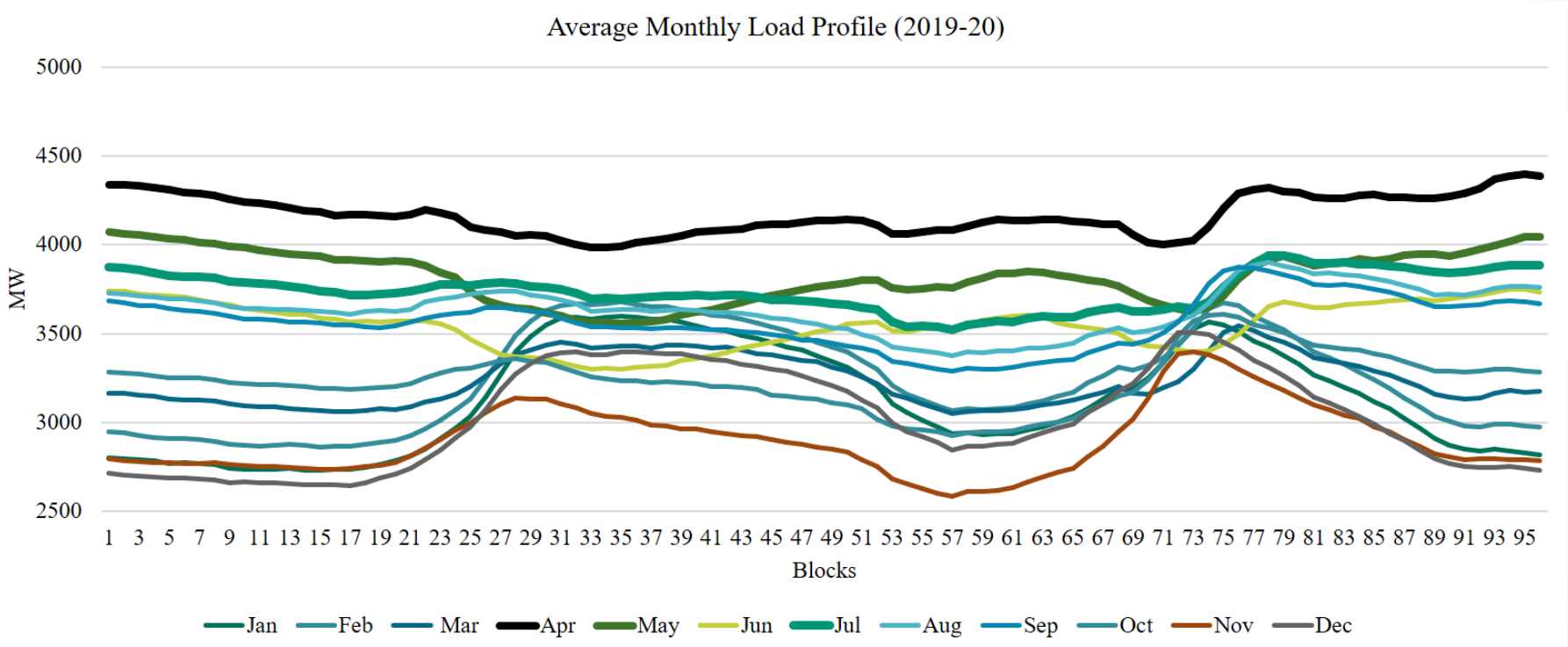
Power Supply Position – Energy at State Periphery



Forecasted Per Capita Electricity Consumption for Utility + Non-Utility at Bus-bar - with COVID-19 Impact



Average Monthly Load Profile 2019-20



Resource Adequacy

Technology-wise Contracted Capacity (MW)

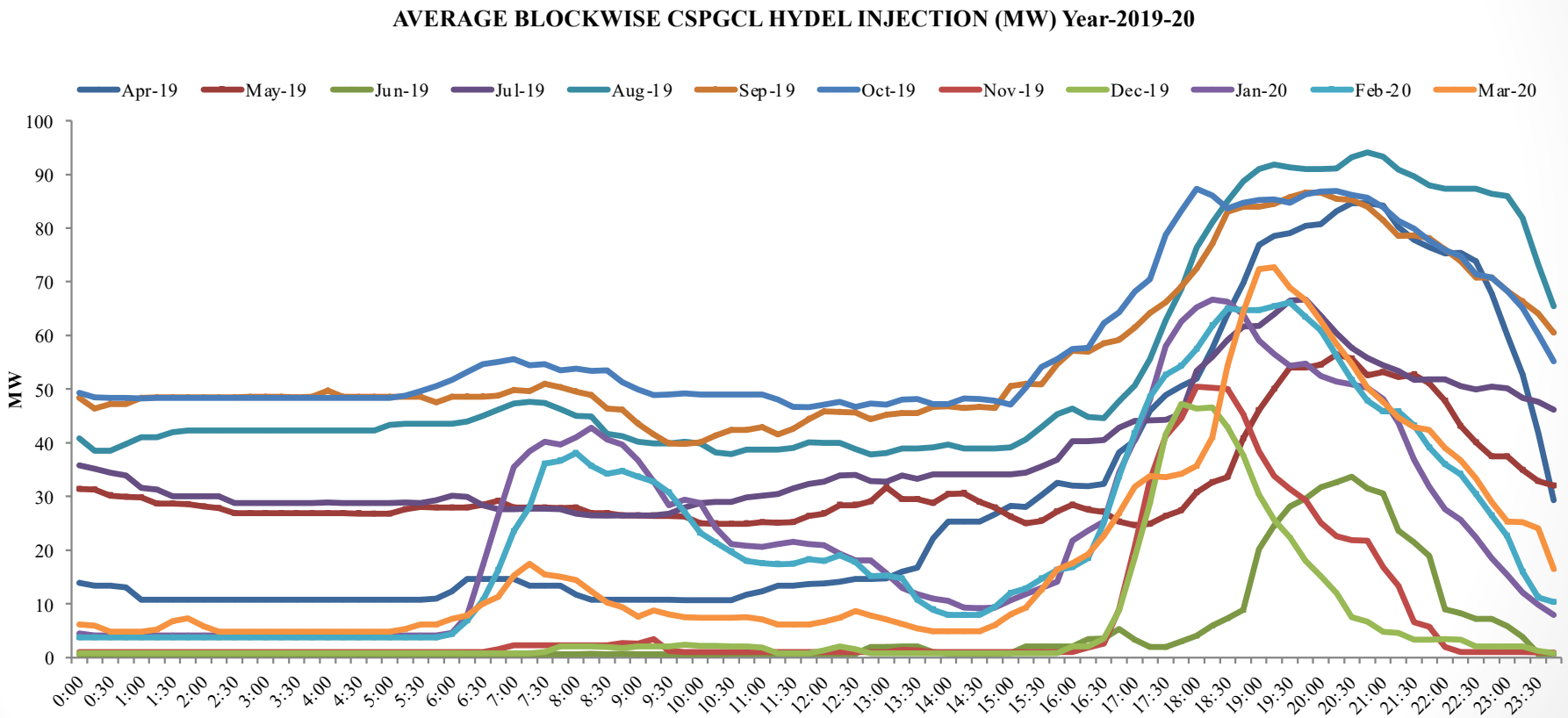
Type	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Biomass	172.67	172.67	172.67	172.67	172.67	172.67	159.17	110.02	102.82	85
Hybrid	25	125	925	1095	1095	1095	1095	1095	1095	1095
Hydro	295.65	423.45	423.45	423.45	423.45	423.45	423.45	423.45	423.45	423.45
Nuclear	48	48	48	48	48	48	48	48	48	48
Solar	492	492	1082	1382	1382	1382	1382	1382	1382	1382
Thermal	3981.365	4977.19	5049.19	5049.19	5049.19	5049.19	5049.19	5049.19	4734.19	5734.19
Wind	0	0	300	300	300	300	300	300	300	300
Total	5014.7	6238.3	8000.3	8470.3	8470.3	8470.3	8456.8	8407.7	8085.5	9067.6

Technology-wise Declared Capacity (MW)

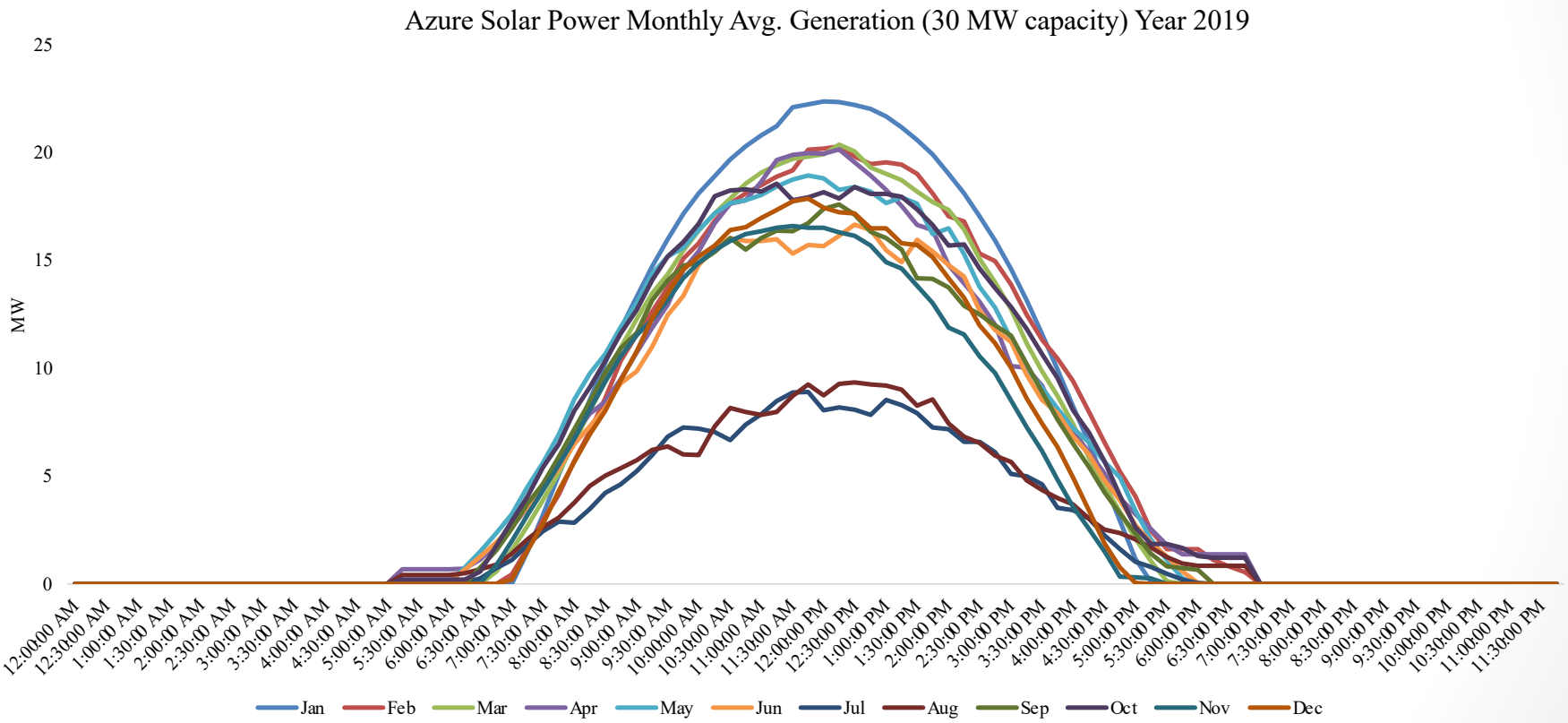
Type	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Biomass	172.67	172.67	172.67	172.67	172.67	172.67	159.17	110.02	102.82	85
Hybrid	25	125	925	1095	1095	1095	1095	1095	1095	1095
Hydro	295.65	423.45	423.45	423.45	423.45	423.45	423.45	423.45	423.45	423.45
Nuclear	48	48	48	48	48	48	48	48	48	48
Solar	492	492	1082	1382	1382	1382	1382	1382	1382	1382
Thermal	3981.365	4977.19	5049.19	5049.19	5049.19	5049.19	5049.19	5049.19	4734.19	5734.19
Wind	0	0	300	300	300	300	300	300	300	300
Total	5014.7	6238.3	8000.3	8470.3	8470.3	8470.3	8456.8	8407.7	8085.5	9067.6

Generation Availability – Hydro & Solar

Hydel Generation Pattern



Solar Generation Pattern

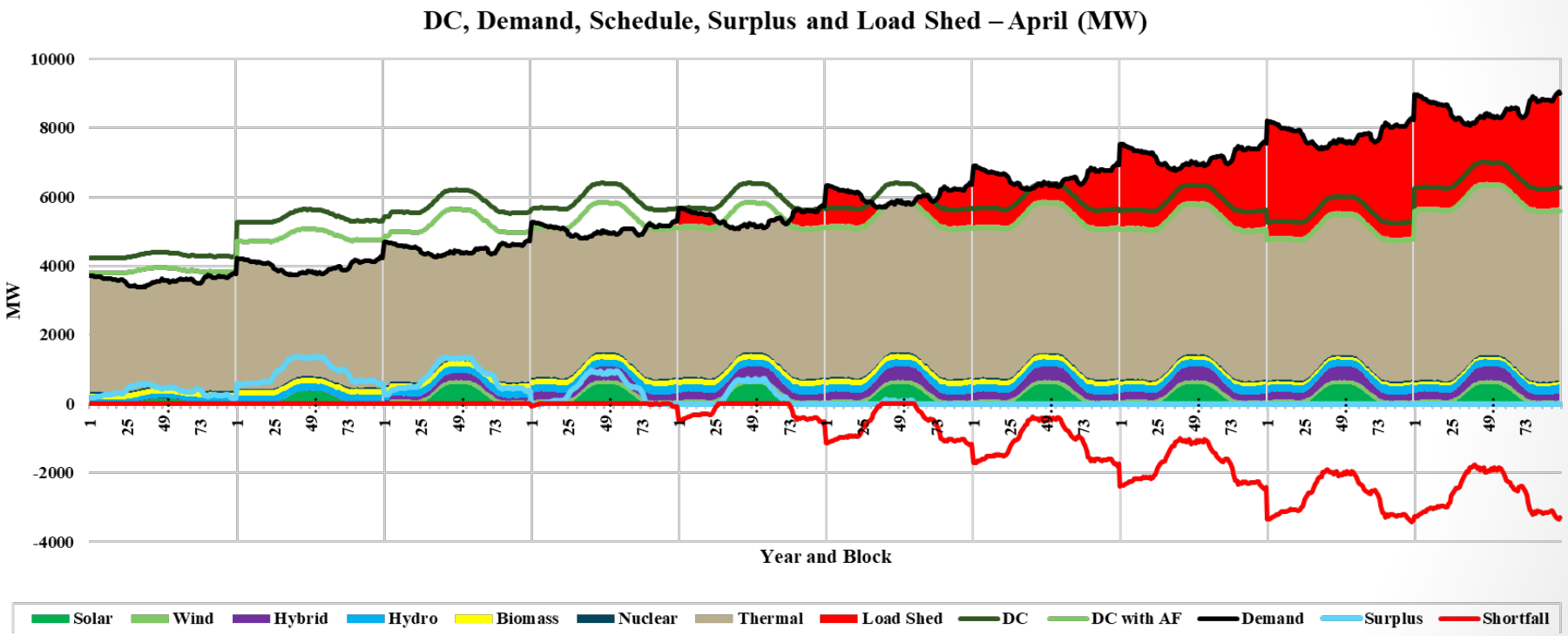


Long-term Power Procurement Planning

Simulation Scenarios for Chhattisgarh

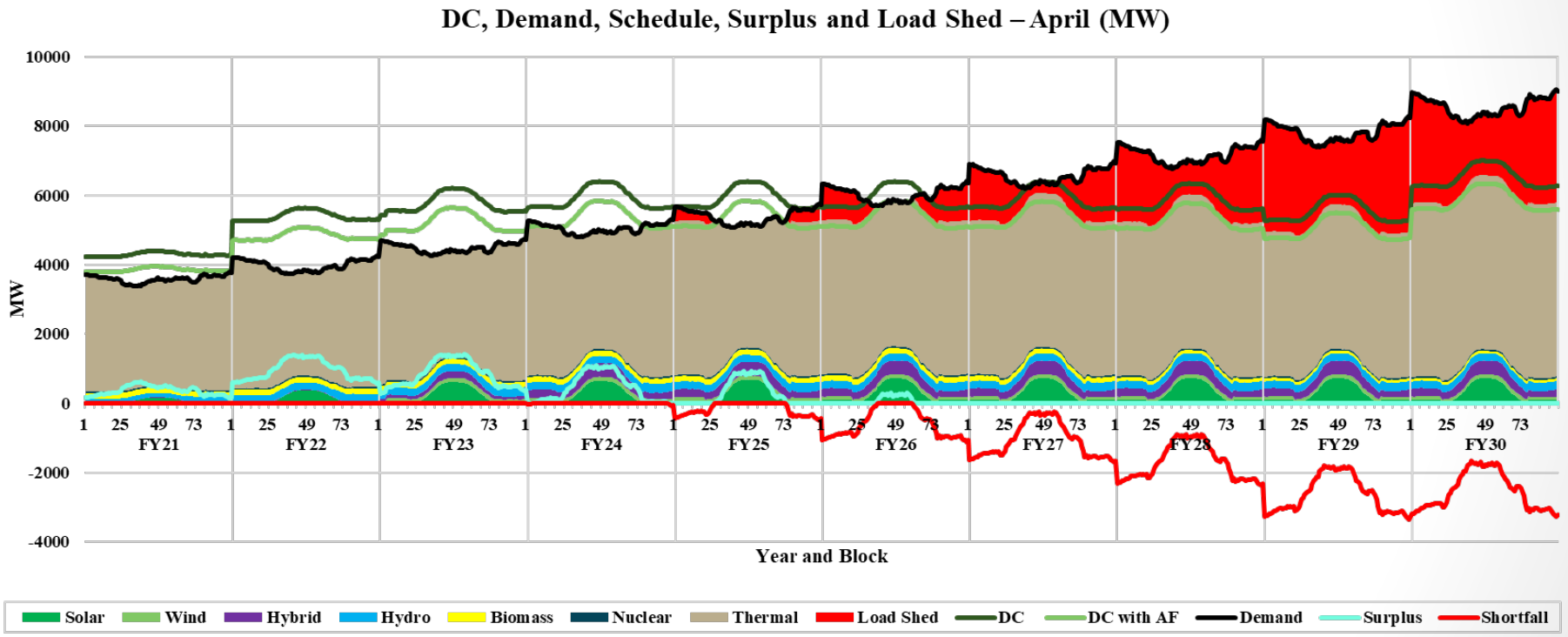
- **Scenario 1**: Base case
- **Scenario 2**: Base case + Advancing return of Marwa I and II from Telangana by 2024-25
- **Scenario 3**: Base case + Surrendering of PPAs (490 MW) from 2021-22 onward
- **Scenario 4**: Base case + Staggered surrendering of PPAs (490 MW) from 2021-22 onward
- **Scenario 5**: Base case + **200 MW solar plant and 100MWh Battery from 2022-23**
- **Scenario 6**: Base case + Mixed strategy
- **Scenario 7**: Base case + Short-term power purchase (ST-PP)
- **Scenario 8**: Base case + ST-PP + Advancing return of Marwa I and II from Telangana by 2024-25
- **Scenario 9**: Base case + ST-PP + Advancing return of Marwa I and II from Telangana by 2024-25 + **200 MW solar plant and 100MWh Battery from 2022-23**

Power Supply and Surplus Projection (April_3d) – Base case



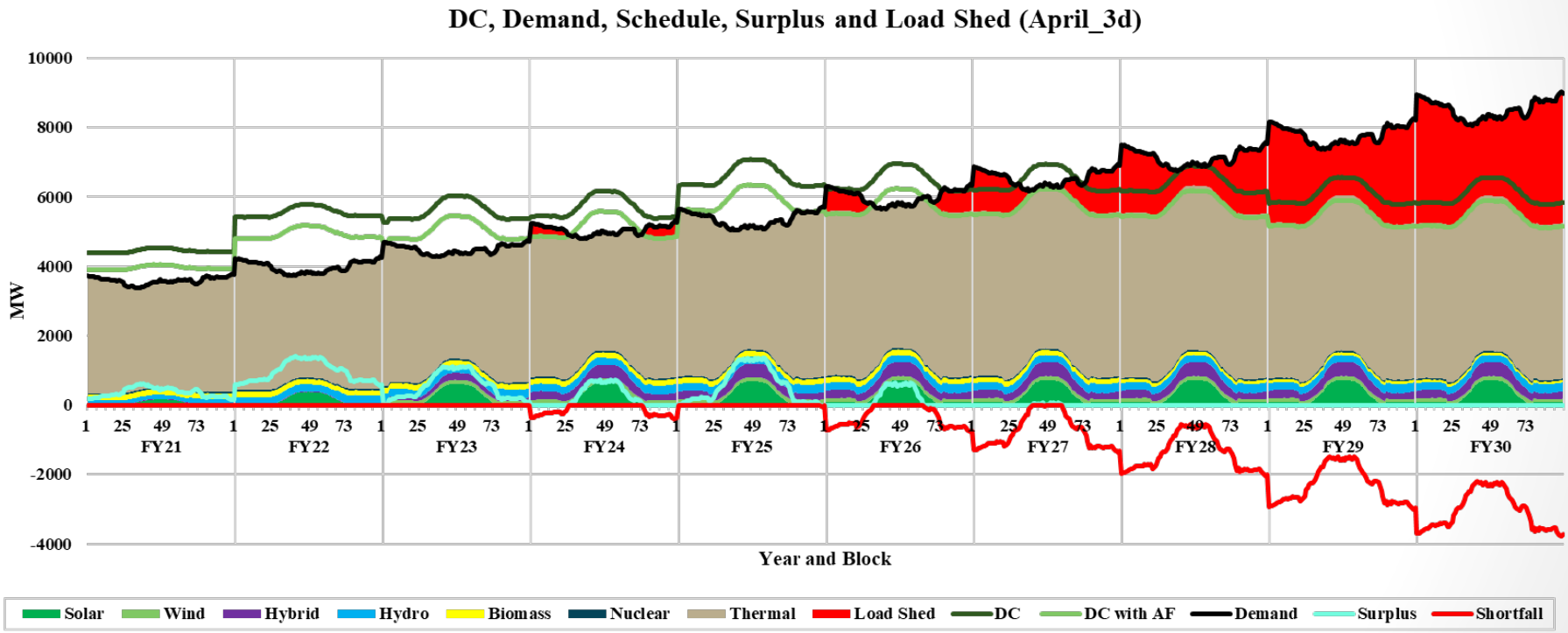
Note: Draft results. Please contact before quoting/sharing results

Power Supply and Surplus Projection (April_3d) - Base case + 200 MW Solar Plant and 100MWh Battery from 2022-23



Note: Draft results. Please contact before quoting/sharing results

Modelling Results for Power Supply and Surplus Projection (April_3d) - Base case + Mixed Strategy



Note: Draft results. Please contact before quoting/sharing results

LTDF and PPP - No One Size Fit All

Uttar Pradesh

- Composition of SGDP – high agri and services
- Low share of industrial consumers in electricity consumption
- Higher proportion of domestic consumers
- Generally power shortage
- Significant number of new consumers added (domestic)
- ST power procurement and sale

Chhattisgarh

- Composition of SGDP – very high Industrial
- High share of industrial consumers in electricity consumption
- Generally power surplus
- Significant number of new consumers added (domestic)
- Significant captive power generating capacity
- ST power sale and procurement

Optimality of Procurement

RA Framework

- Considers long-term demand forecast
- Does not consider technical /operational constraints
- Limited for demand response (price sensitivity)
- Considering Captive and Rooftop solar (indirectly)
- No role of costs by source
- No consideration of transmission cost
- Considers transmission loss
- No consideration of environment or flexibility
- No optimality of decision
- Relatively easier exercise

Optimal PPP

- Considers long-term demand forecast
- Considers technical /operational constraints
  - Technical minimum
  - Ramping Rates (up/down)
  - Shutdown/startup constraints
- Considering Captive and Rooftop solar (directly)
- Considers cost by source
- Considers Transmission cost
- Considers Transmission loss (in detail)
- Flexibility inherently considered
- Consideration of environmental impact
- Optimal decision for power procurement
- Little complex

Overall perspective including availability of resources for power generation.

Key Regulatory and Policy Takeaways

- Separate and dynamic regulation for Resource Adequacy (LTDF and PPP) – every 3-5 years
- Institutionalising a separate **Regulatory Process for Resource Adequacy (LTDF and PPP)** – incl. separate Petition, Public hearing and approval process for the same.
- Role of Demand Side Flexibility – Demand Response
- Role of Supply Side Flexibility – Ramping, Tech. min., Storage ..
- Data Sharing and Warehousing
- Compliance Monitoring

Thank you

Centre for Energy Regulation

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Annexure-C

Power Market Update

JERC SAC
13th Dec,24

Highlights : Power Sector

✓ **All India Demand FY25 (H1)**

- Total demand in country increased by 5% YoY.
- Peak demand increased by 12% YoY - 250 GW in May'24
- State with maximum % demand increase in FY25 are

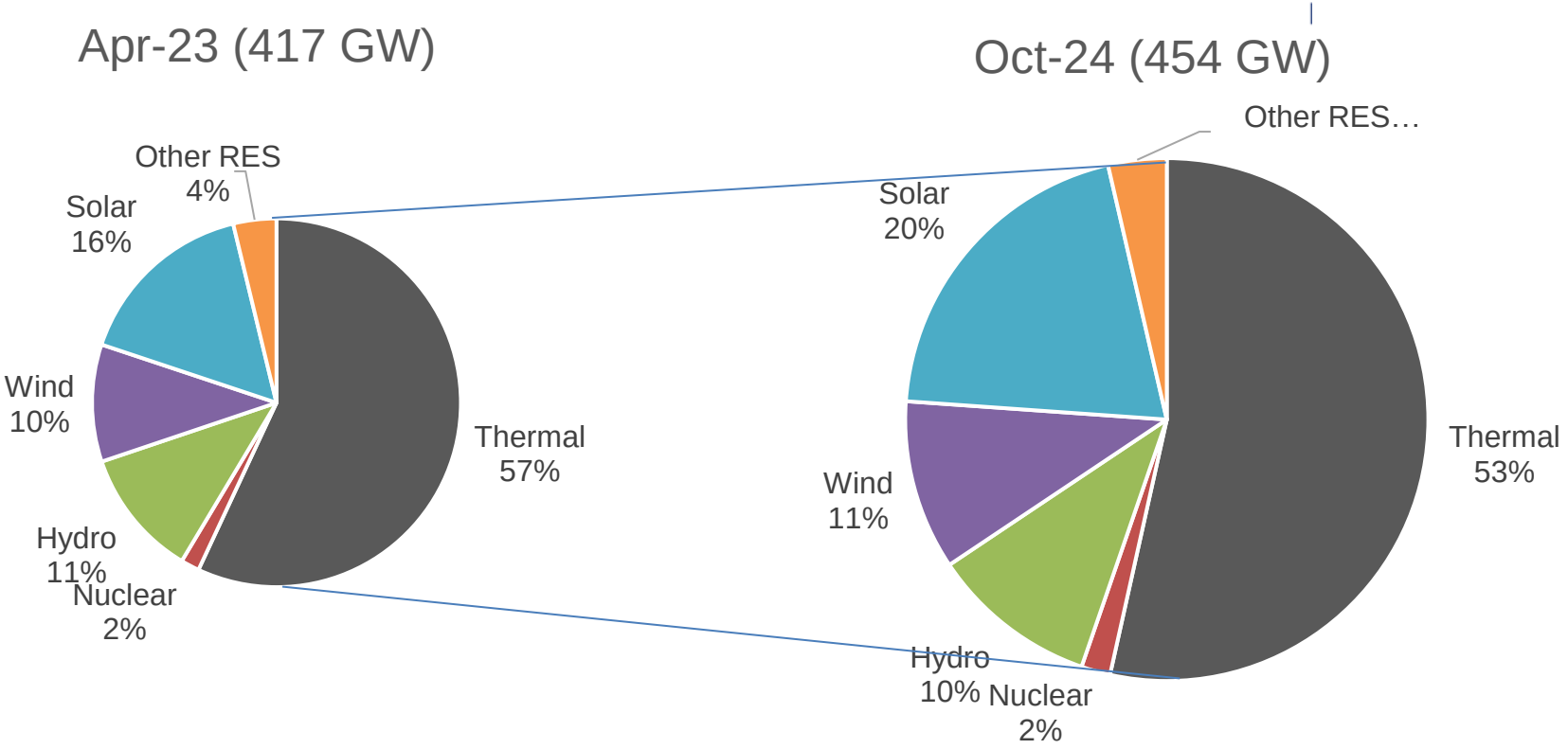
  PB (15%) I UP (14%) I HR (14%) I UK (13%) I RJ (7%)
- RE generation share w.r.t total generation
  - Wind & Solar Generation contributed 12%
  - Wind, Solar & Hydro Generation contributed 23%

✓ **Coal Supply Position**

- Domestic Coal production increased by 6.05% YoY till Oct and coal stocks ~ 13 days
- Imported Coal prices are also favorable and stable @52$/ton.
- …. leading to lower power price

Demand Met (BU)			
Month	**FY 25**	**FY 24**	**% Change**
April	144	130	10.9%
May	155	137	13.7%
June	152	140	8.6%
July	150	140	6.6%
August	144	151	-4.8%
Sept	141	141	-0.4%
Oct	141	139	1.4%
Nov	125	119	4.4%
Total	**1150**	**1099**	**4.6%**

Installed Capacity (GW)

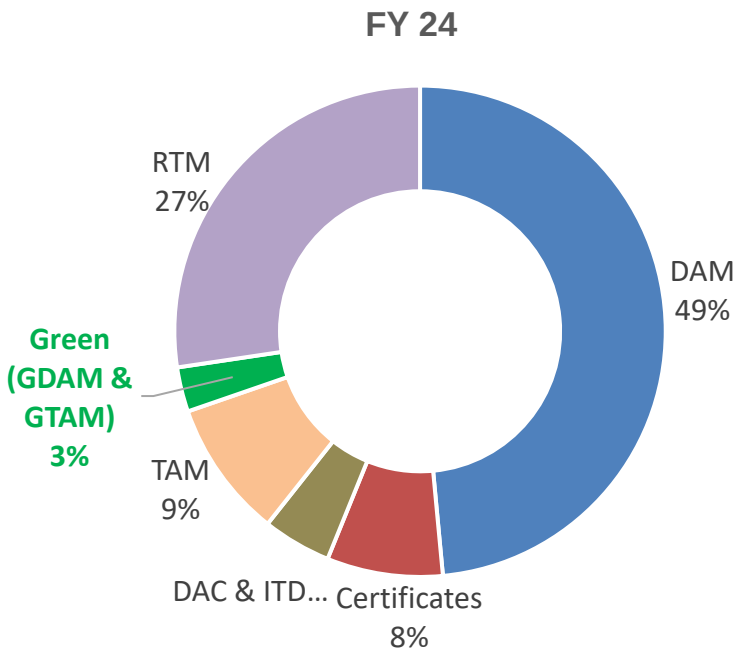


Increase in Solar Capacity, from 67 GW in Apr-23 to 92 GW in Oct-24

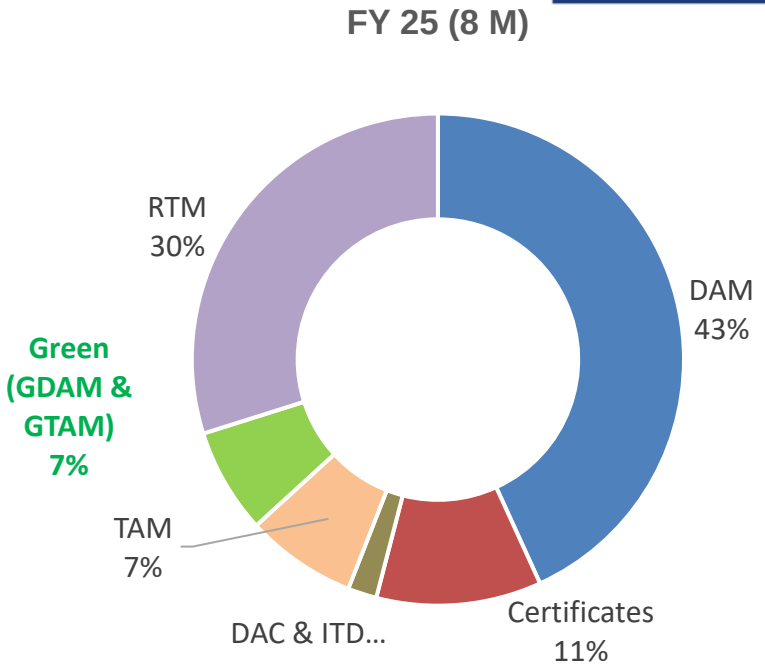
Exchange Products

- Three Power Exchanges (IEX, PXIL, HPX)
- Integrated DAM - *Closed double sided auction*
  - DAM (includes Cross Border Trade) & **G-DAM**
  - High Price DAM
- Real-Time Market (RTM) - *Closed double sided auction*
- Intraday Market (Conv., HP ITD & **Green**) – *Continuous matching*
- Day Ahead Contingency (Conv., HP DAC & **Green**) – *Continuous matching*
- TAM, HP-TAM & **Green TAM** **(up to 3 Months)**
  - Daily, Weekly, Monthly – *Uniform price step auction*
  - Any Day Single-Sided Contract (Conv. & **Green**) – *Reverse auction*
- Tertiary Reserve Ancillary Services (TRAS): AS-DAM & AS-RTM
- **Certificates: RECs & ESCerts** – *Closed double sided auction*
- **Upcoming proposed products:**
  - **TAM Contracts for delivery upto 11 months**
  - **Green RTM market**

IEX Product Mix



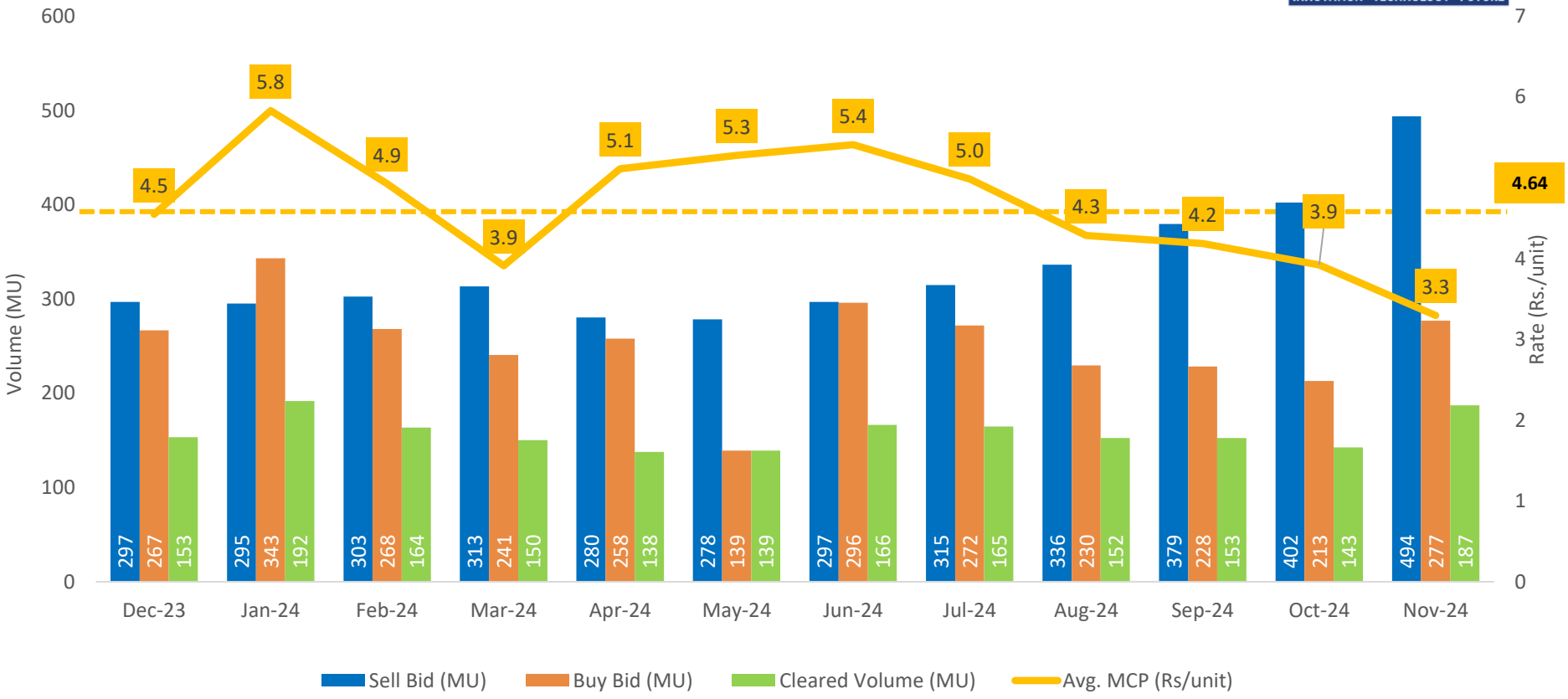
Total Volume: 110 BU



Total Volume: 87 BU

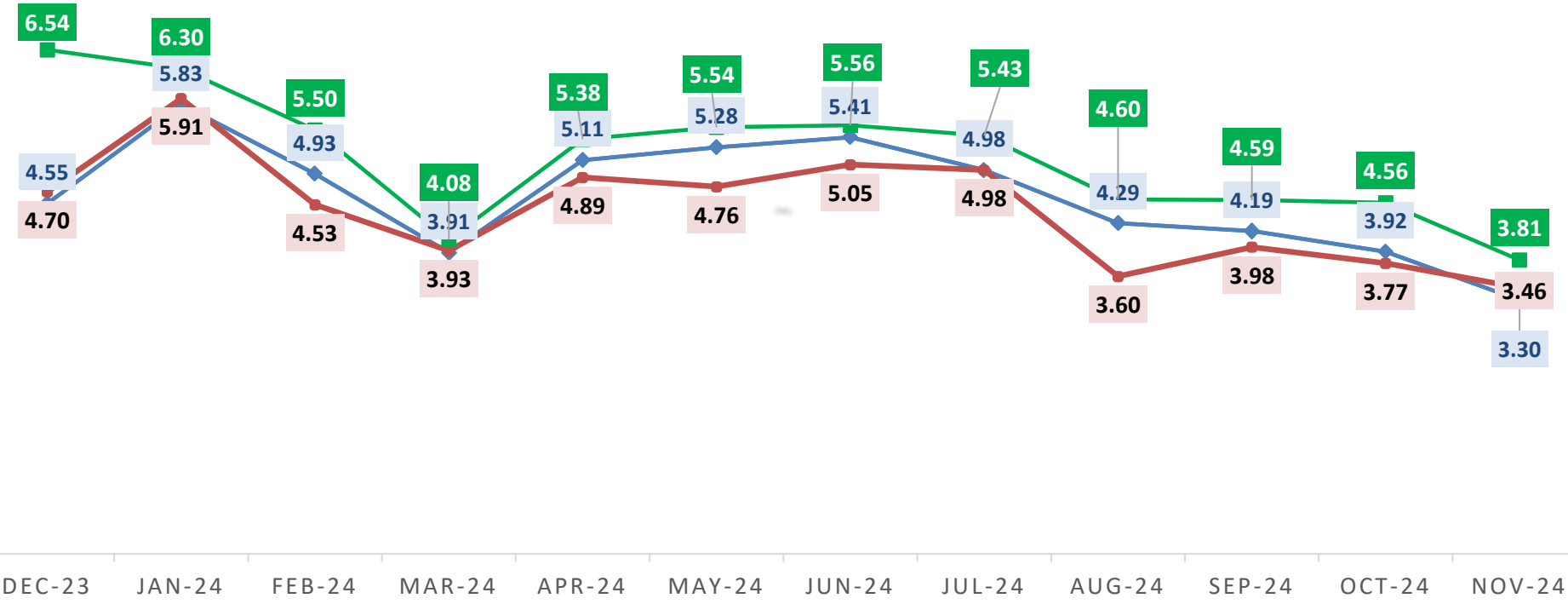
- Increase in volume traded is observed in Real Time Market and Green Market Segments of Power Exchanges.

DAM Daily Average Trends (Last 12 Months)



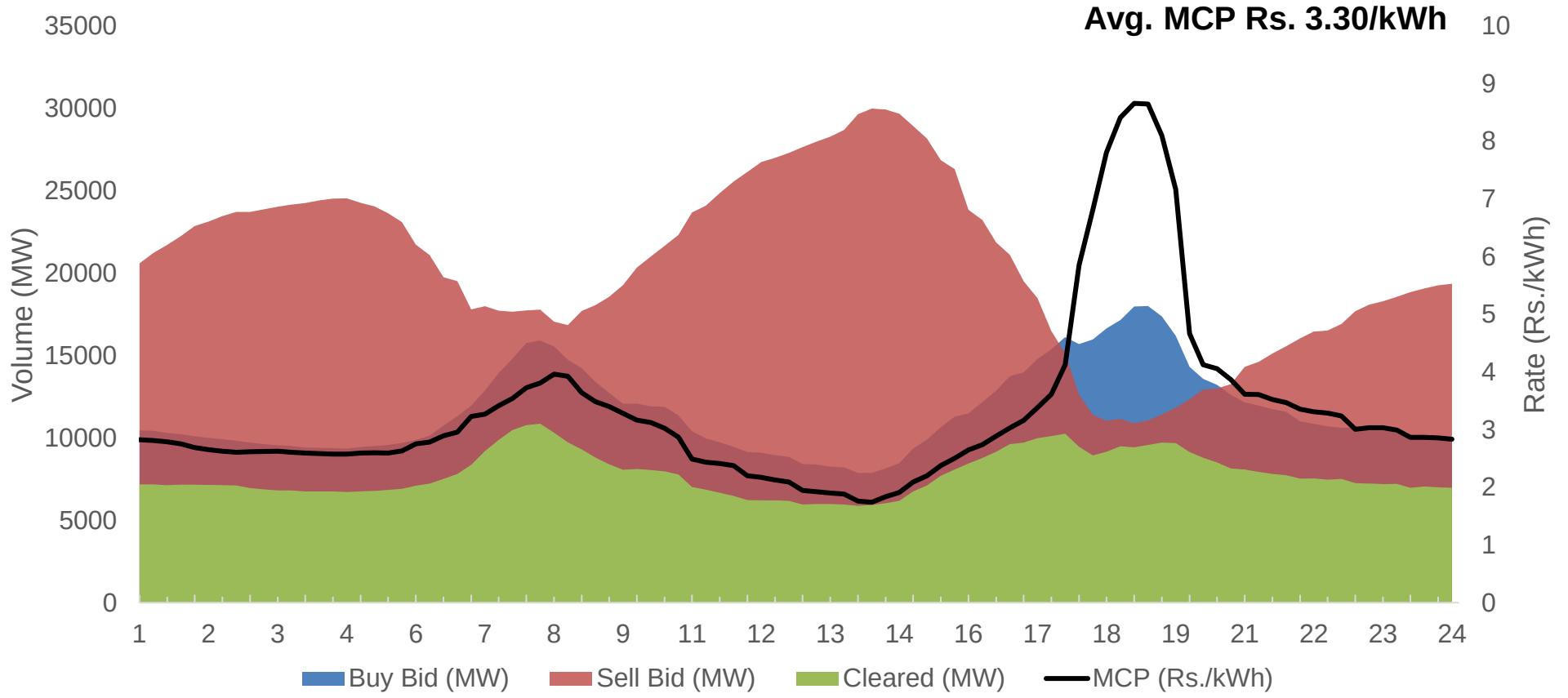
Price Trends (Rs./kWh) DAM, RTM & GDAM (12months)

RTM Avg MCP: 4.46 Rs/unit | DAM Avg MCP: 4.64 Rs/unit | GDAM Avg. MCP: 5.16 Rs/unit

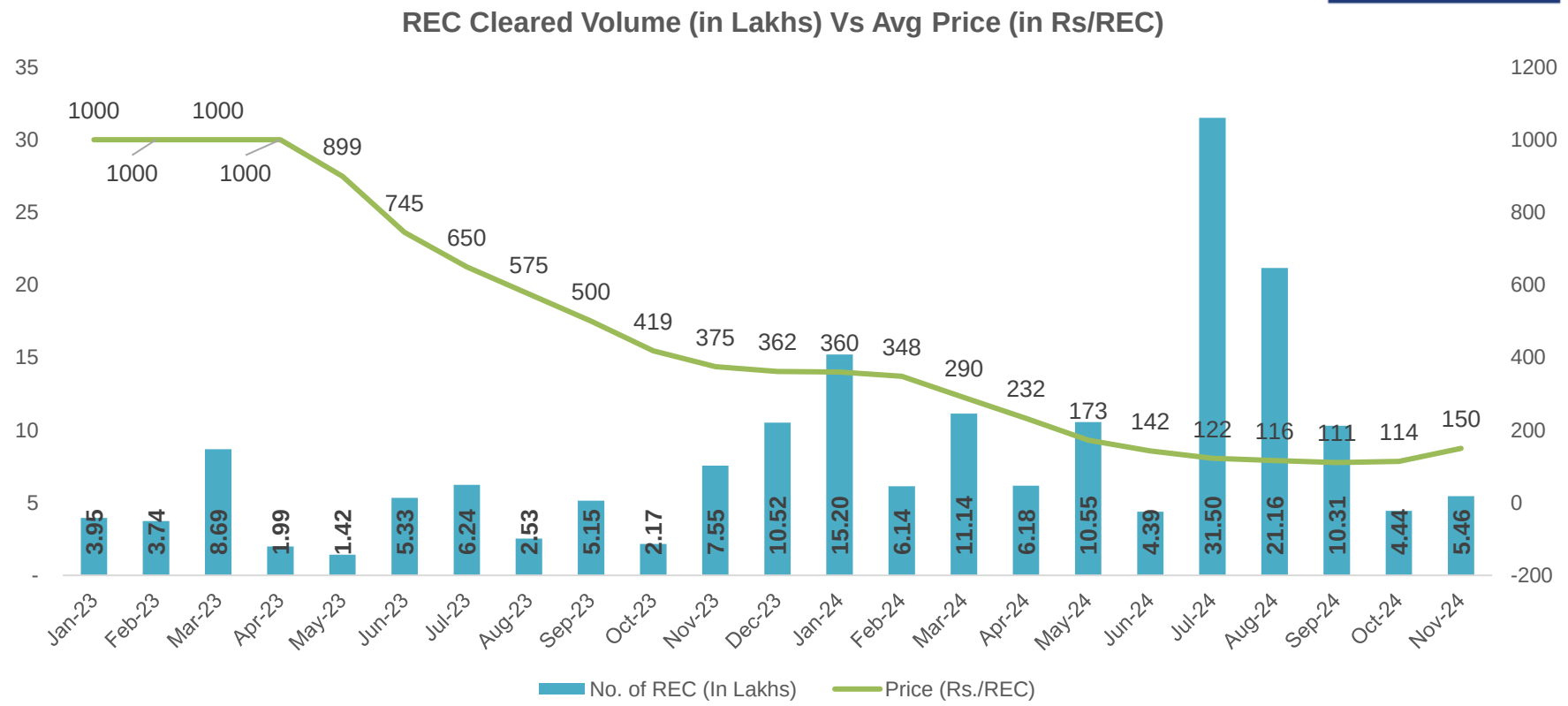


Data till Nov-24

Typical Winter Day (Nov-24)



Renewable Energy Certificates (REC) Snapshot



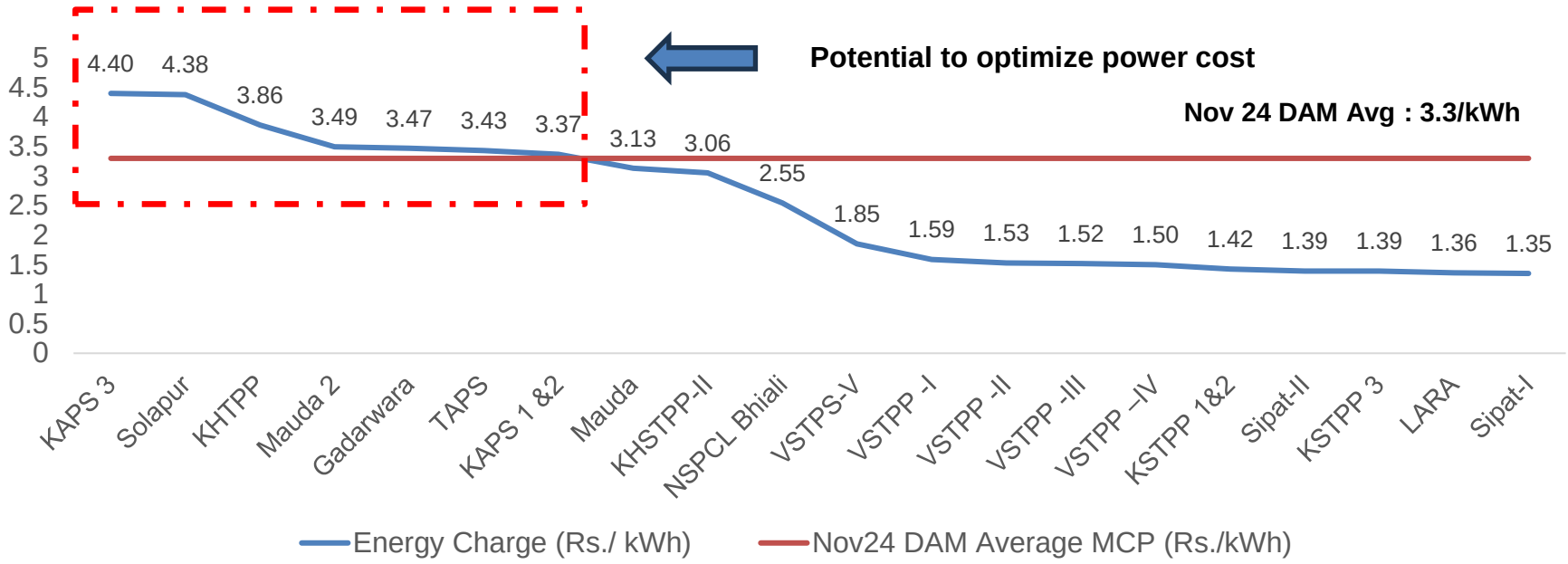
RECs Inventory (4.9 Cr) … leading to lower prices 15p/kWh – Easy for Discoms to comply with RPO.

Renewable Energy Trajectory (MoP Order dtd 20.10.2023)

Sl.No	Year	Wind renewable energy	Hydro renewable energy	Distributed renewable energy*	Other renewable energy	Total renewable energy
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	2024-25	0.67%	0.38%	1.50%	27.35%	**29.91%**
2.	2025-26	1.45%	1.22%	2.10%	28.24%	**33.01%**
3.	2026-27	1.97%	1.34%	2.70%	29.94%	**35.95%**
4.	2027-28	2.45%	1.42%	3.30%	31.64%	**38.81%**
5.	2028-29	2.95%	1.42%	3.90%	33.10%	**41.36%**
6.	2029-30	3.48%	1.33%	4.50%	34.02%	**43.33%**

- Wind RE component to be met by energy produced from Wind Power Projects (WPPs) commissioned after 31.3.2024.
- Hydro RE component to be met by energy produced from Hydro Power Projects [including PSPs and SHPs], commissioned after 31.3.2024. Hydro RE component can also be met from Hydro Power Projects located outside India.
- Distributed RE component to be met from energy generated from RE projects less than 10 MW and shall include solar installations under all configurations.
- Other RE component can be met from any RE power project other than WPPs and Hydro Power Projects commissioned before 1.4.2024.
- Allowed fungibility within 'Other RPO', Wind RPO and HPO

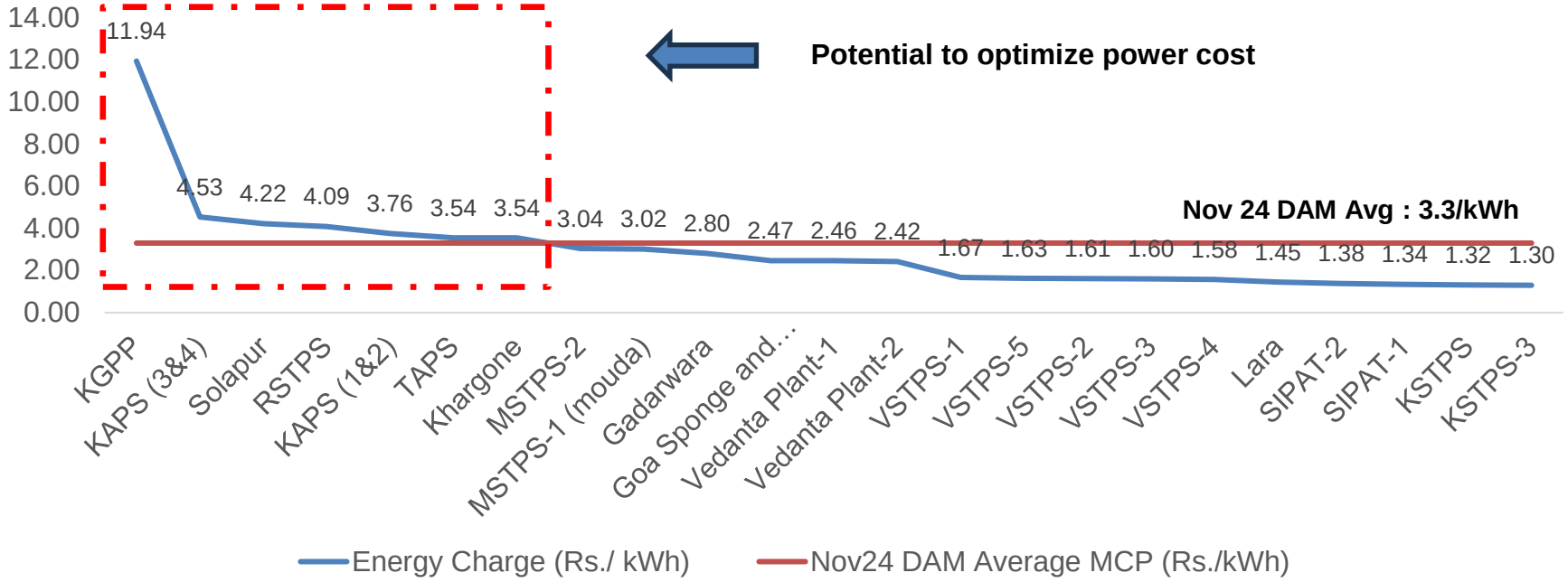
Optimization of Power Purchase Cost - DNHDDPCL



MOD as per DNHDDPDCL Tariff Order for FY 2024-25

- Potential for optimizing power cost by placing replacement bids for high VC plants like KAPS 3, Solapur, KHTPP etc.
- Plants can be brought to technical minimum or put under RSD
- AP, TS, PB & MH regularly optimize

Optimization of Power Purchase Cost – Goa



MOD as per Goa Energy Dept. Tariff Order for FY 2024-25

- Potential for optimizing power cost by placing replacement bids for high VC plants like KGPP, KAPS (3&4), Solapur etc.

Key Takeaways

- **Green DAM** – higher liquidity on sale side .. opportunity to procure competitive green power for RPO compliance.
- **Low power prices** .. Thanks to better coal production , lower import prices & lower demand … all leading to opportunities to optimize thru exchanges.
- **REC prices** has slashed to < 20 p/kWh, an opportunity to fulfil RPO compliance.

Thanks
for kind attention !!

rajesh.mediratta@igxindia.com