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AND RENEWABLE ENERGY

Rethinking Utility Resource Planning in RE Rich Environment

Work done under the USAID PACE-D 2.0 - RE program in India

Asian Clean Energy Forum |18th June 2020

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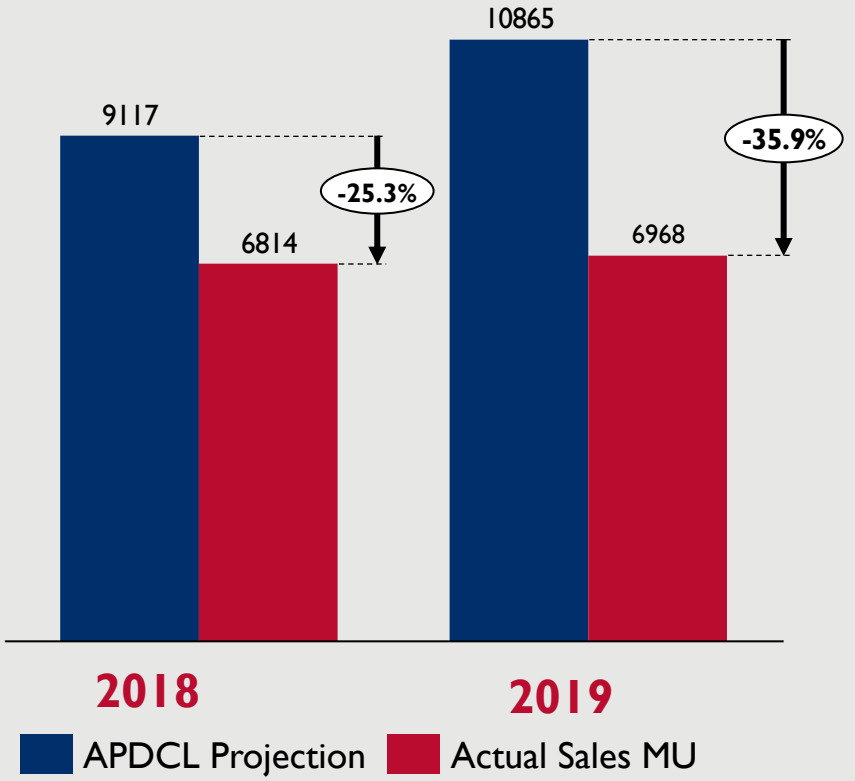
Agenda

- What is Resource Planning
- Importance of Resource Planning
- Existing Practices in Resource Planning
- Work undertaken under USAID PACE-D 2.0 RE Program
- Recommendations

WHAT IS RESOURCE PLANNING?

Resource Planning is a process that helps DISCOMs to **optimize** their supply resources to meet long-term and medium-term demand based on **least cost** and maximum renewable energy in its power portfolio. Key attributes of resource planning are as follows:

- Demand Forecasting
- Resource Mapping
- Estimating Additional Resources
- Developing Alternate Resource Portfolios
  - Combinations of RE, Demand Side and Conventional
  - Develop Options (Managing Risk and Uncertainty)

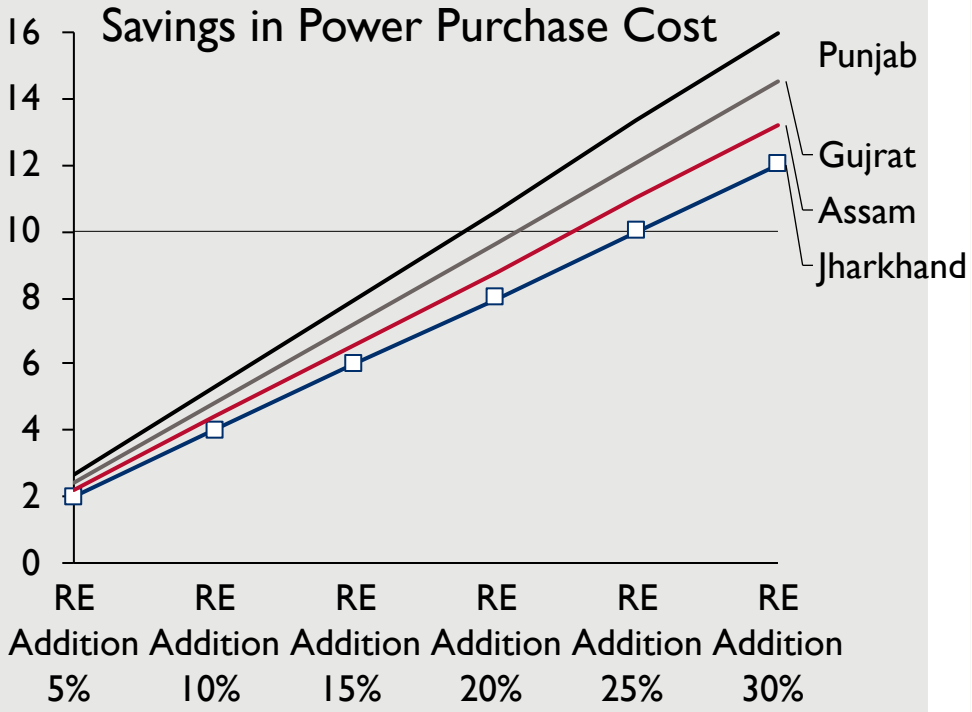


Demand Overestimation resulted additional cost burden to DISCOM **$ 232 Million in FY 2018-19.**

Why is Resource Planning Important ?

Power procurement cost is 60-70% of the total cost of supply.

- Minimize grid integration cost
- Avoid installations and use of peaking generators.
- Avoid over or under resource contracts.
- Better Manage Risk and Uncertainty- Meet situations like COVID
- Reliability of supply
- Higher use of RE
- Energy security
- Reduce consumer tariff



10% reduction in PPC power portfolio.

Savings: $ 73 Million annually

RE Development Impacting DISCOM Resource Planning

- **Development 1** : RE Prices are lower than fossil fuel prices
- **Development 2**: DSM Measures provide low cost additional resource
- **Development 3**: Technology Advancements now provide ways to balance demand and supply.

Development 1 : Falling Prices of Renewable Energy in India

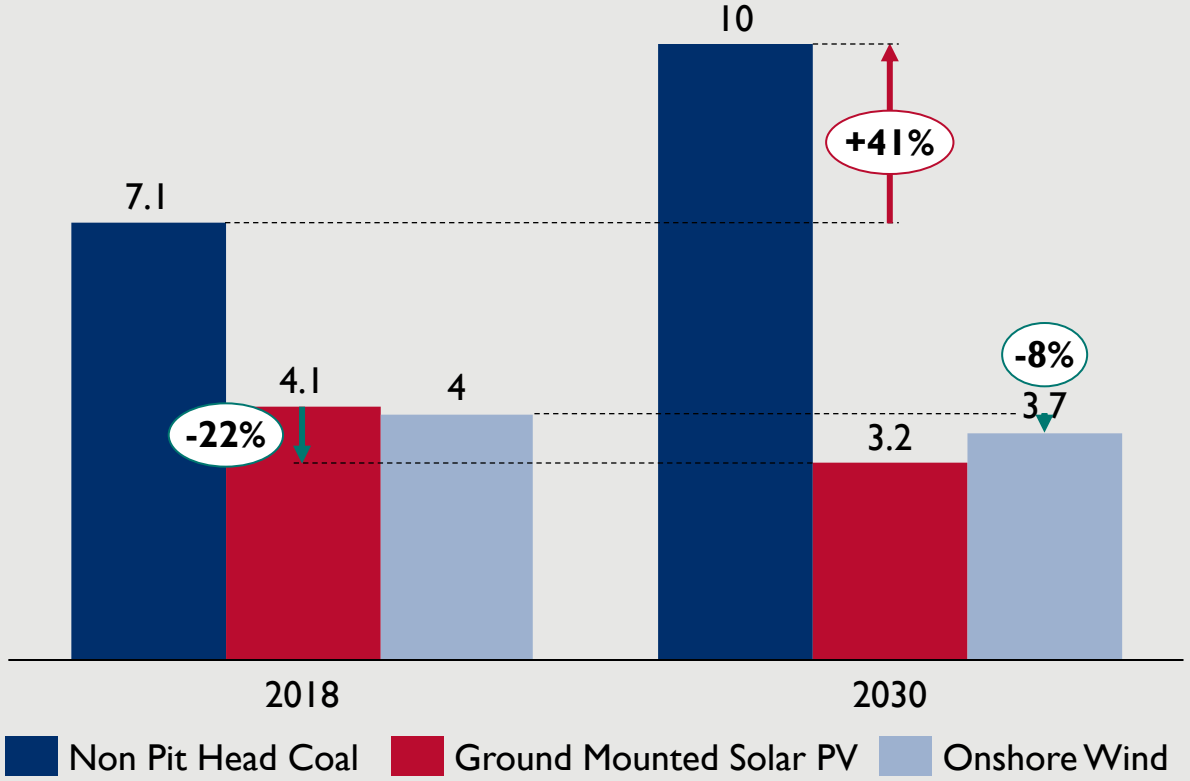
RE Installed
84 GW
(48% of Installed Cap. Jan 2020)

RE Target by Y2022
175 GW
Aiming for 225GW

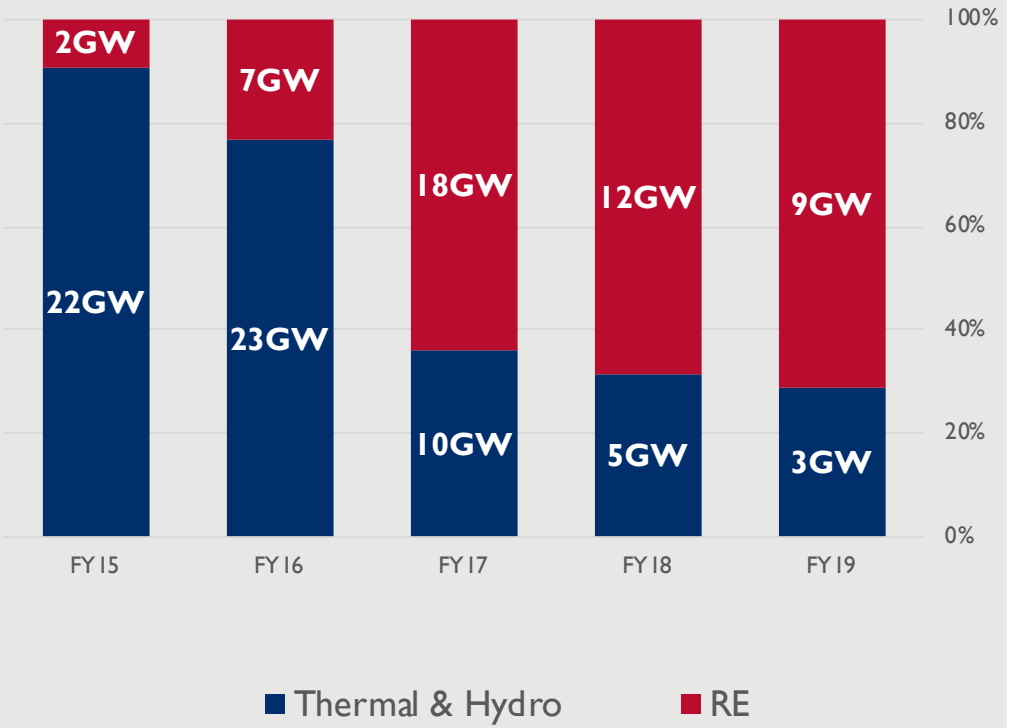
Falling RE Prices
Wind ₹ 2.5 -2.85/kWh
Solar ₹ 2.4 -2.65/kWh

Discoms' Avg. Procurement Cost
₹ 3.6/kWh
(APPC FY18-19)

Future Power Generation Costs in India (cents/kWh)

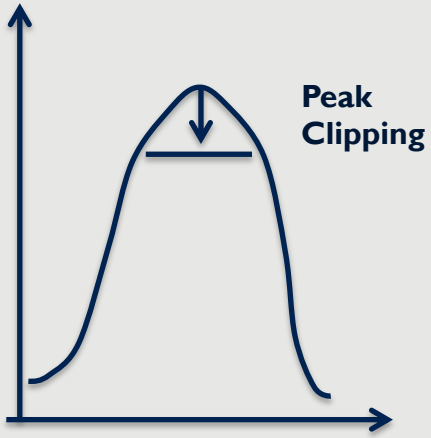


Capacity Addition Trend – RE Focused

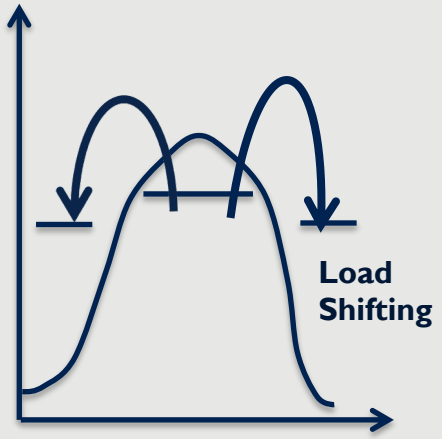


Development 2: DSM, DER and Technology Can Control Demand Variations

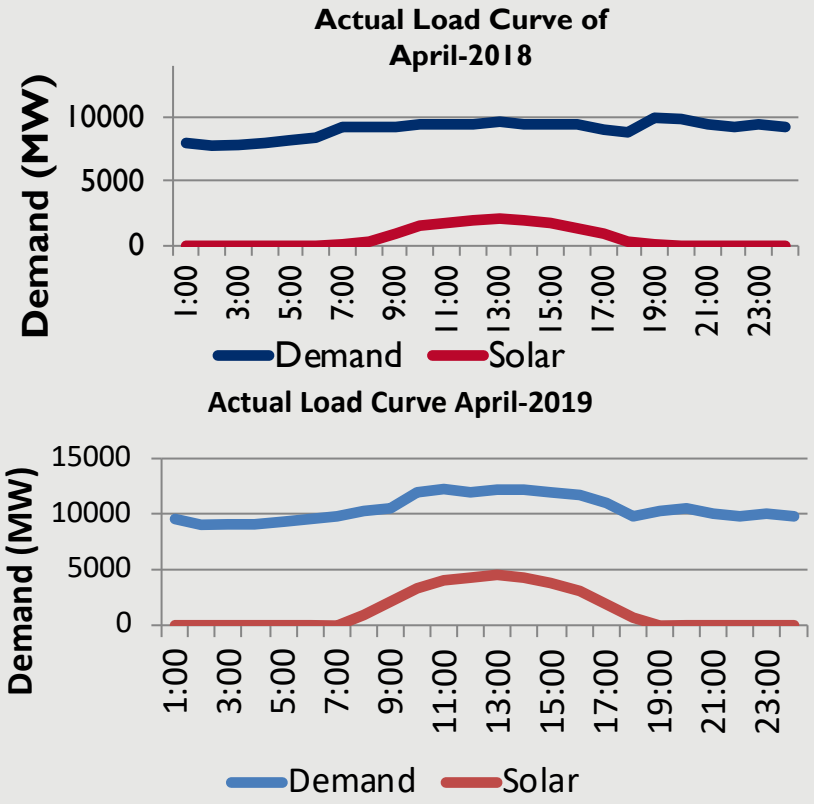
Demand Response



EE & Price Signals

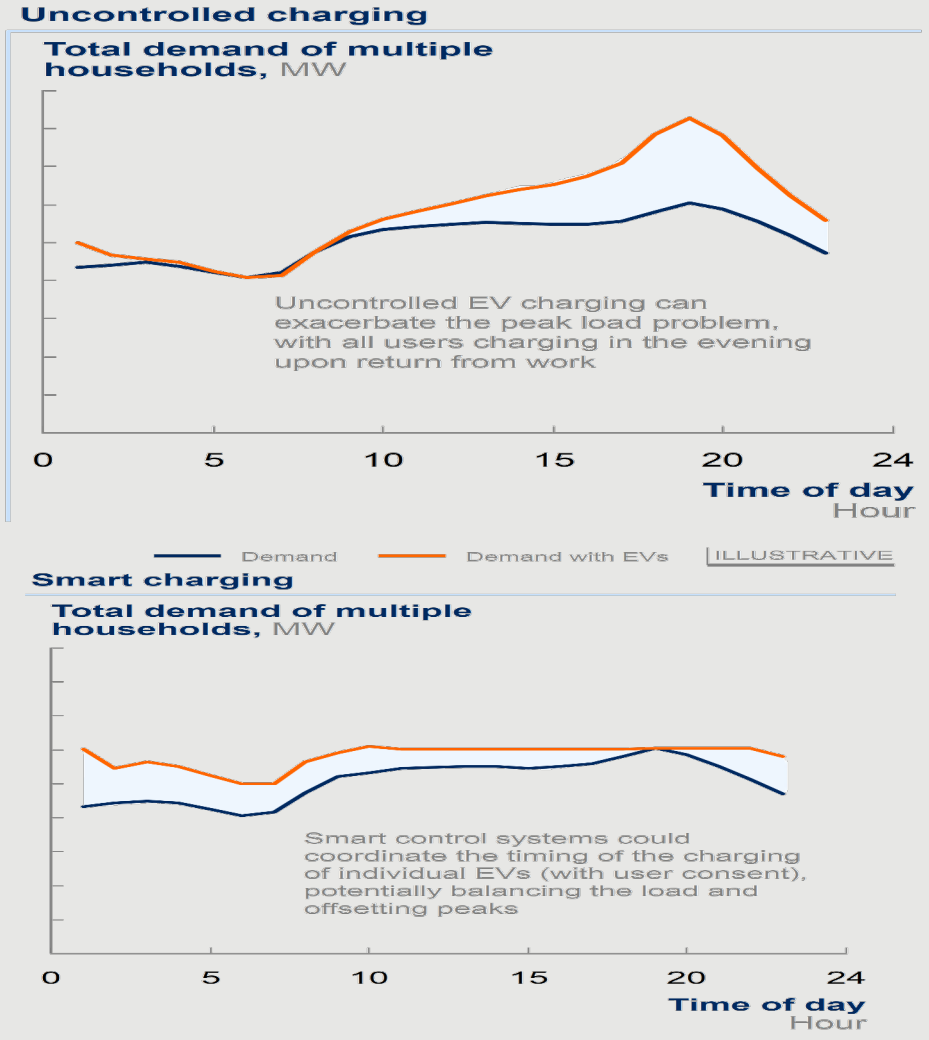


Dist. Generation



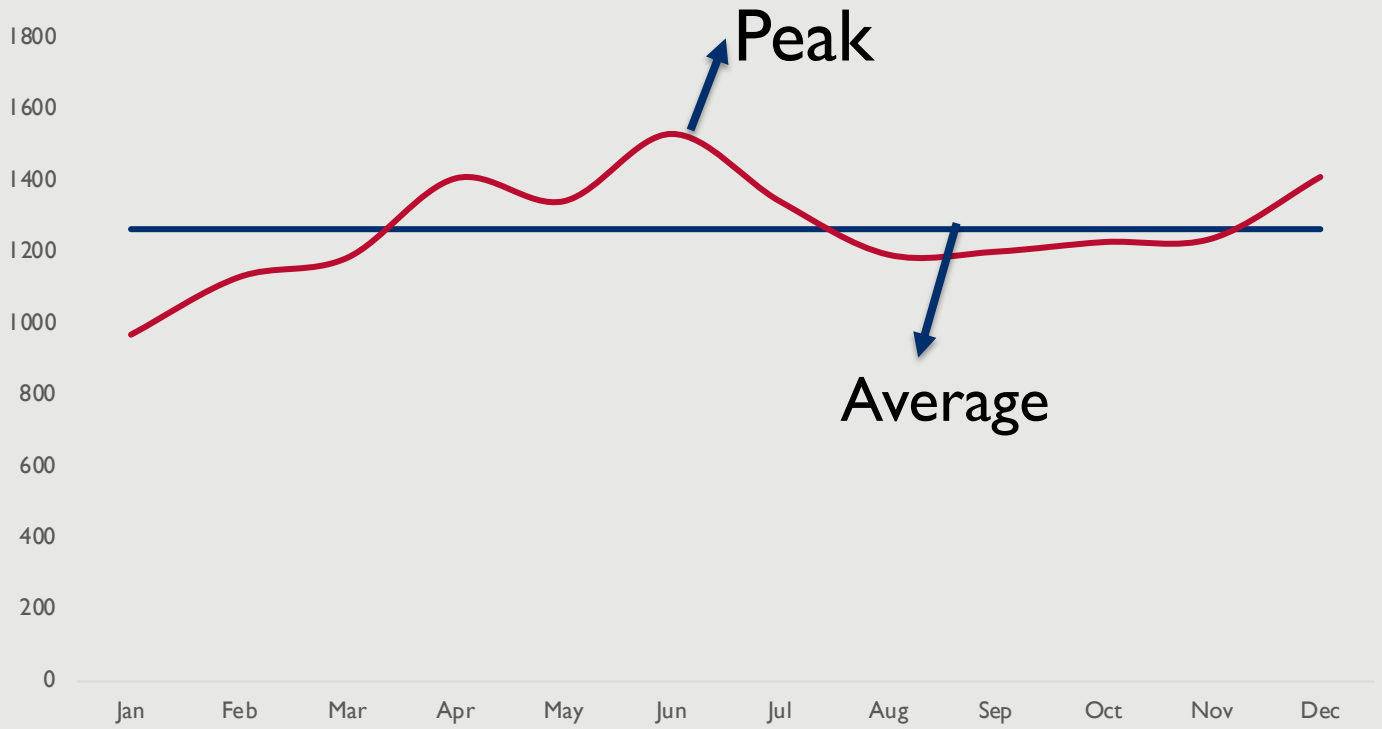
Karnataka : Due to shifting of part of Irrigation pump sets to Solar generation time. Total irrigation contributes to 1/3rd of State Energy

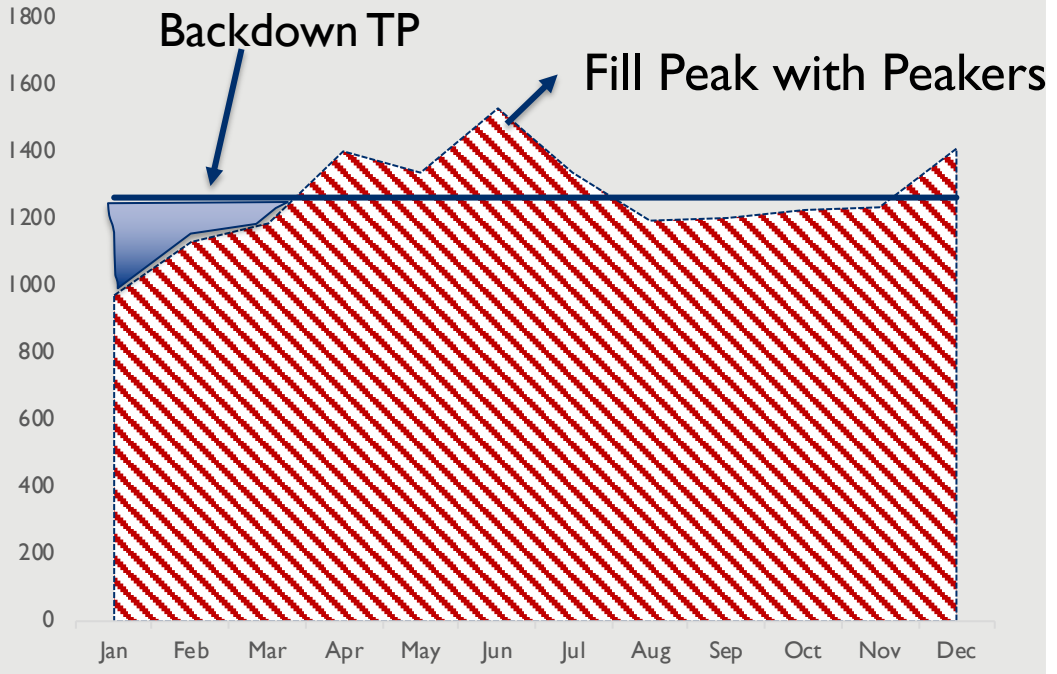
Electric Vehicles



Long Term Resource Planning, with efficient Demand Forecast helps prepare Discoms for the challenges ahead

Development 3 : It is possible to better match variations in supply with demand across space-time

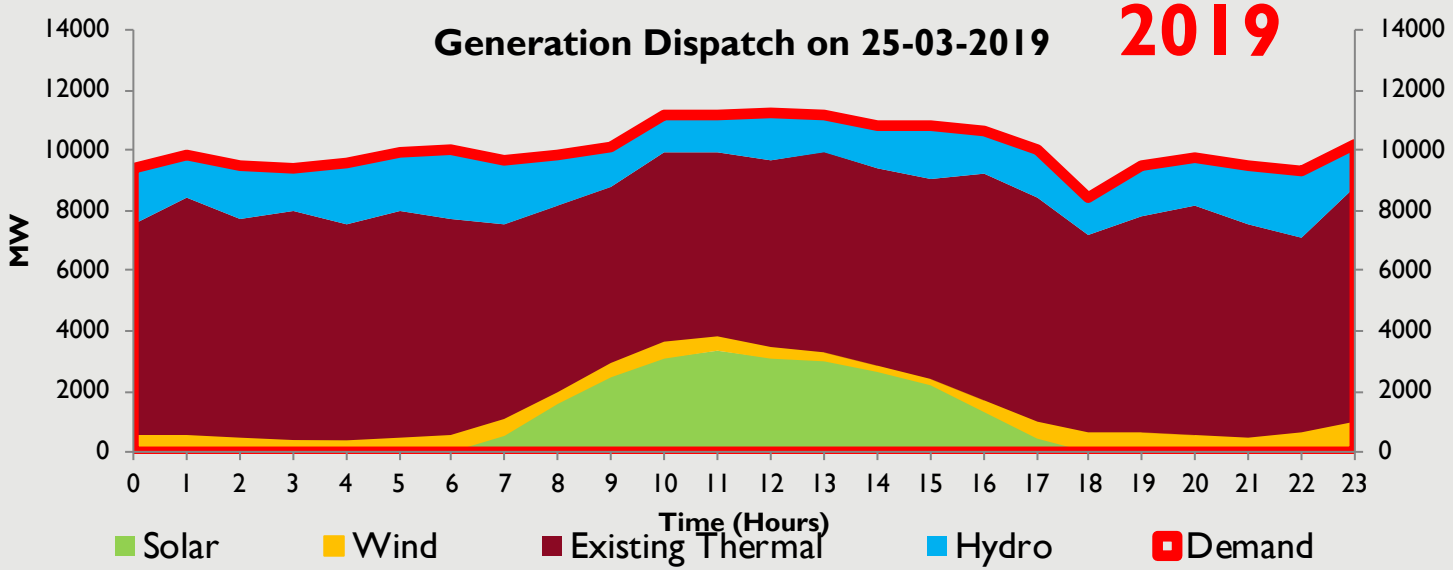


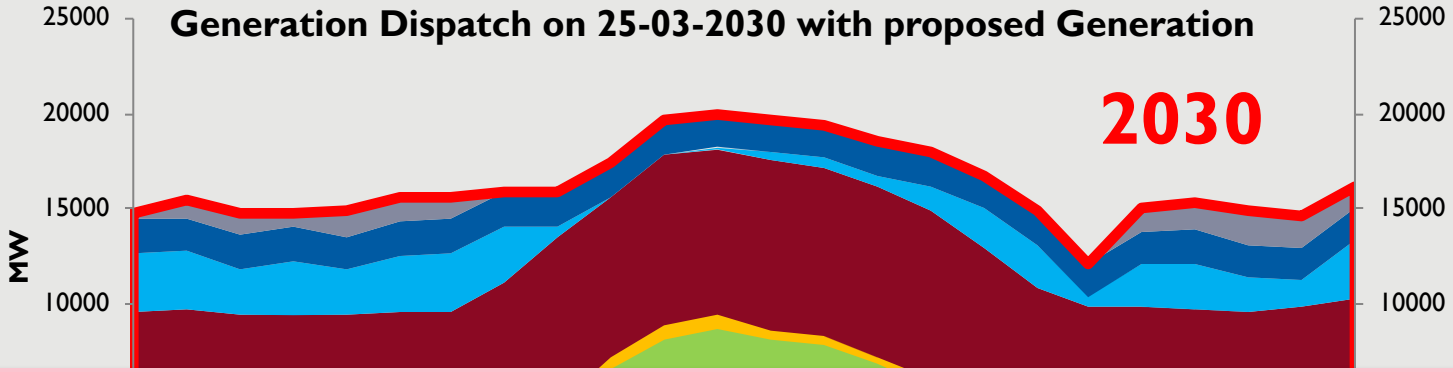


- Thermal Resource fairly a base load, predictable and stable.
- The peak requirements were attended through Peaker's
- Demand was considered uncontrollable.
- Demand was higher than supply. Load control was through load shedding.

Better Forecasting, Load Shifting, Demand Response, Energy Efficiency, Pricing Signal can help matching without external support

Simulation Study for Karnataka (Southern State in India)





14.3 % AT&C Loss | 20.6 Million Customers

2019

Peak Demand : 11245 MW

Resources : Thermal + Hydro + RE (W+S)

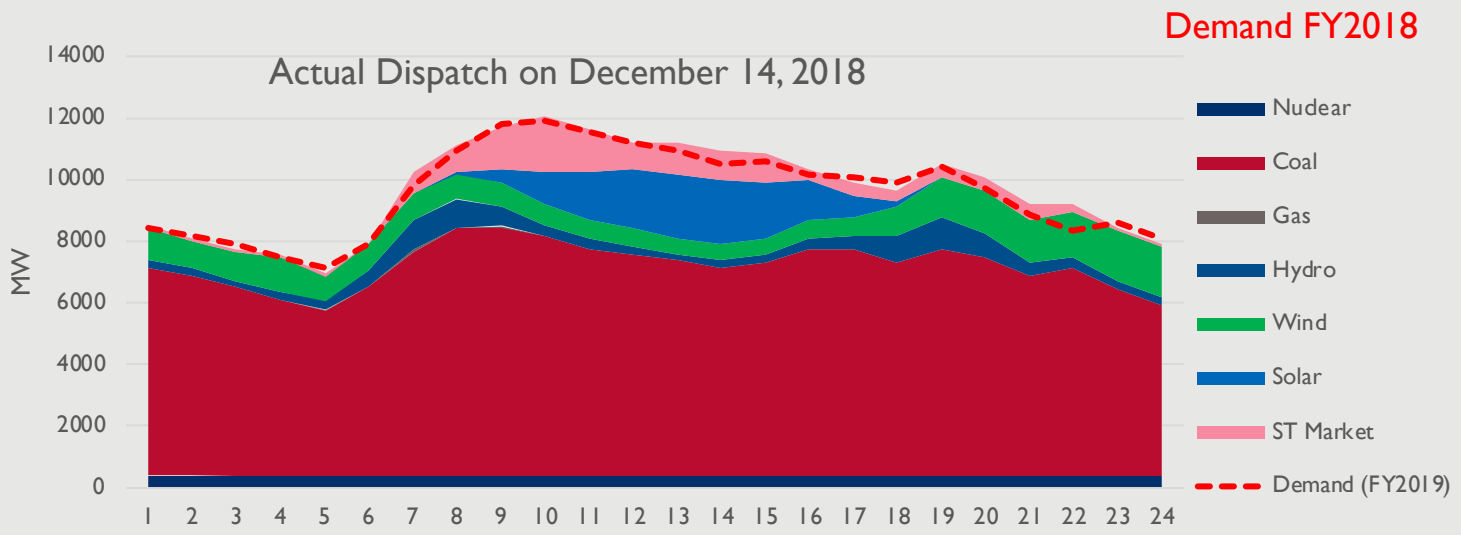
2030

Peak Demand : 19127 MW

	Business As Usual (+)	RE Scenario (+)
Thermal	4720 MW	2670 MW
RE	0 MW	6400 MW
Storage	-	2000 MW

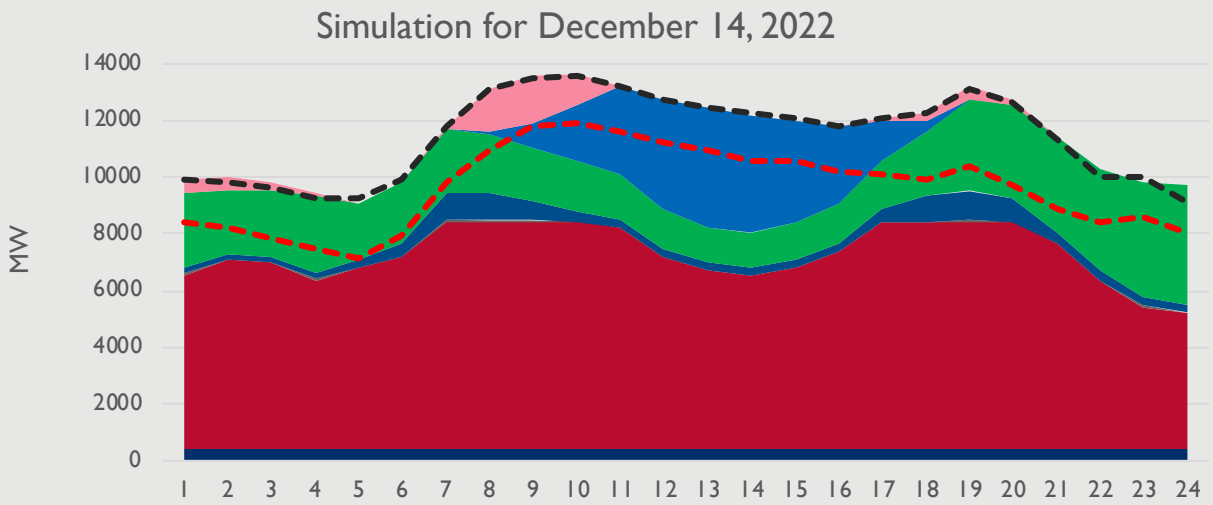
- No stranded asset created
- Better Planning will result in high RE and savings in PPC by $ 133 Million Annually

Simulation Study for Rajasthan (Northern State in India)



Dispatch on Dec. 14, 2018

- PLF of TPPs – 71%
- RE Generation Share – 15%
- Avg. Power Cost – Rs 4.88/u



Capacity Add.
2x Solar
2.5x Wind
Others-Nil

Simulation for Dec. 14, 2022

- PLF of TPPs – 72%
- RE Generation Share – 30%
- Avg. Power Cost– Rs 4.63/u
  (Decrease of about 5.2%)

With better Demand Forecast & Resource Planning, RE Share can Get Doubled

Existing Gaps in Resource Planning

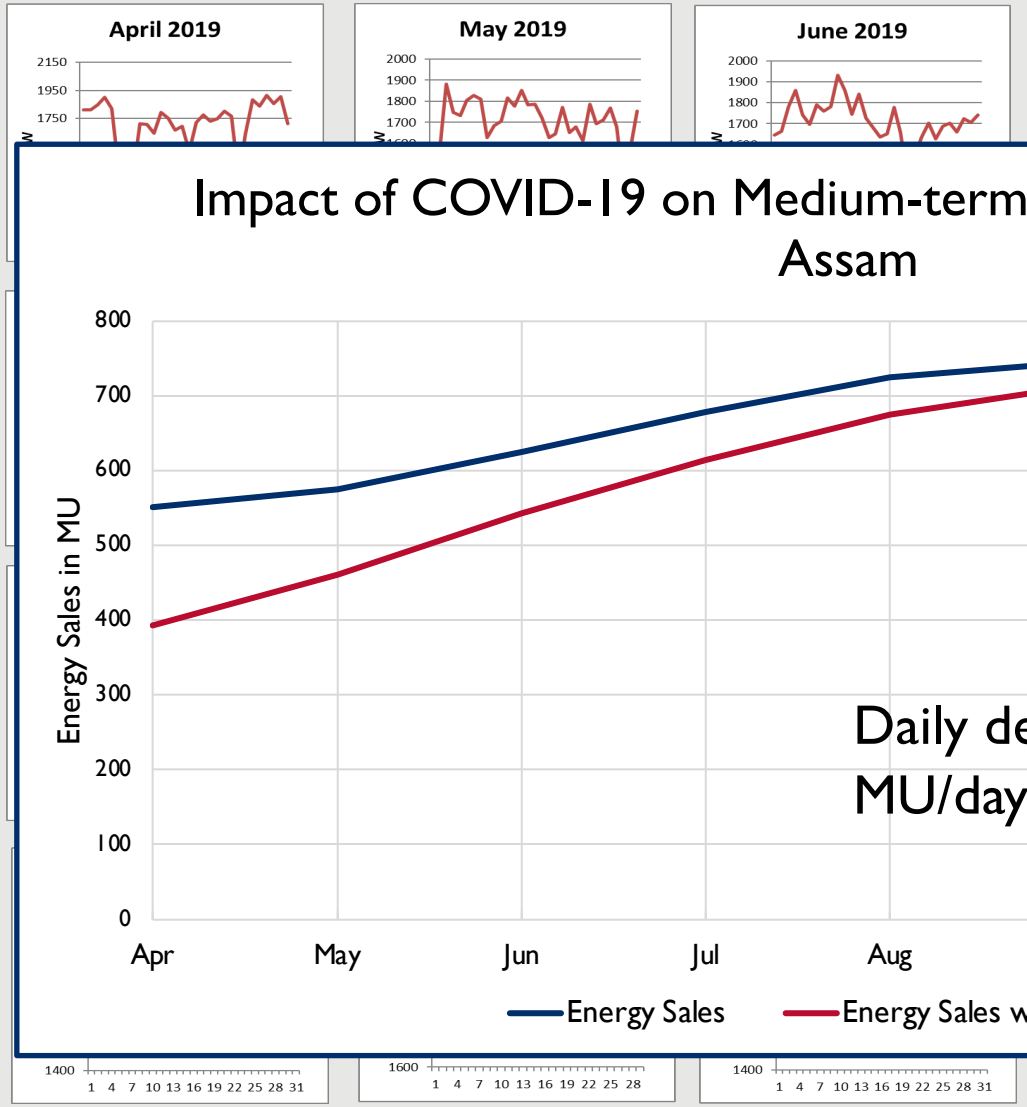
1. Demand Forecasting and Resource Planning is not granular, profile based and guided by **time series analysis.**
2. **Absence of well defined regulatory framework** or pronounced methodology to examine the 60-80% cost of Distribution business.
3. Emphasis on **Risk, Sensitivity and Probabilistic Analysis** is absent.
4. **Capacity building** is needed to equip professionals with RE dominated portfolio.
5. Utility focus is on short term causalities with **limited updates** of medium term and long term resource plans
6. **Power procurement** is by MOU and competitive bidding.

Work Done under USAID Program on Strategic Energy Planning

- White Paper on "**Rethinking DISCOM resource planning in RE rich environment**"
- DISCOM Resource Planning **Software tool**
  - Demand forecasting
  - Generation planning
  - Least-cost power procurement
- **Model Regulations** for long term and medium term resource planning
- Working with **two partner states in India** – Jharkhand and Assam to deploy and demonstrate the benefits of resource planning
- Online Certification Program on Resource Planning – **Capacity Building**

Actual Results from Software Tool : Hourly Load Profiles

Peak demand for each day for each month for FY 2020



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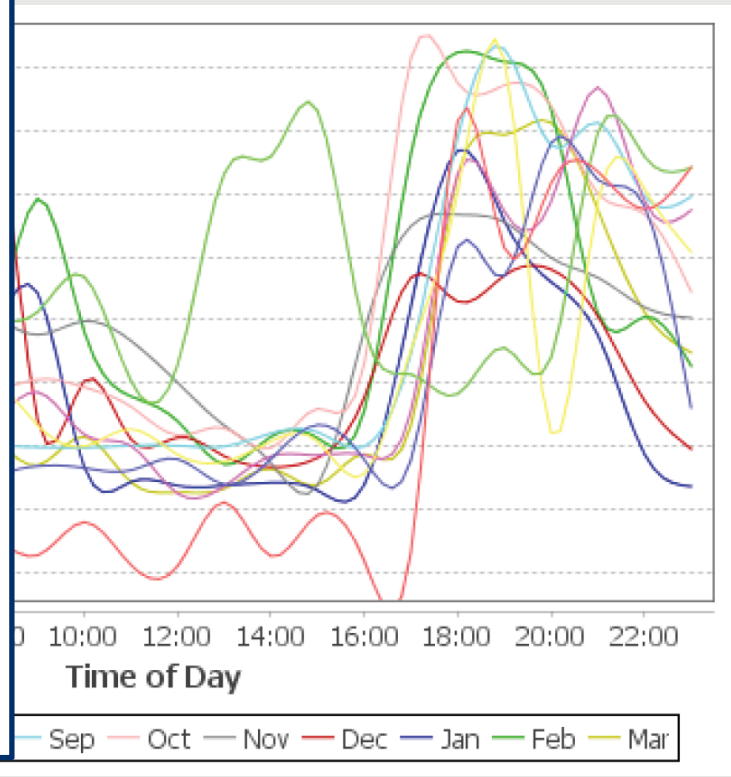

Impact of COVID-19 on Medium-term Demand Forecast for Assam

Daily demand is about 13 MU/day* in Assam nowadays.

% Deviation Of Demand Projections W.R.T Energy Sales Approved is **< 5%**

Recommendations

Recommendation I :	Increase Awareness of the importance of Resource Planning
Recommendation II :	Create Regulatory Framework for Resource Planning
Recommendation III :	Develop Software tools
Recommendation IV :	Risk and Uncertainty Management to be integral part of Resource planning
Recommendation V :	Capacity Building at all levels

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Thanks!

Your Feedback, Questions are Welcome…

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