Reflections on the Role of Demand Response / Demand Side Management in the Maharashtra Power Sector Transition

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Why Are We Interested In Demand Response/Demand Side Management Now?

- Being a **capital intensive sector**, system costs of the power system are largely determined by the installed capital (GW, MVA) required to meet peak load.

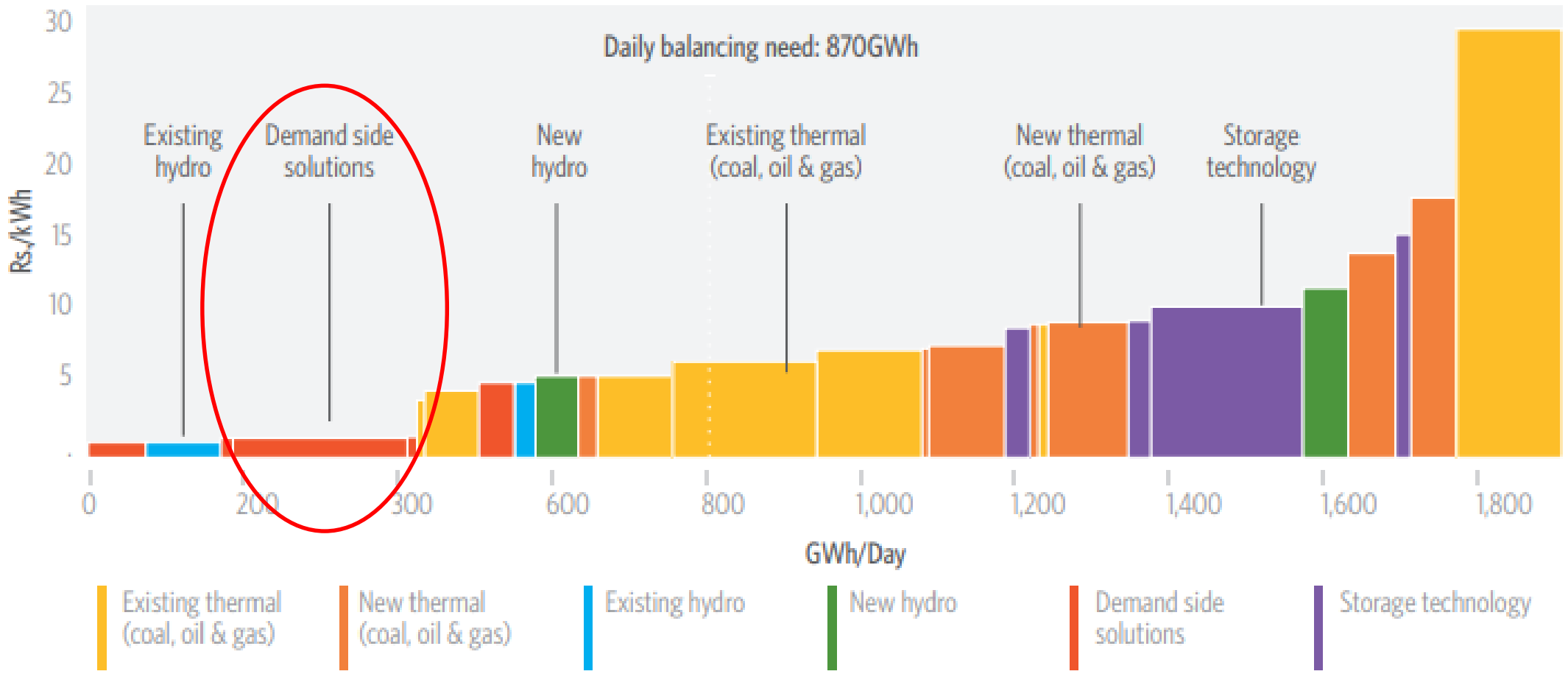
- Demand response / demand side management can often be a cost effective way of **reducing system costs**.

- The growing role of variable renewables (VRE) has increased the focus on demand response / demand side management because VRE is not dispatchable and **not always perfectly correlated with load.**

- The increasing sophistication of wholesale and retail markets, and the declining cost of communication and control technologies, potentially **increase the scope of available demand response.**

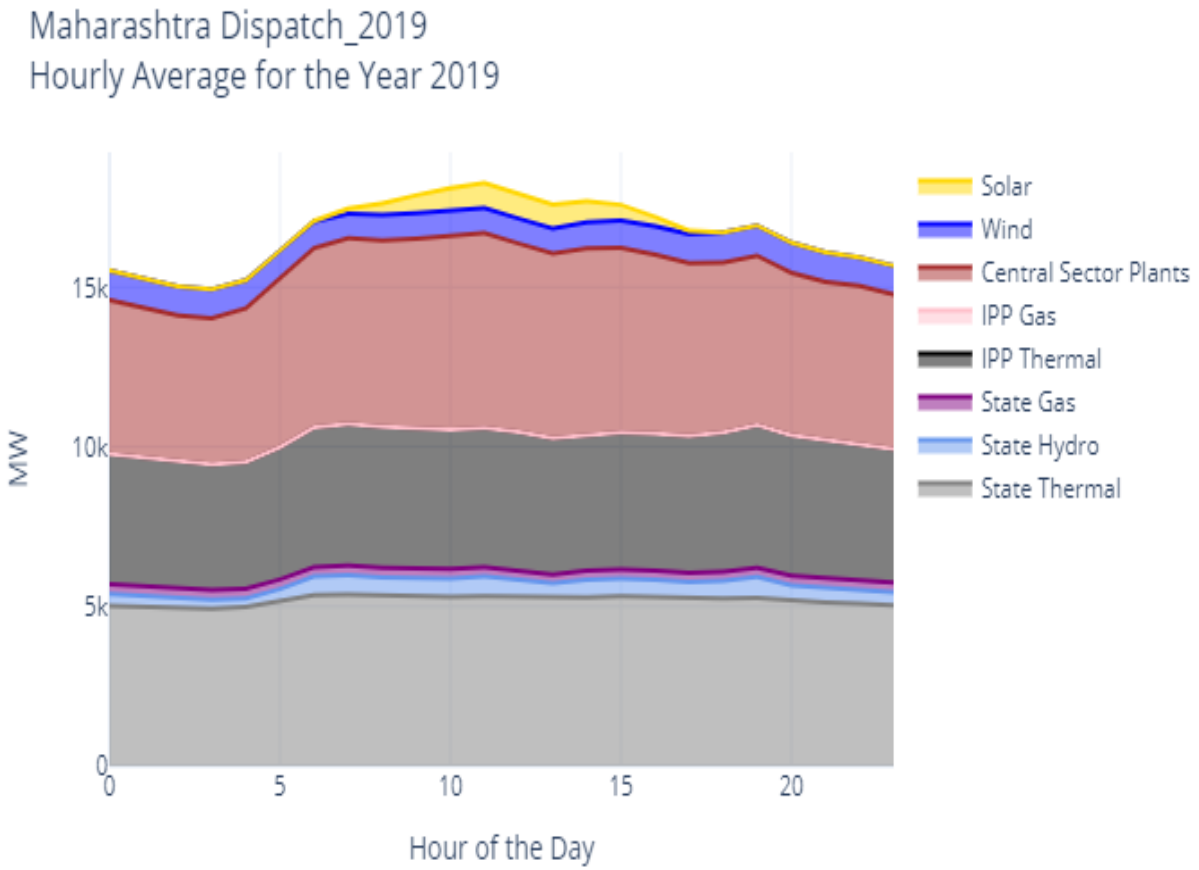
Demand Response / Demand Side Management is Generally Considered Low Cost But Often Neglected

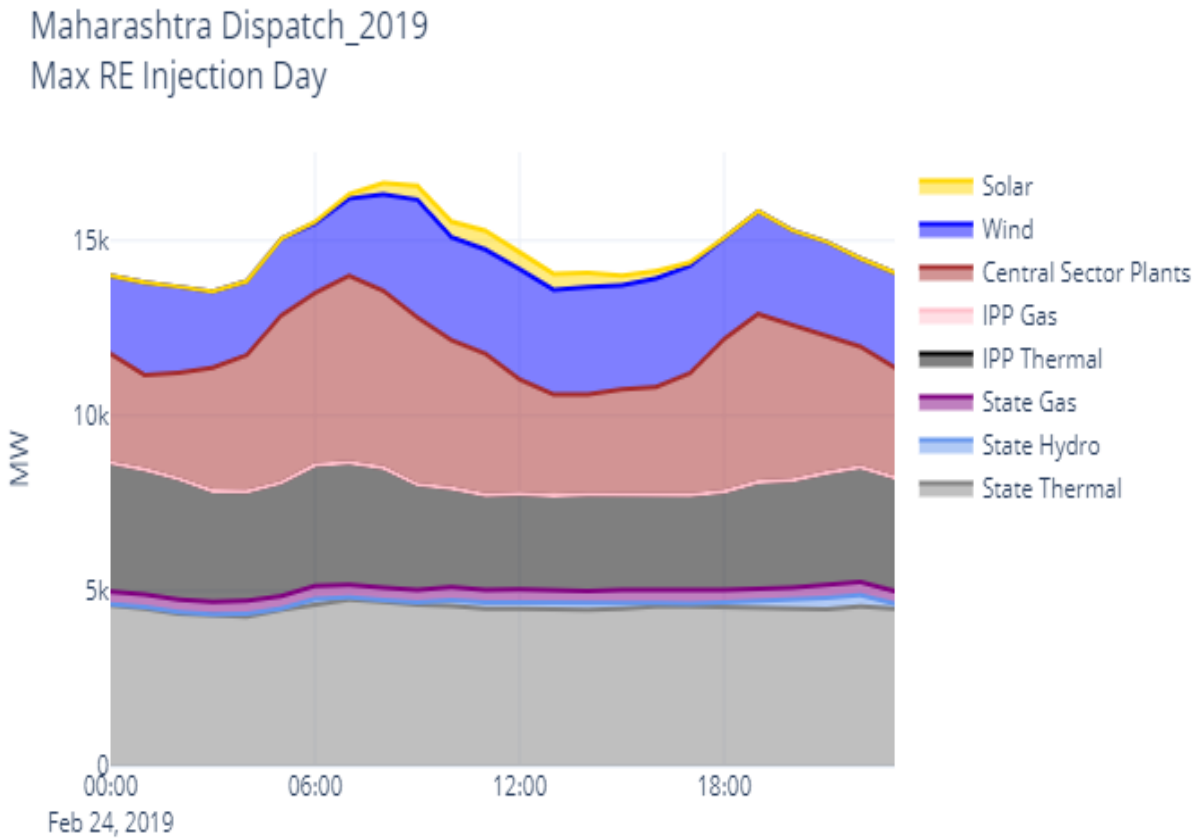
Supply Curve for Meeting Daily Balancing Requirement in 2030



Source: Modelling and analysis from Climate Policy Initiative and TERI (2018)

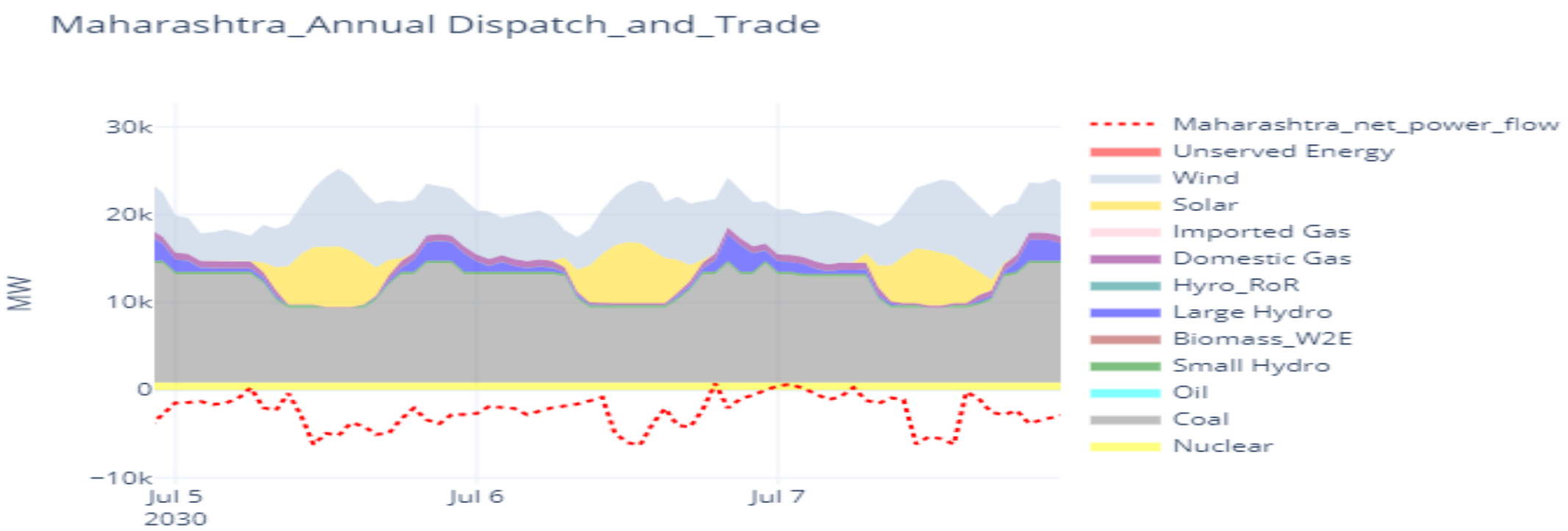
Today Maharashtra Doesn't Face a Challenge in VRE Grid Integration





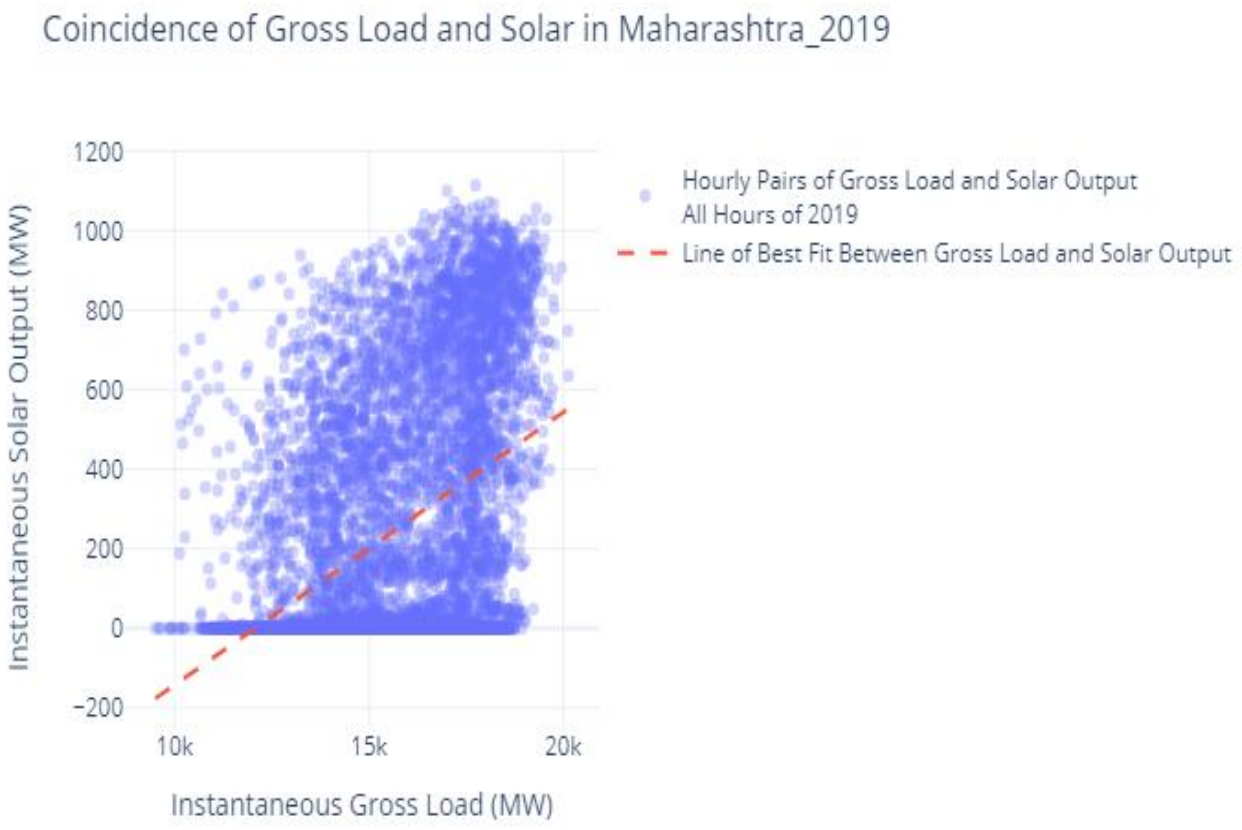
Source: TERI analysis based on data from Maharashtra State Load Dispatch Centre

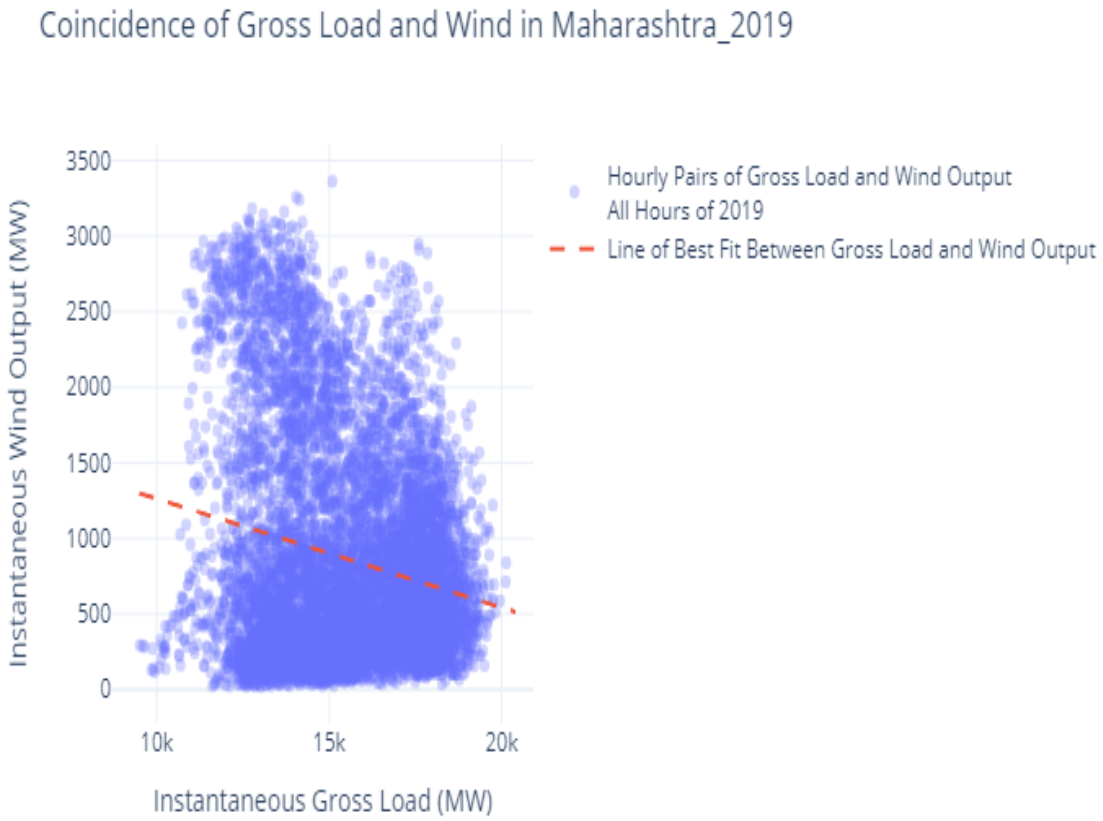
But By 2030 This Could Change



Source and notes: Based on data from TERI's PyPSA-India dispatch model. Scenario assumes 190 GW of solar and 128 GW of wind at all India level by 2030, with capacity allocation to Maharashtra according to its estimated share in all India technical potential for RE. Net power flow refers to out of state import / export, but this may also include contracted capacities from central stations or market purchases or bilateral trade.

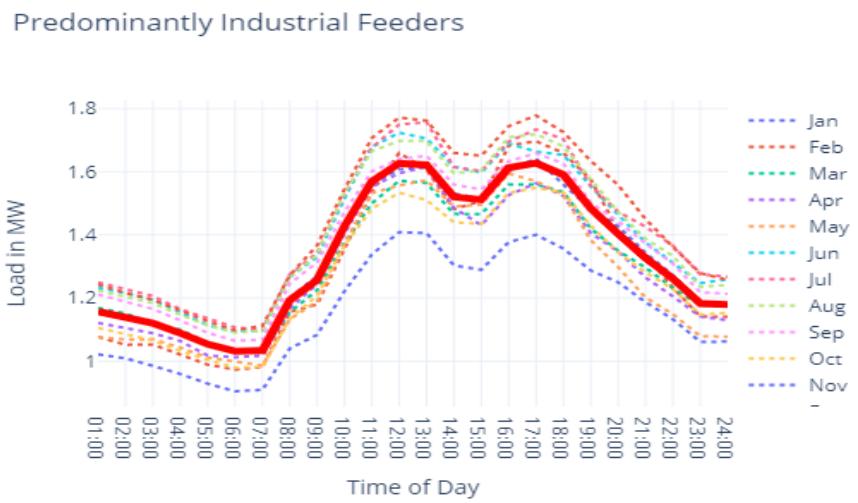
Wind and Solar Do Not Perfectly Coincide with Load in Maharashtra

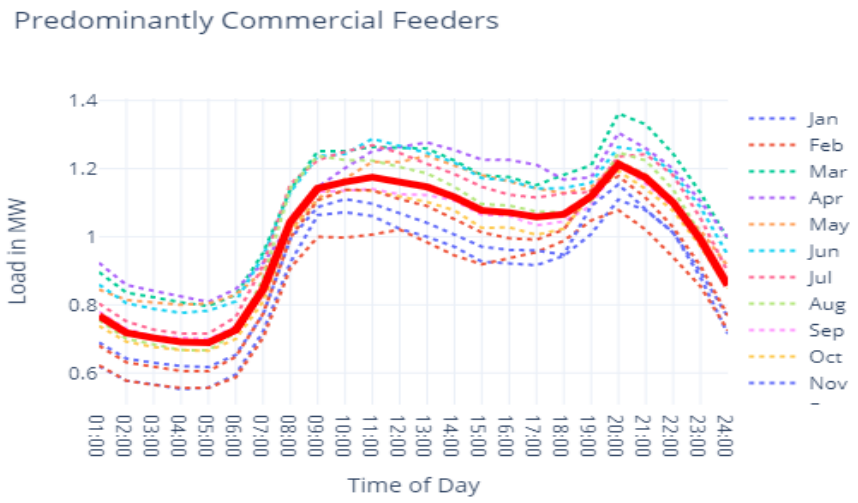


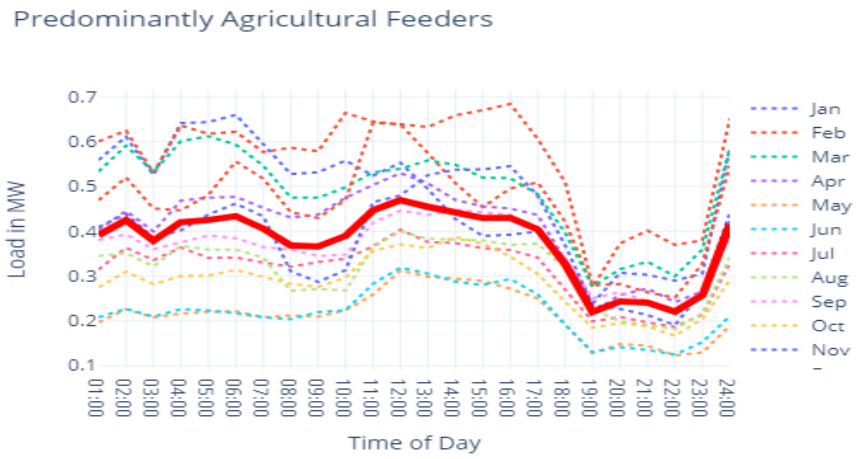


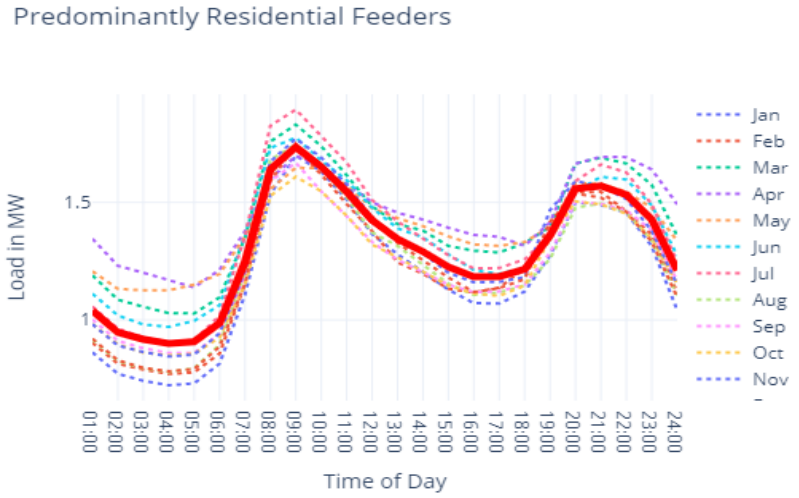
Source: TERI analysis based on data from Maharashtra State Load Dispatch Centre

Not All Customers are Created Equal in Terms of Their Contribution to Peak Load and *Hence* to System Costs

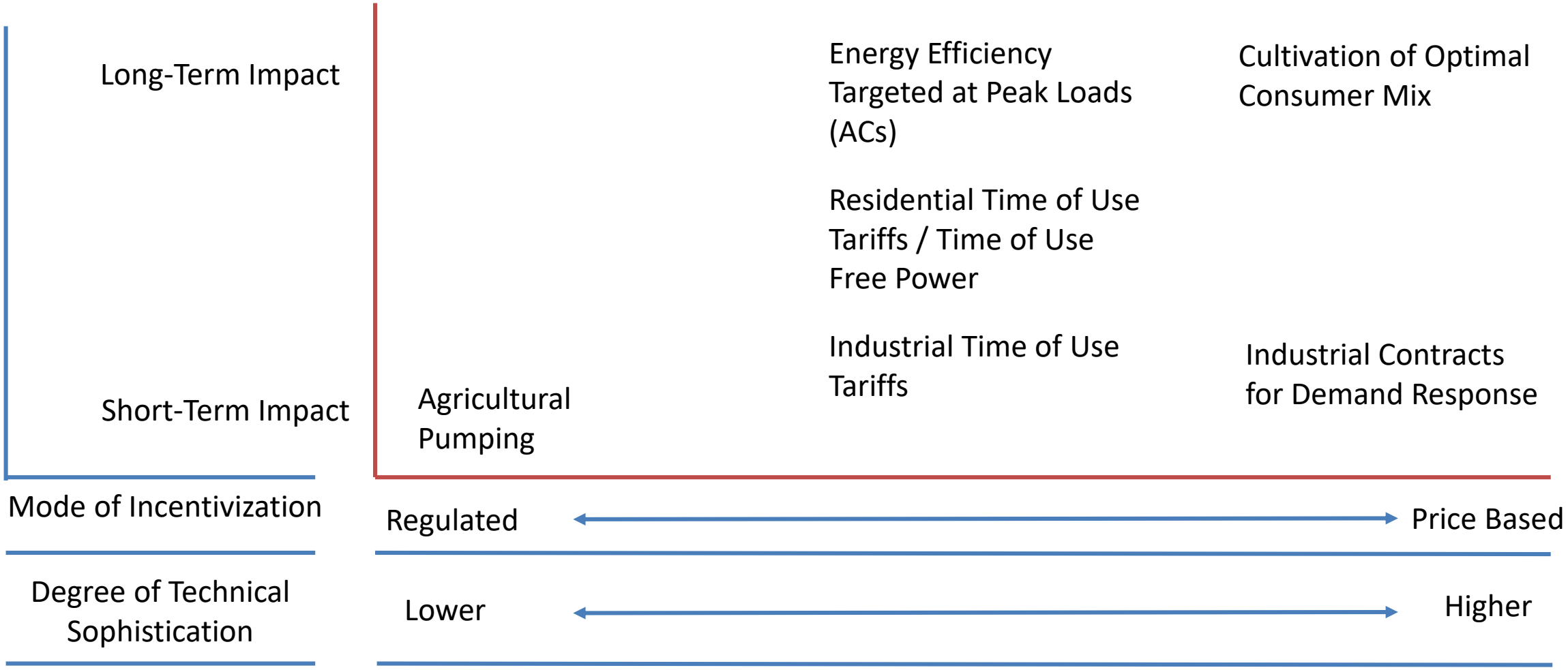








There are Many Different Types of Demand Response and Not All Require Sophisticated Controls and Price Signals



Some Final Thoughts

- In a capital intensive system, where product cannot be stored and peak demand must be met, **load factor** and the **coincidence of load and supply** are crucial principles determining system costs.

- Although system integration of RE is not a challenge currently for Maharashtra and the coincidence of peak load and solar provides certain advantages, the **challenge of RE integration will grow substantially.**

- Demand response and demand side management can be a very cost-effective means of facilitating RE integration, but is often overlooked.

- There are many different options to promote demand response and demand side management, and it is **not immediately necessary** to have in place the most sophisticated controls and dynamic price signals. **Regulated measures** and simple **time of use tariffs** can go a long way to facilitating change.

Thank You