Comments to the Central Electricity Authority 's draft "Guidelines for Medium and Long Term Demand Forecast" released on 11 April 2023

For the kind attention of:

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Background:

The CEA is the primary national source of load forecasting, at the level of all-India, states, union territories, regions, and mega-cities. The forecasts are for electrical energy requirements (TWh) and peak demand (MW). The CEA's Energy Power Survey (EPS) committee publishes the Electric Power Survey Report every five years.

Load forecasts made by discoms are key to tariff setting and power purchase decisions. They are, however, primarily implemented based on historic demand. Important factors that can lead to load variation — such as regional and seasonal variations in demand, time-of-day use, expected differences in load demand based on income categories, change in future load profile due to energy conservation, investments in end-use efficiency, increasing electrification (EV charging), and reduced load on the grid (rooftop solar) — are typically not considered as inputs into the forecast model by utilities (RAP, 2023[1]).[2]

The draft guidelines proposed by CEA in April 2023 are a welcome step to enable a uniform and rigorous approach for demand forecasting by discoms. They are commendable and very well received, and merit strong support from all. A few small specific comments are as follows.

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[1] RAP (2023). Review of Integrated Resource Planning and Load Forecasting Techniques in India
https://www.raponline.org/wp-content/uploads/2023/02/rap-India-IRP_policy_brief_FINAL-2.pdf
[2] See also, illustratively, the New York State ISO's most recent annually updated (2023) load forecast:
https://www.nyiso.com/documents/20142/2226333/2023-Gold-Book-Public.pdf/c079fc6b-514f-b28d-60e2-256546600214. As noted on page 9: "The baseline forecasts project the NYCA and zonal loads under expected future weather conditions, which include increasing
temperature trends over the forecast horizon. The baseline forecasts account for the load-reducing impacts of energy efficiency programs, building codes, and appliance efficiency standards (Table I-8); behind-the-meter solar PV (Table I-9); and BTM non-solar distributed energy generation (Table I-10). The baseline forecasts also include the expected impacts of electric vehicle usage (Table I-11) and building electrification (Table I-13). The impacts of net electricity consumption of energy storage resources are added to the baseline energy forecast, while the peak-reducing impacts of BTM energy storage resources are deducted from the baseline peak forecasts (Table I-12). The baseline forecasts also include projected load increases from new and expanding large load projects (Table I-14)."

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Comments and suggestions on the draft guidelines:

- A.4 (page 3): Text mentions that the forecast should be prepared/reviewed/updated in consultation with various departments. We suggest the scope of consultation can also include industry associations representing large and micro-small-and-medium enterprises, consumer rights groups, state and city transport undertakings, private bus fleet owners, EV charging service providers (both charging point stations and battery swapping operators), weather department (Indian Meteorological Department) state level offices, Bureau of Energy Efficiency (to capture data on the building stocks and appliances by regions), and Ministry of Finance (to capture data on the state of economy – data related to Gross Domestic Product and Gross State Domestic Product).

- A.8 paragraph on time granularity of forecast (page 4): Season wise forecast can be added in the scope which can help in better planning, as availability of RE power and weather conditions changes can be accounted for.

- Box A1 (page 5): The guideline states that the aim of the forecast is to cover electricity demand projection for the utility system, including demand met by distributed power sources such as captive power plants and rooftop solar plants. The objective can be broadened to include power demand met by demand-side interventions such as grid-interactive buildings, demand-response, EV charging etc.

- A.14 (page 5) mentions validation of forecasting results using econometric methods. Clear guidelines regarding econometric method and specific models for energy forecasting can be added based on the ongoing study at the CEA related to nationwide forecasts.

- B.1 (page 6): The guideline states that category-wise consumption data should serve as the basic input for power demand forecasting. An additional granularity level can be added for accounting growth in specific end uses such as space cooling (ACs and coolers), space heating (heaters/water heaters), EV charging at homes/workplaces/commercial depots etc.

- Section G (page 13): This section includes the methodology for estimation of peak demand. In addition to the given parameters, RE generation curves can be used for estimating net peak demand.

- Annexure – V (page 23): The weighted average growth of EV was estimated as 5% and is assumed same for future. As EVs are new and emerging technology for private and commercial (fleet) use, instead of weighted average, a diffusion model can be used for estimating EV sales more accurately. Such a model can also consider attributes of emerging technologies by vehicle type and expected charging mix.[3]

- Some additional points that can be added in the guidelines:
  - Training sessions for discoms to apply these methods to forecasts
  - Timeline for preparing forecasts
  - Verification of forecasts by CEA

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[3] Illustratively, EV growth forecasts in India are available from the IEA https://www.iea.org/data-and-statistics/charts/electric-vehicle-share-of-vehicle-sales-by-mode-and-scenario-in-india-2030 and from ICCT for all segments https://theicct.org/wp-content/uploads/2021/06/Battery-capacity-ev-india-feb2021.pdf

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A broader issue to account for is that any national demand forecasting guidelines would be well-placed to make a provision for increased transparency in the development of the forecast and possibly comparing with other independently developed comparative forecasts. This is to ensure that if perchance the principal demand forecast has any unintended errors, they can be rectified.

At the discretion of the government, it might benefit to have another qualified entity that is independent (and has no stake in the outcome of the forecast) develop an independent forecast. If the official forecast and the independent forecast are comparable, there would be increased confidence in the marketplace about the robustness of the official forecast. However, if there are differences, then further examination could be conducted to reconcile the two estimates. As crores of rupees of investments will be made based on the forecasts, the increased cost of an independent estimate could be deemed to be worth considering. This is not to reduce the stature of the official entity but to help strengthen the forecasting exercise. Such an approach could be potentially considered for integration into the draft guidelines.

Thank you for the opportunity to review and offer comment on the draft guidelines. We are grateful for the same.

We stand ready to assist the Central Electricity Authority, in whatever way we can be most helpful. Please do not hesitate to reach out for any further discussion, should you wish.

Sincerely,

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