



Canadian Renewable
Energy Association

WIND. SOLAR. STORAGE.

Association canadienne
de l'énergie renouvelable

ÉOLIEN. SOLAIRE. STOCKAGE.

“Shape of You” – The Electricity Load Curve

CAMPUT Webinar

Wednesday, September 16, 2020



Canadian Renewable Energy Association

- Formed on July 1, 2020 through a merger of the Canadian Wind Energy Association and the Canadian Solar Industries Association.
- National industry association representing more than 250 wind energy, solar energy and energy storage companies active in the Canadian market.
- Our mandate covers the application of these technologies at multiple scales – from utility scale wind and solar farms to residential solar and battery storage.
- Our vision is to ensure wind energy, solar energy and energy storage play a central role in transforming Canada's energy mix.

The Impacts of Wind and Solar Energy on the Grid

- The rapid growth of utility-scale wind and solar energy in Canada has contributed to increased variability in electricity supply. A broad range of approaches have emerged to manage this variability, steadily enabling increased penetration of these technologies into the grid (e.g., larger balancing areas, wind / solar complementarity, energy storage technologies, and more sophisticated grid operations).
- The increasing growth of distributed / self-supply wind and solar energy in Canada has introduced variability in the demand for grid produced power, in conjunction with many other technologies that are reshaping the electricity load curve (e.g., energy conservation and peak shaving measures, demand response measures, time of use pricing, electric vehicles).

Increased Variability = Increased Need for Flexible Resources

- Wind energy and solar energy have attributes that make them very flexible resources:
 - Fast ramping, near instant response times, no inertia and very low marginal costs
 - Modular deployment provides increased flexibility (e.g. one flexible wind turbine rather than a less flexible nuclear reactor)
 - Can be deployed where the power is needed (e.g. solar right in the community requiring power or at a home/facility using the power directly)
 - Can be paired with energy storage to provide flexibility for load shifting to meet multiple objectives (i.e. peak shaving for cost savings; load shifting for grid stability etc).

Wind Energy and Solar Energy as Solutions Providers

- Wind and solar energy, alone or coupled with energy storage, can provide a broad range of ancillary services to the grid (e.g., operating reserves, frequency response, ramping, peak shifting, etc.). Provision of such ancillary services is not fundamentally a technical challenge – few technology adjustments are required to enable this.
- Wind and solar energy OEMs and operators have little incentive to make such adjustments and investments in the power plant, however, without opportunities to compete for the provision of such services and be compensated for providing them.
- Accessing new revenue streams is increasingly important for the wind and solar energy industries in deregulated electricity markets as their increased penetration drives down the market price of energy while enhancing flexibility for grid operators.

How Do We Get There?

- In wholesale markets, we need new electricity market rules that allow renewable energy and energy storage to participate and compete in markets for reliability, flexibility and ancillary services. Crown Utilities need to recognize and value the full range of services that can be provided by renewable energy and energy storage in electricity system planning processes.
- System operators need increased visibility of distributed energy resources and access to data and tools that allow efficient management of these resources.
- None of this is easy. Such changes raise questions around electricity system management, control and cost-sharing. We need to learn from each other. The grid is becoming more diverse, digitized and distributed. Technological evolution will not stop and cannot be ignored. We need to adapt.....and quickly.