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# Running the grid on VRE

## Flexibility in long term planning

Alexandre Prieur

2022 IRED Conference, Adelaide

CanmetENERGY

*Leadership in ecoInnovation*



Canada

# Canada - 2022 Landscape

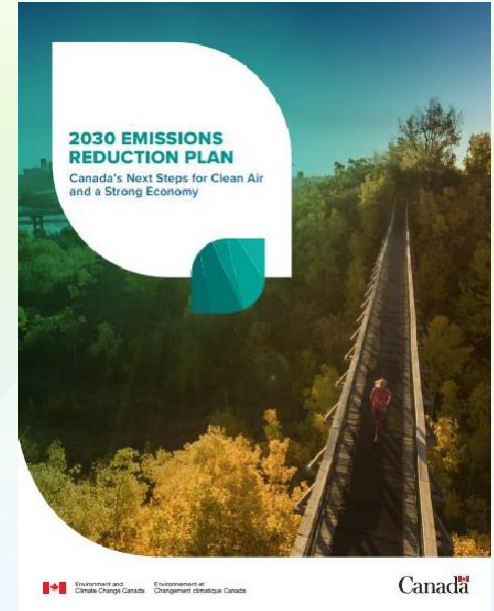
## Net-zero emissions by 2050

Net-zero Electricity by 2035

100 percent zero-emission vehicle sales by 2035

2030 90% clean electricity

## Minister Mandate Letters



### International Commitments

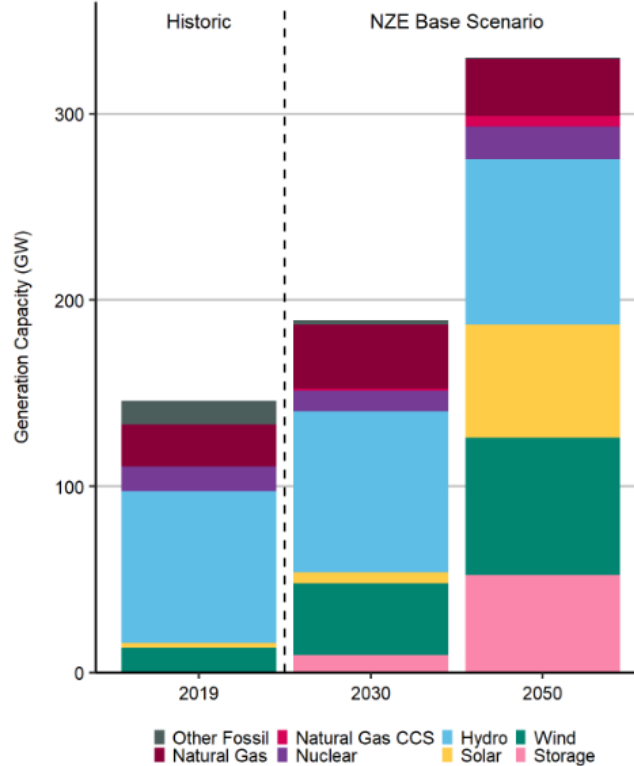
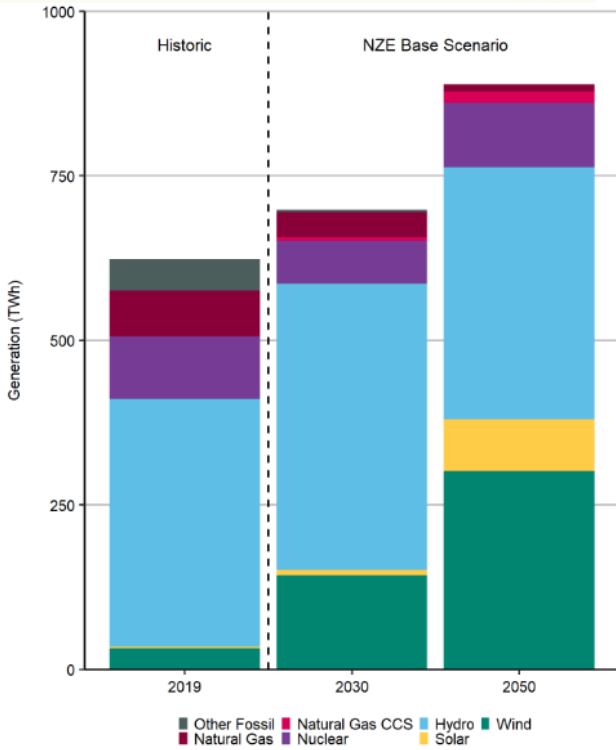


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# Example of 2050 scenarios

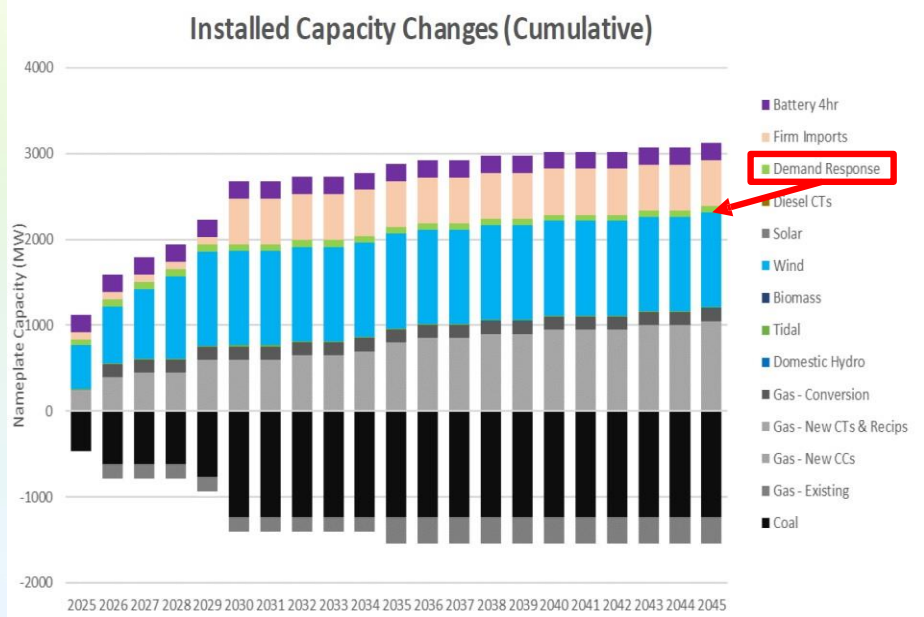


- In this scenario, **wind and solar** account for **59%** of new capacity additions through 2050.
- Electricity **storage** sees a rapid growth and reaches **15%** of total installed capacity in 2050.
- New demand growth is primarily satisfied by wind and solar with other low carbon technologies such as **SMR, hydropower, and natural gas CCS** providing supplemental energy.
- All new nuclear additions are **SMR** units, which begin to make inroads after **2040**.
- Natural gas **CCS** plays an important role but is restricted to the provinces with greater carbon storage potential.
- Almost all conventional fossil fuel-fired electricity supply comes from natural gas simple cycle units.
- The importance of hydropower remains high. However, there are **not major hydropower capacity additions** due to relatively high assumed capital costs.

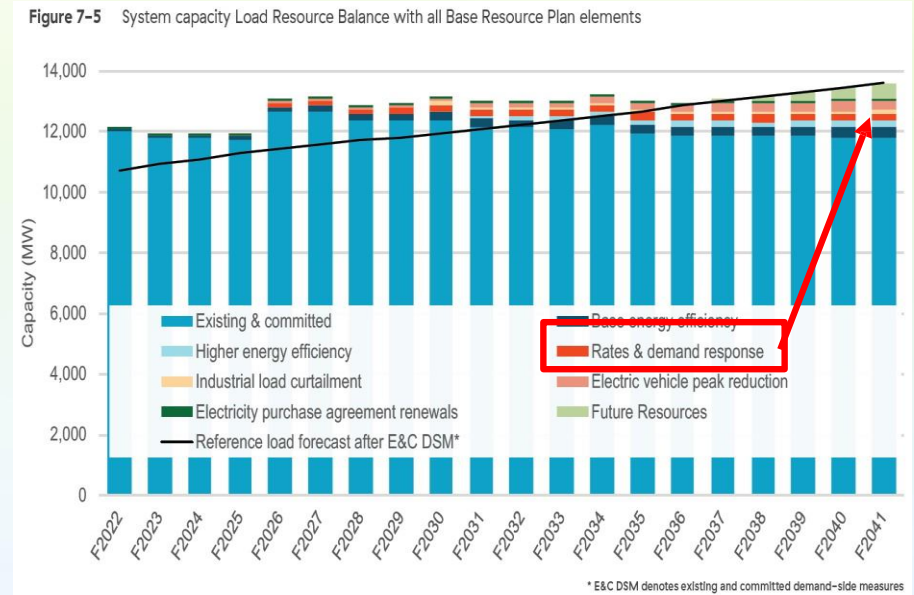


# Role of Load Flexibility in Long-Term Planning

- Current, flexibility is not considered... or used only minimally for capacity



Nova Scotia Power 2022 Evergreen Integrated Resource Plan (Draft)

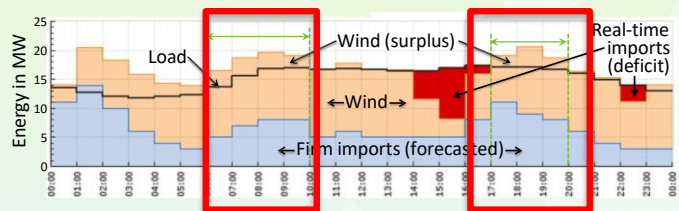


BC Hydro 2021 Integrated Resource Plan

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# Capacity... and Beyond!

- Why load flexibility for capacity?
  - Low-cost compared to generation, transmission, and storage
  - Capable of balancing variable renewables

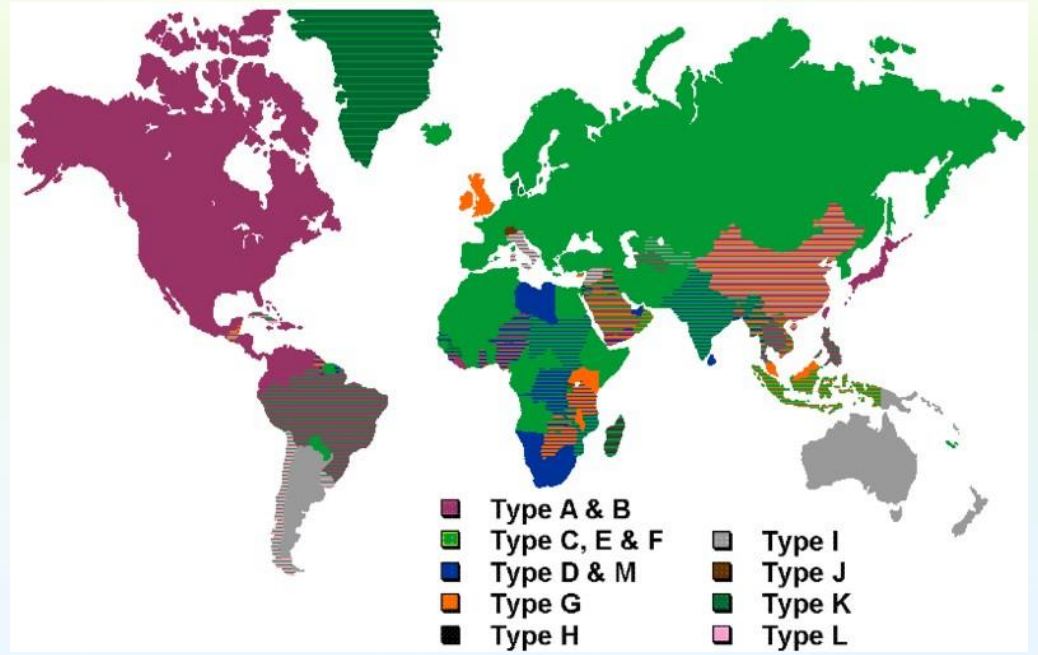
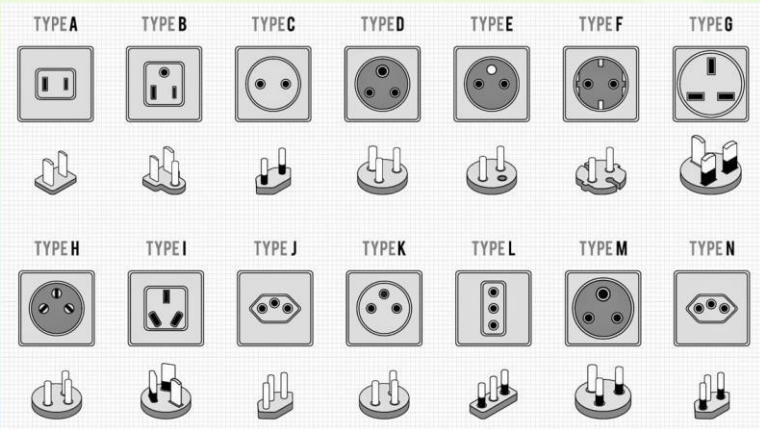


Residential thermal storage charges with excess wind

- Already existing potential, less hurdles than other capacity investments (e.g., HVDC)
- Additional roles
  - Provide stability (help IBR integration)
  - Contribute to resiliency and reliability
  - Emulate storage

# We need to collaborate (yes again)

## What if we don't...



[https://commons.wikimedia.org/wiki/File:Map\\_of\\_the\\_world\\_coloured\\_by\\_type\\_of\\_plug\\_used.png](https://commons.wikimedia.org/wiki/File:Map_of_the_world_coloured_by_type_of_plug_used.png)

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# For more information...



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