

## **Patchworking Canada's Energy Transition**

**Accelerating through Evidence-based Decision Making**

*CCRE Energy Leaders Roundtable, October 2023*

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### **Disclaimer**

*The views expressed here are those of the author and do not necessarily reflect the opinions of the CCRE or its members.*



# Patchworking Canada's Energy Transition

## Outline on opportunities to accelerate electricity decision making

- The world has changed since the CCRE's national energy vision
- Set against a global context, Canada's energy and climate policies are inconsistent and conflicting
  - Policy tactics in the absence of a strategy to address how Canada's challenges differ across the country is destined to fail
- The difficult path to clean electricity is understated and leading to controversy and a fracturing of national politics
- Policy makers have not grasped the growth challenge in front of the Clean Electricity Regulation (CER)
  - Clean electricity pathways have regional disparities that don't align with the CER
  - Transmission (Tx) and Hydro are not a panacea and cannot solve the CER's 2035 ambition
  - Renewables as a standalone solution are a myth
- Canada has economically beneficial options and should clarify the limitations and costs of integrating renewables
- ITCs should support Canada's economic battle for a share of the new global net zero economy
- Conclusion
  - Use evidence to accelerate awareness and urgently drive a winning national energy transition strategy

# Since the CCRE's National Energy Vision the world has changed

In Penticton 2019, the CCRE NEV initiative led to national dialog and several works

CCRE tabled the potential of a principled and evidence-based national energy vision to get Canada to Net Zero

- Pathways consist of an Energy Trifecta enabling Canada to “Hit Above Its Weight to Reduce Global Emissions”

## CCRE National Energy Vision Commentaries

Why Canada needs a national energy strategy

B.Tobin, A.Engen, Nov 2019

A Principled Approach

K.Taylor, Apr 2021, Foreword by G.Wright

Canada's Low Carbon Energy Infrastructure  
Opportunity in a Global Net Zero Future

M.Brouillette, Dec 2021

Case Study: Implications for Ontario & Quebec

M.Brouillette, Jun 2022

Latter two were informed by:

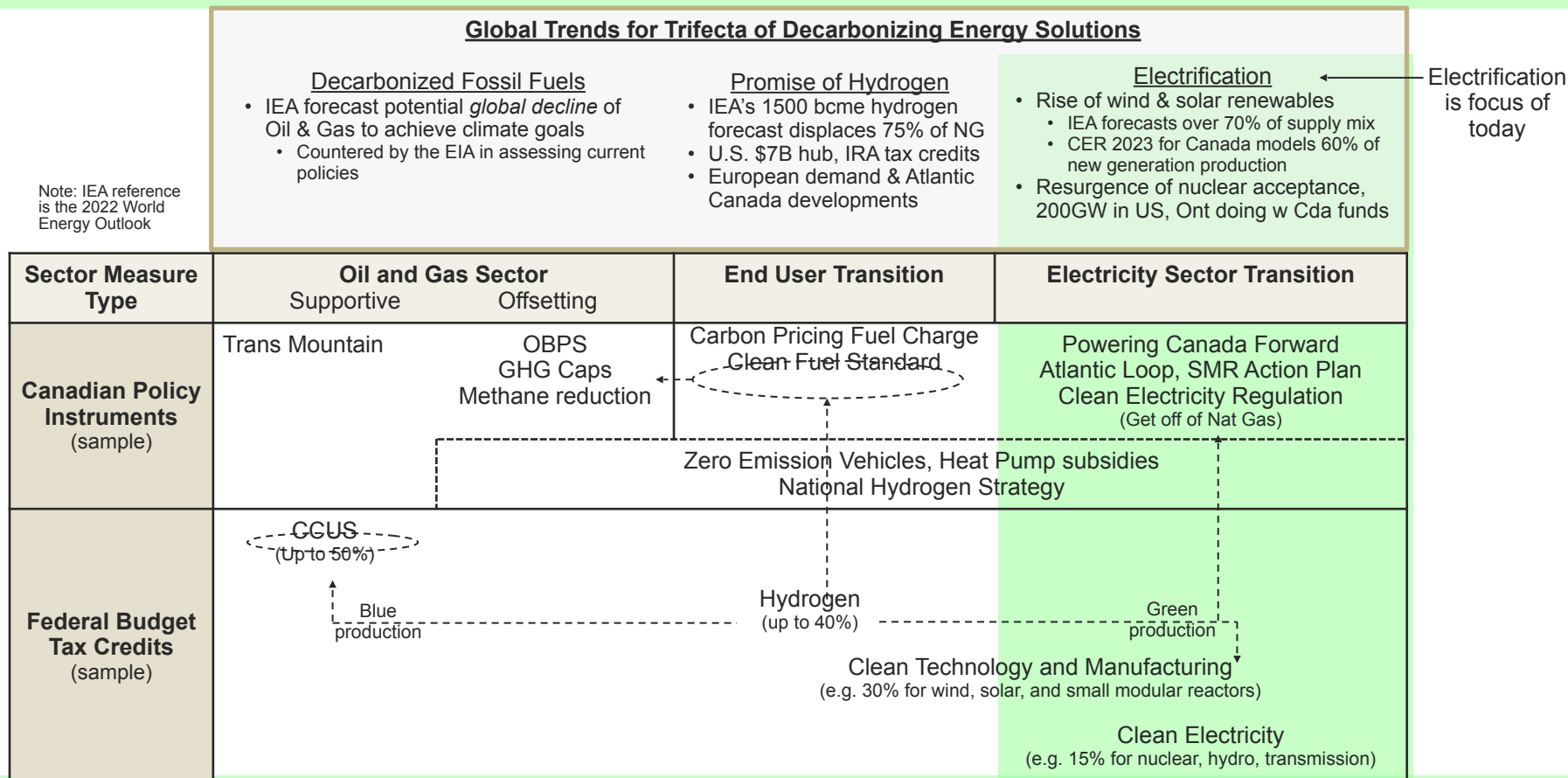
- The Realm of the Possible for Canada: Hitting Above Its Weight to Reduce Global Emissions, Strategic Policy Economics, Dec 2020
- Electrification Pathways for Ontario, Strategic Policy Economics, Jul 2021

Recent tectonic global geopolitical shifts

- Russian invasion of Ukraine and energy security
- U.S. – China tensions around trade, trade balance, strategic supply chain security, and manufacturing
- Dimming view on effectiveness of carbon taxes
- U.S. IRA, the economics of energy and supply chain security in the energy transition
- Rising recognition of nuclear as a clean energy option
- Global flooding, heatwaves, wildfires and the hottest September ever

# Canada's Energy and Climate policies in a global context

The portfolio is a mix of inconsistent and conflicting policy objectives



# The Clean Electricity Regulation has raised more controversy

And electrification challenges are undermining traditional supply options

**Is it time  
for BC to  
go  
nuclear?**  
Aug 11

Alberta looking  
to Ontario as  
ally on CER  
Sept 30

Alberta says  
federal strings  
on climate  
funding a threat  
Aug 8

**Alberta looks to  
use sovereignty  
Act against  
CER**  
Sep 28

Sask says CER  
impossible and  
unaffordable  
CER Aug 11

**Ontario and  
Prairie  
Premiers slam  
irresponsible  
CER**  
Aug 10

**Manitoba plans  
on wind as hydro  
is too costly as  
electricity  
demand doubles**  
Jul 2

**Ruling out  
nuclear power  
would be  
irresponsible  
for Quebec**  
Aug 14

NB says  
Atlantic Loop  
too costly  
Aug 4

**Show us the  
Money – NL to  
Quebec on  
Churchill falls  
deal**  
Sept 25

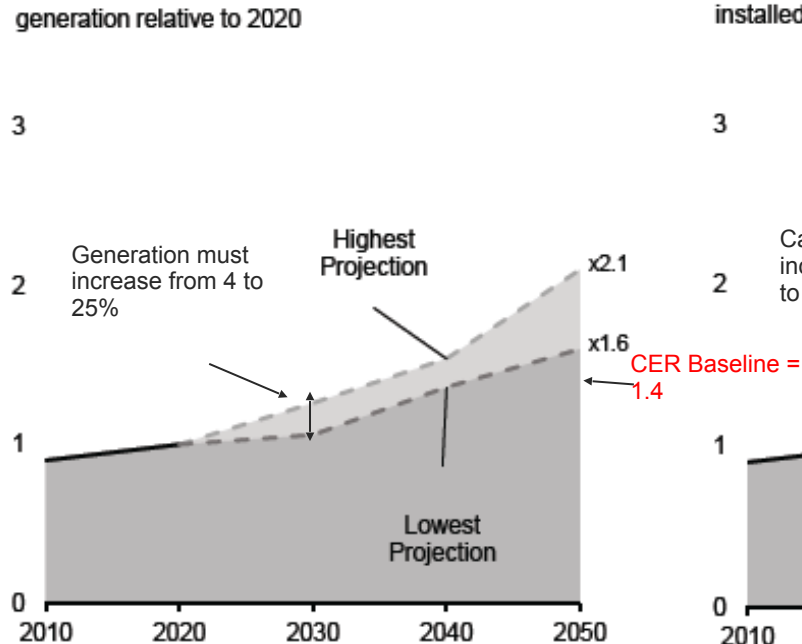
CER  
means  
pain for NS  
Aug 25

**NS  
abandons  
Atlantic  
Loop, too  
costly**  
Oct 11

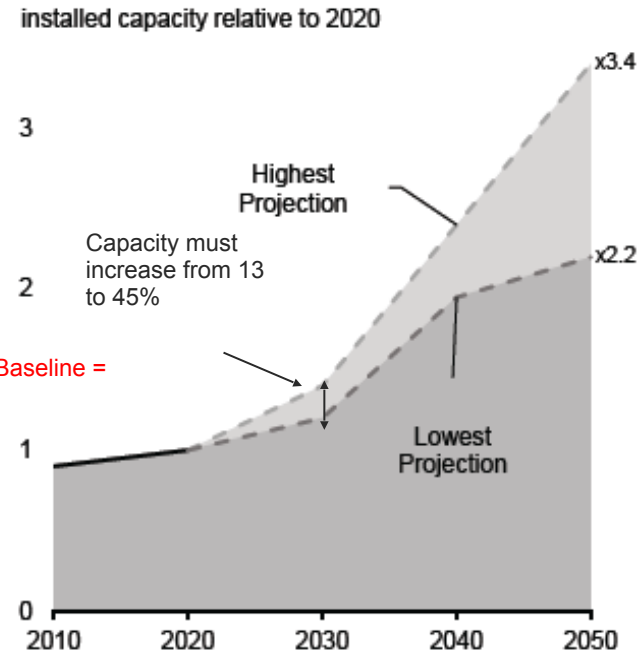
# Federal statements on electricity growth understate the challenge

Policy appears to have been developed against naïve electricity growth outlooks

## Projected Electricity Generation Requirements in Canada, 2019-2050



## Projected Electricity Capacity Requirements in Canada, 2019-2050

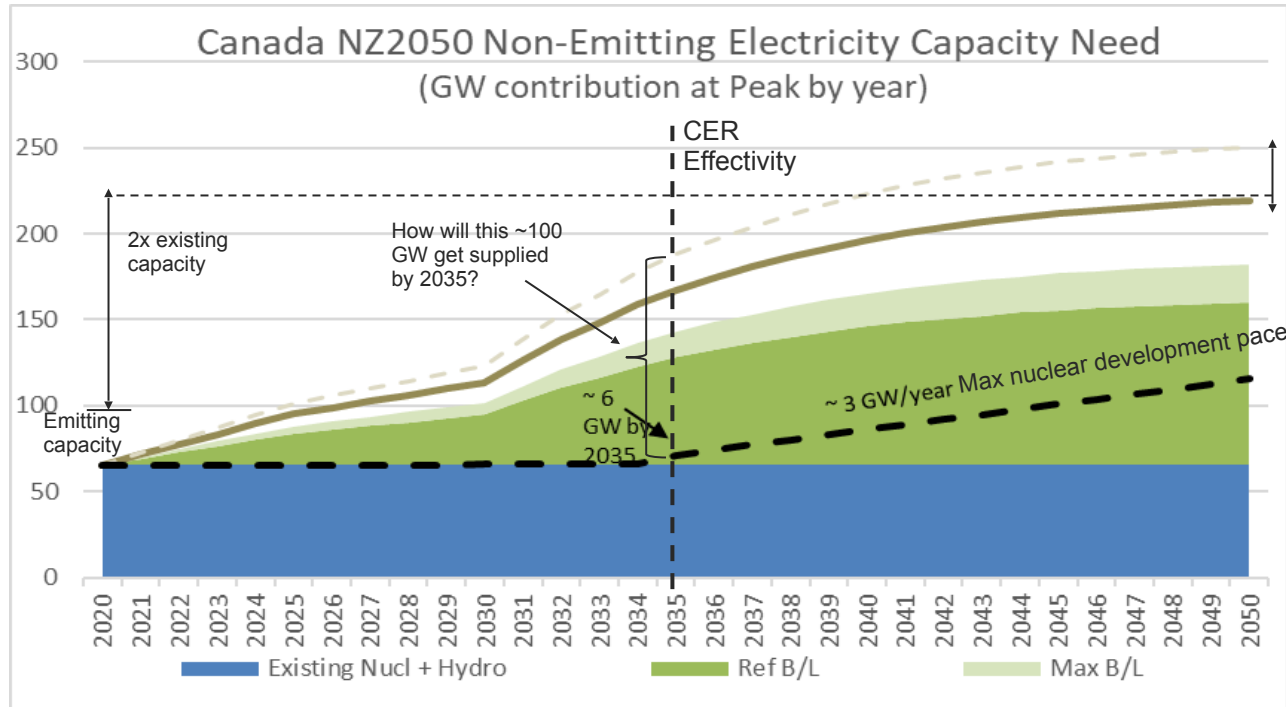


Source: 2023 Federal Budget

# CER suggests policy makers haven't grasped the growth challenge

Its not just the capacity required to replace emitting supplies, but also to meet new demand

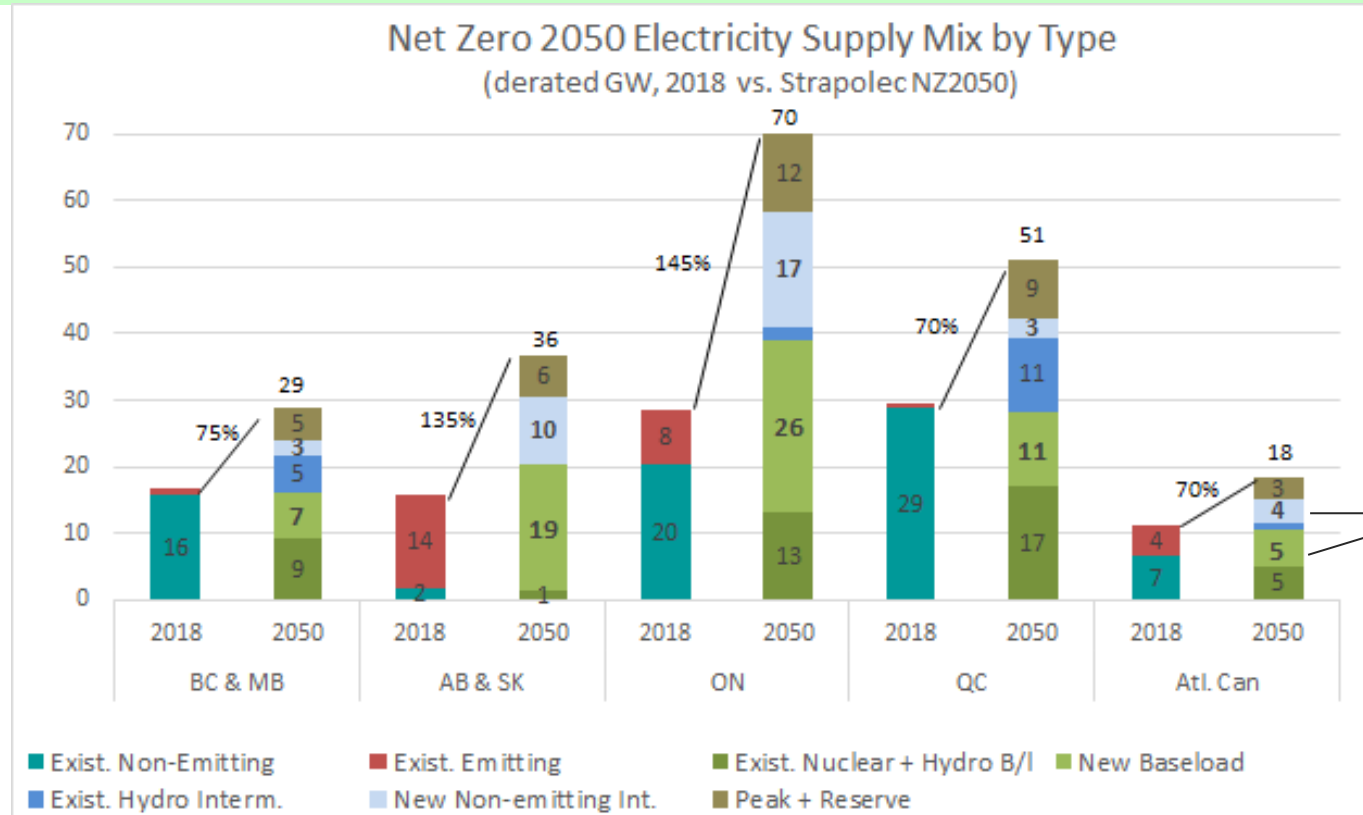
- Accelerating EV and heat pump adoption will drive the curve
- Generation options more limited than many expect
- Must accept that new gas fired generation will be needed in the short term with potential continued use in the long run



***The scale of the challenge and timelines involved require urgent development decisions now***

## New supply capacity is needed across Canada → A flaw in policy

Ont. & Alb./Sask. have the greatest need for new supply from growth and replacement



Example: Atlantic Canada needs 9 GW of new baseload and intermediate supply

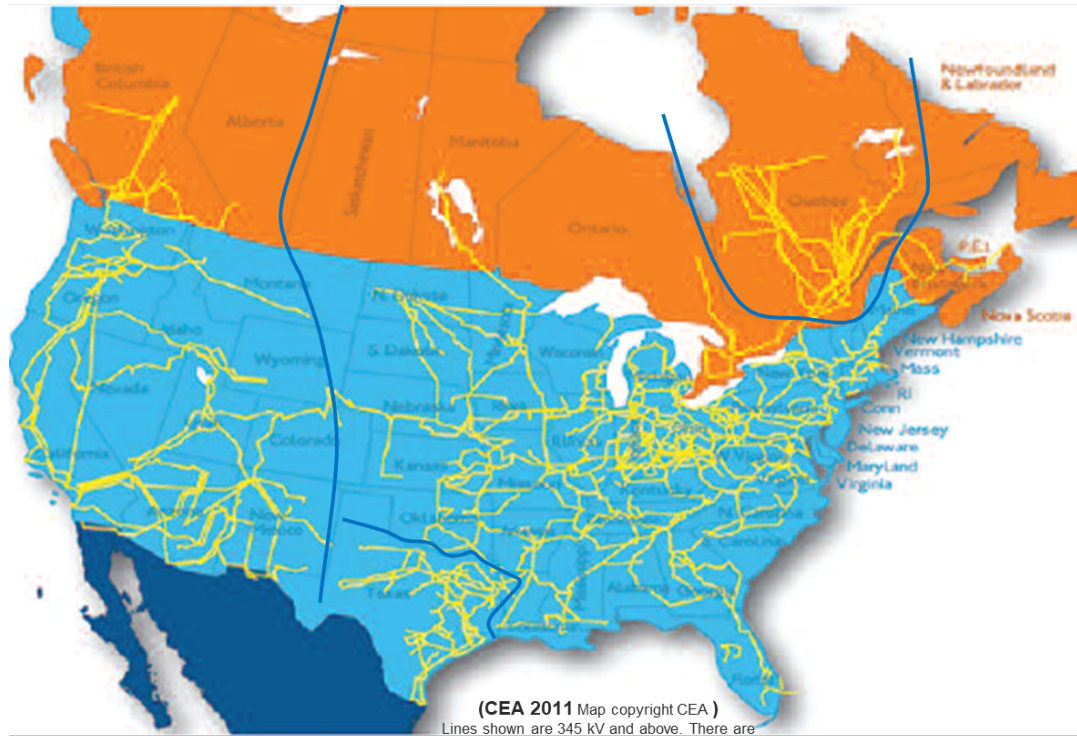
Baseload defined as demand that is present 98% of the time 24x7, 365 days/years. Peak + reserve is demand that is present less than 2% of the time. Intermediate is everything else.  
Source: CCRC Commentary, June 2022; Strapoloc Analysis; Strapoloc, Electrification Pathways for Ontario, 2021, Strapoloc analysis



# Tx and Hydro are not a panacea and cannot solve the 2035 ambition

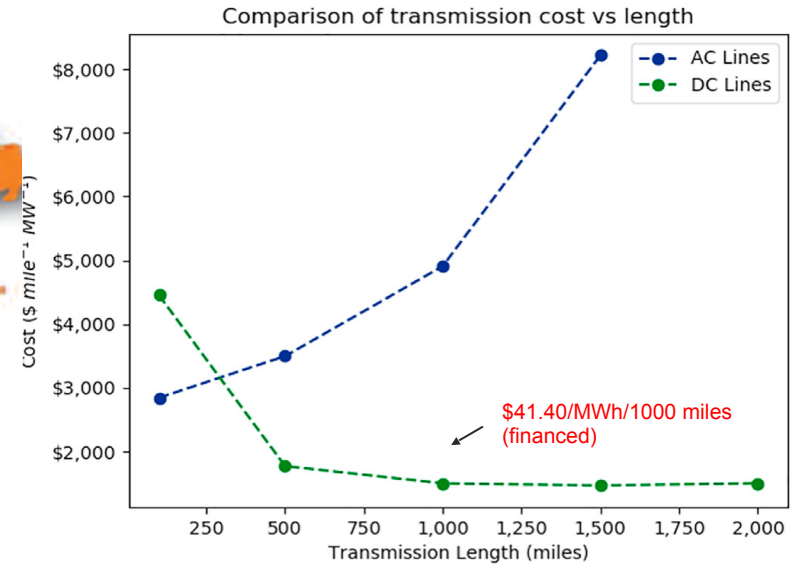
Population and Hydro supply shaped Canada's grid; New hydro is limited

## North American Transmission Infrastructure



Sources: Strapolec, Renewables in Ontario / Quebec Transmission System Interties, 2016; Strapolec analysis

## Cost of Transmission is Very High



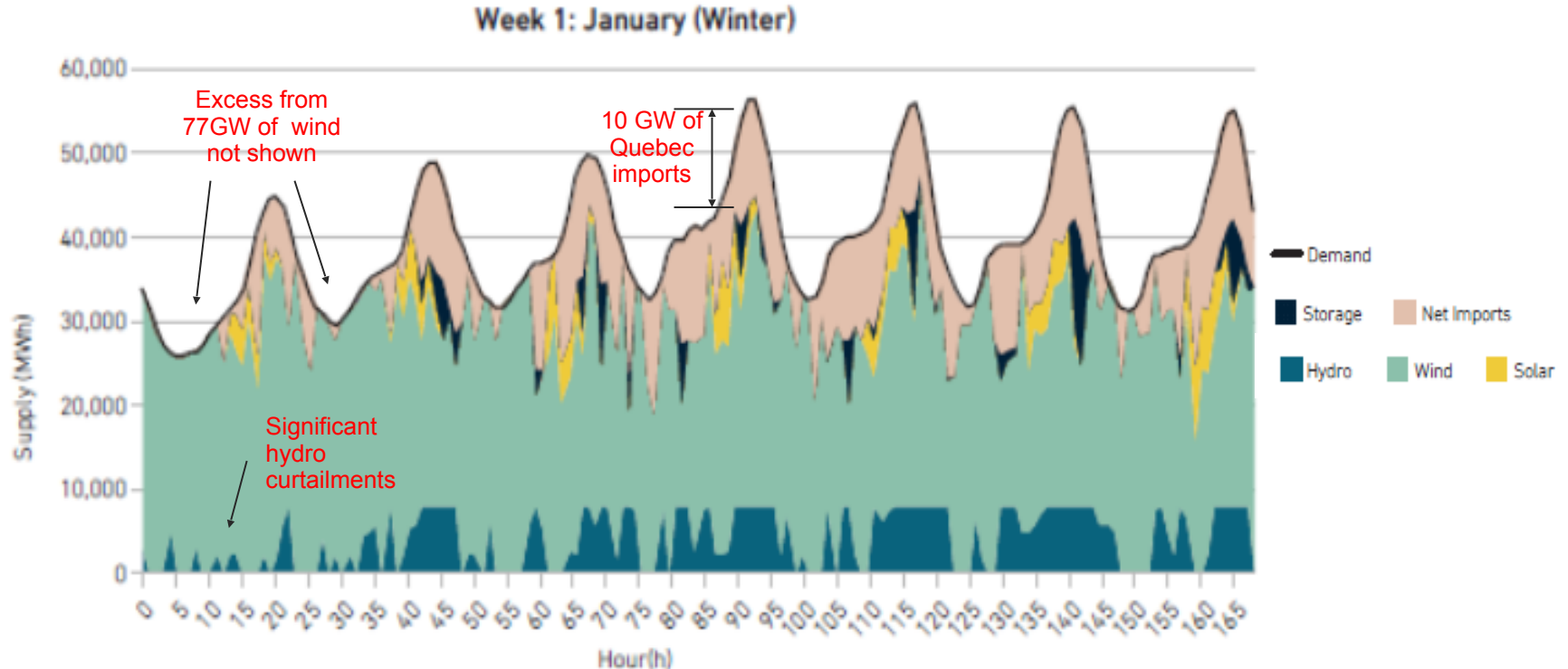
Source: DeSantis et al., iScience 24, 103495, December 17, 2021

**Cost are best optimized by locating generation as close to demand centers as possible**

# David Suzuki Foundation (DSF)<sup>1</sup> depicts Ontario Wind-based supply

DSF is a major proponent of a renewables only solution, arguing it is technically feasible

Model fidelity overestimates renewable's contribution & underestimate the costs<sup>2</sup>

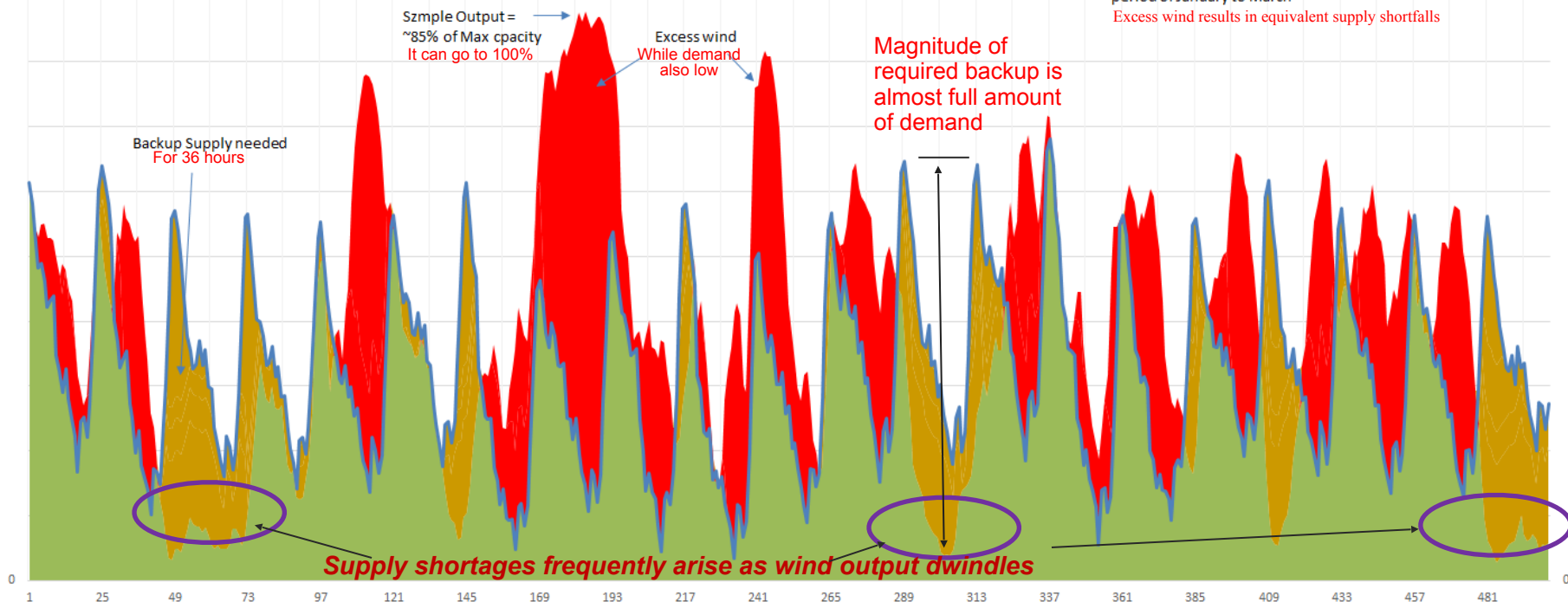


Source: 1. DSF, 2021; Strapollec Analysis. 2. PWU Submission to ECCC on approach for CER modelling, June 2022.

# Wind Output vs Intermediate Demand - Ontario

Wind intermittency & misalignment with Intermediate demand requires significant backup

Wind output vs Intermediate demand\* (above Baseload) –  
Example actual profiles March 23 – April 13



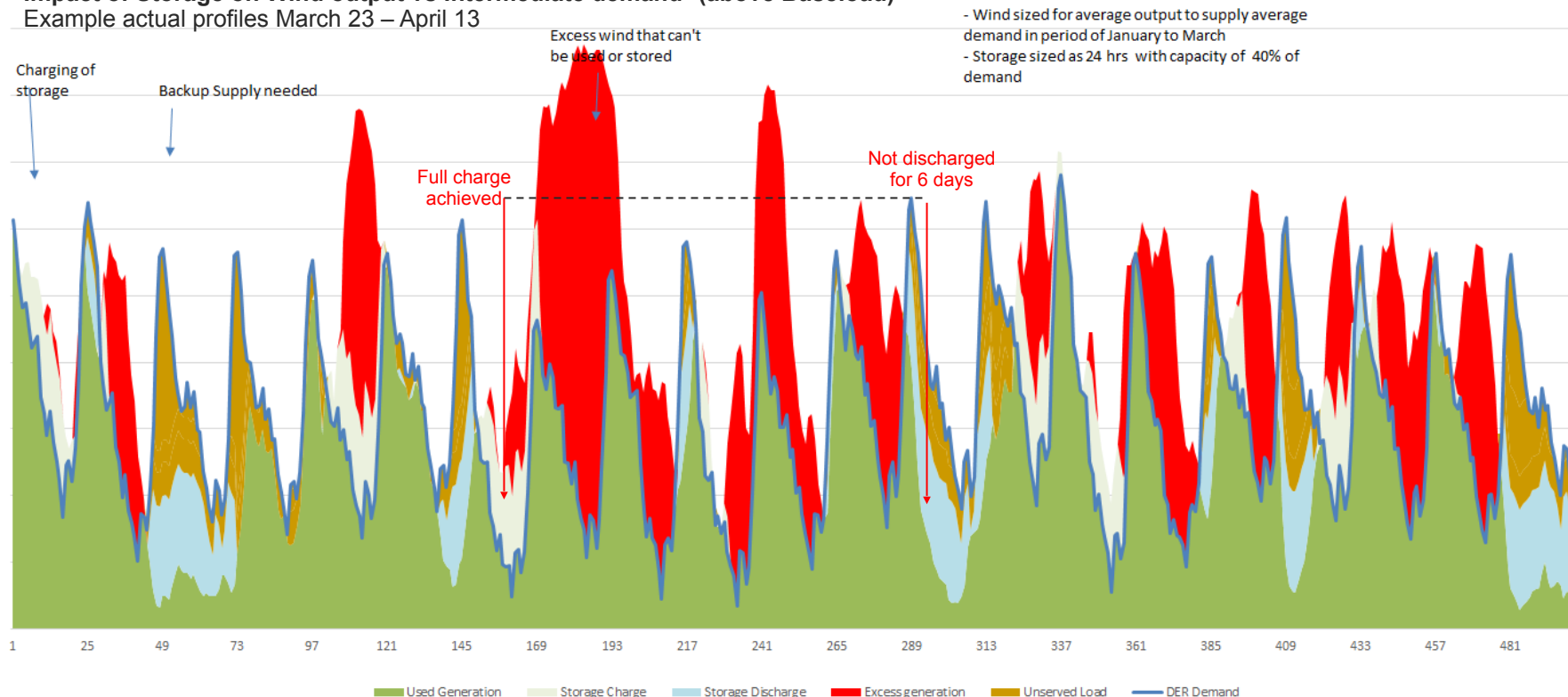
Source: IESO Actuals, Strapolec Analysis. \*Intermediate demand is net of baseload and top 2% of peaks

# Wind Output vs Intermediate Demand – Ontario – With Storage

Even 24-hour storage still needs significant backup generation, and comes at a high cost

## Impact of Storage on Wind output vs Intermediate demand\* (above Baseload) –

Example actual profiles March 23 – April 13



Source: IESO Actuals, Strapolec Analysis . \*Intermediate demand is net of baseload and top 2% of peaks

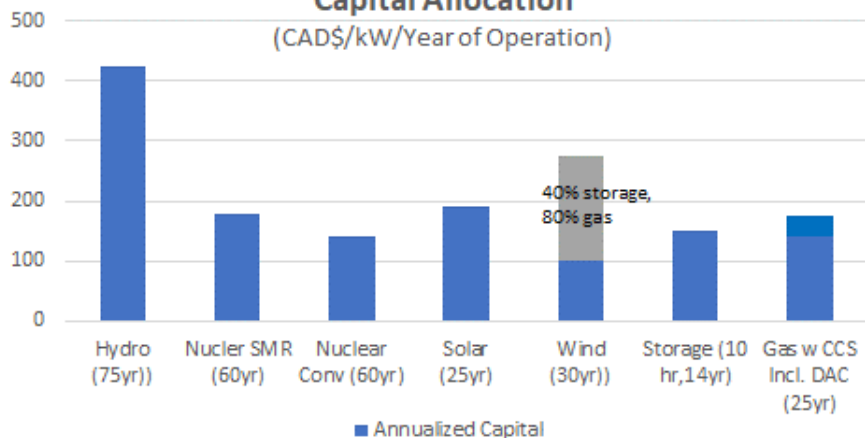
## Non-emitting electricity asset capital costs are largely similar

Despite the hyperbole out of the renewables sector, renewables-based solutions are costly

Risks exist on creating systemic disadvantages in Canada on the cost of electricity

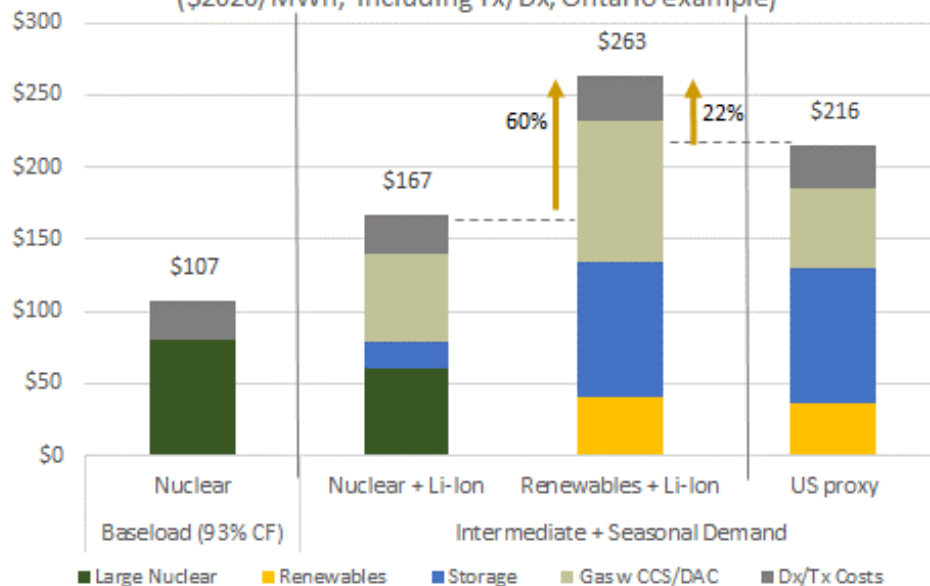
### Life Adjusted Energy Equivalent Annualized Capital Allocation

(CAD\$/kW/Year of Operation)



### LCOE Equivalent for NZ2050 Portfolio Solutions

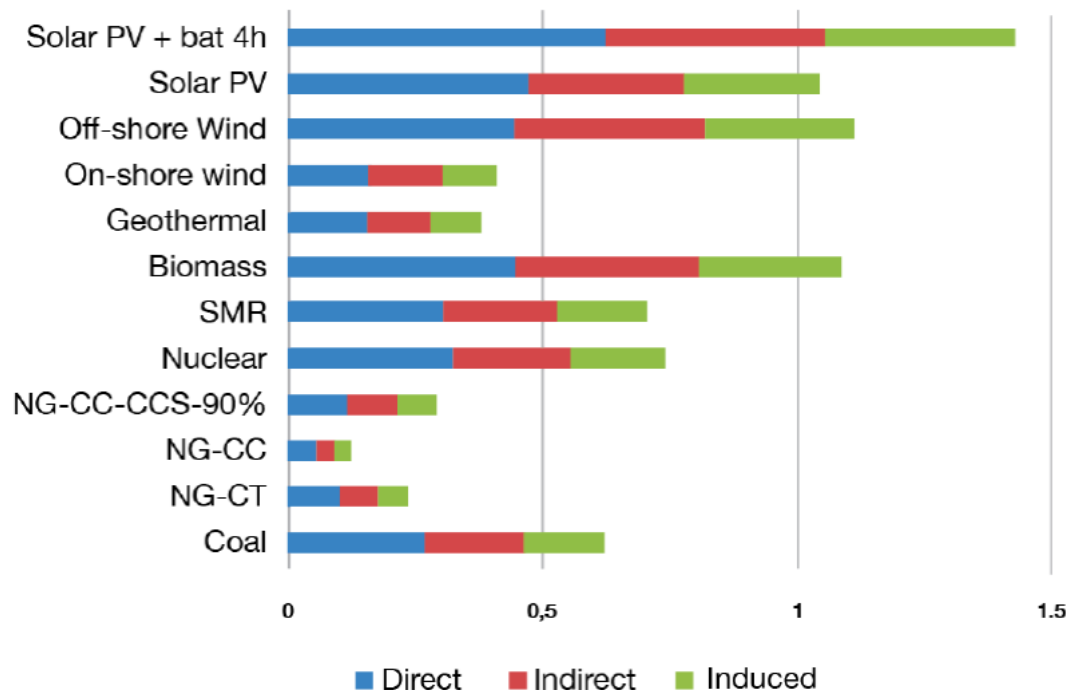
(\$2020/MWh, including Tx/Dx, Ontario example)



# Powering Canada Forward values economic benefits of transition

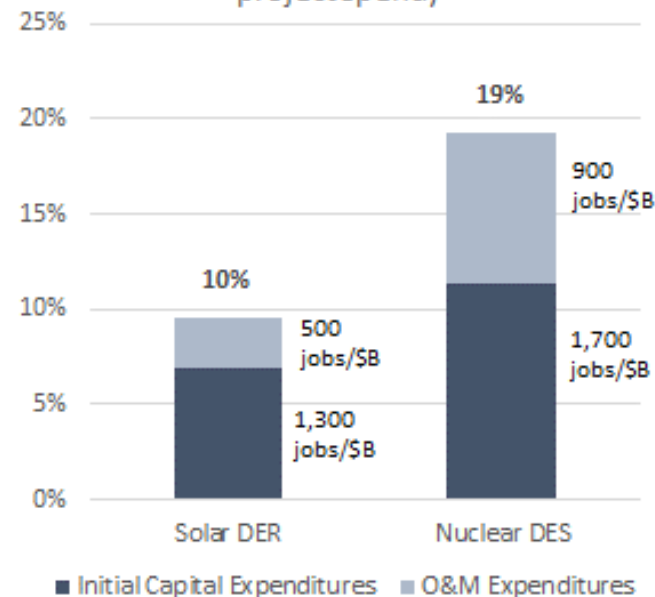
But the metrics used are misleading decision makers

Figure 2. Jobs per GWh for various generating technologies in Canada



Source: Powering Canada Forward, 2023

Electricity Supply Option GDP and Jobs implications  
(Ontario GDP % of and jobs per \$B of project spend)

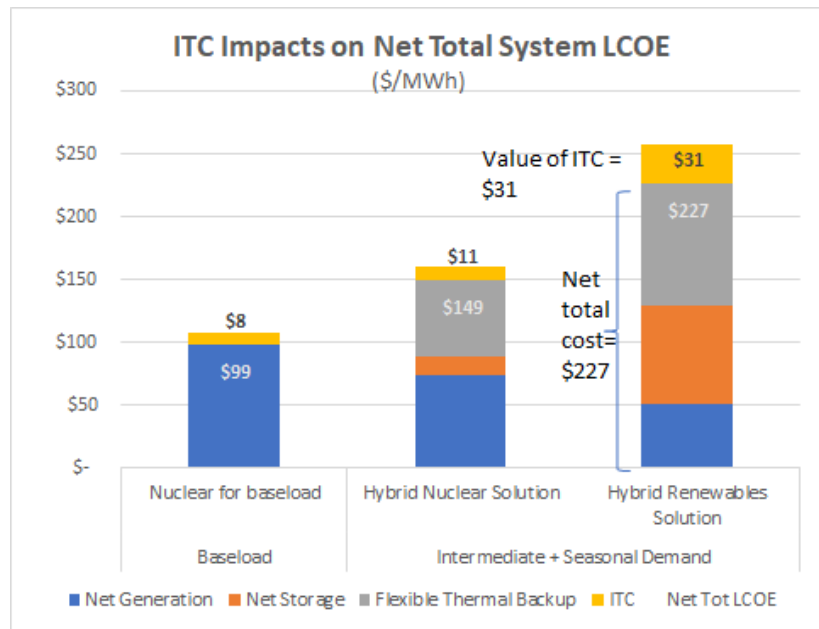


Source: CCRE Commentary, DER in Ontario, 2019

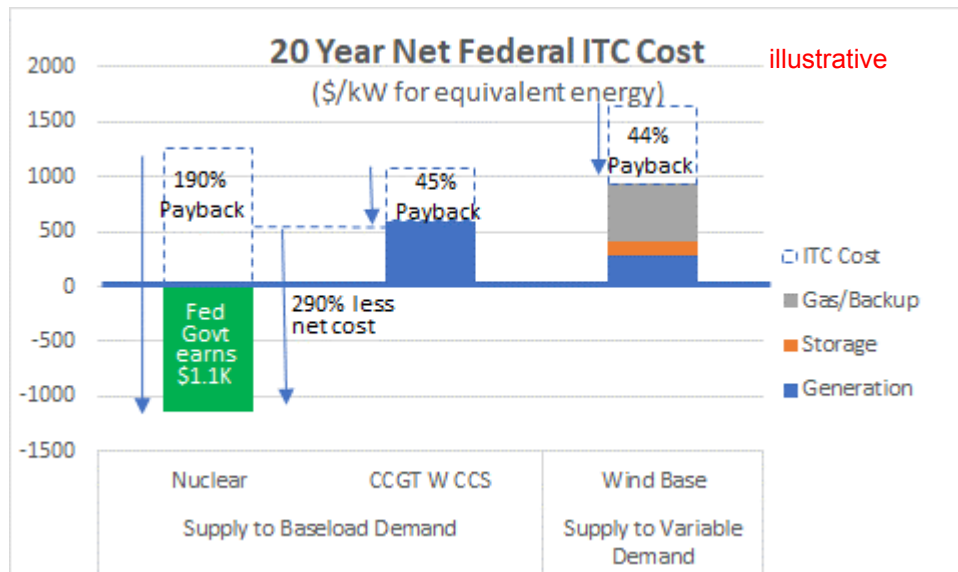
# ITCs and the economic battle started by the U.S. IRA

Adopting a strategic industrial policy around *Domestic Content* should inform tax policy

Ratepayers are not being delivered the low-cost options



The federal government is not optimizing its ROI from taxes created by the economic development



Source: PWU submission to Finance Canada on ITCs, Strapolec analysis

# Conclusion: A National Energy Vision remains relevant to placing Canada in a positive economic position globally

Canada needs a stronger evidence-based approach to help accelerate:

- Awareness of the significance and nuances of the challenge
- Urgent definition of a winning national energy transition strategy
- Decision making on the infrastructure choices needed to support Canada's energy transition towards Net Zero.

The pace of decarbonization will be about the cost of electricity, as is the affordability of the transition

- Modeling of the energy transition costs and economics is misinforming decision makers
  - e.g. for the electricity system
- The real available options are limited, the potential for both interprovincial conflict and collaboration remains as a result
- Some options are clearly less costly than others, and federal policies should be aligned to best enable those