

Interprovincial transmission in Canada

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Outline

Many studies show the benefits of inter-provincial transmission

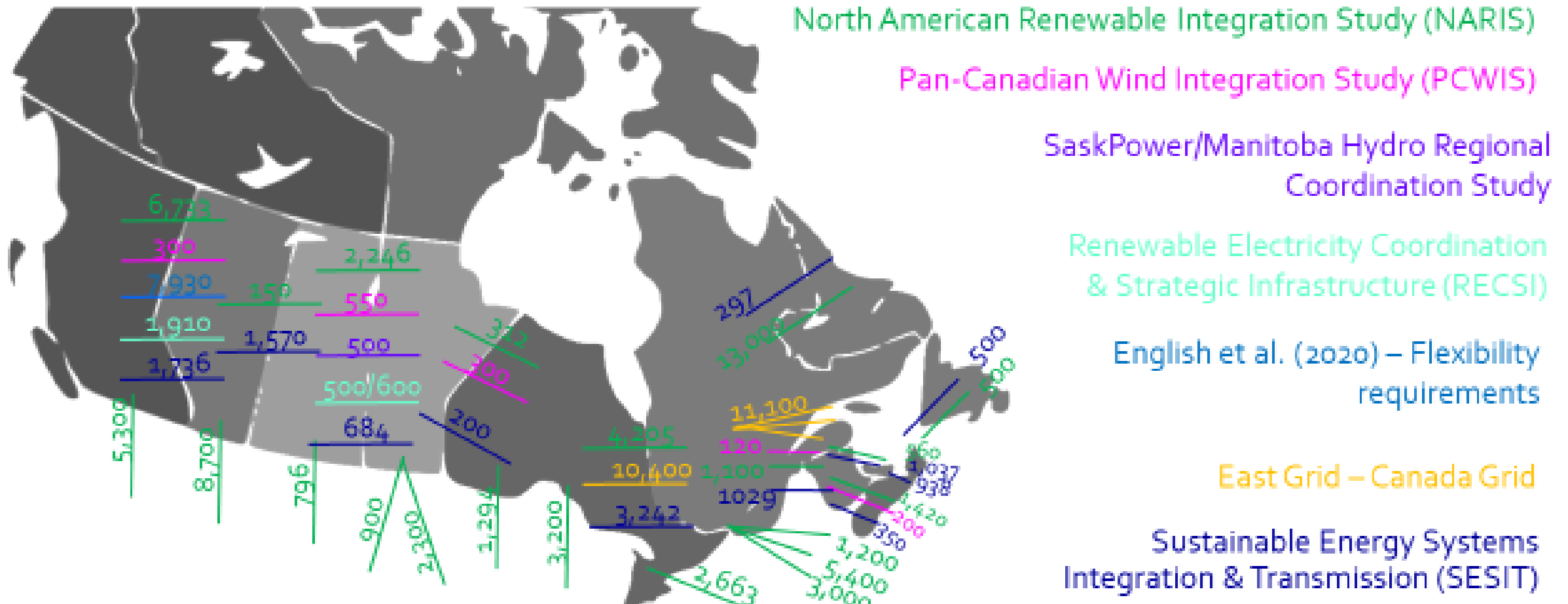
Benefits span several dimensions

And yet, transmission expansion is limited in Canada...
... why?

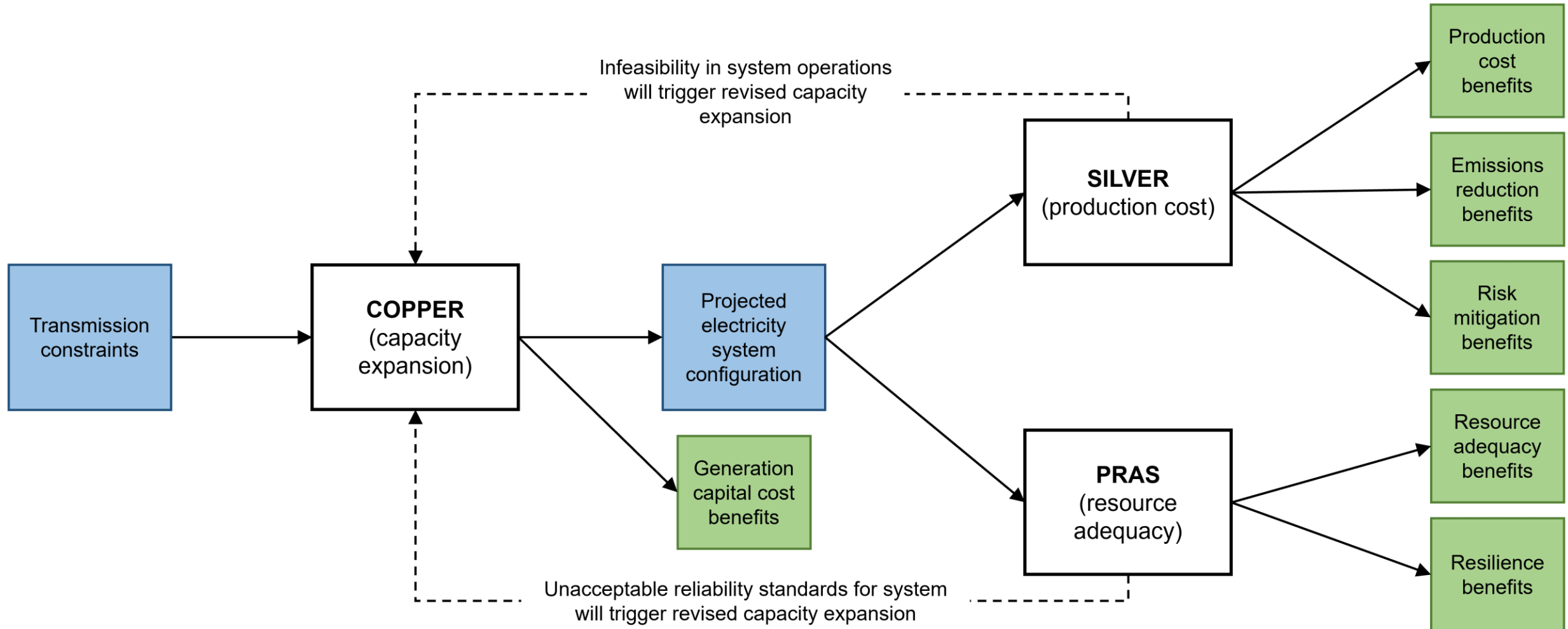
International case studies may provide some lessons

Moving forward...

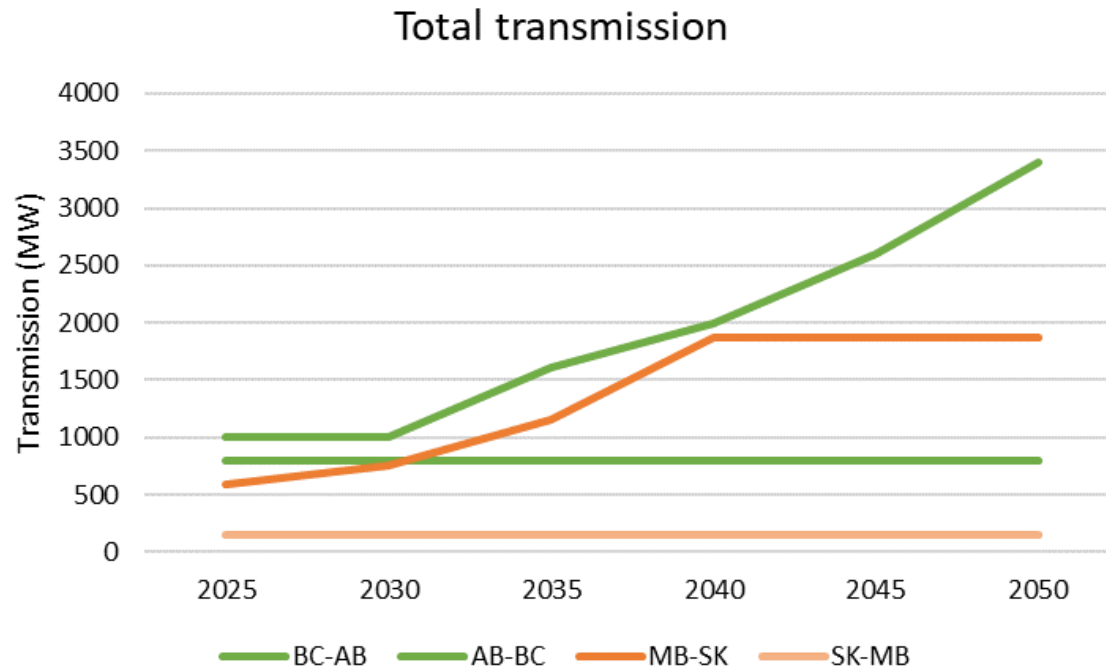
Several studies have demonstrated the benefits of inter-provincial transmission expansion projects ...



Case study – multi-benefit analysis of transmission expansion



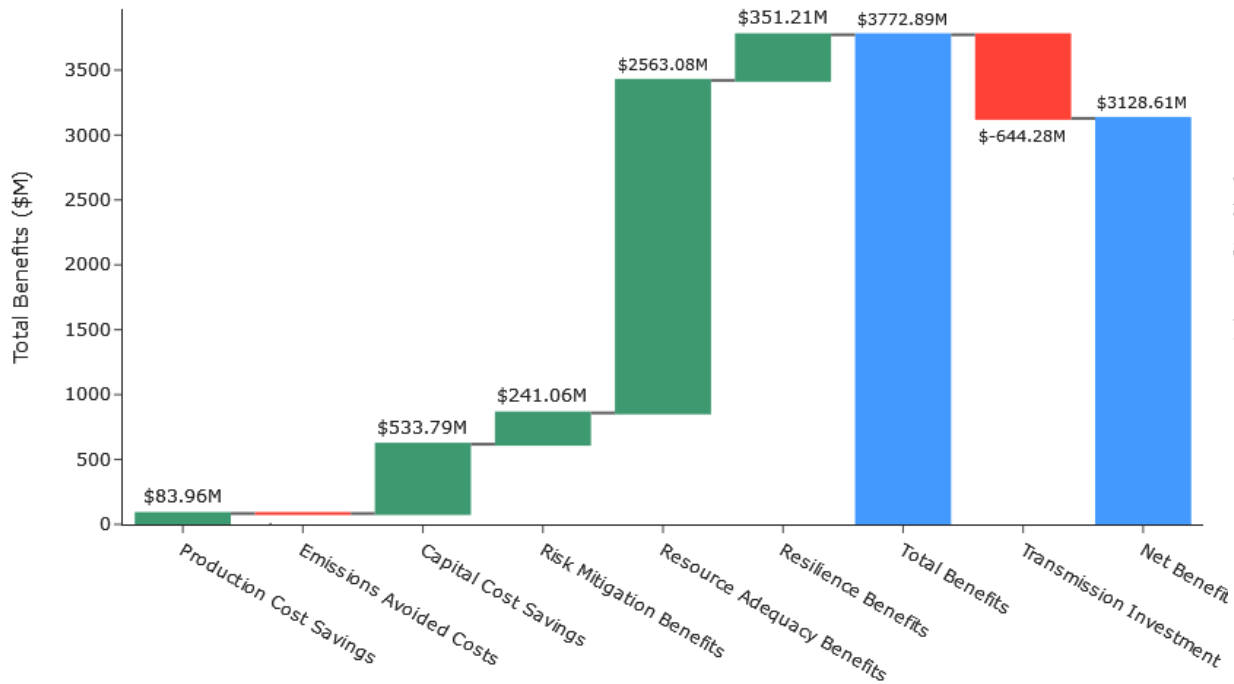
Case study – BC-AB & SK-MB transmission expansion



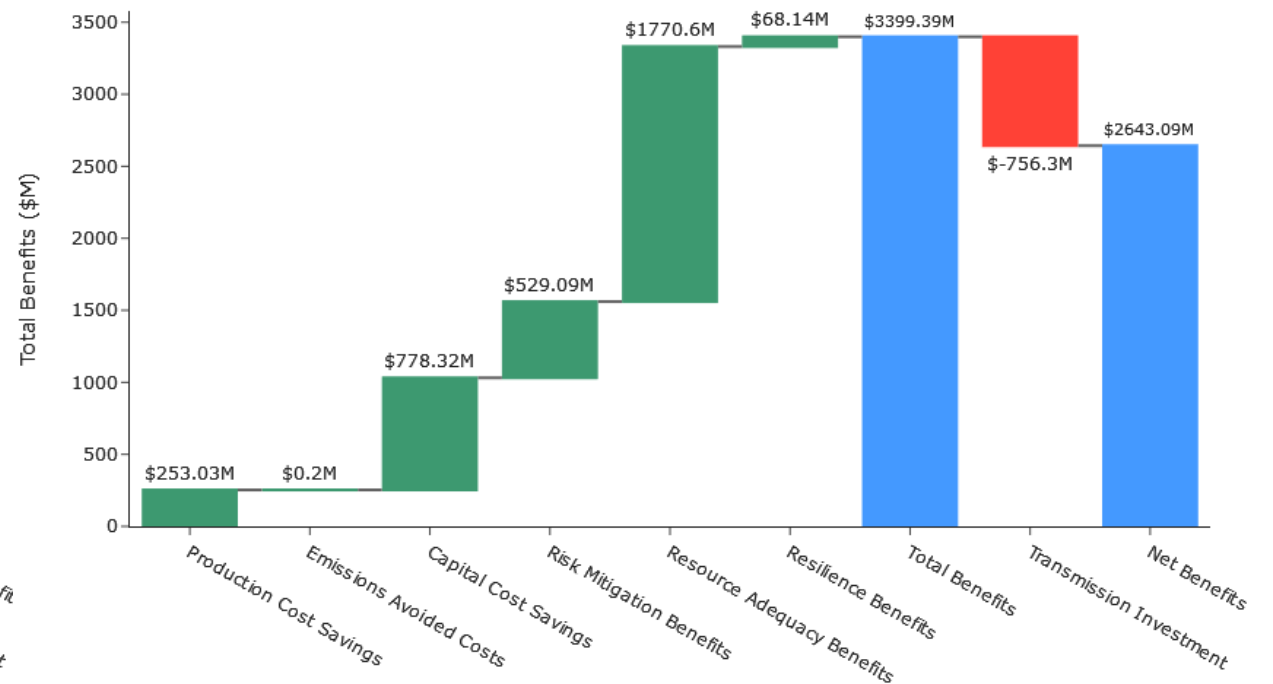
Transmission corridor	Expanded transmission capacity (MW)	Transmission investment (M\$)
BC-AB	2,395	\$644
MB-SK	1,472	\$756

Case study – multi-benefit stacking

BC – AB Transmission Expansion



MB – SK Transmission Expansion



... any yet procurement is limited for a variety of reasons

Provincial jurisdiction over energy

- > revenues flow to provincial government
- > regulatory and market structure mismatch between provinces
- > economic barriers – can't access new customers in neighboring provinces
- > political barriers – local jobs; provincial rivalries; local accountability; provincial champions
 - federal action is seen as threatening independence and powers

Lack of leadership on power sector planning, including now decarbonization

- > lack of innovative culture within the regulators across Canada
- > lack of centralized discourse – lack of venue for a cohesive dialogue
 - >>> allow vested interests to dominate the conversation & maintain the status quo

Local concerns -NIMBY

Regulatory mismatch – the context for transmission expansion varies by province

- Canada doesn't have federal intervention (like FERC or the IRA support)
- Regulation and tariffs across Canada:
 - Transmission is regulated by provincial regulators under a cost-of-service methodology
 - Each regulator sets a rate of return, based on their allowed investments
 - This approach favors additional assets (over which a return is earned) instead of alternative approaches (e.g., DSM) which are less straightforward to remunerate
- Provinces fall into one of three categories
 - Vertically integrated crown corporations with little competition
 - Vertically integrated private companies with little competition
 - Unbundled electricity sector with open wholesale & retail competition

(1) Vertically integrated crown corporations

- little competition

Provinces include:	British Columbia, Saskatchewan, Manitoba, Quebec, New Brunswick, Newfoundland
Ownership	Provincial government owns the dominate electricity company High degree of vertical integration (ownership is <i>not</i> unbundled)
Operations	Crown corp. oversees generation, transmission, system operation, distribution, retail <i>Not</i> operationally unbundled
Market/ procurement	Wholesale market based on bilateral contracts and regulated retail market IPPs can play a small role through long-term contracts Retail market is not open to competition
Politics	Utilities are not independent; they are influenced by other priorities such as regional development, economic support for industries, etc. Crown corps. earn revenues for the provincial government and are generally popular among citizens

(2) Vertically integrated private companies - with little competition

Provinces include:	Nova Scotia, PEI (to some extent)
Ownership	Single investor-owned company is responsible for the electricity sector NS - High degree of vertical integration PEI - Moderate degree of vertical integration – imports ~75% of power from NB Power
Operations	Nova Scotia Power (NSPI) regulated by Utility & Review Board System operator (NSPSO) operates wholesale market functions as part of NSPI IPPs can sell to NSPI which then distributes to consumers (RE can be sold directly)
Market/ procurement	Wholesale market based on bilateral contracts and regulated retail market There are some supply contracts from IPPs & imports from other provinces
Politics	Clean Energy Solutions Task Force established in 2023 – recommending an independent system operator & standalone energy regulator

(3) Unbundled electricity sector - with open wholesale & retail competition

Provinces include:	Alberta and Ontario
Ownership	Generation by investor- & municipally- owned companies (& Crown corp. in Ontario) Transmission assets are mostly owned by investor-owned companies
Operations	IESO is responsible for planning, conservation, market design* Distribution is under the control of municipal companies (AB and ON)
Market/ procurement	Open, competitive, organized wholesale market providing an hourly price signal Transmission asset owners earn a profit based on a regulated transmission tariff Ontario has a <i>Transmission Rights Market</i> (can import, export, or transport energy) Competitive retail market - competitive retailers in an open retail market
Politics	AB – recently released green paper on transmission (cost allocation, congestion, interties) ON – dual-peaking (due to electrification), capacity shortfall, DR program, nuclear expansion, ultra-low overnight pricing introduced in 2023

Projects in Canada

New Brunswick/ Nova Scotia Transmission Reliability project

- New 345 kV line; 65 km long; parallel to existing line
- Increase energy operational flexibility & reliability in Nova Scotia
 - to integrate renewables & phase out fossil generation
- Engagement & environmental assessments currently underway; construction in Fall 2024 (?)

Ontario & Quebec – new electricity trade agreement between provincial governments

- Annual capacity swap of 600 MW trade agreement between IESO & Hydro-Quebec
- Take advantage of complementary seasonal peaks in demand (ON in summer QC in winter)
- 10-year agreement –no payments by either party ('protecting ratepayers in both provinces')

Birtle Transmission project

- 230 kV line in MB to boarder with SK to transmit power to SK
- began public engagement in 2016; energized in 2021

Alberta –released green paper on transmission

Addressing seven policy issues:

- Contribution of generation to transmission costs

- Responsibility for line losses

- Non-wires solutions

- Congestion policy

- Cost allocation for transmission

- Cost allocation for ancillary services

- Treatment of interties

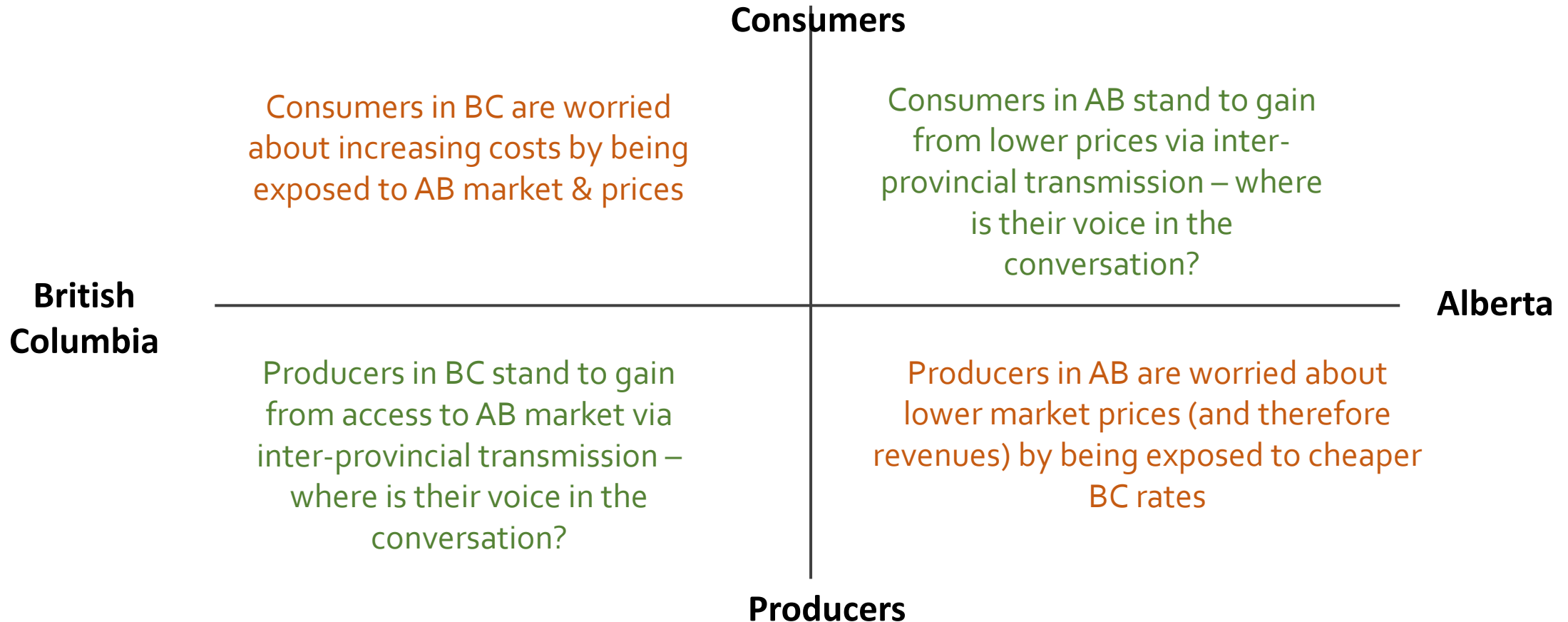
The international context

– lessons learned & successful attributes

	Europe	Nordic	Japan
Commitment from government to break down provincialism	ENTSO-E Represents 39 electricity transmission system operators from 35 countries across Europe	(1) Nord Pool - wholesale market owned by the four countries' TSOs (2) Nordic Council of Ministers TSOs have joint planning sessions (3) Nordic Energy Research group	Organization for Cross-regional Coordination of Transmission Operators (OCCTO) – formulation of a long-term network plan
Sharing of benefits	Pan-European Transmission Network plans and cost-benefit analysis: 10-year network development plan is the basis for the selection of EU projects of common interest	Denmark: worlds largest expansion of wind capacity enabled by backup hydro power from Norway; bigger markets that were more attractive to investors and increased cost efficiency	Need to move power from offshore wind power projects to demand centers; improve resilience
Retain policy autonomy	Each country retains policy autonomy		Regional monopolies

Next steps – change the narrative...?

Bilateral approach that focuses on giving the winners a voice and minimizing the impacts on losers



Next steps – bridge the gap between Provincial targets & utility planning

- In provinces with a crown corporation, there can (and should) be a connection between provincial decarbonization targets & policy and utility infrastructure planning
- In British Columbia, there is a gap between:
 - provincial decarbonization targets published in the CleanBC plan
 - modelling with an energy-economy model (gTech) and
 - power system planning published in the 10-year capital plan
 - BC Hydro infrastructure planning modelled in...?
- In provinces with vertically integrated crown corporations, provincial ownership could help the government execute on transition plans

Next steps – federal levers

- Current process:
 - provinces agree to pay the development cost in its province
 - a long-term contract (signed by the two provinces) support the investment
- Federal government – could support/create incentives
 - Nordic inspiration – combination of Council of Ministers + Research Hub
 - Federal financial support for transmission infrastructure
 - Harmonization of trade across provincial boundaries
- Merchant transmission line
 - Funded by the federal government and/or private investors
 - Contracted by players > generators/TSOs in Alberta, PowerEX, etc.
 - Potentially built on the same right of way inter-provincial pipelines...

Future work

- Embarking on a study - multi-country analysis
 - Planning – degree of centralization
 - Building – process (competitive tendering; do regulations favour incumbents)
 - Operation – access; competitiveness
 - Renumeration – market design; standardized rate of return
- Tease out lessons learned from structures that exist internationally that might be applicable to the Canadian context



Thank you

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