2022 LONG TERM GAS RESOURCE PLAN (LTGRP)
DEMAND-SIDE MANAGEMENT ANALYSIS
DRAFT RESULTS

November 3, 2021

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Welcome, Acknowledgment, Introduction

FortisBC acknowledges and respects Indigenous People in this place we call Canada, on whose traditional territories we all live, work and play.

FortisBC is committed to Reconciliation with Indigenous Peoples, using our Statement of Indigenous Principles to guide our words and actions.

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Guiding Principles for FortisBC

Agenda

- **Welcome, Acknowledgment, Introduction & Sessions Overview** (15 min.)
- **Demand-side Management Analysis: Context & Approach** (50 min.)
- **Break** (10 min.)
- **Demand-side Management Analysis: Draft Results** (60 min.)
- **Primer on Next Session Topics: System Planning & Gas Supply** (35 min.)
- **Wrap-up & Next Steps** (10 min.)

Session Objectives

- Inform you about the status of the 2022 LTGRP
- Present and solicit feedback on the demand-side management analysis including:
  - Analysis approach
  - Linkages to the CPR and DSM Plan
  - Draft results
- Introduce the topics for the next session on gas supply and system planning

Housekeeping

Please put yourself on **mute** when you're not speaking to reduce background noise.

Please use the **chat** to provide any general feedback or comments as we go through the session.

We ask that you enter your questions in the **Q&A** or wait until the allocated discussion sections to put your **hand up** to ask your question.

The session audio/video will not be recorded; however, the chat history will be saved solely for note-taking purposes. Session notes will be shared with everyone and posted online.

Reminder that the pre-read document provides additional detail on the information summarized during this session.

Ken Ross
Manager, Resource Planning & DSM Reporting

Terry Penner
System Capacity Planning Manager

Jordan Cumming
Commercial & Planning Lead, Energy Supply

New FortisBC LTGRP Team Members:

Diana Aguilar

Beth Ringdahl

IRP@fortisbc.com

FortisBC Speakers & New Members

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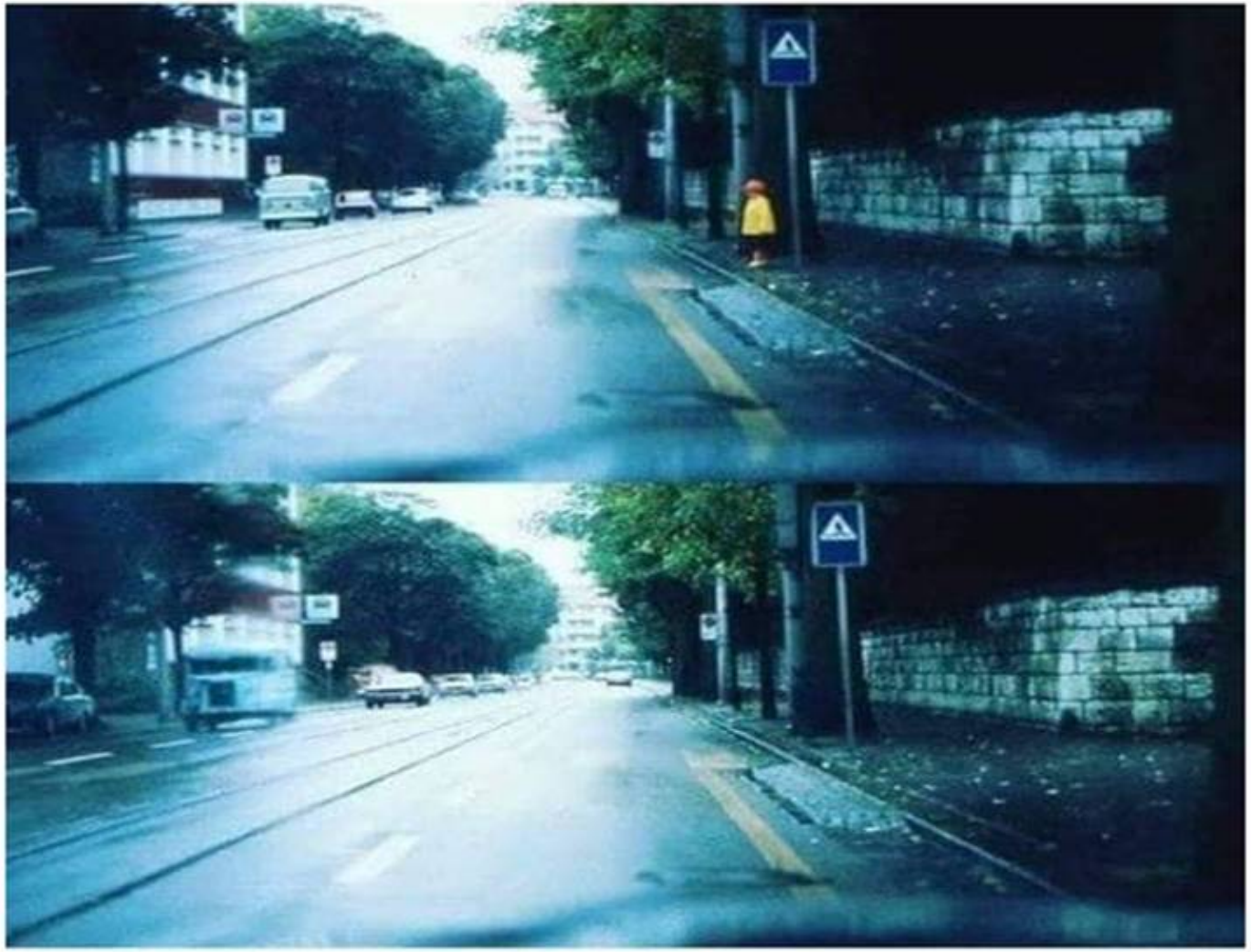
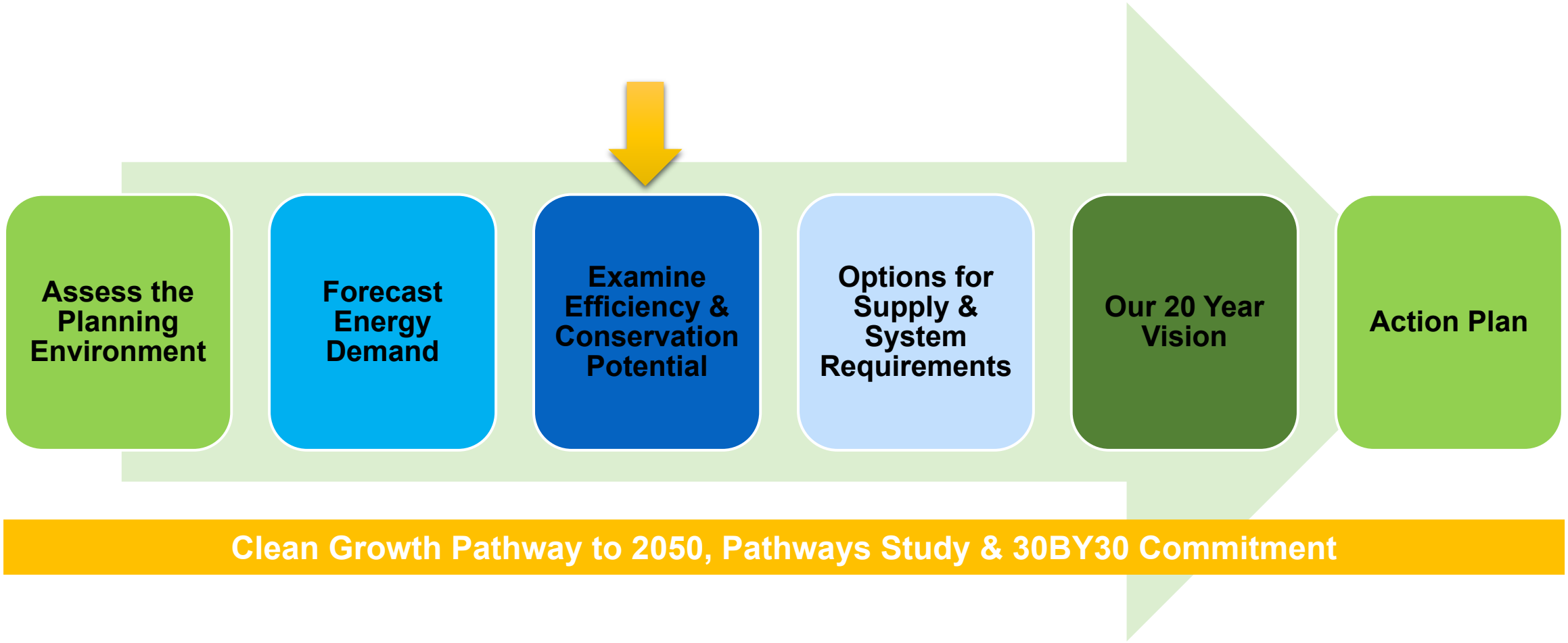
Resource Planning Advisory Group (RPAG) Members Registered for this Session

- Avista Utilities
- BC Business Council
- BC Ministry of Energy, Mines & Low Carbon Innovation
- BC Public Interest Advocacy Centre
- BC Sustainable Energy Association
- BC Utilities Commission
- BC Hydro
- Building Owners & Managers Association
- Canadian Institute of Plumbing and Heating
- Commercial Energy Consumers Association of BC
- City of Abbotsford
- City of Burnaby
- City of Kamloops
- City of Kelowna
- Clean Energy Association of BC
- Commercial Energy Consumers Association of BC
- Community Energy Association
- District of Saanich
- Metro Vancouver
- Midgard Consulting (Representing Residential Consumer Intervener Association)
- MoveUP
- North West Gas Association
- Puget Sound Energy
- University of Victoria

Safety moment

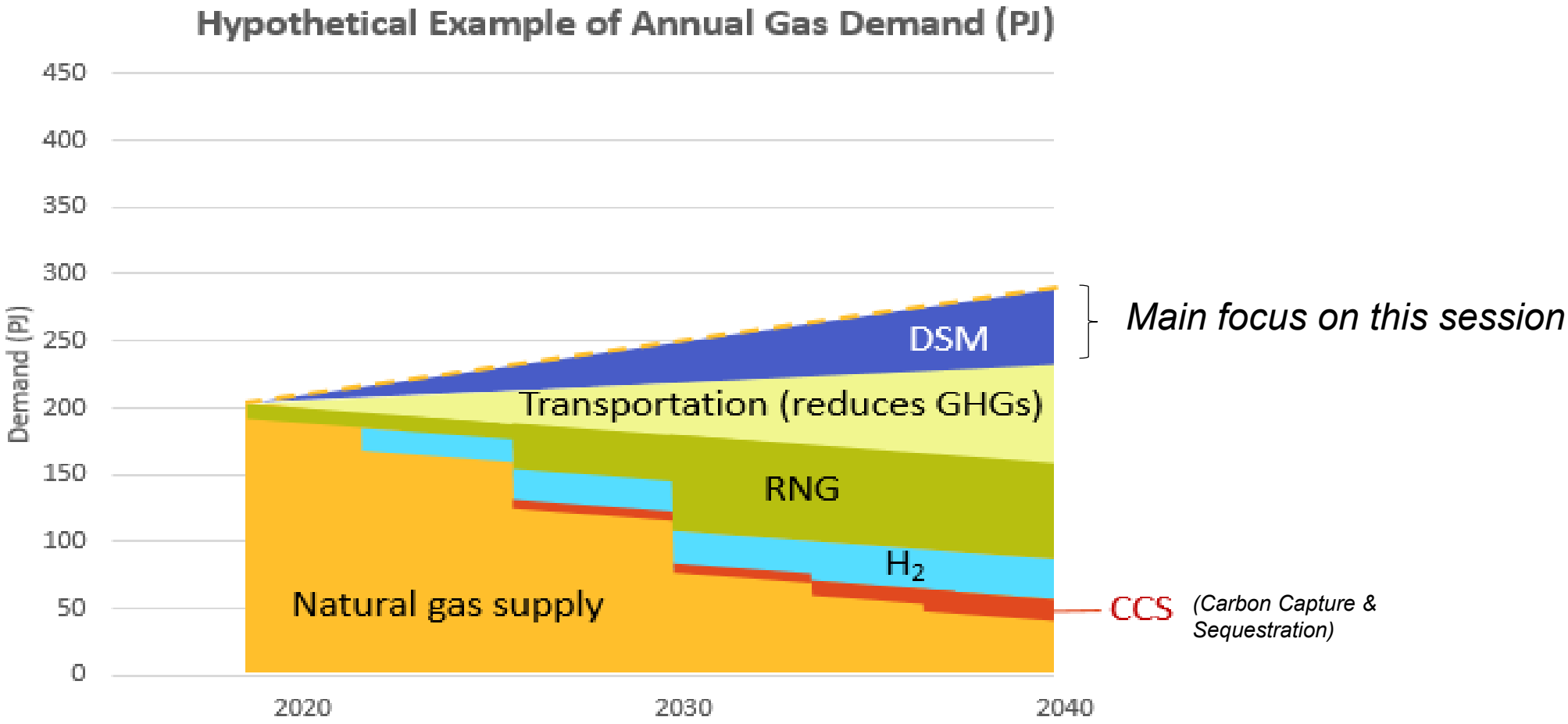


Recall the LTGRP Process

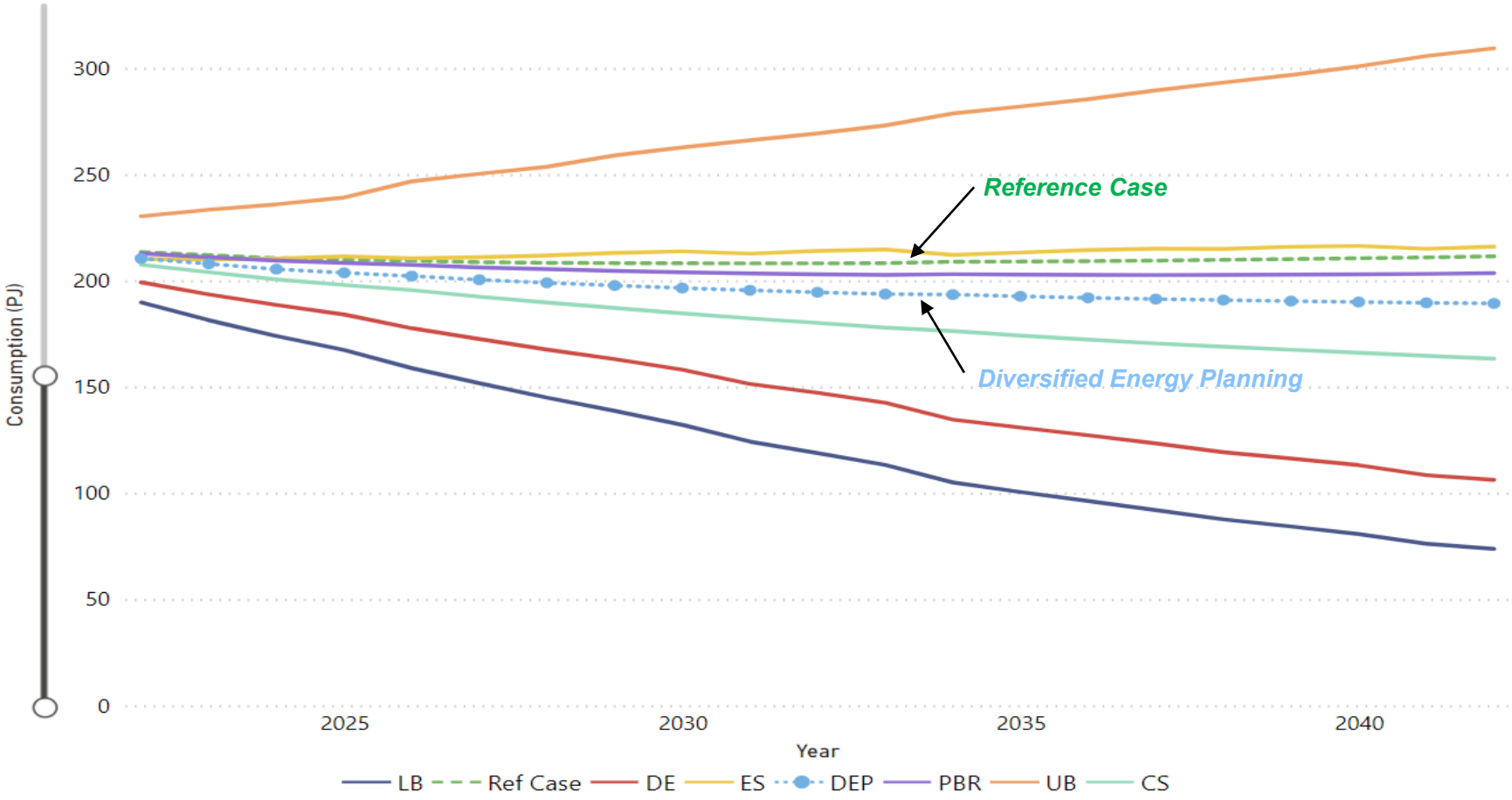


Demand and supply balance

- Key to meeting GHG targets



Scenario comparison of forecasted demand
(residential, commercial, industrial)



Note: *Excludes LNG & CNG*

2022 LTGRP Scenarios

FEI has developed the following scenarios:

UB: Upper Bound

ES: Economic Stagnation

Ref Case: Reference Case

PBR: Price-based Regulation

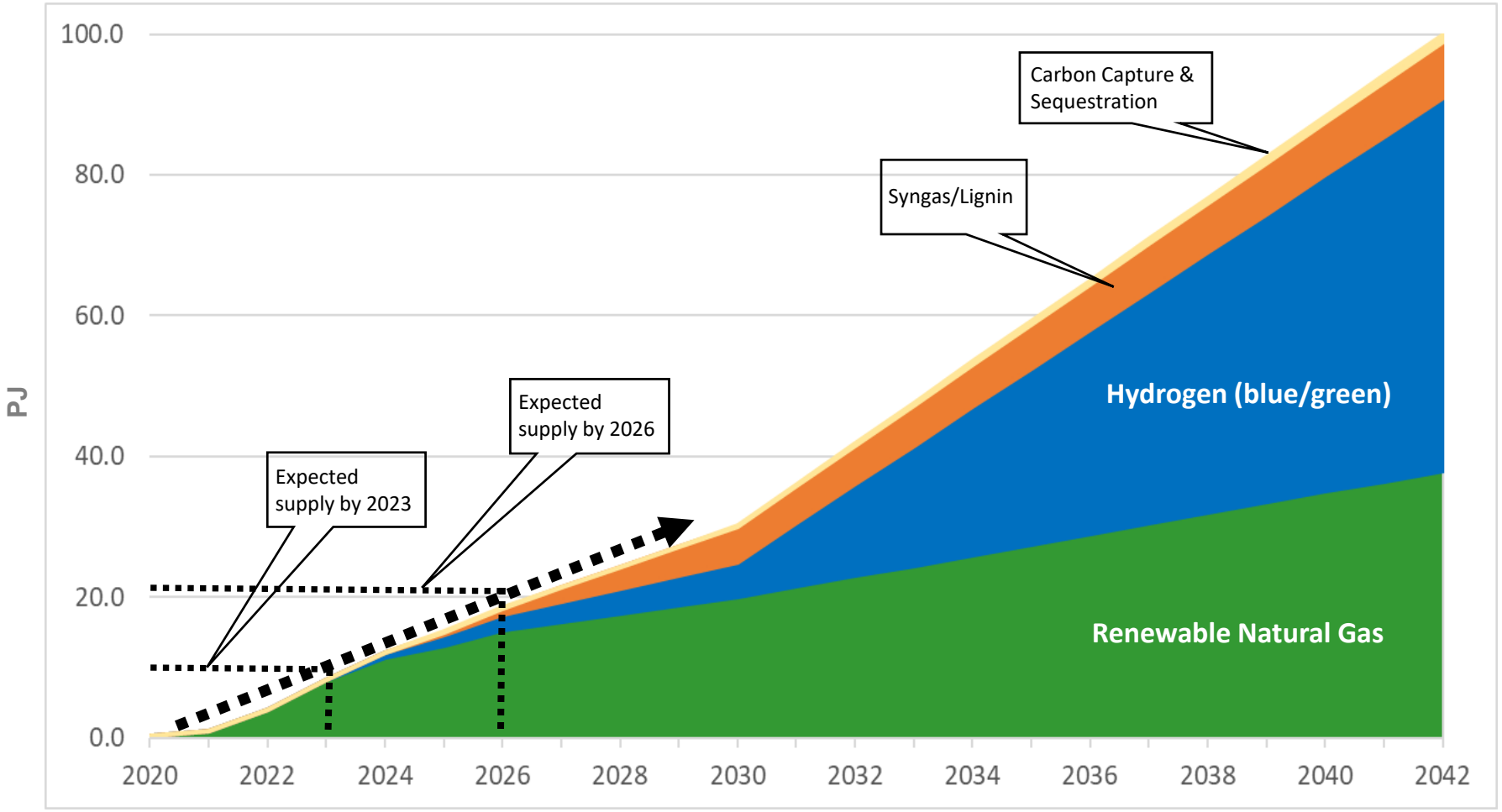
DEP: Diversified Energy Planning

CS: Crowd sourced (via the slider tool)

DE: Deep Electrification

LB: Lower Bound

Renewable and Low Carbon Gas Supply Outlook (Long-Term, Preliminary)



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Feedback from Previous Session

Demand Forecasting, Renewable Supply and Future Scenarios

- Impact of renewable gases on the gas system
- Cost and timing of renewable supply
- Breakout of transportation sector demand
- Clarification of aspects of the demand and supply critical uncertainties
- Competition for renewable energy resources
- Location of emission reductions and carbon accounting approach
- Approaches to decarbonizing various sectors
- Demand and carbon reductions by end-use
- Costs of decarbonization approaches
- Slider tool for exploring and discussing demand/supply critical uncertainties

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Consultant, Posterity Group
LTGRP Analyst

Chris Pulfer
Principal, Posterity Group
LTGRP Project Director

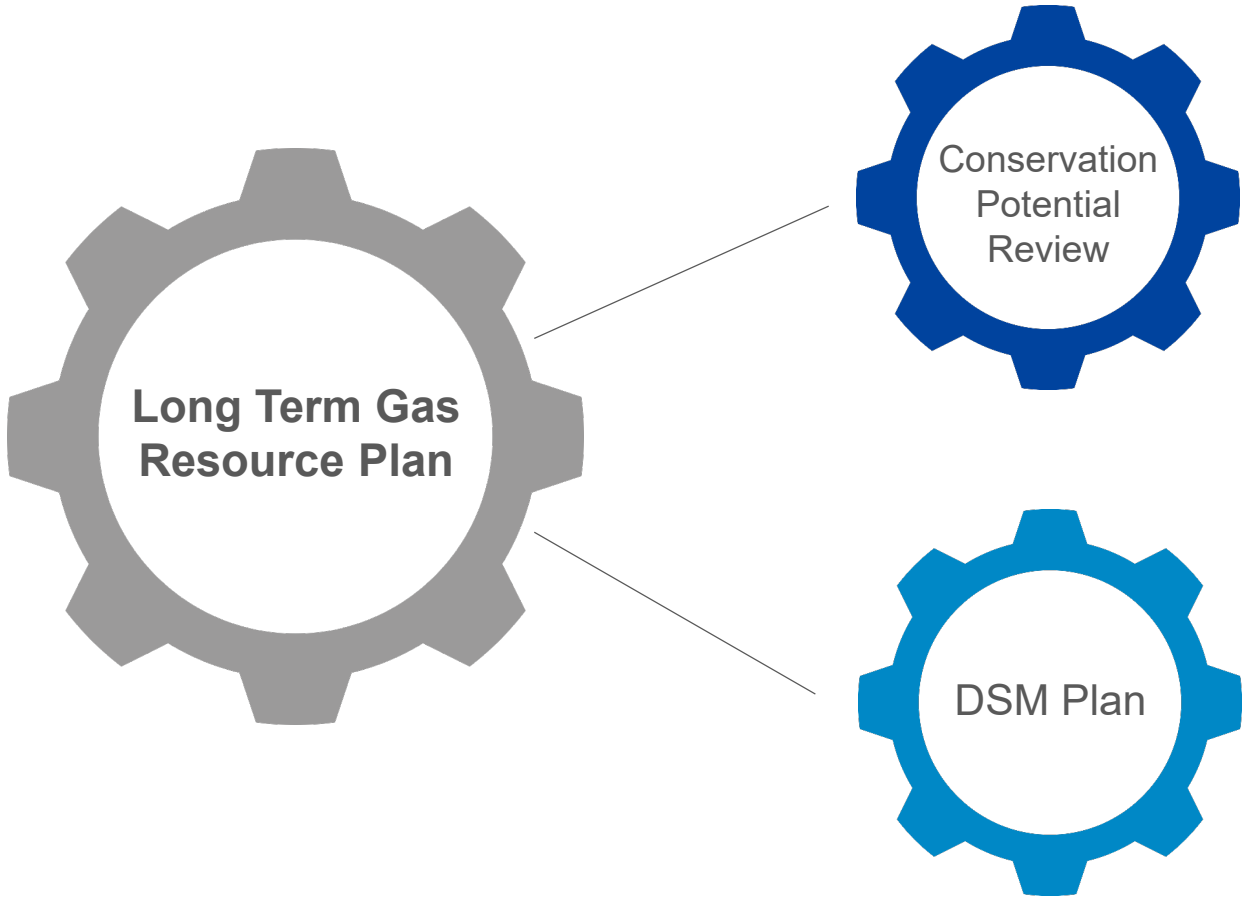
Dave Shipley
Senior Consultant, Posterity Group
LTGRP Technical Director

Erika Aruja
Consultant, Posterity Group
LTGRP Project Manager

Guest Speakers

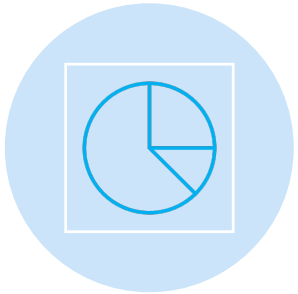
Demand-side Management Analysis for the 2022 LTGRP Context & Approach

Demand-Side Management: Context



DSM Modelling Method

Approach to DSM Analysis in the 2022 LTGRP



DSM energy savings potential modelled from 2022 to 2042.

Draws on the energy conservation measures from the 2021 Conservation Potential Review (CPR).

Developed four DSM spending levels (“settings”) to apply to various scenarios: Taper off, low, medium, high.

DSM savings are applied to residential, commercial and industrial sectors, not transportation or export.

DSM Budget Settings used in the LTGRP Scenarios

- Developed DSM budget “settings” based on:
  - Incentive levels as key driver (cover 50% or 100% of incremental costs),
  - Measures screened through DSM cost effectiveness tests; and/or
  - Budget levels (incentive spending and non-incentive program spending).

DSM Budget Settings

	"Taper Off"	"Low"	"Medium"	"High"
Description	Assumes DSM spending tapers off as the province electrifies	Constrained to include only the most cost-effective measures	Similar to the CPR's medium market potential scenario where adoption of measures is based on incentives covering 50% of a measures incremental cost	Similar to the CPR's high market potential scenario where adoption of measures is based on incentives covering 100% of a measures incremental cost
Incentive Level setting	Any incentive level is permitted	Any incentive level is permitted	50% of measure incremental cost	100% of measure incremental cost
Economic Screen setting	Passes either TRC>1 or MTRC>1	Passes TRC>1 or MTRC>1 and UCT>2	Passes TRC>1 or MTRC>1	Passes TRC>1 or MTRC>1
Budget setting	Budget limited to of 50% of 2022 spending in 2023, declining to 25% of 2022 spending by 2042	No budget limit applied	No budget limit applied	No budget limit applied

DSM Budget Settings in each Scenario

Scenario	DSM Setting
Reference Case	Medium
Diversified Energy Planning	Medium (sensitivity analysis conducted with Low and High settings)
Deep Electrification	Taper
Price-Based Regulation	Low
Economic Stagnation	Medium
Lower Bound	High DSM
Upper Bound	NA – no DSM
Stakeholder Scenario	Medium

Application of DSM to Fuels

Current Approach:

Apply participation in DSM programs based on volume of fossil-based natural gas.

- The impact of this approach is that if there are significant volumes of RNG, H_2 or other fuels in a scenario, DSM savings (GHG reduction) declines.

Proposed Revised Approach:

Apply participation in DSM programs based on volume of all piped fuels but only reduce demand for fossil-based natural gas from measures.

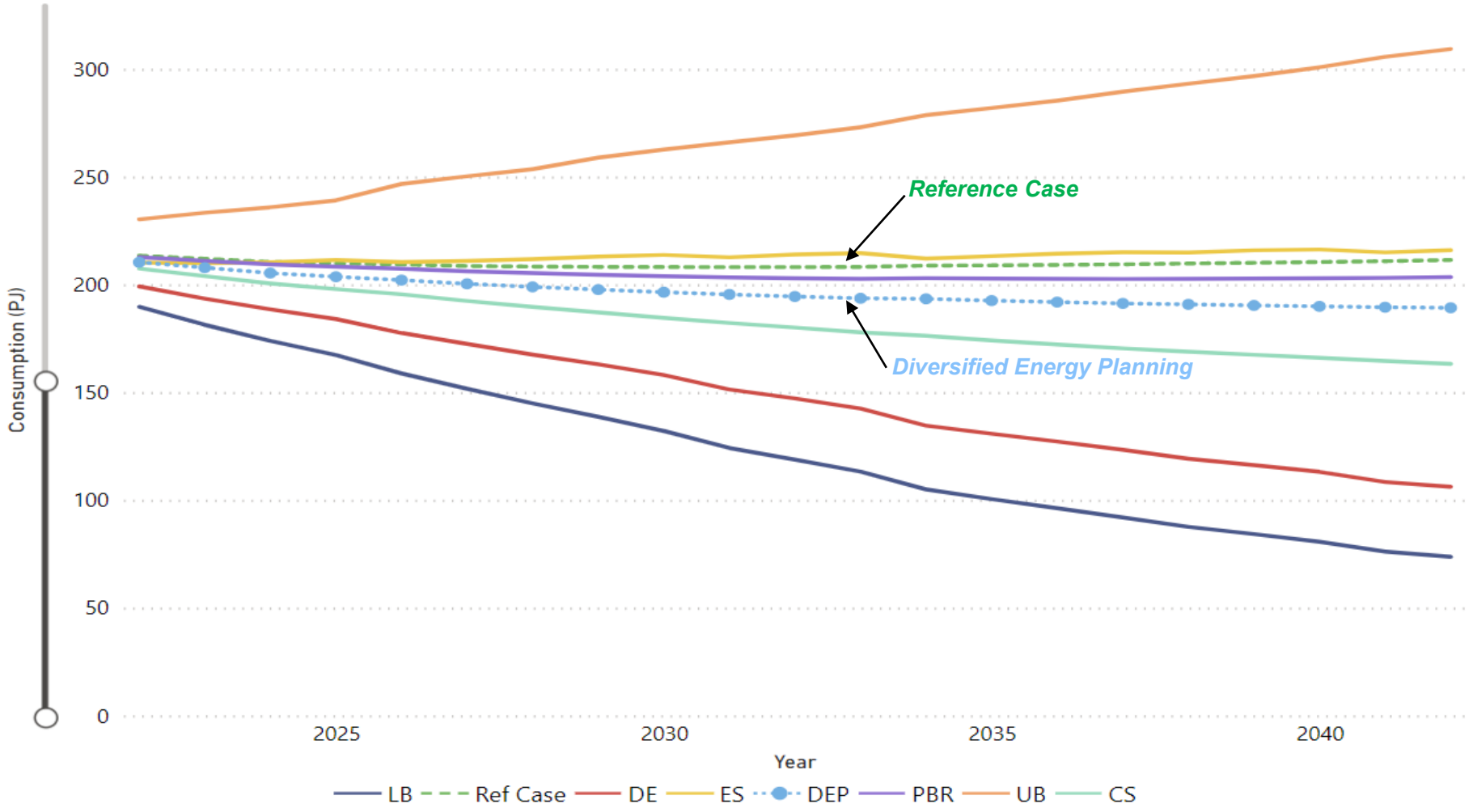
- The logic for this approach is that total piped volume drives DSM participation but savings only affect how much fossil-based natural gas FEI purchases.
- The simplifying assumption we would make is that DSM ends when there is no more fossil-based natural gas in the fuel mix.
- We expect the outcome of this approach is that DSM savings will increase in most scenarios, particularly those with higher volumes of RNG and H_2.

Questions & Discussion

Break

Demand-side Management Analysis for the 2022 LTGRP Draft Results

Consumption, all scenarios (residential, commercial and industrial)



UB: Upper Bound of gas consumption

ES: Economic Stagnation

Ref Case: Reference Case

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DEP: Diversified Energy Planning

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LB: Lower Bound of gas consumption

Note: *Excludes LNG & CNG*

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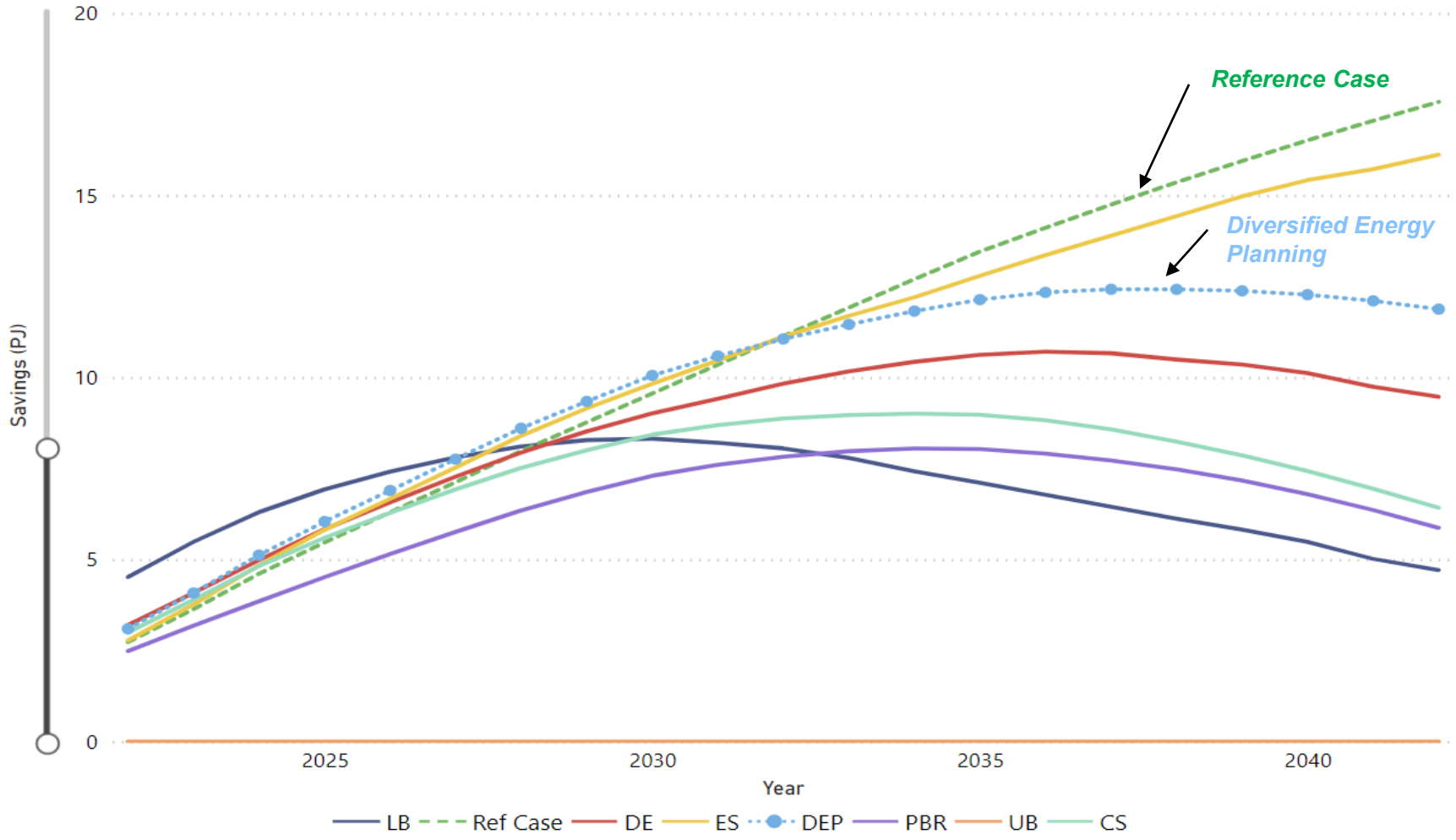
Energy Savings (PJ), all scenarios



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LB: Lower Bound of gas consumption

UB: Upper Bound of gas consumption

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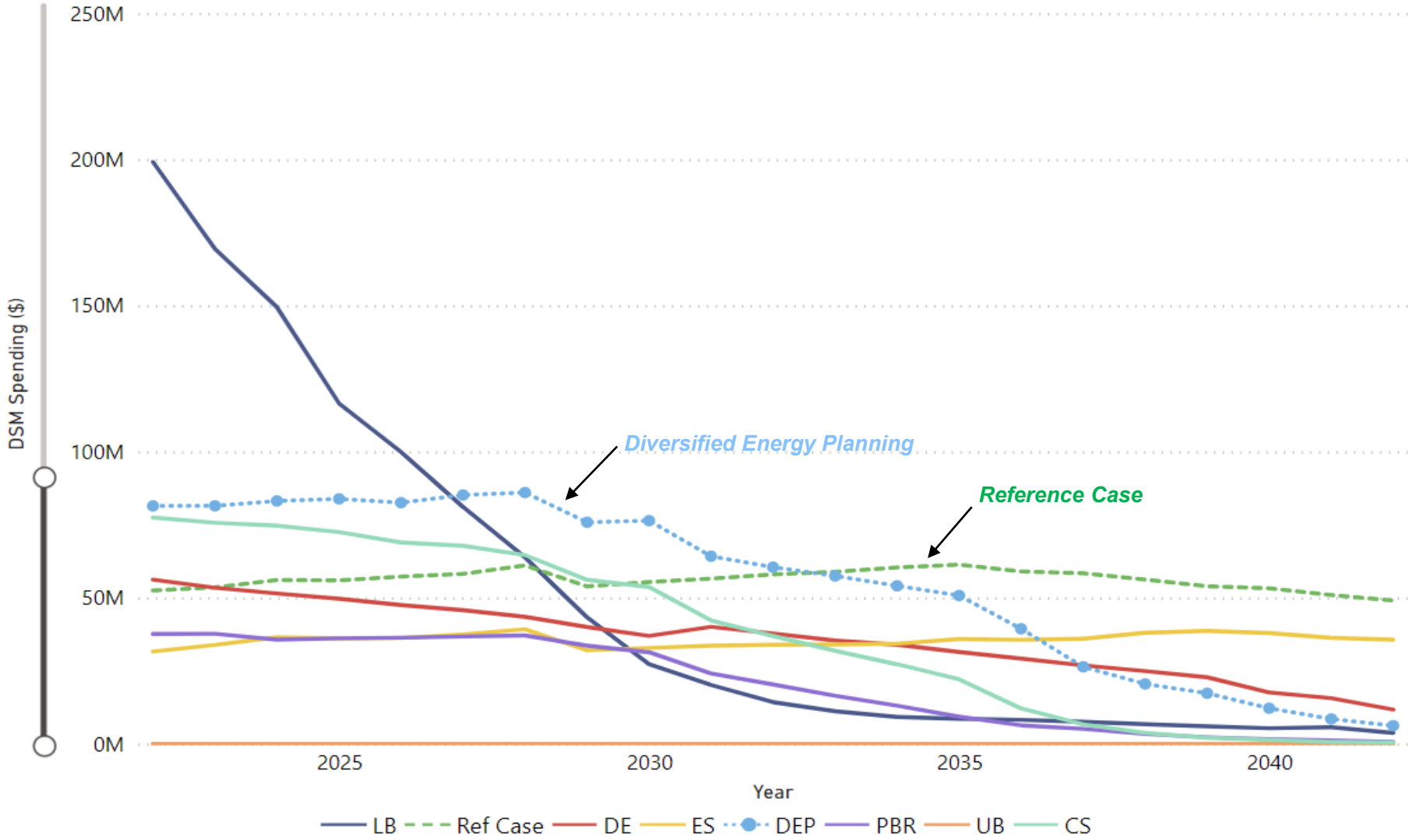
DSM Spending ($, incentive program), all scenarios



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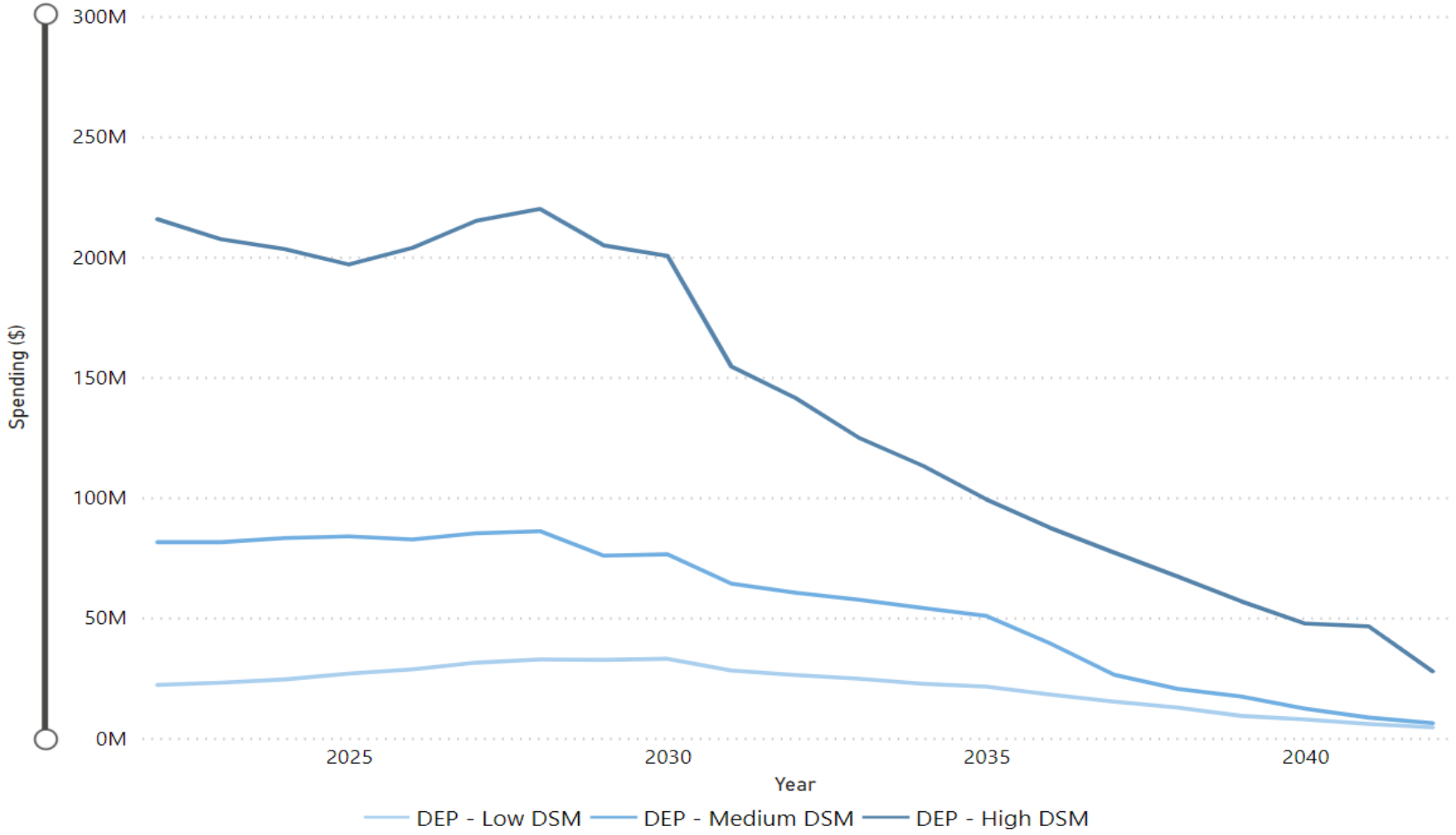
Diversified Energy Planning: Spending ($) in 3 DSM Settings



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Societal Cost-Benefit

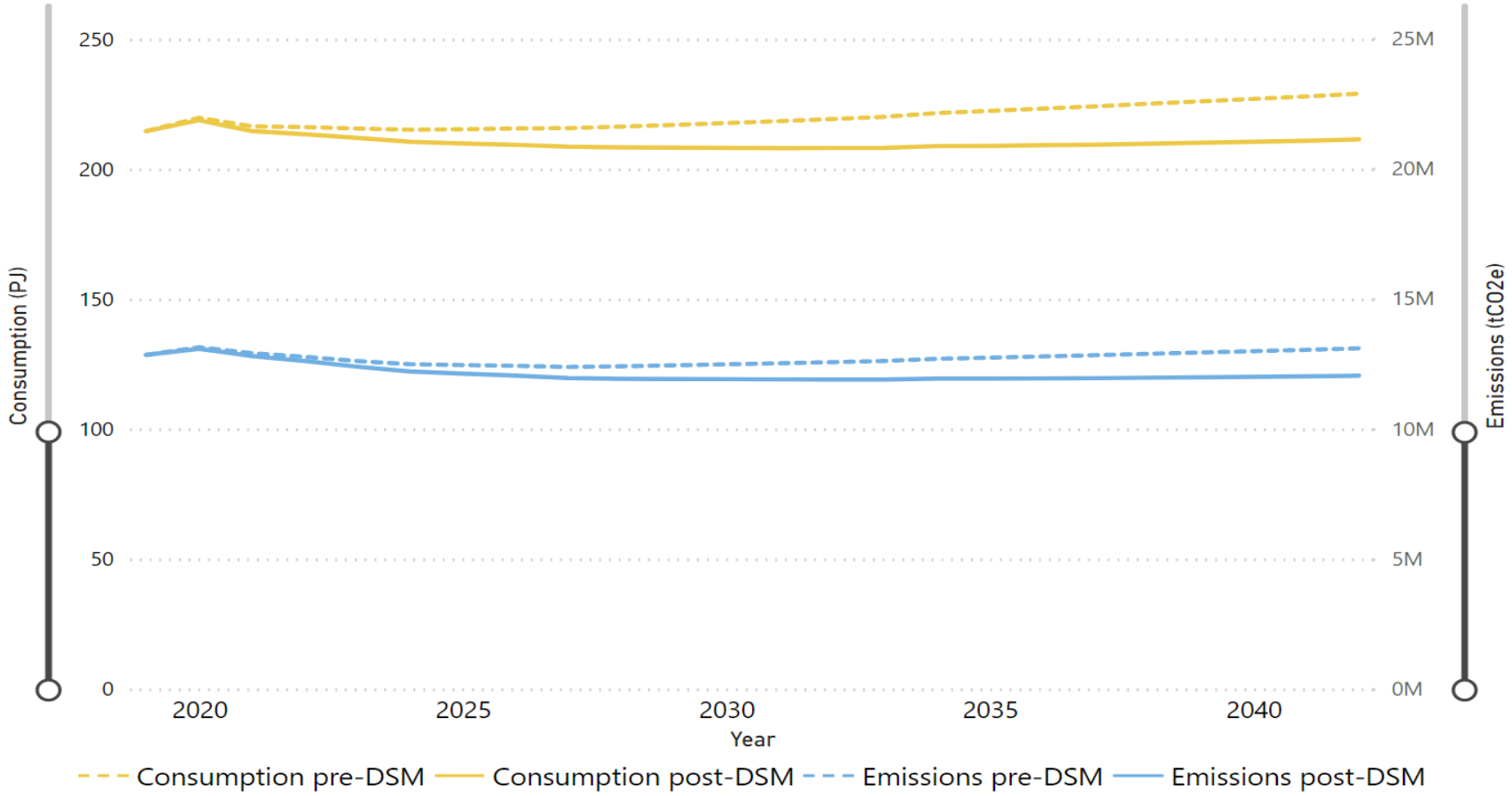
From a societal standpoint, DSM measures are cost effective based on energy savings alone.

As carbon reduction measures, they are more than paid for by energy savings, so **cost per tonne is negative.**

As an example, residential measures in 2030 in the high DSM planning scenario cost approximately -$70/tonne.

That means their energy benefits exceed their costs by approximately $70 for every tonne of lifetime CO_2e reduction.

Pre- vs Post-DSM Consumption and GHG Emissions: Reference Case Scenario



Note: *Excludes LNG & CNG*

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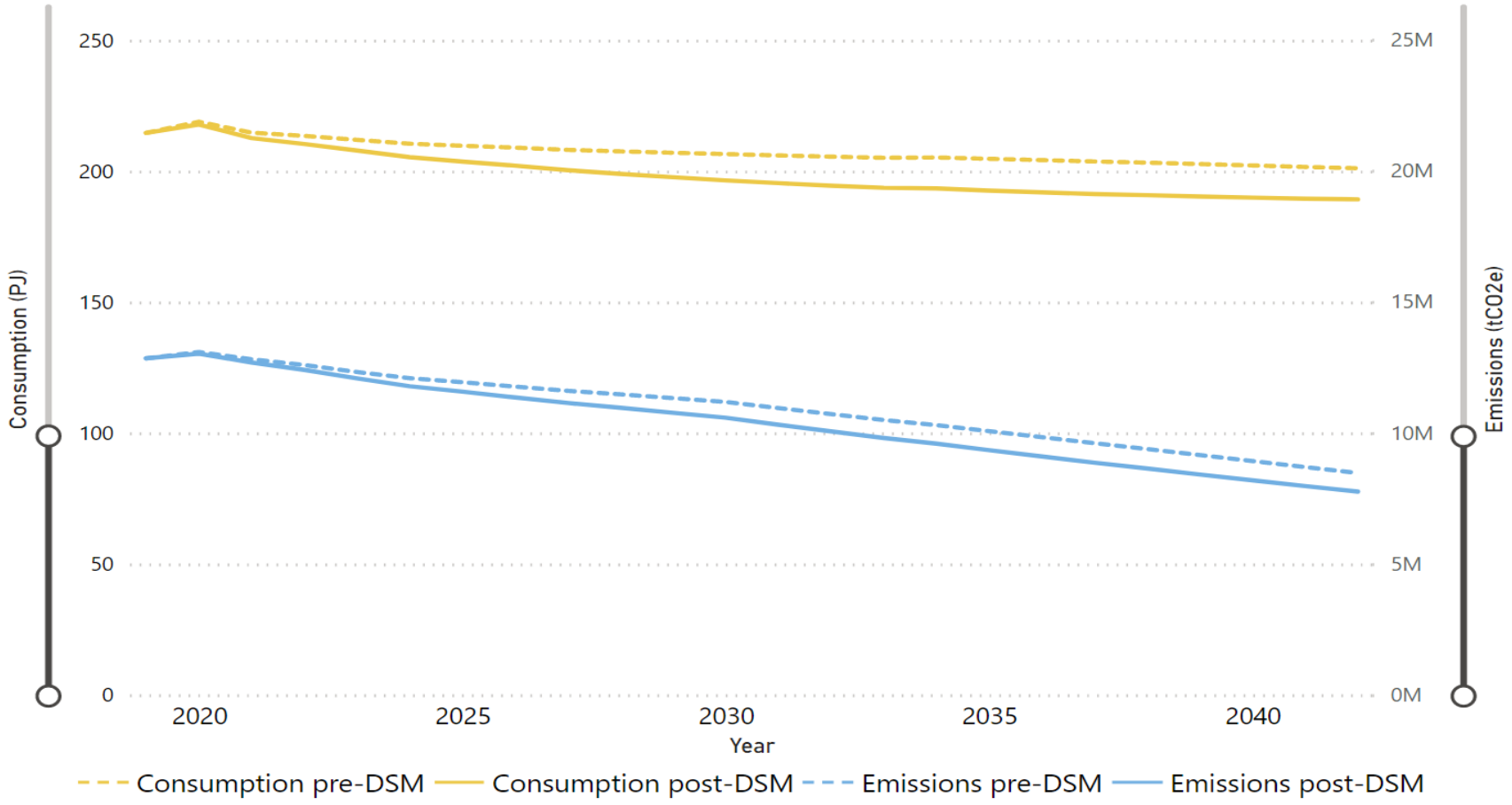
Pre- vs Post-DSM Consumption and GHG Emissions: Diversified Energy Planning Scenario



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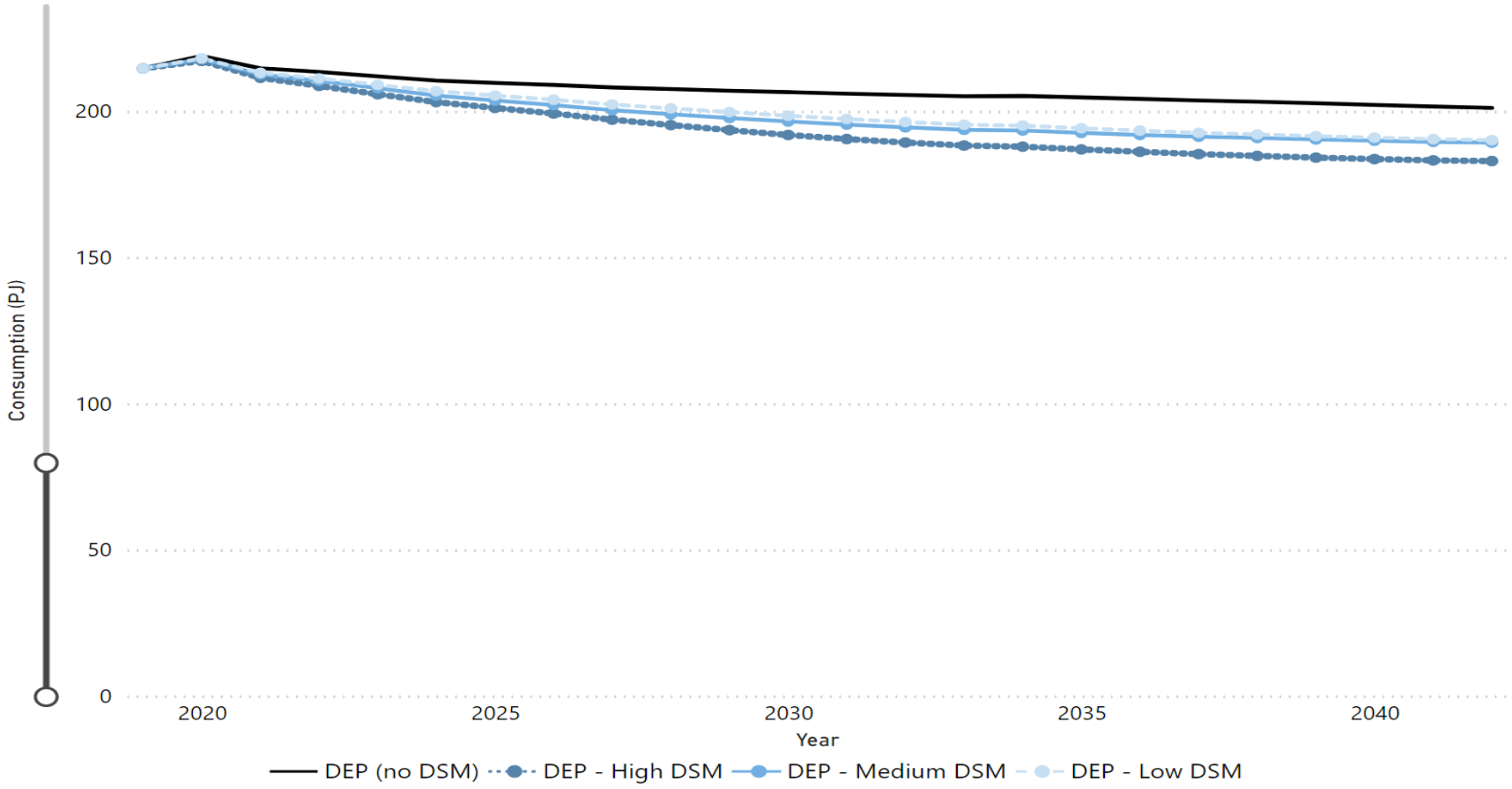
Diversified Energy Planning: Consumption of 3 DSM Settings



Note: *Excludes LNG & CNG*

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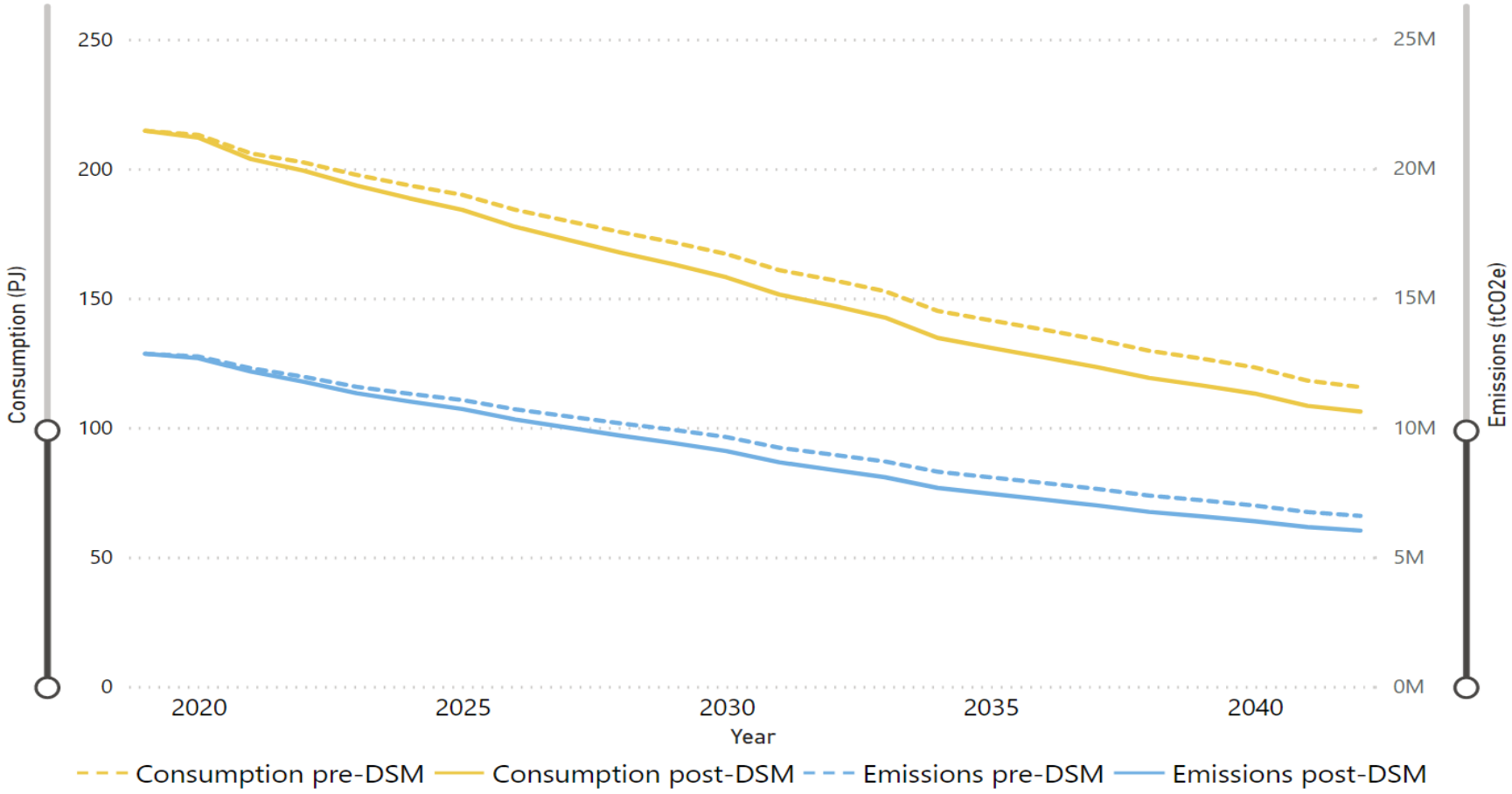
Pre- vs Post-DSM Consumption and GHG Emissions: Deep Electrification Scenario



Note: *Excludes LNG & CNG*

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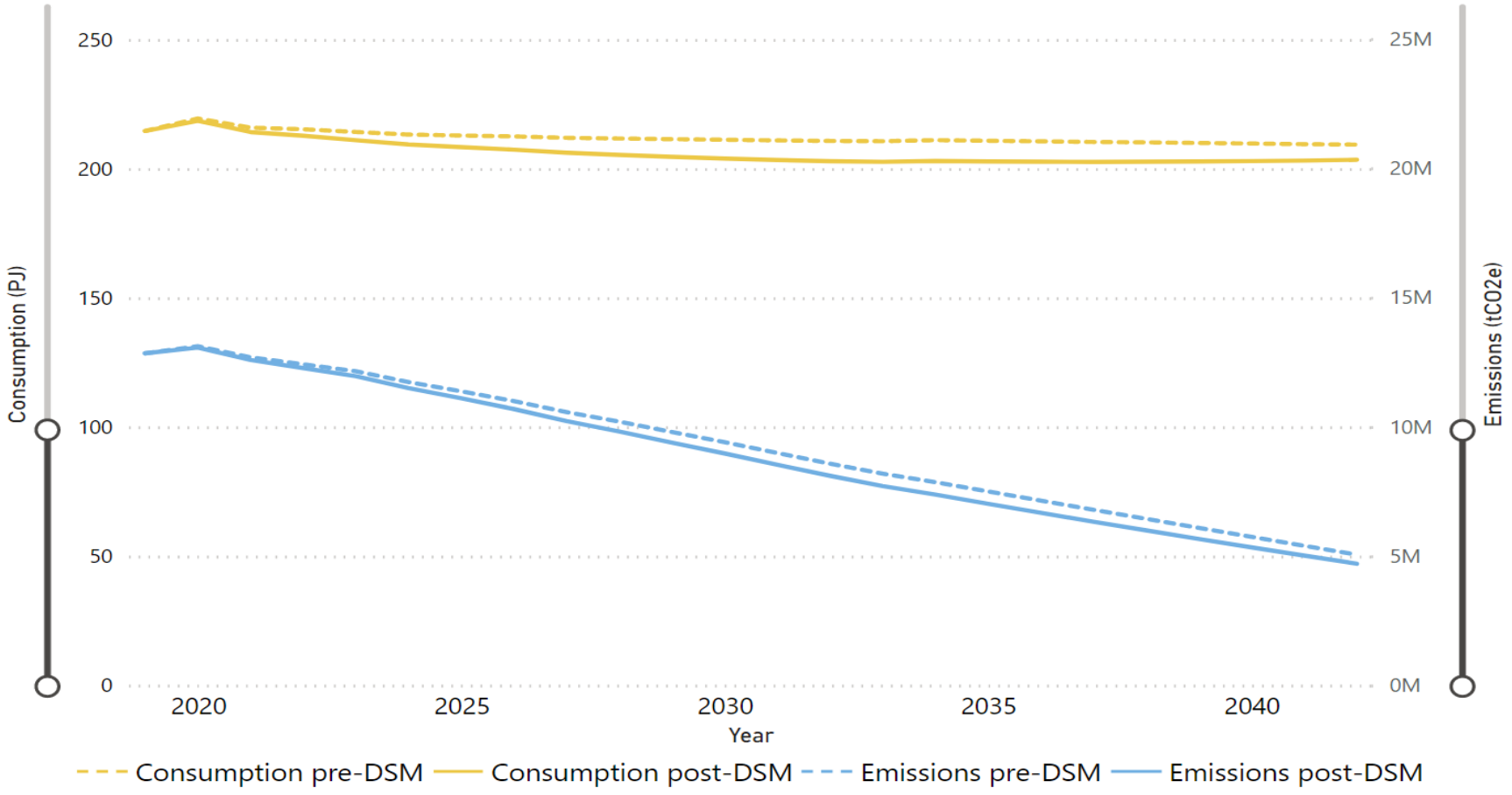
Pre- vs Post-DSM Consumption and GHG Emissions: Price-Based Regulation Scenario



Note: *Excludes LNG & CNG*

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Questions & Discussion

Primer on Topics for the Next Session (December 1)

System Capacity Planning

Peak Demand - System Capacity Planning vs. Gas Supply

Peak Demand – System Capacity Planning

- Determines the FEI infrastructure needed to deliver gas to core customers at a during a peak day or peak hour event
- Infrastructure requirements must also allow delivery of gas to firm transportation customers
- Location and distribution of demand within the transmission and distribution system is a significant factor in determining the available capacity

Peak Demand - Gas Supply Planning

- Determines supply resources needed to serve customers during a peak day event
- Resources/supply for transportation customers are not included

Annual Demand – Gas Supply Planning

- Determines the amount of gas FEI acquires and transports on behalf of customers on an annual basis
- Determines units of energy available to recover costs of service and rate of return

Peak Demand

- Demand is correlated with colder weather
- Peak demand estimated as the maximum hourly or daily consumption during an unusually cold weather event
- FEI designs systems to a cold weather event that might occur once in 20 years to ensure delivery of gas to all firm customers
- 22 weather zones throughout FEI service territory considered in peak planning for system capacity
- Peak demand does not include seasonal and interruptible customer classes

Peak Demand – Forecast Methods

Traditionally:

- Base year peak demand from UPCpeak values derived from currently measured consumption and current customers
- The UPC_{peak} values remain constant.
- Peak demand growth = ∑customer adds x UPC_{peak}
- The current industrial accounts are held constant with no increase or decrease in peak consumption over time

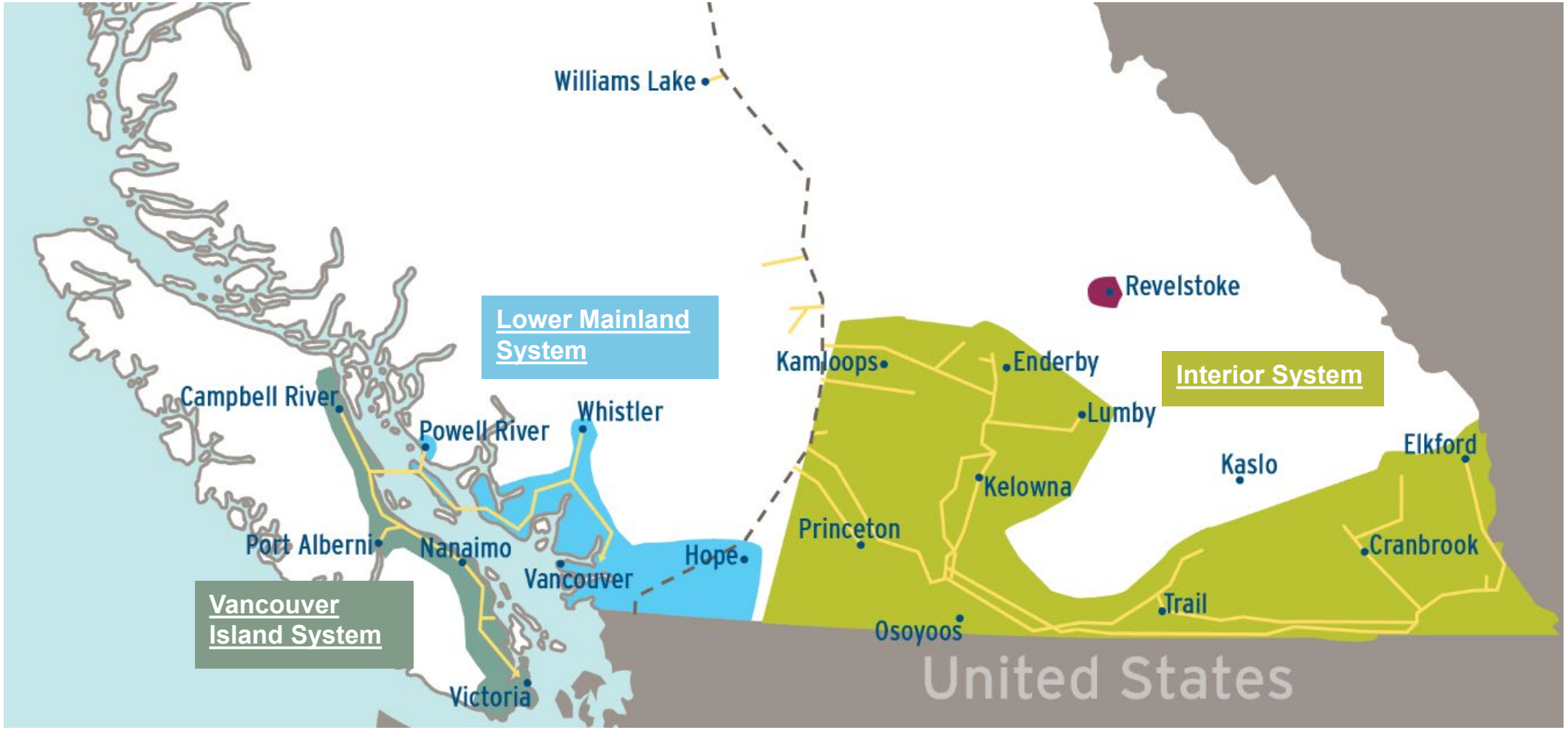
End-Use alternative comparison to the traditional method (conceptual):

- Base year peak demand is determined in the traditional manner.
- The UPC_{peak} values for existing and new customers core and industrial customers are varied over the planning period.
- UPC_{peak} variations are derived considering the same end use factors used to determine annual demand in each scenario.
- Industrial accounts will vary in the high and low forecasts.

FEI Regional Forecasts and Infrastructure

- Peak Demand Forecasts for FEI's three major transmission systems will be presented, reviewing capacity and proposed upgrade requirements to address peak demand.
  - Coastal Transmission System (CTS)
  - Interior Transmission System (ITS)
  - Vancouver Island Transmission System (VITS)

FEI Major Transmission Systems



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LNG, RNG and Hydrogen

- Capacity considerations to support LNG, RNG, and Hydrogen delivery will be discussed.
- Requirements for each system are unique and will evolve over time.
  - Coastal Transmission System (CTS)
  - Interior Transmission System (ITS)
  - Vancouver Island Transmission System (VITS)

Infrastructure to support Peak Demand

For upcoming RPAG Session on December 1, 2021:

- Peak Demand Forecasts – Traditional vs Theoretical End Use methods
- Regional forecasts and infrastructure upgrades on FEI systems
- LNG expansion Woodfibre and Tilbury
- RNG and H_2 capacity considerations

Gas Supply

Regional Gas Market Resources

Supply Hubs:

- Station 2
- AECO/NIT

Market Hubs:

- Kingsgate
- Sumas

Seasonal Storage:

- Aitken Creek
- Rockpoint

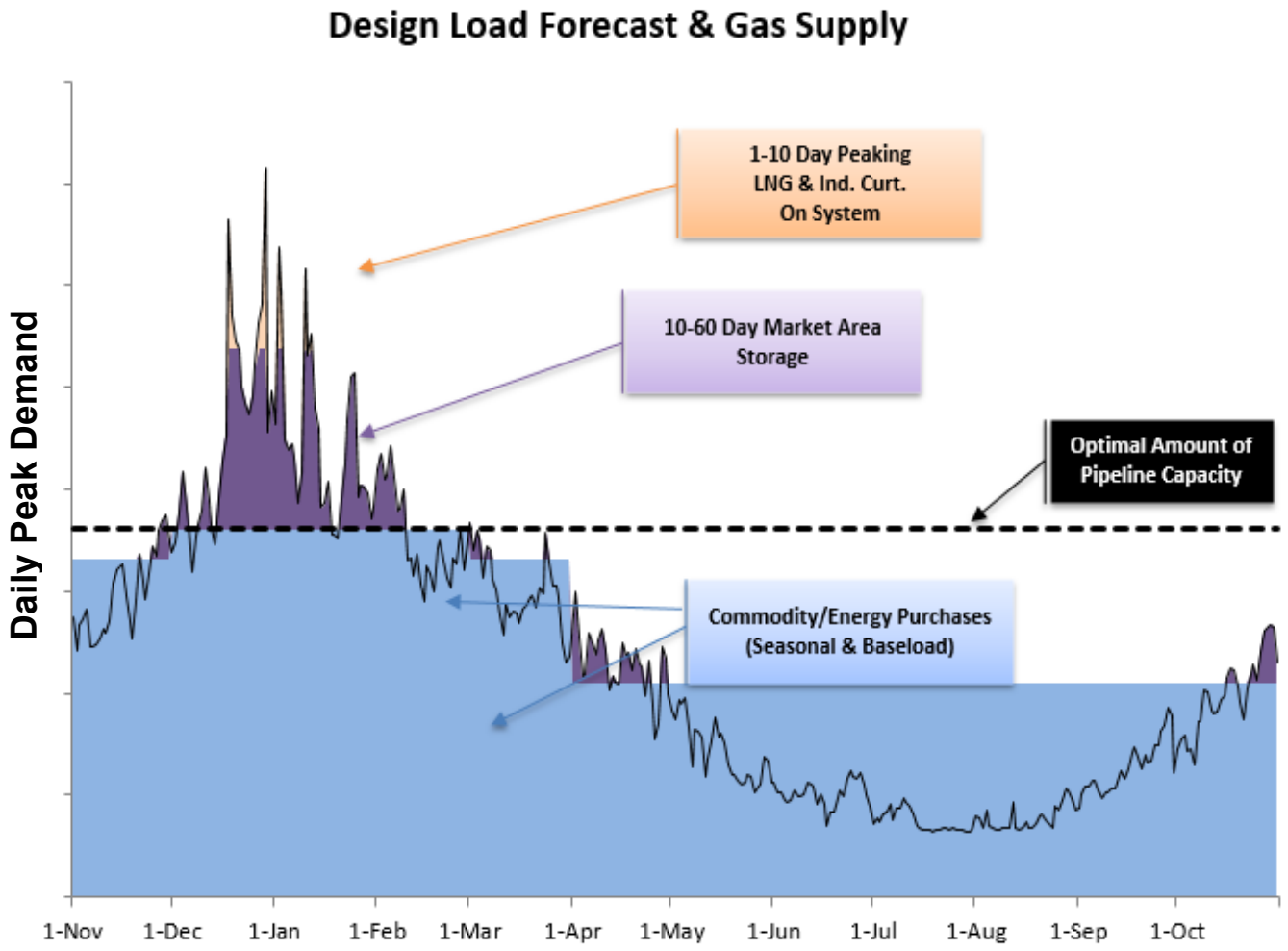
Market Area Storage:

- Jackson Prairie
- Mist

LNG – Peaking Supply:

- Tilbury
- Mt. Hayes

How FEI Meets its Load Requirements



Key objectives include balancing:

- *Security and reliability of gas supply*
- *Diversity of resources, pricing, counterparties*
- *Flexibility*
- *Cost minimization*

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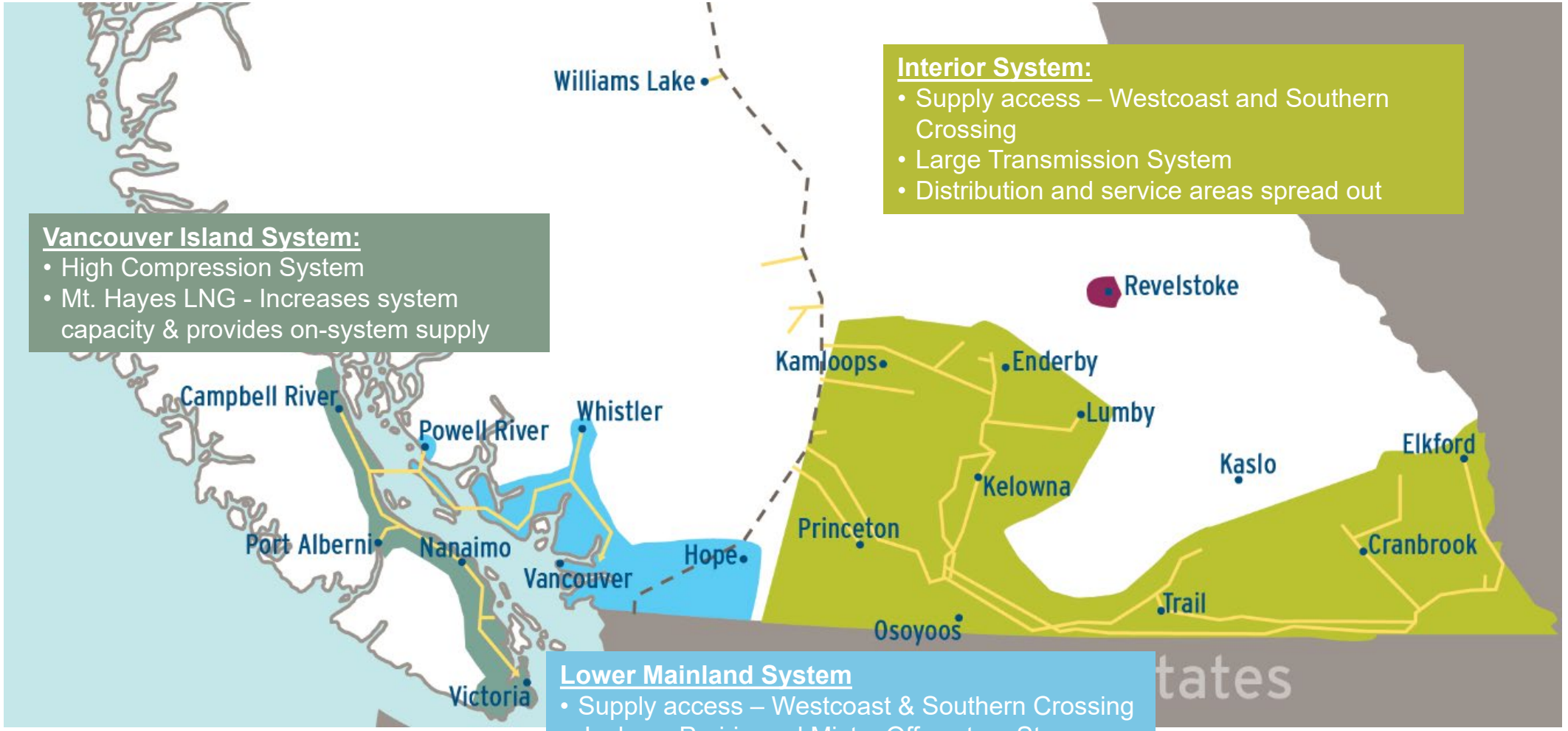
FEI's Load Centers and Characteristics



Interior System:
- Supply access – Westcoast and Southern Crossing
- Large Transmission System
- Distribution and service areas spread out

Vancouver Island System:
- High Compression System
- Mt. Hayes LNG - Increases system capacity & provides on-system supply

Lower Mainland System
- Supply access – Westcoast & Southern Crossing
- Jackson Prairie and Mist – Off-system Storage
- On-system LNG (Tilbury & Mt.Hayes) for peak & emergencies

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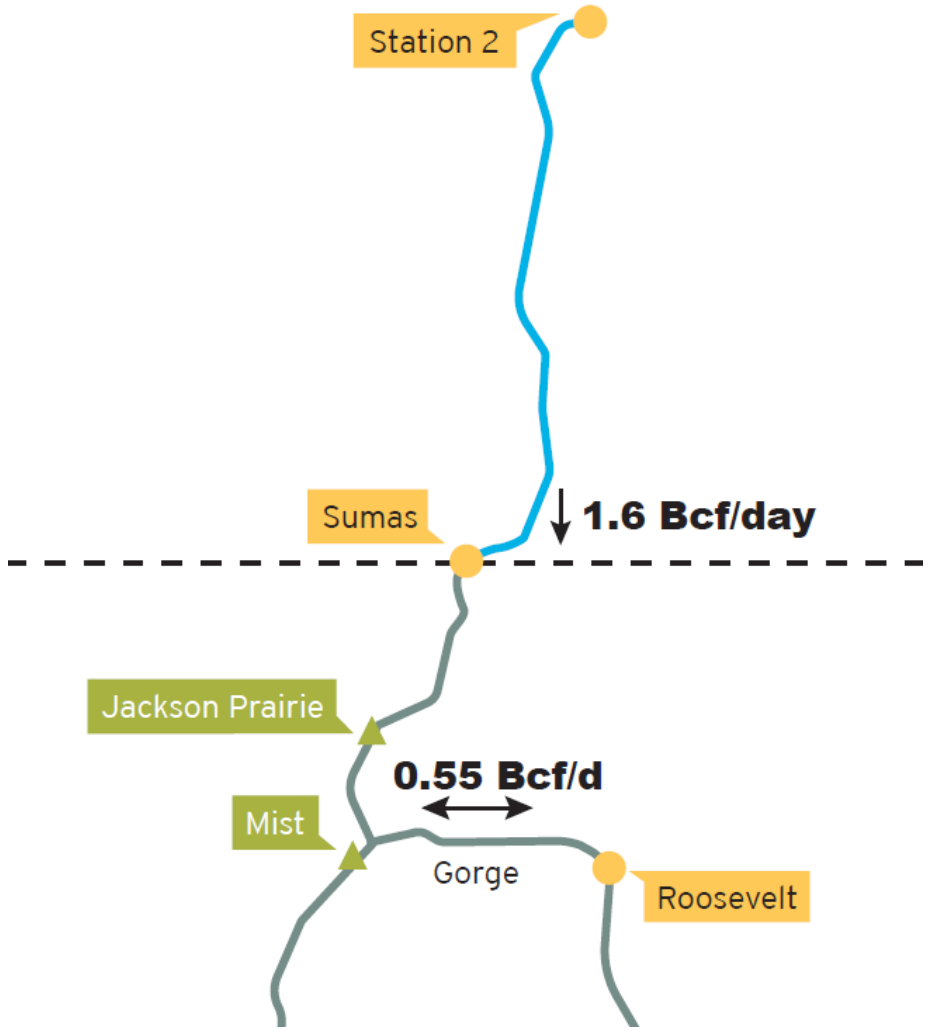
Regional Challenges - Seasonal Constraint



- Coincidental demand and peaks on gas and power systems that are serviced by natural gas infrastructure.
- Baseload Resources - T-South 1.6 Bcf/day and NWP Gorge 0.6 Bcf/day to help meet the baseload supply requirements for the Lower Mainland, Seattle and Portland (I-5 Corridor).
- Short Term Assets (JPS/Mist) help with colder than normal weather.

Key Factors Impacting FEI's Supply Portfolio

Renewable Supply

- Incorporating Renewable Supply into the Portfolio
- Characteristics of On-System vs Off-System Supply

Regional Market Conditions

- Limited Resources in Region (constrained in winter)
- New demand ahead of additional pipeline infrastructure

Supply System Failure

- Hold contingency resources
- Portfolio Approach to Resiliency

New/Potential Regional Infrastructure

- Evaluate pipeline and storage alternatives
- Annual Contracting Plan's contracting strategies are focused on existing resources in region

Questions & Discussion

Wrap-up & Next Steps

Thank you for attending today's session, we appreciate your time and input. Additional opportunities to provide feedback will be announced shortly.

The session presentation and notes will be posted online in the next few weeks.

If you have any further feedback or questions, please reach out to the Resource Planning team at **irp@fortisbc.com.**

Thank you

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Appendix

Overview of 2022 LTGRP Scenarios: Narratives

Reference Case	Diversified Energy Planning	Deep Electrification	Price-Based Regulation	Economic Stagnation	Lower Bound	Upper Bound
• Expected continuation of current policies and market conditions • Incorporates known expected changes and trends in codes, standards, changes in building stock, carbon price, etc.	• Increased demand for electricity, ren ewables & NGT • Decarbonize gas system • Incorporates 30BY30 targets • FEI will plan to this scenario	• No increase in BC carbon tax but all other policies used to promote electrification • CCS uptake in applications that cannot electrify • Reduced uptake of NGT and renewable gasses	• Price signals boost supply of renewable gasses, CCS and NGT.	• Econ downturn causes refocus of gov't attention • Low carbon & gas prices and customer growth • Low LNG export and demand from NGT sector	• Notional lower bound for total volume; not intended to reflect narrative of a future possible world • CUs set to reduce demand & limit supply	• Notional upper bound for total volume; not intended to reflect narrative of a future possible world • CUs set to increase demand & boost supply