Clean Power 2040

Powering the future

Indigenous Engagement on the 2021 Integrated Resource Plan

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Welcome and Introduction

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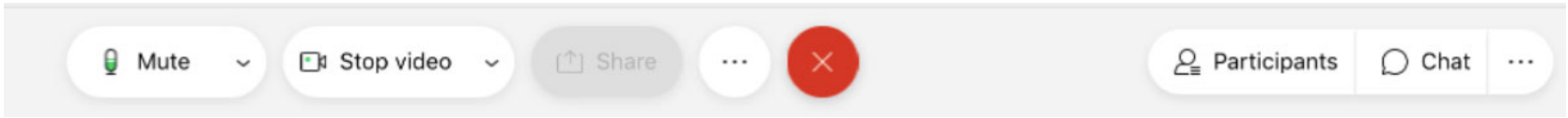
Cisco Webex reminders

We'll be using a few basic tools, which you can find if you hover your mouse over the bottom of the screen

Mute/unmute your mic & turn your video on/off

View the participant list



Audio connection trouble?
See the alternative options here

Open the chat panel:
- to ask questions
- to provide feedback

Virtual meeting etiquette

- Be respectful by listening to others and sharing time so that everyone gets heard
- Stay curious about new ideas
- Minimize distractions by “muting” when not speaking
- Use the chat function to seek input and ask questions
- We are not recording these sessions, and kindly ask that others do not record

Agenda

- Overview: Integrated Resource Plan
- Discussion: Planning objectives guiding the IRP – what's important to you?
- Discussion: Applying those objectives to key planning topics
- Wrap up and next steps

Why this matters to BC Hydro?

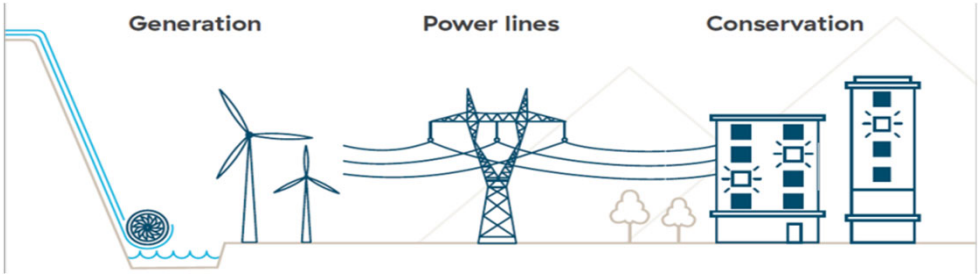
We want your input into our long-term strategic plan

- Early engagement
- Understand your values and what matters to you
- Building and strengthening relationships
- Enhance transparency
- Make a better plan
- The UN Declaration on the Rights of Indigenous Peoples (UNDRIP)

INPUT Why does this matter to you?

What is the Integrated Resource Plan (IRP)?

Actions we need to take now to meet future electricity needs



- BC Hydro's 20-year plan to meet future customer electricity needs
- Province-wide plan for our integrated system
- Considers the Clean Energy Act and the CleanBC Plan
- Submitted to the BC Utilities Commission
- Projects are subject to separate consultation and approval processes

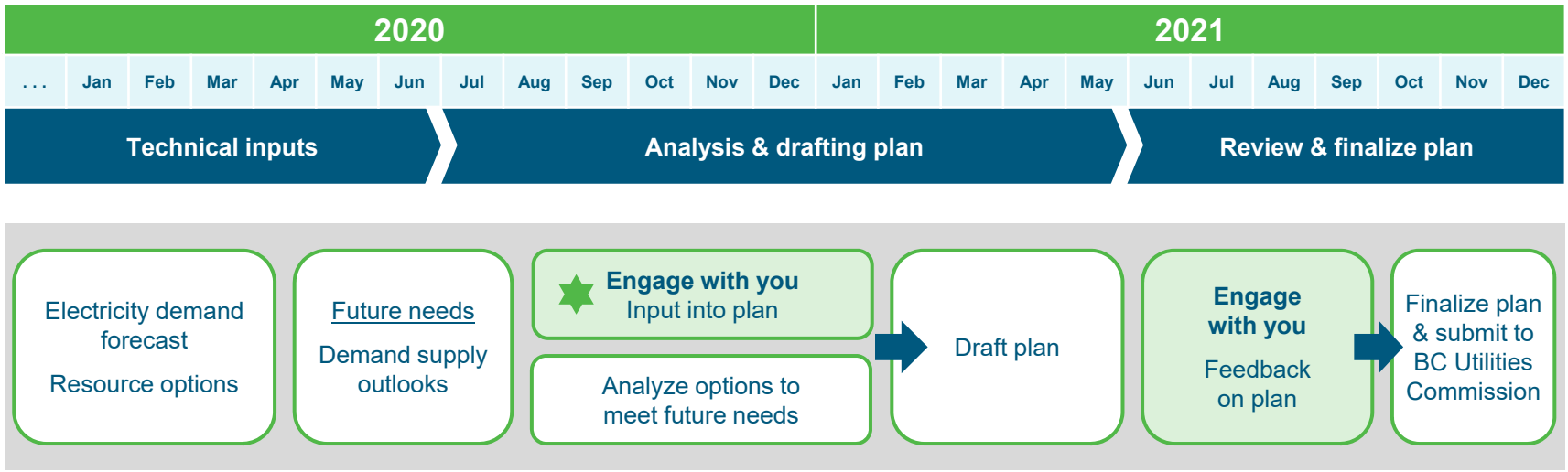
What does the plan include?

An assessment of future customer needs and actions to meet that need

- Conservation
- Investment in infrastructure – preparation actions
  - Power lines
  - Generation stations
- Power acquisitions that may be needed and when

Where are we in the schedule?

Filing date to be determined



Planning objectives

What should we consider when comparing options?

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Planning objectives

Providing clean, reliable power are key priorities. As we plan, we look at the lowest cost options to meet new demand, and we also consider other objectives:

- Keep costs down for customers

- Limit land and water impacts
- Reduce greenhouse gas emissions through clean electricity

- Support reconciliation with Indigenous people

- Support the growth of B.C.'s economy

Planning objectives - discussion

- Are we missing any objectives?
- What advice do you have for us as we use these objectives to compare options?
- Which objectives are most important to you and why?

Two important terms to know

Capacity

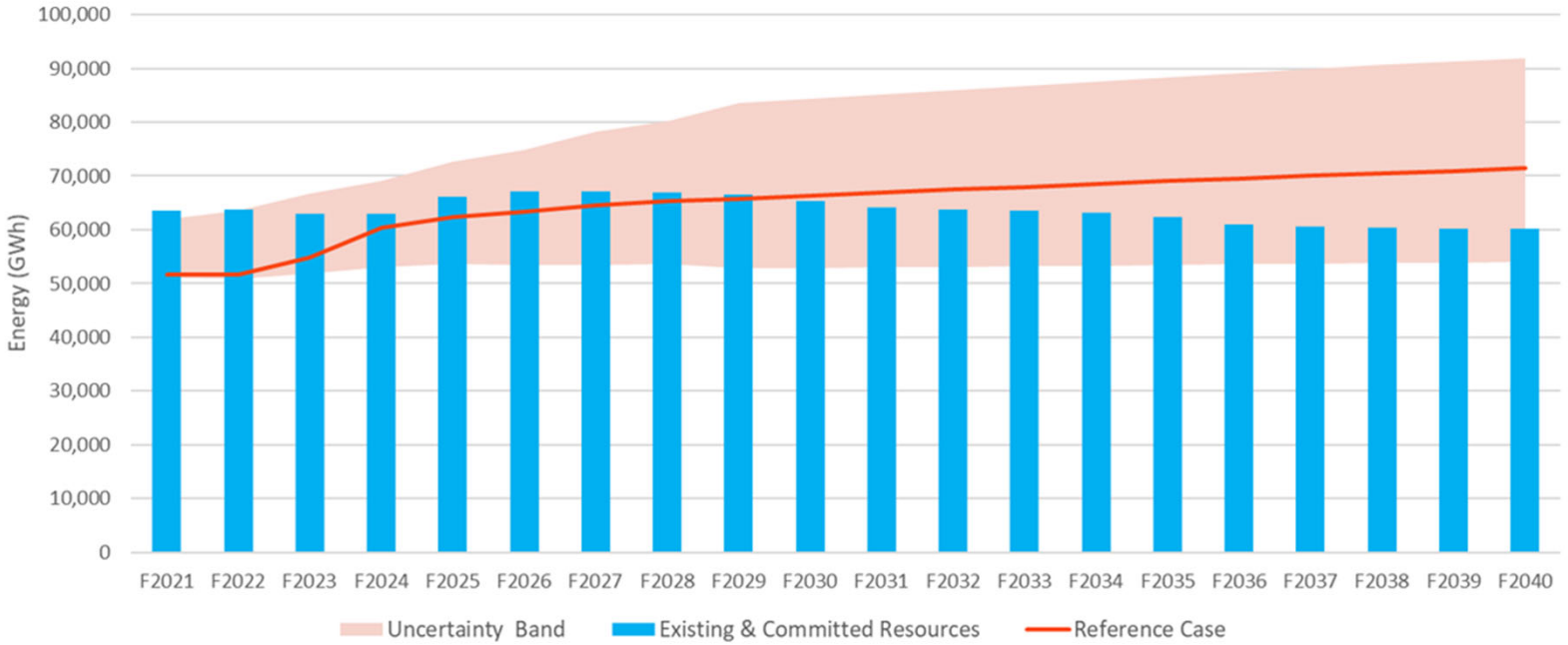
The maximum amount of electricity that can be provided at any moment. Also known as "**peak demand**" from a customer electricity use perspective.

Energy

The amount of electricity we produce and consume throughout the year.

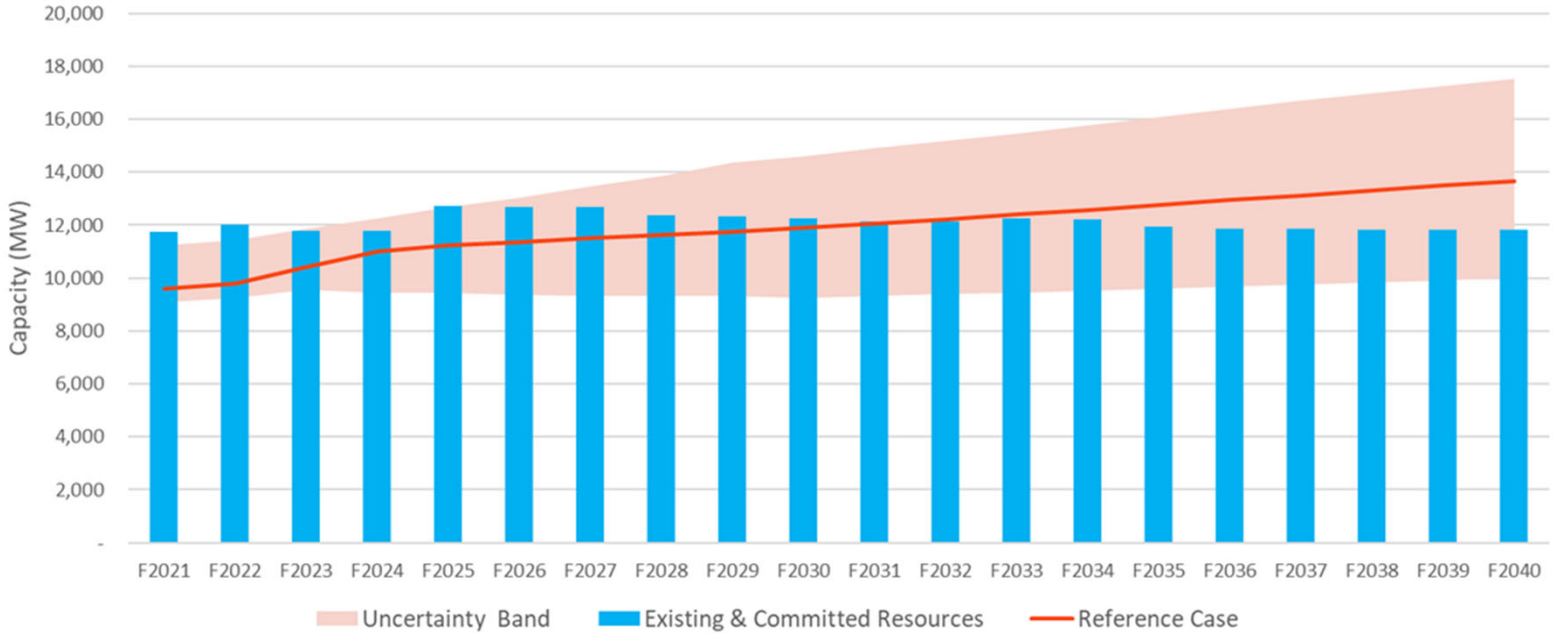
Energy 20-year outlook of supply and demand

We expect to have enough resources to meet B.C.'s energy needs for about 10 years



Capacity 20-year outlook of supply and demand

We expect to have sufficient capacity resources for about 10 years



THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

A note about demand supply outlooks

Includes existing and committed resources only

What is not included are current resources that have an upcoming decision point, including:

- Conservation program activities and associated savings
- Electricity Purchase Agreements that will be expiring and may be renewed

These are considered options as part of the planning process and will be discussed today

Including these activities pushes out need for new power into the future by several years

Future choices 2020 to 2030

1. Conservation and Energy Management
2. Expiring Electricity Purchase Agreements (EPA)
3. Small generation plants approaching end of life

Are there other choices we should consider?

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Conservation and energy management

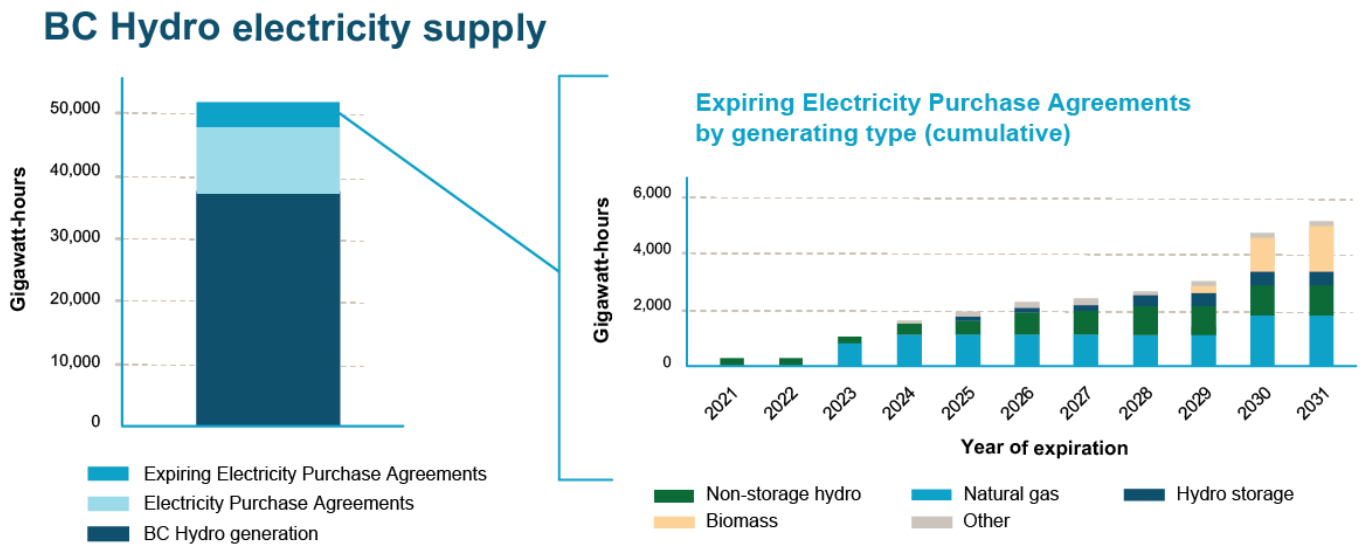
Conservation initiatives can address regional capacity constraints and prepare us for higher demand

Energy efficiency	Capacity focused (reduces peak demand)	
	Voluntary time varying rates (time of use)	Demand response (smart home technology)
• Investment in conservation	• Shifts electricity use patterns through rates	• shift the time when some activities occur

INPUT How do you feel about energy efficiency programs, and advancing new capacity-focused programs? Why?

Electricity Purchase Agreement (EPA) renewals

Around 40 agreements expire in the next 10 years (5000 GWh/yr or 750 MW); 70 agreements expire in the next 20 years (9000 GWh or 1200 MW)



Choices around EPA renewals

The Plan will guide our approach to expiring EPAs

Considerations:

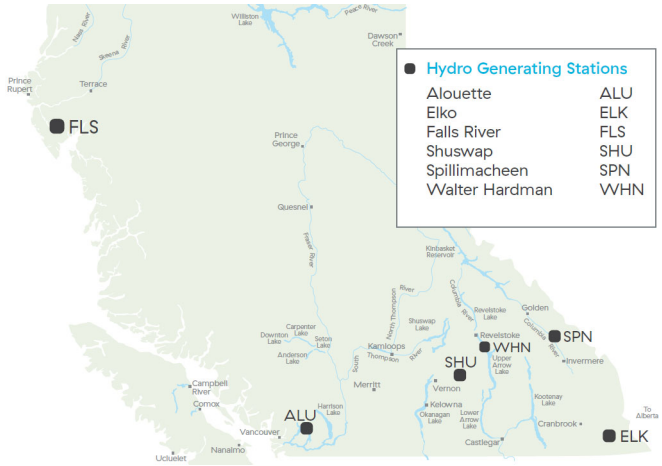
- Cost
- Dependable capacity
- Environmental impacts
- Indigenous Nations' interests
- Location, e.g. near load centres
- Need for energy and capacity

INPUT What should we consider as we design our approach around renewals when we have enough energy and capacity?

Small hydro plants reaching end of life

The Plan will lay out our approach to the future of some small hydro plants

- Six small plants either near or at end of life
- Some of the choices:
  - Redevelop – replace with new dams and equipment
  - Shut Down – temporary shutdown or decommissioning
  - Divest – pass ownership to others



INPUT What approach do we take to redevelopment, decommissioning or divesting?

New supply choices 2030 to 2040

1. Greater Conservation and Customer Involvement
2. Local Power Sources
3. Upgrades to Existing BC Hydro Infrastructure

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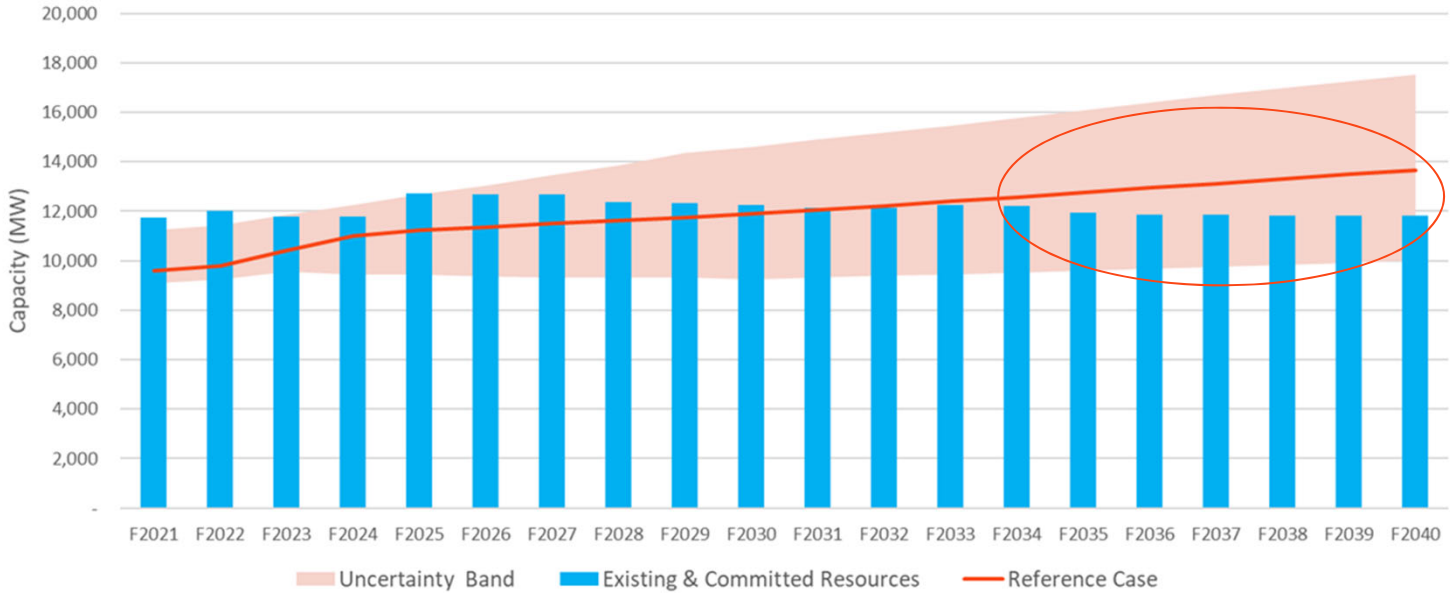
20-year outlook of supply and demand

We expect to start seeing a gap in supply and demand in the second half of the plan, which is dependent on the supply choices made in the first 10 years



2030 to 2040: Getting ready to explore new resources

We're looking at ways to address future capacity needs

	Greater conservation and customer involvement	New or renewed local power sources	Upgrades to existing BC Hydro system
Capacity	• Demand response • Time varying rates	• Utility scale batteries • Pumped storage	• Revelstoke Unit 6 • Transmission upgrades
Energy	• Expanded energy efficiency programs • Customer generation	• Local renewable e.g. wind and solar • Could be EPA renewals and/or new EPAs	• Renewable from most cost effective sources e.g. wind and solar • Could be EPA renewals and/or new EPAs

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

Greater conservation & customer involvement

More choices through conservation initiatives and self-generation

Greater conservation			Self-generation
Energy Efficiency	Voluntary Time Varying Rates (e.g. time of use)	Demand Response (Smart Home Technology)	
Energy conservation programs.	Shifts electricity use to different times of the day	Devices control when some activities use electricity (e.g. laundry at night, electric vehicle charging)	Customers provide supply to the system

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

Greater conservation & customer involvement

	Things to consider
Cost	Investment would be required to expand: - energy efficiency programs - customer participation in time varying rates - smart home technology - self-generation of electricity Avoid or delay the cost to build new, costly electricity infrastructure
Environment	Could avoid or delay impacts of new electricity infrastructure
Socio-economic	New jobs throughout the province

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

New, local power sources

Batteries ● Pumped storage ● Local, renewable power

Batteries	Pumped storage	Local, renewable power
• Connect directly to the power grid • Start up when customer demand is high • Re-charge when customer demand is low, like overnight	• Two reservoirs at different elevations • When customer demand increases, water is released through a turbine that generates electricity to meet short-term demand • When customer demand is low, water is pumped into the higher reservoir and stored	• Acquire renewable power, like wind and solar, close to customer load

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

New, local power sources

Batteries ● Pumped storage ● Local, renewable power

	Things to consider	
	Batteries with renewables	**Pumped storage with renewables**
Cost	• Currently very expensive, however, may be on par with pumped storage by 2030. • shorter lead time to deploy than pumped storage • Local renewables avoid power line upgrade costs	• The next cheapest capacity source after upgrades to our system • Longer lead times to deploy than batteries • Local renewables avoid power line upgrade costs
Environment	• Battery: smaller environmental footprint • Concerns over battery creation and disposal • Renewables have some environmental impacts but may avoid power line upgrades	• Larger environmental footprint • Renewables have some environmental impacts but may avoid power line upgrades
Socio-economic	• Construction jobs • Potential opportunities to advance reconciliation with Indigenous Nations located near costs effective clean resources	• Construction jobs • Potential opportunities to advance reconciliation with Indigenous Nations located near costs effective clean resources

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

Upgrades to existing BC Hydro system

Upgrade to Revelstoke Generating Station	Provincial renewable energy sources	Transmission system upgrades
• Adds a sixth generating unit	• New sources acquired from around the province	• Bring power from both Revelstoke Generating Station and renewable energy sources around the province to our major load centres in the Lower Mainland and Vancouver Island

THIS SLIDE PROVIDES BACKGROUND INFORMATION – NOT PRESENTED

Upgrades to existing BC Hydro system

	Things to consider
Cost	• Adding a sixth generating unit to Revelstoke Generating Station is likely the lower cost option for new capacity. • Acquiring new, renewable electricity supply from around the province is likely more cost effective than only acquiring supply that is close to load • Potential power line upgrades can increase costs
Environment	• Revelstoke Generating Station is already designed to accommodate six units • Environmental impacts of potential power line upgrades or additions
Socio-economic	• Economic development opportunities through construction and upgrades. • Renewable energy projects provide potential opportunities to advance reconciliation with Indigenous Nations close to costs effective clean resources

2030 to 2040: New Power Supply Choices

We'd like to hear your interests and concerns

Greater conservation & Customer involvement

New local power sources

Upgrades to existing BC hydro system

INPUT After looking at all three broad options, is there anything you'd like to add?

Planning for uncertainty

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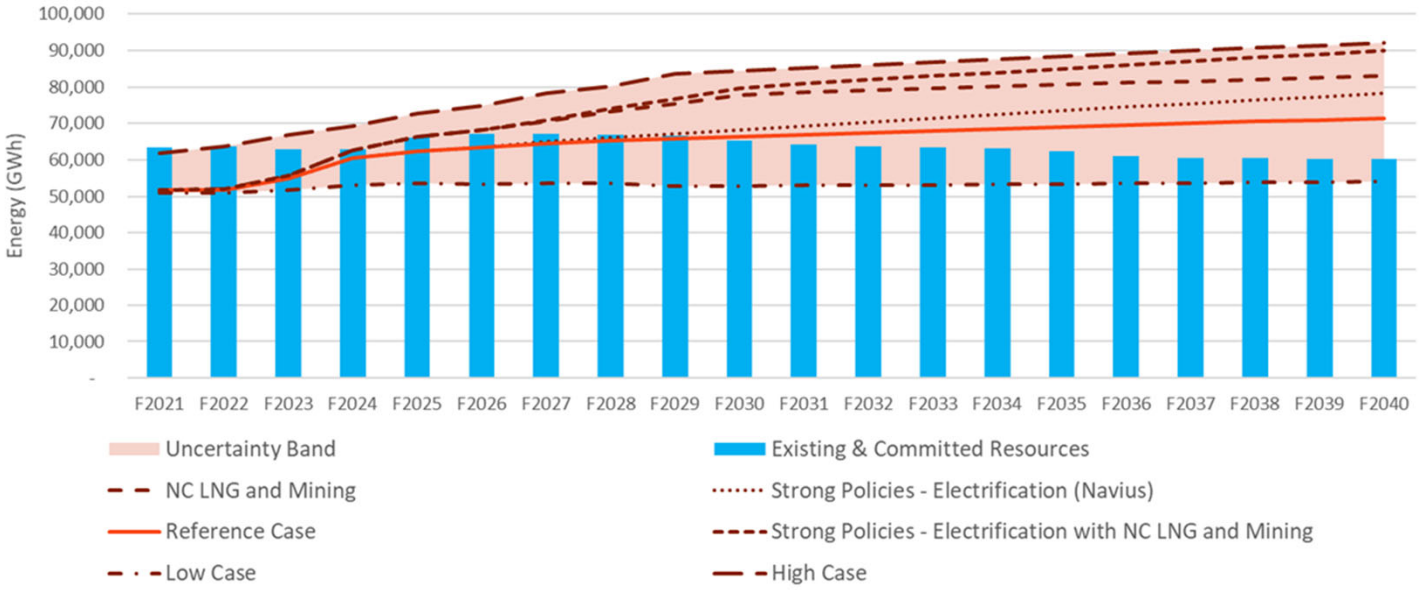
Planning for uncertainty – Scenarios

The Plan considers uncertainty when comparing our options



Planning for uncertainty – Regions

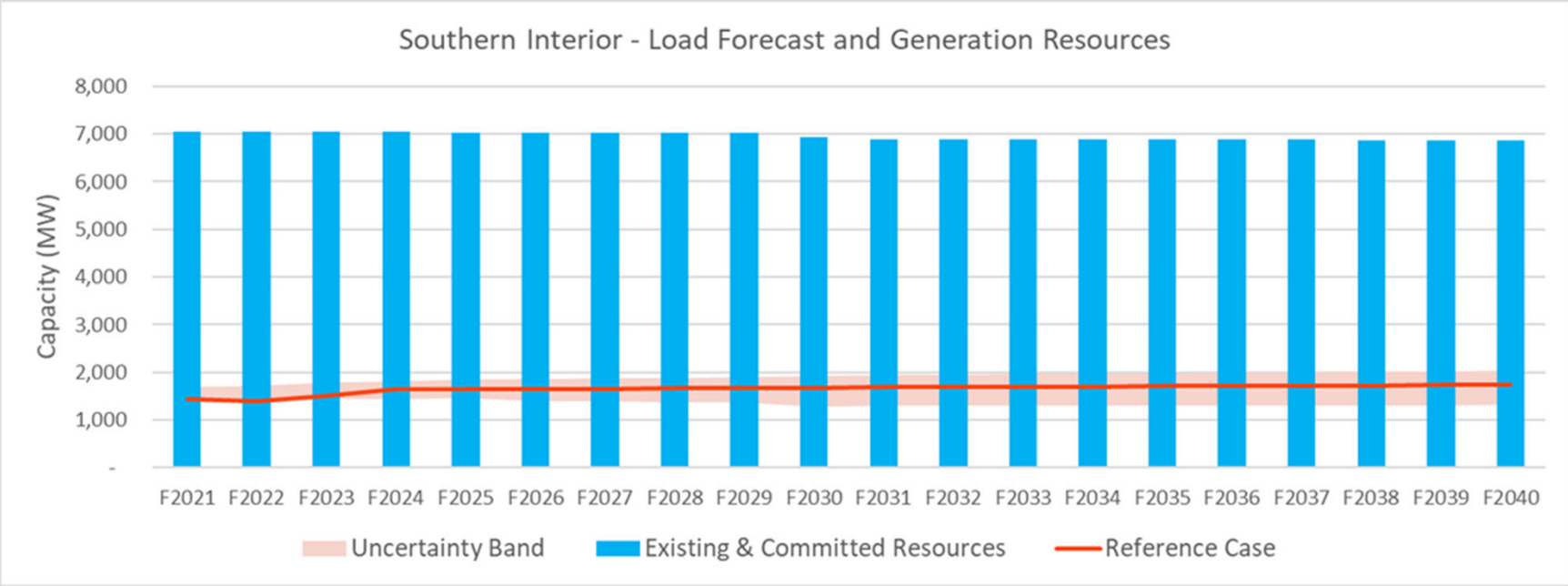
IRP considers regional implication of scenarios

Region specific

The following slides include projects and initiatives that we may be contemplating. As the strategy for the power system, the IRP will influence future decisions on whether these are advanced. Projects are subject to separate consultation and approval processes.

Southern Interior – Supply demand outlook

Generation far exceeds load in the region



Southern Interior

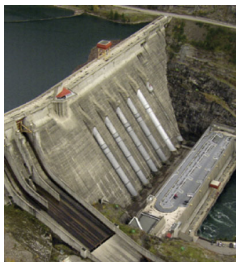
We don't expect to have resource constraints in the region

Options with current resources:

- Potential to renew expiring Electricity Purchase Agreements
- Energy efficiency, time varying rates and demand response
- BC Hydro Small Plants: Shuswap, Spillimacheen, Walter Hardman, Elko

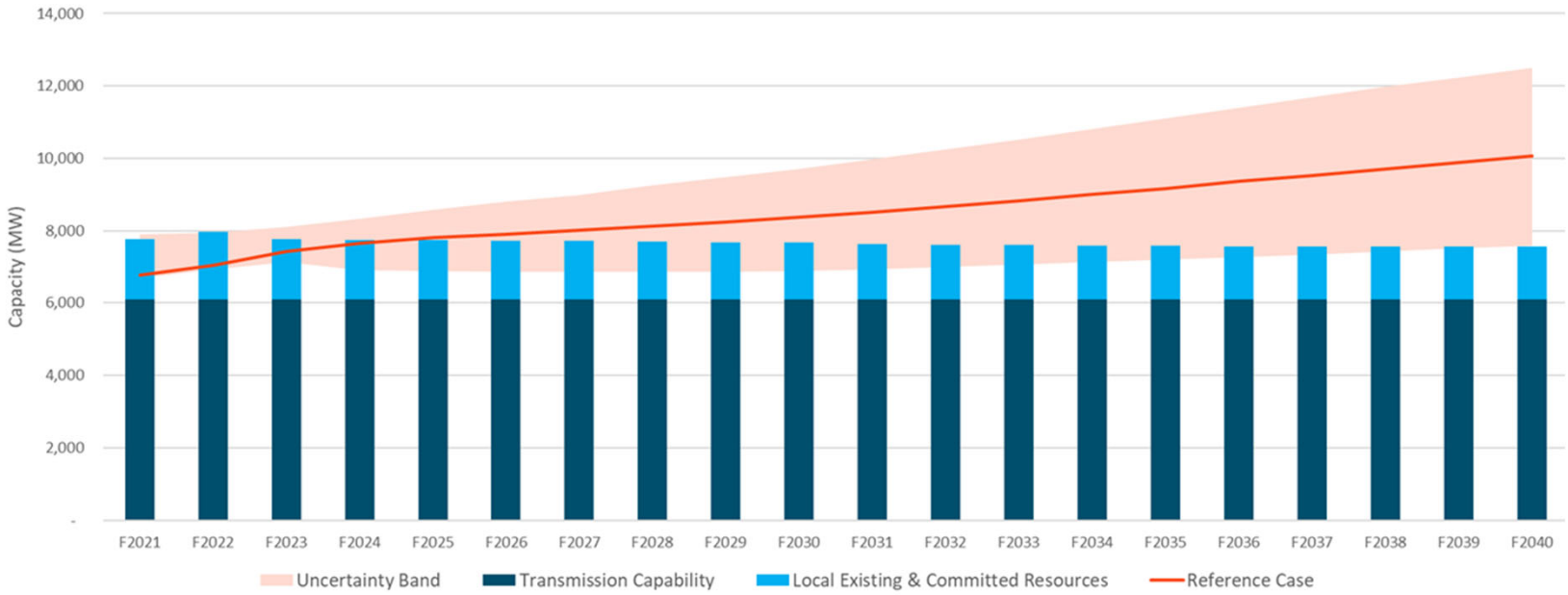
Beyond 10 years:

- Revelstoke Unit 6 (500 MW Capacity)
- Potential upgrades to transmission capacity from Interior to Lower Mainland
- Potential addition of generation station to Duncan Dam (30 MW)
- Seton Unit Upgrade (+6 MW)
- Renewables include solar, wind and run of river hydro



Lower Mainland / Vancouver Island region supply demand outlook

We'll have to choose from our options soon



Lower Mainland sub-region – Options to meet demand

We have several options to meet future demand based on reference outlook

Options with current resources

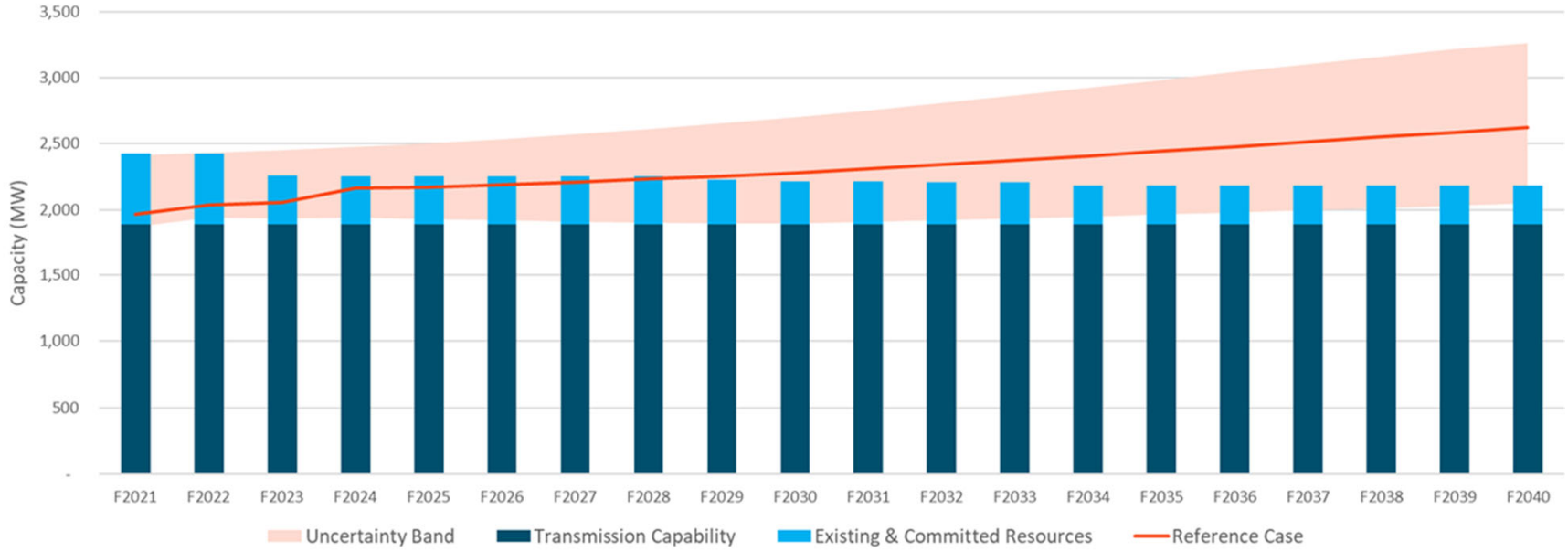
- Conservation and energy management initiatives
- Potential to renew expiring Electricity Purchase Agreements
- Wahleach generating station turbine replacement (+14 MW)
- BC Hydro small plants: Alouette (+21 MW)
- Seton Unit Upgrade (+6 MW)
- Future of Burrard site

Beyond 10 years

- Batteries and pumped storage
- Potential upgrades to transmission capacity from Interior to Lower Mainland
- Renewables may include run of river and small storage hydro

Vancouver Island sub-region supply demand outlook

Expect to have enough capacity to meet demand until around F2029



Vancouver Island – Options to meet demand

We have several options to meet future demand based on reference outlook

Options with current resources:

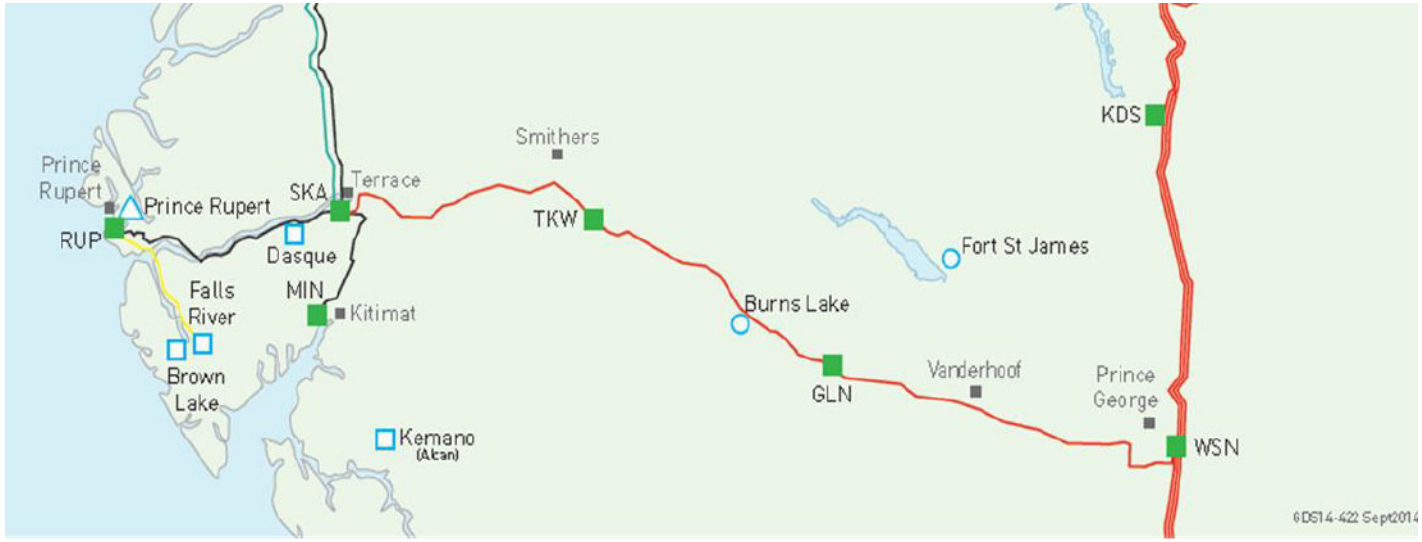
- Potential to renew expiring Electricity Purchase Agreements
- Energy efficiency, time varying rates and demand response

Beyond 10 years:

- Upgrade cable to Vancouver Island
- batteries and pumped storage
- Renewables may include small storage hydro

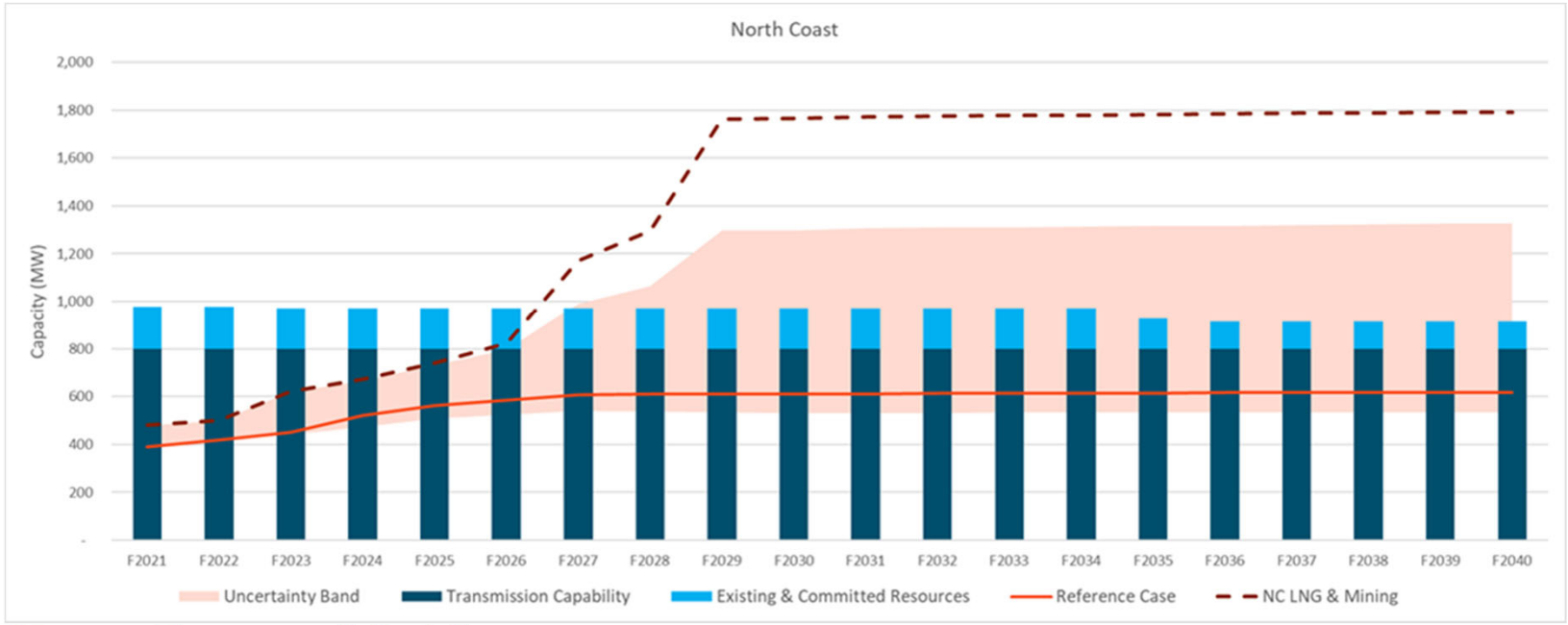
North Coast region

The region is served by one long radial line



North Coast region supply demand outlook

Upside potential from LNG and mining loads



North Coast region

Options available to meet higher demand scenarios envisioning more LNG and more mines

Preparing new transmission (consultation underway)

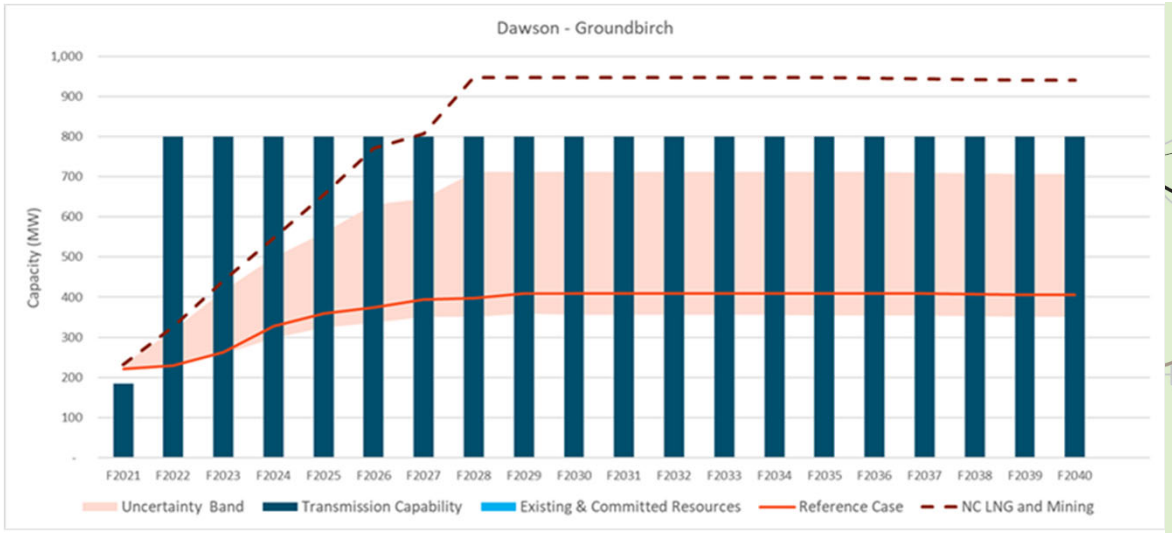
- Prince George to Terrace Capacitors project
- Twinning 287 kV (SKA to MIN) from Terrace to Kitimat

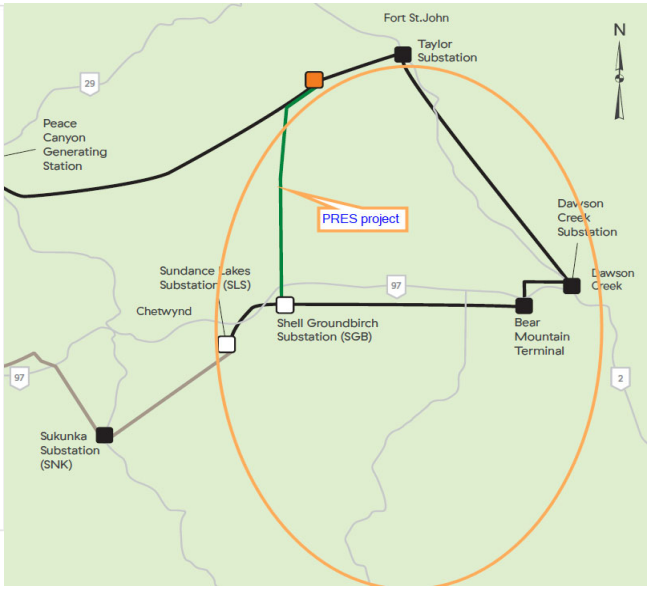
Future potential system need (if additional customer commitments with higher electrification)

- Twinning the transmission line from Prince George to Terrace
- Renewables:
  - Falls River (BC hydro facility)
  - Geothermal, storage hydro
  - Pumped storage combined with local renewables (e.g. off-shore wind, run-of-river hydro)

Dawson Creek – Groundbirch area

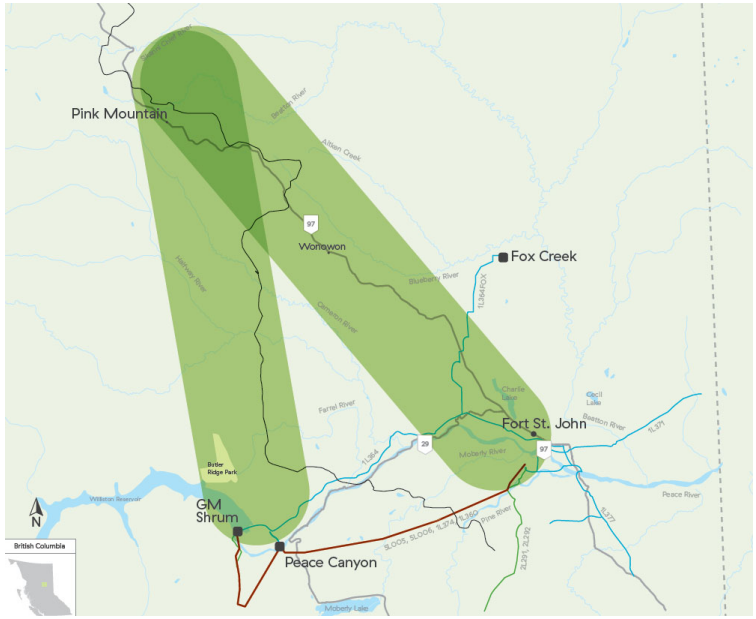
The demand supply outlook shows enough capacity in reference case but potential need for more reinforcement in higher scenario





North Montney area

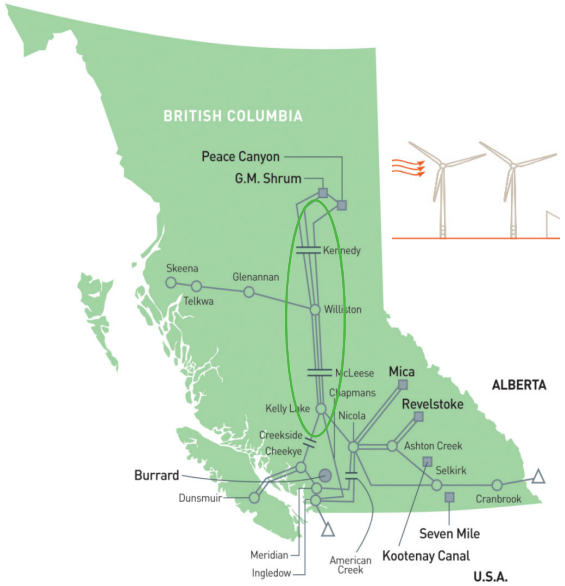
This are has no existing transmission line, but potential for electrification



- No customer commitments yet
- Preparing for new transmission if/when customer commitments occur

North – potential projects

Generation and transmission options in the North



Potential future options (beyond 10 years)

- GMS units 1-5 capacity increase (~100 MW)
- Renewables: wind resources in Peace are among lowest cost energy resources within British Columbia
- Upgrades to Peace to Williston or Peace to Kelly Lake Transmission lines to power North Coast or Lower Mainland / Vancouver Island

Next steps and thank you

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Next Steps

- We will circulate meeting summary for your review and comment
- We ask for your comments and input for this phase of consultation by Jan 31, 2021
- Your input will inform Draft Actions
- We will release the Consultation Summary Report in winter/spring 2021
- Consultation on Draft Actions to take place in spring/summer 2021

INPUT Do you have any closing comments or thoughts you'd like to share?

Thanks for participating

- Please take the survey: https://bchydro.civilspace.io/en/projects/clean-power-2040/engagements/clean-power-2040-indigenous-input
- Provide input by email at CP2040.Indigenous@bchydro.com
- Call us at 1-877-461-0161 (extension 3) if you have any questions

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