

2022 Long Term Gas Resource Plan (LTGRP)

Resource Plan Advisory Group (RPAG) Session on Long Term Demand Side Management (DSM) Analysis

Session held on Nov 3, 2021

The following notes from the November 3 RPAG session should be reviewed in conjunction with the slides as the speaking points of the FortisBC presenters is not captured in the notes. The presentation slide deck was sent to attendees prior to the November session.

List of attendees attached as Appendix A.

1. Welcome, Introductions & Session Overview

Paul Chernikhowsky, Directory of Regulatory Projects and Resource Planning

- Welcome, acknowledgement and FortisBC guiding principles

Ken Ross, Manager, Integrated Resource Planning and DSM Reporting

- Review session objectives and introductions
- Status of the Resource Planning process
- Feedback from previous session

- a. *RPAG Member*: It would be nice if we could see a list of all the attendees.
 - i. *FortisBC*: Slide 9 of the presentation includes a list of RPAG members who indicated they would be joining this session. FortisBC apologizes in advance for anyone that we may have missed. Please refer to Appendix A.

2. Demand-side Management Analysis: Context and Approach

- Posterity Group is providing analytical support to FortisBC's Long Term Gas Resource Plan, the Conservation Potential Review and the 2023-2027 DSM Expenditures Plan. This ensures that all models accurately feed into one another for short and long range planning.
- The LTGRP Reference case is used as the baseline to develop models that incorporate DSM investment to forecast energy savings and GHG emission reductions
- For clarification, DSM budget levels are developed through settings within the model. They are not pre-defined budget limitations by FortisBC.

The scenarios presented are based on reducing conventional natural gas based on the assumption of using DSM largely as a decarbonization tool for GHG emission reduction. Therefore, the charts may indicate curtailed savings in the longer term as conventional natural gas is replaced by renewables. There was general support for modeling an approach in which DSM investment is proportional to the total energy supplied by FortisBC, including renewable gases. The energy savings would still be applied to fossil gas, but the savings would no longer be

curtailed as fossil gas share decreases. This approach is noted for consideration when developing models for the next LTGRP.

- a. *RPAG Member*: The CleanBC Roadmap to 2030, released October 25, may change the long term outlook for FortisBC's LTGRP modelling due to policy requirements. Will FortisBC ask BCUC for an extension in order to incorporate these policy updates?
 - i. *FortisBC*¹: We appreciate the challenges presented by the release of the CleanBC Roadmap. We need to balance the process of meeting deadlines for deliverables associated with developing the plan given a BCUC directive submission date of March 31, within the dynamics of the changing policy environment. It may take several months of analysis and discussion to understand and finalize all the implications of the Roadmap and thus the impacts to our long term resource planning. At this late stage, it would not be possible to recreate the models for a March 31 submission deadline. However, we will address the policy update and its impact in the LTGRP. It is important to note that we have developed our LTGRP modelled forecasts to a broad range of scenarios including Deep Electrification that already incorporates an aggressive portion of low carbon natural gas alternatives, and the Diversified Energy Planning that includes some gas to electric fuel switching. At this time FortisBC considers that it is more important to complete and file the LTGRP by the March 31 submission date than to wait until all aspects of the CleanBC Roadmap are fully defined, and that further changes resulting from forthcoming details of the Roadmap be incorporated into the next iteration of the LTGRP.
- b. *RPAG Member*: If FortisBC does not apply CleanBC policy updates now, it may be even more complex to address this update within the regulatory proceeding and there was general support for asking for an extension from BCUC.
 - i. *FortisBC*: Due to the rapid pace of change in this dynamic resource planning environment, we may likely need to submit the next iteration of the LTGRP in a shorter timeframe than applied to the 2022 LTGRP. If we continuously wait for policy updates, the plan could be constantly stalled. There would need to be direction from BCUC to change the submission date as well as direction from the FortisBC leadership team. FEI believes that is important to submit the 2022 LTGRP in March in order to inform ongoing planning for a decarbonized future, and to continue addressing details and legislation stemming from the CleanBC Roadmap as they become available. Therefore at this time FortisBC intends to proceed with the March 31, 2022 submission timeline.
- c. *RPAG Member*: Is there any Planning Scenario that would be similar to that proposed in the CleanBC Roadmap?
 - i. *FortisBC*: As discussed, the details of the CleanBC Roadmap are still being examined and to an extent remain under development. However, between the Diversified Energy Planning and the Deep Electrification scenarios we expect we have modelled the range of likely outcomes. As FortisBC gains greater clarity about the policy, we will be able to provide more insight as to how close the modelled scenarios correlate to or encompass the implications of the CleanBC Roadmap. The amounts of renewable and low carbon gas supplies may also

¹ Please note: Some responses were by both FortisBC and Posterity Group. We have done our best to provide comprehensive comments as they were presented in the session.

need to increase, but the transition to these supplies is already being addressed in the 2022 LTGRP.

- d. *RPAG Member:* What DSM activity/programs would result in the deepest savings?
 - i. *Posterity Group:* There were 173 total measures included across all three sectors (residential/commercial/industrial) in the analysis. The top 10 measures (in 2030 and at a 50% incentive level, as an illustrative example) include: Low Flow Showerheads, Heat Recovery Systems (Industrial), Home Energy Reports, ENERGY STAR condensing tankless water heaters, Drain Water Heat Recovery, Steam-to-Hot Water Conversions (for District Energy systems), Energy Management (Industrial), Residential HRVs, Res/Com Communicating T-stats, Residential HVAC Zoning.
- e. *RPAG Member:* Can you clarify if the DSM incentives are strictly limited to gas-burning equipment, or do they also include a broader definition of demand-side management - i.e. could FBC invest in reducing demand by improving insulation, door/window efficiency, etc.? (E.g. if you are heating a chronically "leaky" house, then perhaps it doesn't matter as much if the equipment is 75% or 95% efficient).
 - i. *Posterity Group:* The DSM incentives cover all measures that affect gas use within a building, including insulation, air sealing measures, energy management, recommissioning programs and more. The DSM forecasts were developed in line with the Conservation Potential Review measures with the most impactful savings. Gas Heat Pumps, dual fuel heating systems and deep retrofits were incorporated into the Conservation Potential Review (CPR) and have a major influence on the savings potential – even though there was a high degree of uncertainty when the CPR was developed through 2020 and 2021. The DSM measures focused on building envelope to reduce thermal load as we sought to reduce space heating loads, then secondly through water heating loads. This will lead to major savings in commercial and residential. These scenarios were developed based on the DSM Regulations at that time that examine all cost effective DSM.
- f. *RPAG Member:* What DSM measure persistence value was assumed to develop these projections?
 - i. *Posterity Group:* The persistence is developed from the CPR and as such each measure is assigned their individual measure life accordingly. These measure lives range from three years (controls) to 20+ years (insulation).
- g. *RPAG Member:* Why is 100% incentives setting used for the taper off scenario?
 - i. *Posterity Group:* Perhaps we misspoke - the "Taper Off" DSM case (applied to the Deep Electrification scenario) assumes a 25% incentive. The "Taper Off" setting has the incentive level setting "any incentive level is permitted". What this means is that at a measure level, spending on incentives is optimized (sometimes at 100% of incremental measure cost, sometimes at 50% or 25%) to achieve maximum GJs saved within the economic screen and budget setting constraints listed.
- h. *RPAG Member:* What measures are included in a Deep Energy Retrofit (DER) situation?
 - i. *Posterity Group:* Deep retrofits (residential and commercial) were modelled as an aggregation of measures - primarily thermal envelope and equipment efficiency. In Residential, the measures include Attic Insulation, Wall Insulation, Basement Insulation, Air Sealing, Drain Water Heat Recovery, Exposed Floor Insulation, Gas Heat Pumps (Combi Systems), High-performance windows and

doors, and Heat Recovery Ventilators. In commercial, a DER package was assumed to include: Air Sealing, Condensing Boiler replacement (for space heating and DHW), ERV/HRVs, Gas Heat Pumps, as well as wall/roof and window upgrades.

- i. *RPAG Member*: Please describe the relationship and cost for Zero Emissions Energy Alternative (ZEEA) and GGRR / RNG when they are included in the Modified Total Resource Cost DSM cost effectiveness tests? Does this mean that both DSM and RNG are being equally valued/emphasized in the LTGRP?
 - i. *FortisBC*: In the calculation of the MTRC for DSM cost-effectiveness testing, our analysis suggests that the ZEEA and RNG are quite close in value. Within the CPR, in the calculations of MTRC across the portfolio, ZEEA is actually a higher avoided cost than the forecasted RNG costs. In our models, the ZEEA is \$29+/GJ based on the Long Run Cost of Electricity of \$106 per Megawatt hour based on our most recently known publicly available record. There is an additional 15% rider for Non-Energy Benefits (NEBS) which results in a ZEEA of \$34-\$35. As such, in the high DSM scenario, using the MTRC test across the entire DSM Portfolio, DSM is given a higher value than RNG. Although there is uncertainty on the costs of the portfolio of renewable gas prices going forward, we expect costs to come down over time. Our preliminary forecast of the long run costs of RNG will be below \$30 with the caveat that there is a lot of uncertainty associated with this estimate.
- j. *RPAG Member*: A comment was raised that there are public filings indicating that the \$106 LRMC of electricity value may be coming down.
 - i. *FortisBC*: We will look into this comment further. There is a case to be made that over the long term the marginal resource is renewable/low-carbon gas. We wanted to cover our bases with the analysis so we have run the scenario with current avoided costs, and potential future avoided costs. Your feedback in this regard is welcome.

3. Demand-side Management Analysis: Draft Results

The following background notes are to be considered in Posterity Group's presentation of LTGRP DSM analysis:

- The analysis conducted to date applies DSM activities only to fossil gas. Posterity Group intends to re-run the analysis across all fuel supplies, applying the savings only to fossil gas supplies. This will result in higher DSM spend. These results will be included in the 2022 LTGRP and will simulate the highest reductions of carbon emissions resulting from DSM, since fossil gas will be reduced at a faster rate.
- Applying DSM savings to all fuels (fossil, renewable and lower carbon gas) may be discussed in the 2022 LTGRP, but this analysis cannot be completed in time for the March 31 submission date since such analysis will require a model update. This update can be considered for the next iteration of the LTGRP. It is important to note that you get the same amount of savings potential, however the allocation to fuel type may differ. In the cases presented, the savings were allocated to the highest potential GHG emission reduction opportunity.
- The three (high, medium and low) DSM investment levels modelled were applied to the Diversified Energy (Planning) scenario only and range from around \$100-\$200 Million annually. This number represents incentive program investment only. An additional 25-30%

investment is required to support enabling activities, Innovative technology, Conservation Education and Outreach, and other specified DSM activities.

- It is important to compare the societal cost-benefits of DSM in relation to other GHG emission reduction alternatives. Residential DSM in 2030 is estimated to provide a net benefit of \$70 per tonne as cost effective measures pay for themselves over the lifetime of the measure (including incentives and non-incentives). Commercial and industrial programs would offer an even greater net benefit per tonne of GHG reduction than residential opportunities².
- a. *RPAG Member*: On slide 31, is the decline in spending an artifact due to the fact of the models in that DSM activity was only applied to conventional gas rather than all fuel types?
 - i. *Posterity Group*: Correct. In these curves, in the latter years (2035-2042) spending drops off due to the large proportion of renewable and low carbon gas within the mix of fuel types. The Reference Case, Upper Bound of Gas Consumption (no DSM), Economic Stagnation, and Deep Electrification Scenarios will not change too much after adjusting the models to account for all fuel types. The Diversified Planning scenario will show the greatest effect.
- b. *RPAG Member*: I support continuing DSM with renewables as energy efficiency helps reduce costs to customers over time. In addition, there are significant non-energy benefits such as comfort, air quality and more. Over time will the price of RG have a more significant impact on cost effectiveness and the investment in DSM?
 - i. *Posterity Group*: For medium and high DSM scenarios in which all MTRC cost effective measures are included, the RNG cost may not be that big a factor in limiting DSM investment. To clarify, the cost of RNG does not vary per approach, rather we look at avoided costs across each scenario. There may be value in exploring this further where the participant would gain greater benefits if the cost of energy was high. DSM program participation may also go up with higher energy costs.
- c. *RPAG Member*: Another factor outlined in the recently announced CleanBC Roadmap is that after 2030 water and space heating equipment must be greater than 100% efficiency. How does this impact the CPR and long range DSM planning?
 - i. *FortisBC*: We recognize that there are a lot of dynamics at play in the CleanBC Roadmap announcement. FortisBC will be working with the BCUC, the Province, BC Hydro and other key stakeholders to determine the best course of action for the March 2022 LTGRP filing, longer term resource planning and DSM expenditures plan and program development.
- d. *RPAG Member*: Will the CleanBC Roadmap and related policies require new tools to analyze DSM performance? Could the cost of carbon reduction ever be included in cost tests?
 - i. *FortisBC/Posterity Group*: We may need to look at new cost effectiveness metrics to support these new policies. This may come up as the Province addresses updates to the DSM Regulation. An interesting consideration for example, would be a carbon cost test added to the analytics. The benefit/cost

² Note: There is a small amount of double counting benefits as the cost of carbon is already included in the TRC. Additional analysis would further refine these estimates of cost per tonne of GHG emission reduction through FortisBC's DSM activity.

for avoided cost of carbon may be used in combination with other traditional DSM tests, signifying that the energy cost savings more than pay for the carbon reduction. There may be measures that become cost effective although not so in traditional tests. Such new metrics could point to the next least cost option for carbon abatement. There is a lot of work yet to be done to fully define and understand the implications of the CleanBC roadmap in this regard.

- e. *RPAG Member* commented that in their research, the cost per tonne of emissions reductions for electrification may be higher than for gas DSM initiatives, although some measures perform better than others. Air Source Heat Pumps are not the only answer for GHG emission reduction initiatives.
 - i. *FortisBC*: Yes, we still don't have the cost per tonne for the Deep Electrification scenario or Air Source Heat Pump measures, in particular, to compare with some of the decarbonization scenarios that FortisBC is pursuing. Further, we do not have access to full cost accounting including meeting electrical load into the future. Cost of electricity now versus heat pumps into the future will diverge with supply constraints. It is anticipated that this will be covered in BC Hydro's IRP that is due to be filed in December. We recognize that there are knowledge gaps associated with both the Deep Electrification and the Diversified Energy Planning scenarios and there will need to be a full costing required in both the short and longer term.
 - ii. *Posterity Group*: In 2018, we conducted a study for Ontario to examine costs of carbon neutral scenarios through comparisons of cost per tonne of GHG emissions reduction. In examining electrification measures, two scenarios were developed; one in which the current grid was sufficient and the other in which grid expansion was required. In the scenario requiring grid expansion, heat pump fuel switching scenarios were more expensive than other scenarios. Unfortunately, with the change in government at that time, this study was completed but is not publicly available.
 - iii. *FortisBC*: We can all agree that future energy resource planning is very complex and a lot of collaboration and will be needed in the months and years ahead to shape the best outcome for British Columbians.
- f. *RPAG Member*: Long term energy resource modelling is very complex and it is difficult to see the impacts of the disruption of these changes in costs and supply. For example, marine transportation has big growth potential in renewable hydrogen. Zero carbon in new construction is compelling and achievable however the massive growth in long haul electrification of transportation will be challenging. How are costs to be distributed with these large disrupting factors affecting the new energy planning landscape? Is the modelling constrained by historical incremental conditions vs the dynamism we will likely have and need in the future?
 - i. *FortisBC*: We agree that this is indeed a complex issue. We see the Diversified Energy Planning as the most resilient scenario to meet the future needs of British Columbians. We are indeed monitoring what is unfolding on a larger, even global scale. However, we cannot be paralyzed into over analyzing all scenarios. We must stay focused on the practicalities and logistics of our efforts to decarbonize our gas supply. There are many risks associated for each pathway to decarbonize BC's energy future. Our belief is that the Diversified Pathway that includes a place for the infrastructure of both gas and electricity

systems provides the least risk for resilient and cost effective energy supply for British Columbia.

- ii. No, the model is not constrained and many of these points were included when developing these scenarios. They have been broadly encompassing, including marine, transport, ports and renewables to provide as accurate planning environment based on the information we had at the time. The scenarios were built on customer end use consumption and how they are expected to react within these constraints. We then added low, medium, and high scenarios to try to provide a range of bounds and possibilities for the scenario analysis.
- g. *RPAG Member* expressed appreciation for the cautionary responses to comments and acknowledges the critical role of the gas infrastructure in providing more cost effective ways to decarbonize through displacement of conventional gas. Electrification is not the only answer. The costs associated with new electric supply are difficult to predict. It is easy for senior governments to promise to keep energy costs low, but we all need to understand the reality of the costs that will be incurred through this energy transition although through energy efficiency and building retrofits we should be consuming far less energy in future years.
- h. *Guest Attendee*: Can RPAG members get a pivot table that shows the top measures in the CPR?
 - i. *FortisBC*: We will take that suggestion back and consider it. The CPR report will be made public in the LTGRP submission.
- i. *RPAG Member*: On slide 29, energy savings are consistent and clustered between 2025 and 2030 but then diverge. But in Slide 30 there is a wide divergence in the spending levels that will be conducted to achieve these levels of spend?
 - i. *Posterity Group*: There are diminishing returns that come into play if you give 100% incentives in that you do not always drive two times the participation. Through program design one must balance incentive levels with participation levels to achieve cost effective energy savings. The lower bound budget provides savings for measures with long measure life. The budget is incurred immediately upon installation of the measure but the savings are incurred over time due the lifetime of the measure. A reminder that a part of this divergence is due to the model being based on energy savings of conventional natural gas as mentioned earlier.
 - ii. Slide 30 illustrates a DSM investment range of \$25 to \$75 Million based on program incentives and non-incentive spending. Note this does not include the additional 25-30% investment for other non-program related spending that comprises the total DSM portfolio.
- j. *RPAG Member*: Is FortisBC using this analysis to gauge their DSM investment? What are the appropriate levels of DSM investment?
 - i. *FortisBC*: These graphs are being used to illustrate energy savings levels for future DSM investment scenarios. When we think of the Diversified Energy Planning scenario, for example, we want to see if the spending level is at the right level to achieve a significant savings level as illustrated in Slide 31 through Low, Medium and High DSM scenarios. The CPR, LTGRP and DSM Expenditures Plan being developed and LTGRP are all linked and inform the development of scenarios.
 - ii. The DSM expenditures plan development that is now under way for beyond the 2022 program year is developed in parallel to resource planning. Both are

informed by the CPR. The plan is built from the ground up to gauge what is the maximum realistic spending level as a starting point. The draft is taken through an internal and external consultation process and adjustments are made based on the feedback received. There are some new elements added to the plan including Deep Energy Retrofits, market transformation of gas heat pumps, and dual fuel hybrid heating systems. The plan is being developed in a more complex policy environment than past DSM plans. We need to understand where policy is heading and ensure the plan supports decarbonization activities in addition to traditional DSM energy savings objectives.

4. Primer on Next Session Topics: System Capacity Planning and Gas Supply

FortisBC presented a primer as an introduction to system planning and gas supply initiatives that will be discussed in detail at the December 1, 2021 RPAG meeting. From a Systems Planning perspective topics to be covered will include critical peak daily and annual demand forecasting that ensures adequate FEI infrastructure exists across all transmission and distribution systems. Gas supply planning determines the amount of gas FEI acquires and distributes annually. The benefits of LNG expansion at Woodfibre and Tilbury will be presented from a gas storage and resiliency perspective. The complexities of bringing on renewables and hydrogen and the unique requirements for regional systems will be discussed.

- a. *RPAG Member:* For the next session, can you show peak by customer type (industrial, commercial residential) to better enable the RPAG to understand the nature of peak and potential interaction between peak, DSM, and other factors?
 - i. *FortisBC:* Yes, we can break the demand forecast components down for the December 1 presentation
- b. *RPAG Member:* With regards to the cost of acquiring RNG to meet new demand in BC, does the total cost also include the cost of acquiring additional conventional natural gas, in the case when the RNG demand is met by out-of-province agreements? For example, if a customer is purchasing 100GJ of RNG, FortisBC may need to acquire the environmental attributes of 100GJ of gas from (say) Ontario (if in-province RNG supply is unavailable) and also 100GJ of conventional natural gas to be able to meet the real (additional) in-province customer demand.
 - i. *FortisBC:* Yes, this has been taken into consideration. But it is something we need to review as we complete the LTGRP to make sure we have treated these costs appropriately.
- c. *RPAG Member:* It was mentioned the profile on slide 50 represents approximately 60 percent of load? Can you clarify what is not included?
 - i. *FortisBC:* Customers have a choice to have their gas supply managed through FortisBC or through a gas marketer. The 60 percent of our total throughput is the amount of supply that customers have selected FortisBC to manage. The remaining 40% is from Transport Service Customers who are responsible for bringing the gas to our delivery system.
- d. *RPAG Member:* Can you comment on FortisBC thinking about the highest and best use of renewable gaseous fuels? “Blending” fuels, putting RG into new buildings, seems to compromise the value of these scarce fuels. From an integrated resource planning perspective, isn’t it best to allocate these valuable fuels to difficult to decarbonize sectors?

- i. *FortisBC*: This comment was not directly addressed during the session, but the opinion put forward presumes that clean electricity supplies in BC are unlimited. FortisBC believes that in many cases not using clean electricity in buildings (or electric load avoidance) preserves that valuable resource for other higher value end uses. The Guidehouse report, *Pathways for British Columbia to Achieve its GHG Reduction Goals*, commissioned by FortisBC, indicates that the long term costs of electrification alternatives versus the Diversified Energy Future are higher over the long term, while reaching similar GHG emission reduction levels. FortisBC also believes the Diversified Energy Future is less risky than a Deep Electrification future and continues to study these long term costs and their implications.
- e. *RPAG Member*: How will FortisBC allocate RNG supply and customer demand?
 - i. *FortisBC*: Our first priority is to understand what our customers want, knowing this could shift over time. We will look at best use case scenarios and the right fuel for the right use. There is a lot of work going on in terms of what this will look like. We need to ensure that we deliver the fuel mix that serves customer needs while optimizing the system for a resilient and reliable infrastructure that serves British Columbia's energy needs. We will discuss this topic further at the December 1, RPAG session.

5. Wrap-up & Next Steps

FortisBC indicated that meeting notes will be completed and distributed for review prior to finalizing. A reminder that the next RPAG session is scheduled for December 1. The session was drawn to a close.

A. Appendix A - List of attendees

ORGANIZATION	NAME
Avista Utilities	Tom Pardee
BC Hydro	Bill Clendinning
BC Ministry of Energy, Mines and Low Carbon Innovation	Jennifer Davison
BC Ministry of Energy, Mines and Low Carbon Innovation	Paul Wieringa
BC Ministry of Energy, Mines and Low Carbon Innovation	Steven Groves
BC Public Interest Advocacy Centre	Leigha Worth
BC Sustainable Energy Association	Tom Hackney
BC Utilities Commission	Phil Stallard
Building Owners and Managers Association	Damian Stathonikos
City of Abbotsford	Wasel Rahman
City of Burnaby	Dipak Dattani
City of Kamloops	Glen Cheetham
City of Kelowna	Danielle Noble-Brandt
Clean Energy Association of BC	Steve Davis
Climate Action Secretariat	Chris Gilmore
Commercial Energy Consumers Association of BC	David Craig
Community Energy Association	Dale Littlejohn
District of Saanich	Rebecca Newlove
Enbala	Malcolm Metcalfe
Metro Vancouver	Conor Reynolds
Metro Vancouver	Nicole Chan
Midgard Consulting Inc. (Representing Residential Consumer Intervener Association)	Peter Helland
MoveUp	Jim Quail
MoveUp	Rysa Kronebusch
North West Gas Association	Dan Kirschner
Pembina Institute	Colton Kasteel
Puget Sound Energy	Gurvinder Singh
SFU Renewable Cities	Alex Boston
University of Victoria	Andrew Rowe