

2016 Resource Plan

Technical Advisory Committee

11 February 2016

Presentation and Discussion of the Results of the Economic and Load Forecasting Models

Econometric Model

Does the government spending in the load forecast match what we have been hearing about in the news re: a reduction on the transfer payments?

Yes – the government spending matches the new levels announced by the federal government. The growth rate of the transfer payments is decreasing, but the actual amount of the payments is still going up.

Does the government spending in the load forecast match what we have been hearing about in the news re: a reduction on the transfer payments?

Yes – the government spending matches the new levels announced by the federal government. The growth rate of the transfer payments is decreasing, but the actual amount of the payments is still going up.

Clarification on the population growth numbers – natural population growth rate reaches 0% by 2030, leveling and decreasing after that. Noted that even with high immigration, BC is also projecting a population drop in the future.

Were there considerations for increased immigration, such as climate change refugees?

The model does not consider climate change refugees within the population forecast. The model uses migration to fill the gap that can't be met by the local labour force.

Does the group feel that with government spending not growing in real terms that it is reasonable to have the population stay stable or decline?

Given that jobs in the territory are so strongly linked to government spending, it seems very reasonable.

Load Forecasting Model

Is a Statistically Adjusted End-use (SAE) model usual practice for a small utility?

Usually larger utilities, about 50% of North American utilities use SAE models.

How much does weather cause a variation in the load?

The weather affects the load very strongly

Could we estimate how much of this load is from heating?

Yes – this is the thermal dependency. We do know that 85% of the variance comes from weather

What is the current industrial load?

4 MW average demand and about 36 GWh/year

What does the group think about having Minto Mine close early in our Low Mining Scenario?

Very glad it was incorporated.

Did you look at a scenario where an oil and gas sector started up and connected to the grid?

We looked at the economy if the oil and gas sector started up, but did not consider the projects connecting to the grid. Oil and gas sector tends to use gas drives, are usually very remote and hard to connect to the grid. If an oil and gas sector electrified, it would be a massive load. Also noted that oil and gas does not tend to go through boom and bust cycles like mining does.

When you talk about number of households are you talking about number of residential electrical connections?

For the most part, yes; however there are cases where that is not exactly the case (i.e., two families sharing a single home). The number of people and the household size usually captures these trends.

Clarification of saturation vs. efficiency.

Saturation is the percentage of homes that have a particular end-use. Example would be nearly every single home has a fridge, so the saturation is very high. Only some homes have a hot tub, so the saturation of hot tubs is low.

Efficiency is how much electricity each of the end uses use. An example is the shift from incandescent lighting to CFLs to LEDs. There is still the same amount of lights in a home, but they are being replaced by bulbs that use up to 80% less energy, so the overall use of electricity from lighting homes is decreasing.

Would Yukon Energy proactively build infrastructure to serve a mine?

Yukon Energy would not build new generating assets with expectation that a mine may or may not come online.

Considering all the ore bodies that exist in the Yukon, would having the mining trail off at the end of the period be problematic in choosing a resource to meet that load?

Yes, it is problematic when you have to build to meet a load that then disappears. This would affect the economics of all resource options, not just renewable, as all resource options have a minimum life span of over 20 years. To build a resource that would not be affected by this cycle, YEC would have to purchase a generating asset, run it for a duration of the mine and then sell it, which is not the business model.

Having a generic mine always on the load forecast as BC Hydro does works in a large jurisdiction with lots of mines running (and grid connected) at the same time and with a larger number of projects waiting to be developed. The Yukon is different in that there are usually only a handful of mines operating at one time and it is easily possible that those mines could shut down and leave no industrial load (connected to the grid or not). This has happened in the past and it looks like it will potentially happen again very soon with the early closure of Minto.

Why do small utilities generally not do SAE modelling? And why is it good that YEC is using this method?

There is a requirement to collect and maintain a large body of data to operate a SAE model and small utilities generally do not have the man power to do this work. SAE models are leading-edge methods that takes into account both physical data and end-use information [saturation and efficiency] and projections.

Have we considered price elasticity in our model? BC Hydro has a 5% decrease in usage for every 100% increase in rates.

We used a 10% elasticity in our model. Past studies show that elasticity has been shown to be anywhere from 5% to 30% in the residential sector. A 10% elasticity is generally a good estimate in absence of real data.

Given that electricity in the north is more of an essential service in the winter, particularly for electrically heated buildings, would it mean that we should assume a lower elasticity than 10%.

This may be true, and we could look at the effect of 5% vs. 10%. The effect that this change would have on the model is very small.

Mark Quan spoke about the utility survey that ITRON does. This survey covers a large number of utilities in the states and asks what load growth are they forecasting. The findings of the survey show that there utilities are now generally forecasting a 1% growth in number of customers, as opposed to 2.25% previously, but are expecting no growth in electricity sales. The growth in number of customers but not in total sales has been attributed to energy efficiency. The same would be expected in an islanded grid such as the Yukon. While there are some differences such as weather or building code, the Yukon is supplied with the same consumer products, such as appliances and electronics, as the rest of North America.

Discussion of the inclusion of climate change in the load forecast. Generally utility regulators do not consider climate change in load forecasting, except in the cases where it would increase load (i.e.,

California where increased temperatures drives their peak from air conditioning load in the summer). If there is the possibility that climate change could slightly decrease the load forecast due to warmer winter temperatures, given the uncertainty of the climate change forecasts, it is prudent planning to not include the decrease in load forecasting in case it causes a generation shortfall should the change in temperatures not materialize. It is good to understand how climate change could affect your load. Yukon Energy is looking at running a sensitivity scenario so we can understand the potential impact climate change could have on our load forecast.

Yukon Energy is also looking at including a social cost of carbon in the Resource Plan. A research paper in the social cost of carbon has shown that there is a wide range of potential values. We will discuss this at an upcoming TAC meeting.

Did the Load Forecast include the Microgeneration or IPP policy?

The effects of the Microgeneration policy were considered. The IPP policy will be part of the portfolio analysis.

Electric Vehicles

Why did we use the high EV case in our load forecast?

Looking at federal and territorial climate change commitments, we felt that reducing emissions from cars is going to be a high priority and there will be a push to electrify transportation.

How many EVs does the high case assume in 2035?

Just under 2000 (out of a vehicle fleet of 38,000)

That number of EVs seems very low. How did you arrive at that number?

The consultant used information on the current types of vehicles in the Yukon fleet and how many new vehicles are purchased in the Yukon. Noting that we were not able to link current income rates with EV adoption in the Yukon, because it is an emerging technology and there is only a handful on the road. EV penetration is usually highly correlated with income levels. Noted that the adoption of EVs is expected to be very binary. Either the EV technology or pricepoint will not meet people's expectations and there will be very little adoption, or the technology will suddenly meet people's expectations and price point and there will be lots of EVs very quickly. Also noting that EV adoption is strongly tied to the price of electricity and gas as well as government subsidy programs. Currently in BC, for an example, gas prices are very high while electricity rates are very low.

Feedback was that it was the right decision to use the high EV load for the load forecast.

Was there an assumption of a time of use rate in forecasting the EV charging patterns?

No – load forecasting in general does not account for policies or programs that do not exist.

Home Heating – Fuel Switching

Agreement that the inclusion of home heating fuel switching to electricity in existing homes is problematic as electricity is more expensive than furnace oil or propane. Noted that there does seem to be a trend to switch to propane from oil, but not a lot to electric. Noted that there is also new incentives for deep energy retrofits for older inefficient homes.

Action – Phil is going to check if ATCO is able to provide the number of existing homes that switched to electric each year from their records.

Overall the group could accept a sensitivity scenario of 10% of older homes switching to electric. Noted that in BC they are seeing a trend towards switching to electric even though there is no business case for the switch there either.

Presentation and Discussion of Generation Option Attributes and Electricity Values Survey

Feedback on the Generation Options Attributes

Consider upstream GHG emissions from fuel sources

Consider instream flows requirements of a particular river

Be aware and cautious of the fact we have more information on some areas or technologies than others.

Discussion on how do you measure public perception as compared to actual. Ex. public may perceive one project to be very unsafe and not perceive another project to have any safety concerns, while both projects are assessed to be equally as safe.

Feedback on Electricity Values Survey

Review and feedback/edits on first draft of electricity values survey