2016 Resource Plan
Technical Advisory Committee
28 September 2016

Attendees

- Erin Light – Yukon Government, Water Resources
- Anne Middler – Yukon Conservation Society
- David Ince – Advisor
- John Maissan – Independent
- Peter Turner – Chamber of Commerce
- Shane Andre – Yukon Government, Energy Branch
- Pat Paslowski – Yukon Government, Environment
- Steve Roddick – Yukon Government, Climate Change Secretariat

Environmental, Social and Economic Attributes

See attached presentation

- What happens when you do not have specific data? We rely on the professional judgement of the expert consultants and their use of secondary data such as satellite imagery. Absence of data is denoted in yellow.
- Was salmon rearing looked at? Yes is EN-1
- What type of energy generation would use water but not return it to the environment? No generation options here in the Yukon, most would be a change in flow regimes.
- Would consumptive water consider upstream activities? No.
- In the case of a project like Fish Lake Hydro, when flows are diverted into another watershed, is this considered consumptive? Noted that the government has a bulk watershed interim policy that states you cannot move water from one watershed to another.
- The zone of influence is a very commonly used indicator, particularly for wildlife. This is a very good way of approaching this challenging topic.
- Overall as a course management screening tool, this is a very good method. If a proposed project is chosen, a specific methodology would be chosen to assess the project.
- Is linear access included in EN4-1 and EN4-2? Yes.
- EN4-1 seems very low? Our rating is geared towards smaller projects. Noting that transmission is to the point of interconnection and does not include a major transmission line. These are looked at separately.
- Why is there red of terrestrial footprint criteria for hydro and transmission corridors? A transmission corridor seems like it would be a much lesser impact. A hydro project would have impacts on the landscape. YG Environment generally considers linear developments to be a

negative environmental effect. The linear development around the Site C project has been noted to have increasing negative environmental effects.

- Comment - Some of the infrastructure pressure on small communities would actually be transferred to Whitehorse.
- S5-1 and S5-2 are very mitigatable and the local benefits can be very valuable.
- There is a concern that some of these flags would affect the choice of renewables. We should look at how easy they are to mitigate.
- Did you look at the potential positive effects from climate change such as increased flows to a hydro river? No we just considered the negative effects.
- Does a commitment from a First Nation to partner on a project change the rating on how it affects FN attributes? Not at this step of the process yet. Note that there is an Independent Power Producer policy and profit sharing requirements.
- Why is the biomass a low positive social and hydro a high positive social? Will this not make smaller projects perform worse? The level of capital investment drives these criteria and is low for biomass and high for small hydro.
- When looking at a portfolio with a number of small projects vs. one large project, will the combined economic effects be considered? This will be at the portfolio analysis level.
- With the many downsides shown for biomass it would be nice to see the local employment benefit highlighted. This is a small 0.5MW plant that would not require cutting, which is what would drive local employment.
- It is hard to evaluate pumped storage as it is not for energy. Projects are evaluated for energy and capacity.
- Hard to evaluate the future benefits of projects but this will probably become apparent in the load resource balance.
- Why is Aishihik – Destruction Bay red for EC2-5? Permafrost.
- We know that the cost of carbon is rising? We are using a value of $60 in 2016 rising to $90 in 2035 based on the US EPA values.
- How is the burden of the regulatory process considered? A minimum in- service date considers the regulatory process timeline.

Fuel Forecast

See attached presentation

- Do we know what the breakdown of non-fuel costs are? We know the breakdown of these costs of LNG better than we do for diesel.
- Can you put the two fuel cost graphs in $CDN/ GJ so they can be compared.
- Comment - The forecast cost ratio between diesel and natural gas stays the same as it is today? We will start to see the decline of easily extractable gas due to fracking concerns. The costs should converge? When the costs converge the LNG will be more expensive due to

transportation and refining. Response – The resource plan LNG and diesel price forecast is rigorous and it does not show a convergence of prices.

Greenhouse Gas Emissions Life Cycle Analysis

See attached presentation

- Are there specific guidelines and data provided by the IPCC to conduct a life cycle analysis of GHGs? Not one specific way but many tools and accepted standards.
- Are these numbers similar to those presented for the LNG project? Very similar and we will show a further breakdown.
- What was the methodology used for the methane leakage calculations? Surprised that the upstream emissions for LNG is lower.
- This has been refined since the LNG application. Used data from monitoring programs.
- Is the liquefaction process more carbon intensive than transportation? A detailed breakdown is provided and shown.
- Is YEC doing any stack testing for their own units? Have done with diesels but not for LNG units yet. Testing showed diesels to be much lower than expected.
- It is great to see both GWPs to make it much clearer. Can we spell out what the methane factors actually are?
- Would a thermal facility be built for capacity or energy?
- Can we look at the power provided to the LNG refining (renewable hydro at Tillbury vs Dawson Creek? A sensitivity was performed for the northern source
- How did you determine the social cost of carbon? Estimate of benefits and damages globally.

Load Resource Balance

See attached presentation

- These charts make it very obvious that we need to focus on building more capacity.
- For commercial buildings and institutions with onsite generation –is this considered as part of N-1? No.
- Does N-1 also assumed lowest water? Yes. Would it change the N-1? Only slightly but it would not address the gap.
- Would like to see if energy problems are in March or April that could be addressed with solar vs energy problems in December or January that could not.
- Batteries are very interesting in the cost/capacity. They can also be used for spinning reserve as well as other renewables.
- Learn from the values survey and invest in green capacity that can unlock the renewable energy potential.
- Need to look iteratively at energy and capacity. Also need to consider the daily swing in energy use.

- Would like to see solar with pumped storage.

Next Steps

- Our next meeting will be in November and focus on the results of the portfolio analysis.

General Comments

- The utilities board will review this report and provide comments to the minister.