**SUBJECT AREA:** **Routing Methodology**

**REFERENCE:** **The Environment Act**

**QUESTION:**

The Environment Act, 12.0.2, Climate change considerations, states that "the director or minister must take into account ...the energy efficiency of the proposed development". As advised in MH's response, we have reviewed these sections and are unable to find information with regards to the energy efficiency of the project. Please provide direct references.

**RESPONSE:**

In addition to the EIS sources provided in DWWO-IR-001, information related to energy efficiency of the proposed development includes the following:

- The conductor selected reduces line losses thereby improving efficiency (see MWL–IR-019)
- Upgrades to Glenboro Station minimize line loss by managing loop flow – (Chapter 2 section 2.4.2.3)

In addition Energy Efficiency was canvassed at the NFAT hearing and reference can be made to the Public Utilities Board Report.

**SUBJECT AREA:** Climate Change, General Assessment

**REFERENCE:** DPWO-IR-002

**QUESTION:**

The GHG Life Cycle Assessment describes many variables and significant uncertainty. Does MH have any sense as to the plus or minus accuracy of the conclusion of this report?

**RESPONSE:**

The sensitivity analyses performed for the GHG life cycle assessment provide a sense of the accuracy of the inventory assessment and resulting conclusions. The sensitivity analyses focused on the key contributors to overall non-generation GHG emissions. As can be seen in Table 5 of Appendix 3 of the EIS, just 4 activities produced over 84% of total estimated life cycle emissions: land-use change from clearing (45%); mining bauxite and producing aluminum (21%); mining iron ore and producing steel (9%); and producing and disposing of wood matting (9%). Thus, while there were many variables, only a few had the potential to have a meaningful affect on the overall uncertainty.

Two sensitivities, to higher project emissions, took very conservative assumptions for the intensity of aluminum production and the carbon content of cleared land, respectively. Combined, these sensitivity cases raised the estimate of total emissions by 18%. The base LCA scenario conservatively assumed that wood matting will only be used once for construction and then disposed. Two other sensitivities, to lower project emissions, reduced wood matting emissions by assuming the matting would either be re-used (4% reduction in total emissions) or used as bio-mass fuel (8% reduction). Refer to Section 5.3 and Appendix 4 of the EIS for discussion on the sensitivity analyses.

**SUBJECT AREA:** **Greenhouse gas**

**REFERENCE:** **DPWO-IR-003**

**QUESTION:**

Please ensure that the CV's of Binnu Jeyakumar and Ryan Kilpatrick, including a summary of all other GHG lifecycle assessments they have contributed to are provided. Please ensure that the CV's of the internal staff who contributed to the analysis and the final report will be provided at the appropriate time. With the CV's of the internal staff, please provide references to all prior GHG lifecycle assessments they have contributed to. Considering the mandatory requirement within The Environment Act for the minister to fully review the GHG affect of this project, why would you not make the authors of your assessment available for review?

**RESPONSE:**

CVs will be provided if, and as required, by the CEC Hearing Directive and Process Guidelines.

**SUBJECT AREA:** **The Environment Act**

**REFERENCE:** **DPWO-IR-004, Greenhouse Gas Life Cycle Assessment**

**QUESTION:**

In DPWO-IR-004 MH states; "As the developer of the MMTP, Manitoba Hydro was the only practical source of many key pieces of data and information." Please support this assertion. ISO 14040 does allow for data to be collected from other sources. GHG Life Cycle Assessments have been prepared for numerous other similar resource development projects. Why didn't MB and the Pembina Institute reference data provided by third parties in this analysis? Why were upstream and downstream contributions not considered in this report? "Water Vapour" H20 is considered by many to have the greatest contribution to the earth's greenhouse effect. Why does this assessment not include water vapour? The activity assessment is based on significantly lower construction and labour forces than are relied upon in describing the economic benefits to Manitoba.

**RESPONSE:**

As stated in DPWO-IR-004, *"Manitoba Hydro was best placed to provide estimates of total material quantities, such as tower and conductor steel.".* As Manitoba Hydro plans and designs transmission projects it acquires information, such as details on materials needed to build a project. That information is relevant and readily available for inclusion in estimates such as those made in the GHG LCA. These estimates relate to the specific project design. It is highly unlikely that estimates derived from other sources could be based on such project specific information and as such would be much less accurate. It is the view of Manitoba Hydro that there is no other practical source for many pieces of data related to project design.

Pembina Institute did reference third party data in their analysis. For example, emission factors and other data used during the inventory analysis were referenced from reputable third parties, such as the International Panel on Climate Change (IPCC), Natural Resources Canada, the National Renewable Energy Laboratory, and the US Environmental Protection Agency.

These emission factors consider substantial upstream and downstream contributions. For example, emissions related to the use of diesel on the project include emissions from the production of light and heavy crude, the upgrading of bitumen to synthetic crude, the transportation of light/synthetic crude, the refining of the crude into diesel, transportation to site, and finally combustion of the diesel. A life cycle assessment inherently considers upstream and downstream contributions. Refer to Appendix 5 of the LCA report for discussion of model functionality.

Although water vapour is a significant contributor to the greenhouse effect, when estimating anthropogenic GHG emissions water vapour emissions are not directly included as they do not substantially alter global atmospheric concentrations: As stated by the IPCC, "*There is a natural greenhouse effect which is largely driven by water vapour ($H_2O$) and other greenhouse gases which occur to a certain extent naturally in the atmosphere. However anthropogenic emissions of water vapour do not contribute significantly to the change of atmospheric water vapour concentration. Thus, the IPCC Guidelines do not deal with water vapour as an anthropogenic GHG.*"[1] Since calculation of the global warming potential and radiative forcing of $CO_2$, $CH_4$ and other GHGs includes considerations of feed-back loops, and interactions with water vapour, water vapour is indirectly included in any GHG emissions assessment.[2]

The LCA of the MMTP estimated both emissions from daily transportation of workers to site as well as temporary housing for workers who travel to site. Alternatively, the Economic Impact Assessment[3] of the MMTP estimated the number of all person-years of employment produced by the project. This included not just direct employment, which would include on-site workers considered for the LCA, but also "other direct" and "indirect and induced" employment which

[1] IPCC, "FAQ on IPCC Task Force on National Greenhouse Gas Inventories (TFI), general guidance and other inventory issues", (Q1-2-3), http://www.ipcc-nggip.iges.or.jp/faq/faq.html

[2] For example, "Emissions of CH4 alone have caused an RF of 0.97 [0.74 to 1.20] W m−2 (see Figure SPM.5). This is much larger than the concentration-based estimate of 0.48 [0.38 to 0.58] W m−2 (unchanged from AR4). This difference in estimates is caused by concentration changes in ozone and stratospheric water vapour due to CH4 emissions and other emissions indirectly affecting CH4. {8.3, 8.5}" IPCC Working Group 1, AR5, Physical Science Basis, Summary for Policy Makers, (Page 11), http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

[3] MMTP Socio-Economic Technical Data Reports, 2.5 Economic Impact Assessment, (Section 1.3), https://www.hydro.mb.ca/projects/mb_mn_transmission/pdfs/eis/mmtp_tdr_socioec_economic_impact_assessment.pdf

were not considered for the LCA. While "other direct" would include material suppliers, their transportation emissions are already included in other project activity categories. Whether non-direct employment produces any "additional" emissions, compared to BAU, is highly speculative and was deemed out of scope. Note that, due to uncertainty in daily transportation distances, Pembina took a very conservative approach (i.e. tending to err towards higher emissions) when calculating on-site worker related emissions.

**SUBJECT AREA:** Greenhouse gas

**REFERENCE:** DPWO-IR-005

**QUESTION:**

MH indicates that up to 533 ha, an area measurement, of forested land would need to be cleared. Please provide MH's analysis as to the volume and weight of biomass that will be created by that amount of clearing. Please provide an analysis of the amount of wood matting biomass that will be consumed by the project.

**RESPONSE:**

Manitoba Hydro has not conducted an analysis as to the volume and weight of biomass that will be cleared, however Manitoba Hydro conservatively estimated that a net of 20,866 tonnes of carbon would be removed from the project area over the 50 year life of the project. Manitoba Hydro estimates as part of the Greenhouse Gas Life Cycle Assessment Technical Data Report in Table 1: 8,650 tonnes of wood matting may be required for summer construction activities. It has not been determined at this stage of planning if the wood matting would be disposed of or re-used.

**SUBJECT AREA:** **Property Access**

**REFERENCE:** **DPWO-IR-006**

**QUESTION:**

The MMTP Summary of the Environmental Impact Statement, January 2016, distributed widely throughout Manitoba, clearly indicates on page 39 "Activities to construct a transmission line include surveying." Is the EIS Summary document misleading, or is MH starting construction prior to receipt of a valid license from the minister?

We ask again, did MH review this decision to start construction surveying with The Director, prior to the decision to proceed? Isn't surveying to determine tower placement part of the Work and therefore in contravention of the Act? Did MH obtain an opinion on this decision to proceed with this work?

We believe these three questions can be answered with a "Yes" or "No".

**RESPONSE:**

No, Manitoba Hydro is not starting construction prior to required approvals from the Provincial and Federal processes.

No, Manitoba Hydro did not review with "The Director" any decisions to do surveying work. The surveying work that has been done and is being done prior to the commencement of construction is not "construction" surveying. It is land surveying done in accordance with the provisions of The Land Surveyors Act and is done to facilitate the acquisition of easements and to facilitate identifying the location of the right of ways, not the towers.

Yes, surveying associated with the determination of where to place a tower is part of the work of construction and is done during construction. The Land Surveyors Act does not prohibit the surveying work done within a right of way as part of the determination of where to place a tower.

Yes, Manitoba Hydro obtained legal advice with respect to the 'legality' of retaining land surveyors to prepare surveys for the purpose of identifying the boundaries of the right of way and facilitating the acquisition of easements.

**SUBJECT AREA:** **Project Description**

**REFERENCE:** **DPWO-IR-007**

**QUESTION:**

What ROW factors would need to change in order for the MMTP ROW to be reduced to the 60m that Great Northern is building to?

Although MB indicates they would be negligible, please confirm what the savings from procuring a narrower ROW would be, including land access costs. Would those savings not be a requirement of the Environment Act's duty to provide the minister with the efficiency of the project?

MB references the audible noise levels for a high voltage DC current line, please provide the empirical difference between a DC and AC line of similar kV.

Does MB have any other 500kV transmission lines in Manitoba? If so, what are those ROW widths?

**RESPONSE:**

In order to narrow the right-of-way width to 60m, the ruling span of MMTP needs to be reduced to limit blow out of the conductor. As the right-of-way width is also governed by audible noise level at the edge of the right-of-way, larger phase-phase spacing, greater ground clearance and larger conductor size may be required to ensure that audible noise levels are within allowable limits. These changes would increase the number of towers required and may require larger tower cross arms.

As Manitoba Hydro is not contemplating a narrowing of the right-of-way width, no cost analysis has been done.

The empirical difference between HVAC and HVDC transmission lines is:

- For HVAC, the highest audible noise levels occur in conditions of foul weather
- For HVDC, the highest audible noise levels occur under fair weather conditions

Manitoba Hydro has one other 500-kV AC transmission line in Manitoba, D602F (D603M/M602F). The right-of-way width for D602F is 76.2m (250 ft).

**SUBJECT AREA:** **First Nation and Metis Engagement**

**REFERENCE:** **DPWO-IR-008**

**QUESTION:**

"The figure found on page 30 of the plain language document includes a shaded and two clear boxes" Would MH agree that this figure is misleading and would MH consider revising this document to provide a more honest representation?

**RESPONSE:**

Manitoba Hydro does not agree that the figure is misleading and will not be revising the document.

**SUBJECT AREA:** **Mitigation**

**REFERENCE:** **DPWO-IR-009**

**QUESTION:**

"Manitoba Hydro has successfully utilized a variety of methods to dispose of biomass including:

- Firewood for both commercial and personal use by adjacent communities.
- Timber salvage for commercial forest products including saw logs, pulp wood, chips.
- Supply of biomass fuel for heating to Pineland Tree Nursery."

To allow us to better understand how biomass has been successfully utilized, could MH provide a breakdown of utilization versus consumed (burned and/or mulched) biomass as a percentage on the BiPole III project?

Please confirm the amount (volume & weight) and source of biomass fuel provided to the Pineland Tree Nursery annually.

Please indicate what amount of biomass management MH has allowed for within the current project cost estimates provided.

Please provide what percentage of biomass management MH has allowed for within this project.

Please elaborate on the statement "For MMTP, Manitoba Hydro will investigate financially feasible alternatives...".

**RESPONSE:**

1. Manitoba Hydro has not conducted an analysis of utilization vs. consumed biomass for the Bipole III Project.
2. Manitoba Hydro supplied approx. 5,244 m3 of biomass in 2015 from distribution widening projects in eastern Manitoba.
3. Manitoba Hydro does not provide detailed cost estimates on capital projects as this is commercially sensitive information.

4. Manitoba Hydro has not allocated a defined percentage of biomass management for this Project.
5. Financially feasible alternatives are methods of debris disposal that introduce socio-economic or environmental benefits with minimal additional cost above standard debris disposal methods of burning or chipping/mulching.

**SUBJECT AREA:** **Project Description**

**REFERENCE:** **DPWO-IR-010**

**QUESTION:**

Upon completion, based upon information in hand now, what does MH expect to be the flows in both directions, on an annual basis?

**RESPONSE:**

This question is outside the scope of the Clean Environment Commission hearing.