Manitoba Hydro

NEEDS FOR AND ALTERNATIVES TO (NFAT)

Reference: April 25 GAC Pre-Asks of Manitoba Hydro

Question 4.b. Reference: MH-171 (Revised)

Please redo the figure under the hypothetical assumption that GHG externalities are internalized by paying $40/tonne CO2 in 2014 rising to $80/tonne CO2 in 2048 into a climate change mitigation and adaptation fund for Manitoba GHG emissions under each plan.

Response:

This request assumes that the social costs of carbon for fossil-fueled emissions in Manitoba are internalized as real costs to Manitoba Hydro.

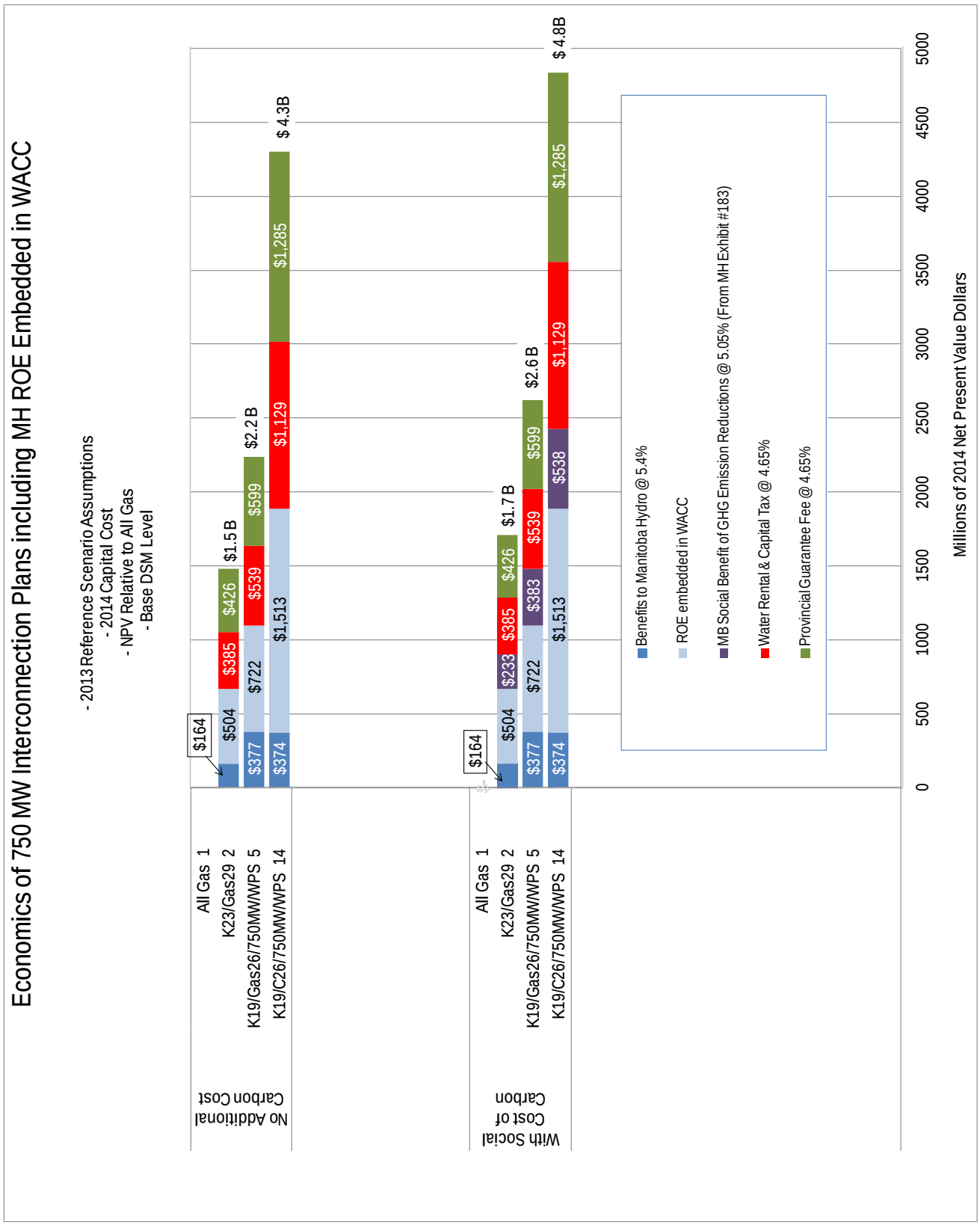
The figure below demonstrates that if the carbon costs for Manitoba fossil fuel GHG emissions are internalized at levels consistent with the estimated social costs of carbon, the development plans with more hydropower and less natural gas generation will benefit. For example the net economic benefit associated with the PDP increases by approximately $500M relative to the All Gas development plan if the social costs of carbon are internalized.

This response utilizes the information and approximations outlined in MH Exhibit #183 in response to Question 2.a of the April 25 GAC Pre-Asks. MH Exhibit #183 determined the present value of the social benefit of GHG emission reductions associated with select development plans based on the 2012 reference scenario assumptions. The figure below adds this estimated social cost of carbon to the economics from MH Exhibit #171 (Revision 3). MH Exhibit #171 (Revision 3) is based on the 2013 reference scenario assumptions and reflect slightly deferred in-service dates in comparison to the information presented in MH Exhibit #183. However, the figure below provides a reasonable approximation of the social GHG benefits associated with the development plans. The relative social carbon benefit values shown are judged to be reasonable in this revised context since the amount of fossil fuel generation is generally consistent and the deferrals modest.

There are a number of key inputs and assumptions made for this social carbon cost analysis:

- The present value of the social carbon benefits has been calculated only over the 2014-2047 time period. This understates the carbon cost benefits that would accrue over the longer term.
- The present value of the social benefit of GHG emission reductions uses a 5.05% discount rate rather than 5.4%. This slightly overstates the carbon cost benefits.

- A modest portion of the Manitoba the total social cost of carbon is already captured and embedded in Manitoba Hydro's economic analysis through assumptions of carbon cost for Manitoba Hydro's fossil fueled generation. Since these costs have not been removed the carbon cost benefits are modestly overstated.


Economics of 750 MW Interconnection Plans including MH ROE Embedded in WACC
- 2013 Reference Scenario Assumptions
- 2014 Capital Cost
- NPV Relative to All Gas
- Base DSM Level
No Additional Carbon Cost
With Social Cost of Carbon
All Gas 1
K23/Gas29 2
K19/Gas26/750MW/WPS 5
K19/C26/750MW/WPS 14
$164
$504
$385
$426
$1.5 B
$377
$722
$539
$599
$2.2 B
$374
$1,513
$1,129
$1,285
$ 4.3B
$164
$504
$233
$385
$426
$1.7 B
$377
$722
$383
$539
$599
$2.6 B
$374
$1,513
$538
$1,129
$1,285
$ 4.8B
Benefits to Manitoba Hydro @ 5.4%
ROE embedded in WACC
MB Social Benefit of GHG Emission Reductions @ 5.05% (From MH Exhibit #183)
Water Rental & Capital Tax @ 4.65%
Provincial Guarantee Fee @ 4.65%
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Millions of 2014 Net Present Value Dollars