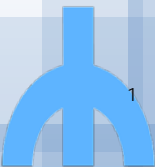


Multiple Account Benefit-Cost Analysis

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Purpose and Scope

- Analyze benefits and costs from broad Manitoba perspective
- Multiple account approach
 - same scope and valuation principles as traditional benefit-cost analysis
 - results disaggregated by evaluation account
 - recognize non-monetized and distributional consequences and trade-offs
- Assist panel in assessing 'overall socio-economic benefit to Manitobans'



Evaluation Accounts

Account	Purpose
Market Valuation	Net benefit to Manitoba Hydro and project partners.
Manitoba Hydro Customer	Consequences for customers: rate impacts in short vs. long term; reliability.
Manitoba Government	Net benefit to taxpayers.
Manitoba Economy	Net employment benefit.
Environment	Emissions and natural/ bio-physical externalities and residual effects.
Social	Consequences for aboriginal and non-aboriginal communities. Other social impacts not addressed elsewhere.
Risk	Nature and significance of key assumptions.



Discount Rate

- Required to calculate present value of monetized consequences over planning period
- Standard approach in benefit-cost analysis
 - weighted average opportunity cost of capital
- Difference from Manitoba Hydro WACC
- Difference from social time preference rate



Resource Development Plans

- Preferred: *K19/ C25/750MW*
- Smaller Tie: *K19/Gas 24/250MW*
- Keeyask-no interconnection: *K22/Gas*
- Gas-no interconnection : *All Gas*



Key Questions

- Is developing Keeyask preferable to gas for meeting domestic load?
- Are plans with a new interconnection and sales agreements preferable to those without?
- Is the plan with a large interconnection and Conawapa preferable to one with a small interconnection and no Conawapa?



Analysis

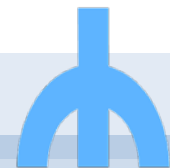
Assumptions, Sources and Key Points

- Market Valuation
- MH Customer
- Manitoba Government
- Manitoba Economy
- Environment
- Social
- Risk



Reference Scenario Results

	Preferred Development Plan	K19/G24/250MW	K22/Gas	All Gas
<u>Market Valuation</u>	--	17	(271)	(654)
<u>Customer Account</u>				
Cumulative rate increase	PDP has highest rate increases in first 20 years but has lowest rate increases over long term.			
Reliability	Interconnection provides greater load carrying capability, lower expected loss of unserved energy and greater ability to manage extreme drought			
<u>Government</u>	--	(354)	(396)	(674)
<u>Manitoba Economy</u>	--	(101)	(120)	(193)
<u>Environment</u>				
Manitoba GHG external cost	--	(209)	(174)	(320)
Global GHG impact	Preferred Development Plan and to lesser extent the two plans with Keeyask G.S. would contribute to a reduction in global emissions by displacing thermal generation in US.			



Reference Scenario Results

	Preferred Development Plan	K19/G24/250MW	K22/Gas	All Gas
<u>Environment (cont.)</u>	--	(9)	(7)	(13)
Manitoba CAC Residual biophysical	Projects subject to environmental process. Residual effects and local external cost expected to be relatively small with initial design, extensive mitigation, monitoring, compensation and benefit-sharing arrangements.			
<u>Social</u>	Significant net returns from up to 25% interest in Keeyask G.S. and income benefits from Conawapa G.S. in Preferred Development Plan; significant benefits from up to 25% interest in two alternatives with Keeyask G.S., greater with new sales and interconnection.			
Partner net return				
Community impacts	Wide range of potential impacts on local employment and business; population, infrastructure and service; social and community well-being; owners of land needed for rights of way and easements; major commitments and plans to minimize adverse residual effects with extensive mitigation, monitoring, compensation and partnership arrangements.			
Other Manitoba	Potentially significant bequest value from the hydro assets remaining at end of planning period; greatest with Preferred Development Plan and to a lesser extent in the alternatives with Keeyask G.S.			
Overall Monetized Net Benefit (Cost)	--	(654)	(968)	(1,855)



Sensitivity Analysis

- Capital cost sensitivity
- Extended analysis to 2 additional plans
 - Keeyask 19/ Conawapa 31/ 750MW (Plan 12)
 - Keeyask 19/ Gas / 750MW (Plan 6)
- Preferred Plan doesn't include WPS investment



Capital Cost Sensitivity

Plan #	14	12	6	4	2	1
Account	PDP (with WPS sale)	K19/C31/ 750 MW	K19/Gas31/ 750 MW	K19/G24/ 250MW	K22/Gas	All Gas
Market Valuation	0	97	573	577	314	251
Government	0	-117	-367	-365	-407	-687
Economy	0	-27	-104	-101	-120	-193
Environment	0	1	-129	-217	-181	-334
Monetized Net Benefit	0	-46	-27	-105	-395	-963

*Plan 14 does not include WPS investment.



Key Findings

- Advantageous to develop Keeyask as opposed to gas and more advantageous with new interconnection
- Advantage increases as one moves from Manitoba Hydro to broader Manitoba perspective
- Overall monetized net benefits greatest for PDP
- Key distributional issue is short to medium versus long term rate impacts
- Main non-monetized issues concern environmental and social impacts of the projects in the different plans
 - assessment does not indicate major residual effects
 - will be addressed in detail in the environmental hearings the projects require



Uncertainty and Risk

- S-curve analysis indicates upside and downside risks for all the plans
- Key issue is what flexibility or risks are retained by initial decisions
 - Gas – retains opportunity to have a no hydro future
 - Keeyask plus interconnection captures immediate sales opportunity
 - Keeyask plus large tie retains opportunity for larger sales and early development of Conawapa



Overall Conclusions

- **Keeyask G.S.:** greater net benefits compared to the all gas option
- **New interconnection:** greater net benefits compared to no interconnection options
- **Preferred Development Plan:** greatest monetized net benefits to society as a whole, but not from a Manitoba Hydro perspective and a customer perspective in the short to medium term
- **Deferred Conawapa and no Conawapa (Plans 12 and 6):** less monetized net benefits to society as a whole, but greater flexibility to respond to future market conditions; also, Plan 6 (Keeyask/gas/750 MW) less costly from a Manitoba Hydro and customer point of view



