

# **Integration of Perspectives & Overall NFAT Conclusion**

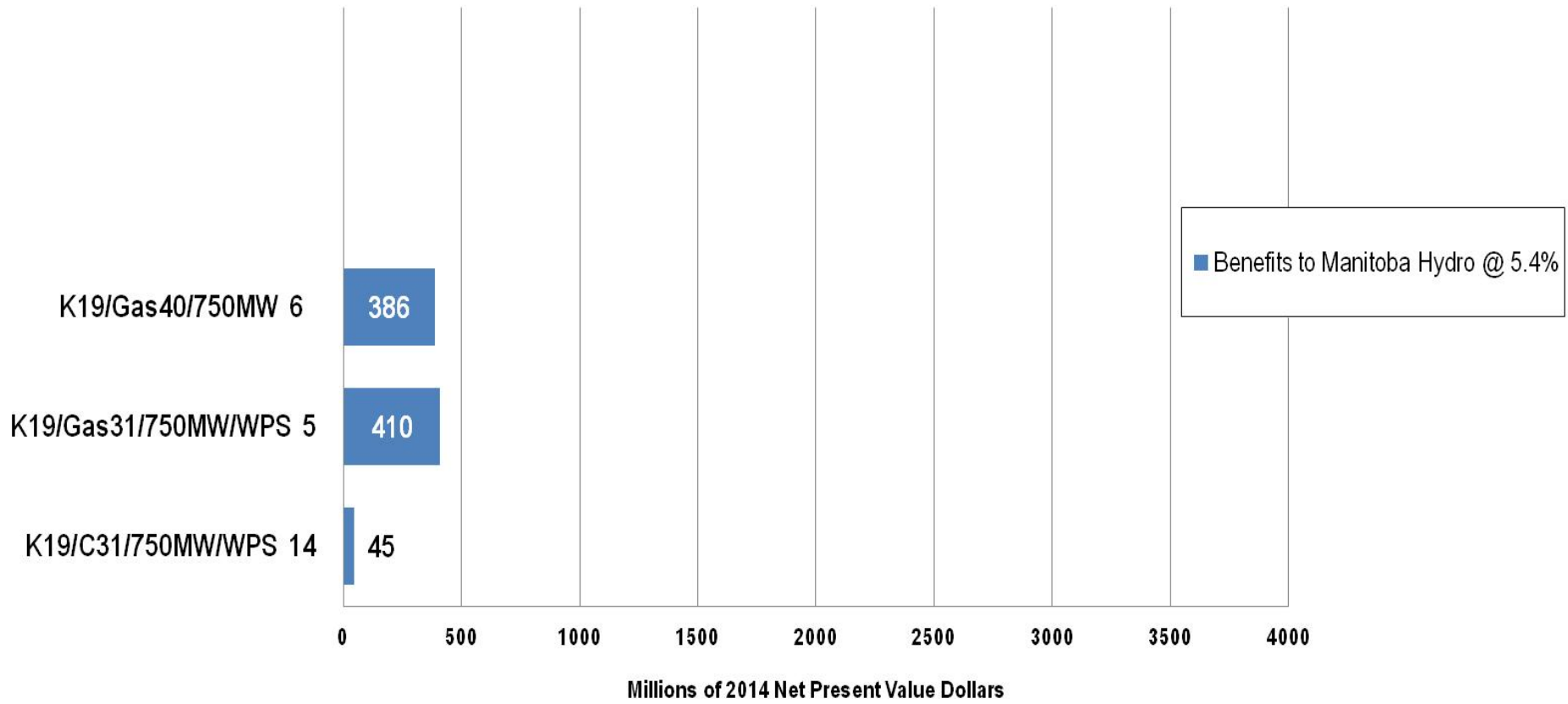
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# Development Plan Economics with Updated Capital Costs and 2013 Information

	Incremental NPV (millions of 2014)\$ @ 5.4% Relative to All Gas at specified level of DSM			
	Base DSM	Level 1 DSM	Level 2 DSM	Level 3 DSM
Plan 2 K23/Gas	111 Gas 2029			
Plan 6 K19/Gas/750MW			386 Gas 2040	
Plan 5 K19/Gas/750MW/WPS	377 Gas 2026	339 Gas 2030	410 Gas 2031	373 Gas 2033
Plan 14 K19/C/750MW/WPS	374 C 2026	124 C 2030	45 C 2031	-7 C 2033
Plan 5 K19/Gas/750MW/WPS Pipeline load added			339 Gas 2030	361 Gas 2030
Plan 14 K19/C/750MW/WPS Pipeline load added			139 C 2030	114 C 2030 <sub>2</sub>

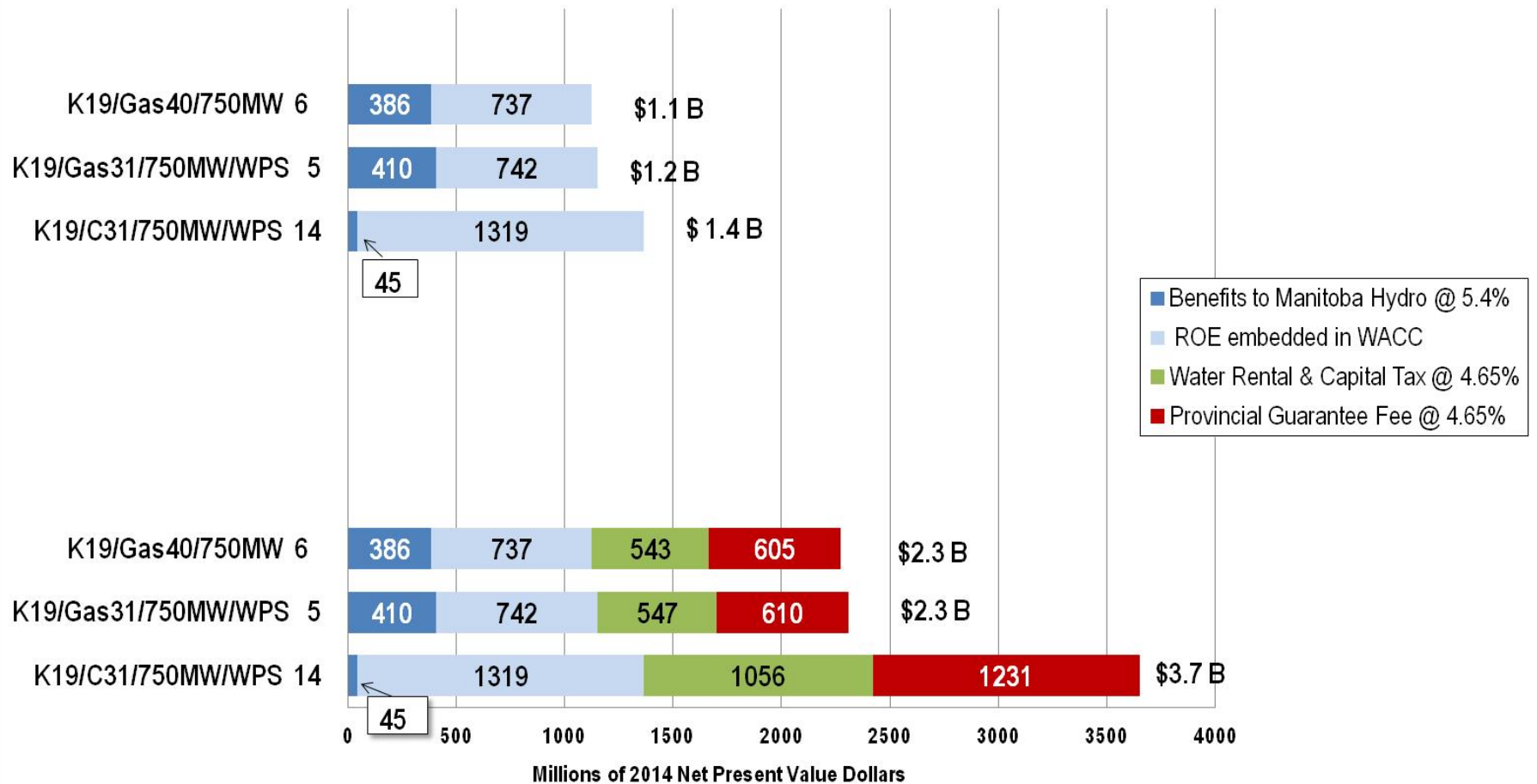
# Economics of 750 MW Interconnection Plans

2014 DSM Level 2, 2013 Reference Scenario Assumptions, 2014 Capital Cost, NPV Relative to All Gas



## Economics of 750 MW Interconnection Plans including MH ROE Embedded in WACC

2014 DSM Level 2, 2013 Reference Scenario Assumptions, 2014 Capital Cost, NPV Relative to All Gas



- Portion of embedded return on equity is required to maintain a debt equity ratio 75:25
- Not suggesting replacing WACC in corporate economics but demonstrates return on equity available to Manitoba Hydro, which is embedded in the WACC

# Social Benefit Cost Evaluation

Benefits in millions of 2014 dollars; NPV at 6.0% real, 2012 assumptions except updated K&C capital costs

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

# Additional Factors Which Would Increase Benefits in Reference Scenario Evaluations

- Additional export contracts (GRE, SaskPower, NSP, others)
- 750 MW Interconnection expanded to 883MW at no cost and 1100MW with no cost in Manitoba
- Interconnection to Wisconsin increases market access and overall export market price for MH
- Interconnection investment likely transferred to other counterparties
- Interconnection likely has more operational benefits than captured by current modeling

# Pathway 5 Implementation

1. July 2014 start construction Keeyask & proceed with 750 interconnection
2. Annually review DSM plans
3. Annually monitor Conawapa economics and ISD
4. Decide by early 2018 if construct Conawapa 2026
5. If economic, proceed with Conawapa with ISD in range 2026 to 2031 & WPS Sale (Plan 14)
6. If Conawapa not proceed:
  - WPS Sale proceeds (Plan 5)
  - WPS Sale not proceed (Plan 6)
  - Both Plans 5 & 6 lower cost than other feasible options

# Risk of Capital Costs Increasing Higher than new Reference Estimates is Manageable

- New Keeyask/Conawapa cost estimates based on excellent info
  - Over 80% of Keeyask contracts costs committed
  - Keeyask Infrastructure Project nearly complete
  - Engineering, environmental, aboriginal arrangements nearly complete for Keeyask
  - GCC led by one of worlds largest contractors & built Limestone on time & within budget
  - Construction contracting & estimating lessons learned from Wuskwatim, Point du Bois, other Canadian projects
  - Enhanced estimating methodology recognizes systemic risk
- Keeyask reference estimate has \$590 Million base (\$735M with interest & escalation) in contingency & reserve to deal with cost increase. This is 14% of remaining costs to be spent.
- More than enough to cover the approx 10% increase Wuskwatim experienced at same point (Wuskwatim only had \$56 Million base contingency & no reserve)



## Risk of Capital Costs Increasing Higher than new Reference Estimates is Manageable(continued)

- If Keeyask costs increase due to general economy wide factors, costs of all projects would increase (e.g. hydro, gas, wind)
- If cost increase factors are specific to Keeyask, all plans with Keeyask would also have cost increases including those with a later ISD
- If Keeyask capital cost increases, Conawapa decision would have this learning, so risk is not for both projects to increase in costs

# Why Not Defer Keeyask Decision & ISD?

- Window of opportunity for interconnection infrastructure time limited. Confluence of factors:
  - US utilities need change in supply mix away from coal
  - US utilities want to avoid overexposure to gas volatility
  - US counterparty willing to develop interconnection
  - Regulators, government & MISO favourable currently to wind synergies with hydro & transmission expansion
  - MB projects construction ready & supported by First Nation partners
  - Low interest rate environment
- Deferring does not eliminate uncertainty
  - Most uncertainties stay uncertain
    - load growth, capital costs, interest & escalation
  - Some uncertainties diminish but persist
    - impacts of shale gas better known but gas price still uncertain
  - Some uncertainties become more uncertain (unknown)
- In uncertain times good to keep options open
  - Interconnection provides options and flexibility

# MH Decisions on Proceeding with a Project is Based on What is Best for Ratepayers and Manitobans

- MH driven by metrics: customer reliability/security, MH economic/financial, social benefit/cost and environmental/socioeconomic
- MH previously halted Limestone, Conawapa, Pointe du Bois generation when circumstances changed
- MH developed 280MW gas generation in 2002
- MH purchased 258 MW wind generation
- MH negotiated GRE Diversity Exchange extension
- MH increasing DSM two to four times
- MH re-evaluated in February the Preferred Development Plan with new information and MHEB reaffirmed plan as being justified

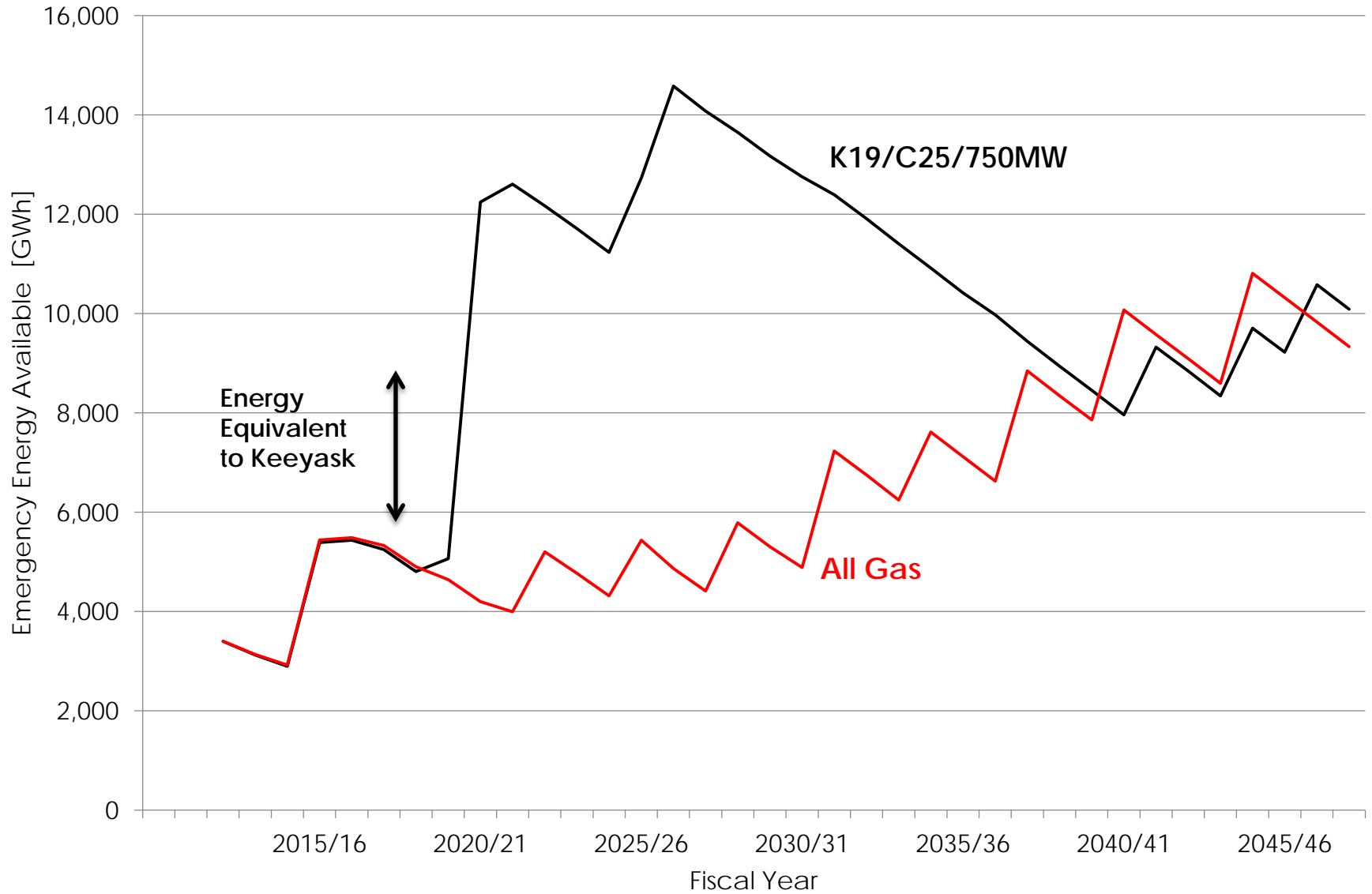
# Preferred Plan Fair to Current & Future Generations

- Current generation receiving benefits of enhanced reliability, energy security, employment, economic growth, benefits to the northern & Aboriginal communities, transfers to provincial government & taxpayers and environmental benefits
- Short term rate increases will be same for all plans
- Medium term rate increases in All-Gas Plan nearly as high as in Preferred Plan
- Long term rate increases in All-Gas plan are much higher than in Preferred Plan
- Overall balance is fair
- Manitobans are benefitting today from investment 20 & 40 years ago.
- Current customers will continue to enjoy low rates in the future - even with the projected rate increases.

# Energy Security and Capacity Reliability

- Additional capacity reliability of Preferred Plan relative to All Gas Plan estimated to be worth \$101 M NPV to domestic customers
- Additional energy security of Preferred Plan relative to All Gas Plan judged to be worth significantly more than the \$100 M NPV
- Customer supply interruptions during energy shortages would have advance warning but typically would involve significantly longer duration than capacity curtailments (days, weeks or months not hours)
- Energy curtailments could repeat for multiple years
- Expanded interconnections to large MISO system best means to reduce risks of energy & capacity curtailments

# Emergency Energy Available Including Non-Firm On-Peak Imports



# Reducing GHGs & Climate Change Worldwide Priority

## United Nations Environment Programme

“Climate change has long-since ceased to be a scientific curiosity, and is no longer just one of many environmental and regulatory concerns. As the United Nations Secretary General has said, it is the major, overriding environmental issue of our time, and the single greatest challenge facing environmental regulators.”

## American Association for the Advancement of Science

“...human-caused climate change is happening, we face risks of abrupt, unpredictable and potentially irreversible changes, and responding now will lower the risk and cost of taking action.”

## David Cameron, British Prime Minister

“I believe man-made climate change is one of the most serious threats that this country and this world faces.”

## Greenpeace International

“We are facing a planetary emergency: climate change threatens the world and our collective future.”

## Conservation of Arctic Flora and Fauna (under the Arctic Council – a forum of Arctic nations):

“Climate change is by far the most serious threat to Arctic biodiversity and exacerbates all other threats.”

# Interconnection is Strategic Infrastructure for MB

- Large new international transmission benefits Manitobans forever (virtually permanent)
  - Cost savings to ratepayers
  - Capacity reliability & energy security
  - Diversification of supply
  - Flexibility & risk reduction (load growth, flows increase/decrease or become more volatile)
  - Reduce GHGs and other air emissions
- Movement to enhance interconnections throughout NA and world
- More difficult to develop later as populations expand
- Similar to other critical infrastructure:
  - Floodway, TransCanada Highway, trans-Canada railway, Winnipeg water supply Shoal Lake, Winnipeg Airport, Trans-Canada Pipeline



# Overall Conclusions

- 750 MW Interconnection plans most economic of all feasible plans with updated capital costs & other factors
- Keeyask Gas plan with 750MW line & MP/NSP (w & w/o WPS)
  - Exceeds WACC NPV test by approx \$400 Million in corporate benefits
  - \$1.1 Billion corporate benefits including embedded equity return
  - \$2.3 Billion benefits including provincial transfers & MH embedded equity return in WACC
  - Social Benefit Cost approx \$0.9 Billion higher benefit than All Gas Plan
  - Justified as being economic & by other benefits- rates, reliability, energy security, environment, economy, aboriginal
- Keeyask Conawapa plan with 750MW line & MP/WPS/NSP
  - Meets or exceeds WACC NPV test by up to \$400 Million in corporate benefits
  - \$1.4 to over \$1.7 Billion corporate benefits including embedded equity return
  - \$3.7 to over \$4.0 Billion benefits including provincial transfers & MH equity return embedded in WACC
  - Social Benefit Cost approx \$1.0 Billion higher benefit than All Gas Plan
  - Justified as being economic & by other benefits- rates, reliability, energy security, environment, economy, aboriginal

# NFAT Future Electricity Supply Plan Decisions

1. Gas or hydro for long term Manitoba electrical future?
  - DSM expanded in all plans
  - Next major electrical supply should be hydro –Keeyask
2. Should interconnection expansion opportunity be pursued?
  - Proceed with 750 MW Interconnection
  - Need Keeyask 2019 & 250 MW MP sale
3. Should WPS 308 MW sale be pursued?
  - Proceed with WPS 308 with Conawapa
  - If not proceed with Conawapa, MH and WPS decide at that time
4. Should Conawapa be pursued?
  - Conawapa is justified but a decision on construction is not required until 2018. The plan to construct Conawapa will be monitored and depend on additional export contracts, gas/export prices, load growth, DSM, capital costs, interest rates, etc.

# Thank You



# Equity Return in the real WACC of 5.4% -return on equity above borrowing cost


## 2013 Base DSM NPV in 2014\$ incremental to All Gas Base DSM)

	RWACC 5.4%	Debt Rate 4.65%	(RWACC - Debt Rate) Embedded Return On 25% Equity
K19/C26/750MW	\$374M	\$1887M	<b>\$1513M</b>
K19/Gas26/750MW	\$377M	\$1098M	<b>\$721M</b>

## 2014 Level 2 DSM (NPV in 2014\$ incremental to All Gas Level 2 DSM)

	RWACC 5.4%	Debt Rate 4.65%	(RWACC - Debt Rate) Embedded Return On 25% Equity
K19/C31/750MW	\$45M	\$1364M	<b>\$1319M</b>
K19/Gas31/750MW	\$410M	\$1152M	<b>\$742M</b>

- Portion of embedded return on equity required to maintain debt equity ratio 75:25
- Not suggesting replacing WACC in corporate economics but demonstrates return on equity available to Manitoba Hydro, which is embedded in the WACC



# Calculations of # Years Advancement of Keeyask for MP, WPS & NSP Sales

NFAT Submission assumed Keeyask Advancement would be:

- 3 to 4 years with base load growth
- 9 years with low load growth
- 11 years with base load and 4X DSM

1. NFAT DSM 2 (all of Option 2) = 2031 Keeyask ISD
2. NFAT DSM 2 (reduced somewhat) = 2029 to 2030 Keeyask ISD
3. Add pipeline load & reduce growth due to elasticity, codes and fuel choice = 2026 to 2028 Keeyask ISD

Keeyask Advancement from 2019 = 7 to 9 years

4. If Keeyask deferred from 2019 to 2020

Keeyask Advancement from 2020 = 6 to 8 years

Thus overall, **Keeyask Advancement likely would be from 6 to 9 years**