

# **Direct Testimony on the NFAT Review Before the Manitoba Public Utilities Board**

May 2, 2014

Presented by Patrick Bowman, InterGroup Consultants Ltd.

# INTRODUCTION

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# APPROVED SCOPE OF WORK IN 67/13

- (a) Impact on domestic rates, including long term impacts;
- (b) Risks to domestic customers through Manitoba Hydro's investment in subsidiaries, export ventures and new Programs;
- (c) Alternatives to Manitoba Hydro's Preferred Development Plan including demand side management programs; and
- (d) Risks including long term financial and economic risks and the financial liability of Manitoba Hydro.

# SUMMARY OF ORIGINAL KEY CONCLUSIONS

1. Focus on key decisions that need to be made today.
2. Despite the Plan selected, it is not possible to avoid major risks.
3. “Pathways” are more important than “Plans”.
4. Two possible visions –Need/Opportunity - both valid.
5. To date, Opportunity plans appear better than Need.
6. Don’t ignore past experience with hydro and interconnections.
7. 750 MW t-line should likely be pursued - optionality.
8. Evidence does not yet support Conawapa. Massive benefits to other stakeholders, Government. Protect 2026. Minimize ongoing costs. Seek rebalanced relationship with province.
9. Expand other activities, such as pursuing all economic DSM, regardless of the Pathway selected.
10. Some issues best left to future GRAs.

# PRELIMINARY COMMENTS

1. Is this a big decision for Manitoba's future?
  - Hurdle concept. Basement suite. Patient Capital.
2. Best information available – adequacy
  - Level 1 vs. Level 2
  - Exceptional advice.
3. Degree of disagreement
  - Tempest in a teapot? NPV/IRR, Regret, IRP/Opportunity
  - Future customers “under bus”?
4. Optionality is key
  - Not deciding everything today. Process.

# UPDATED ANALYSIS (MH-104-12; MH-150)

## Commitment vs. Rate impacts

### Peak MH Net Debt Over Next 20 Years (\$billions)

"Net" references long-term debt plus current portion of debt, less sinking funds

All Gas	\$15.5
Plan 2 - Keeyask as next base load resource for Manitoba	\$20.0
Plan 6 - Keeyask 2019/750 MW US transmission	\$20.6
PDP - add WPS 308 MW contract, plus Conawapa	\$28.4 (IFF13 - \$29.6)

### NOTES ADDED BY MH

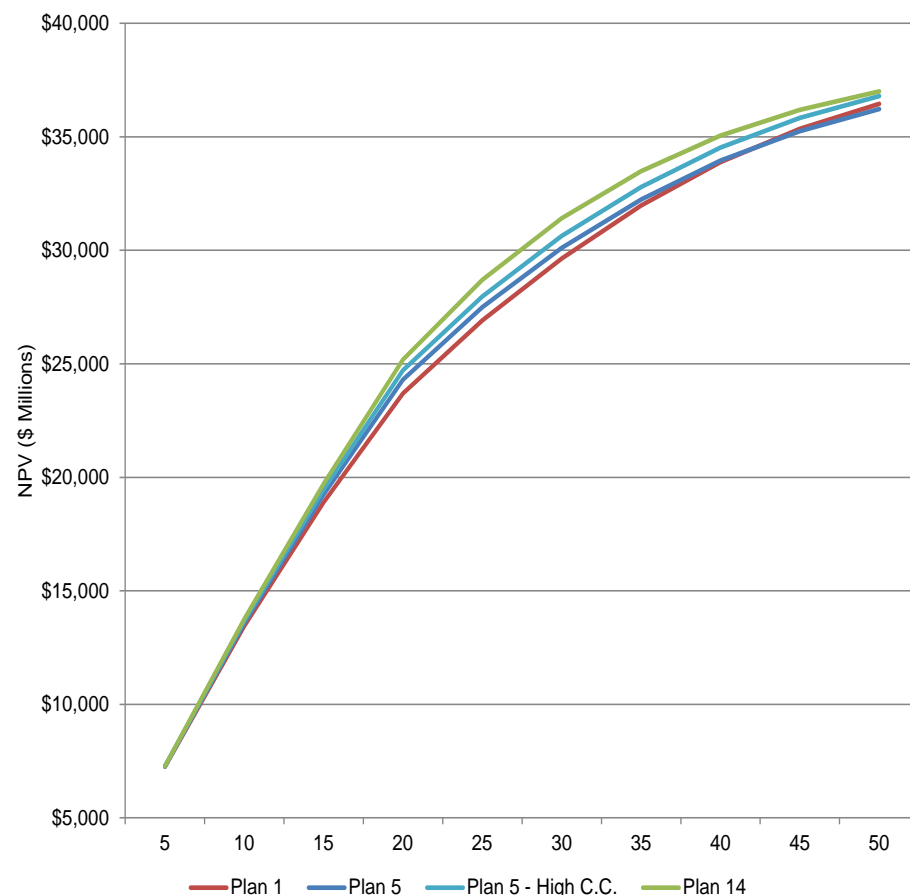
(as described in the NFAT filing Chapter 11):

1 - In the medium term, while net debt levels are the highest with the development plans that include both Keeyask and Conawapa generating stations, as these plans have the overall highest capital investment, they also have the highest fixed asset and retained earnings. [Chapter 11, page 23]

2 - Net debt levels converge towards the end of the study period for all development plans. [Chapter 11, page 23]

3 - The All Gas plan has the greatest variability in net debt by the end of the study period compared to all other development plans, primarily due to the requirement for capital re-investment in gas resources. [Chapter 11, page 13]

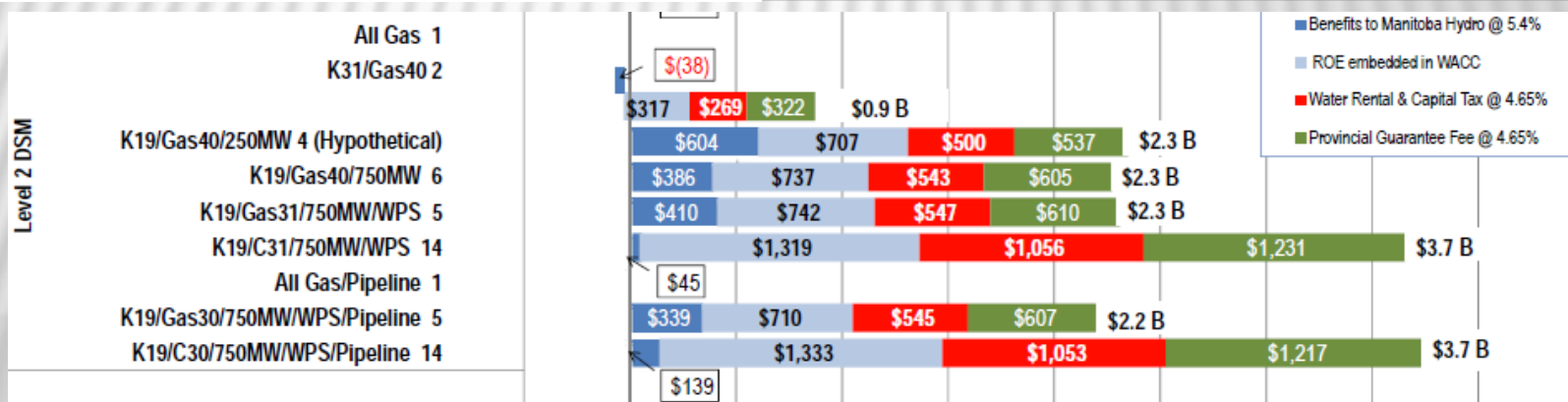
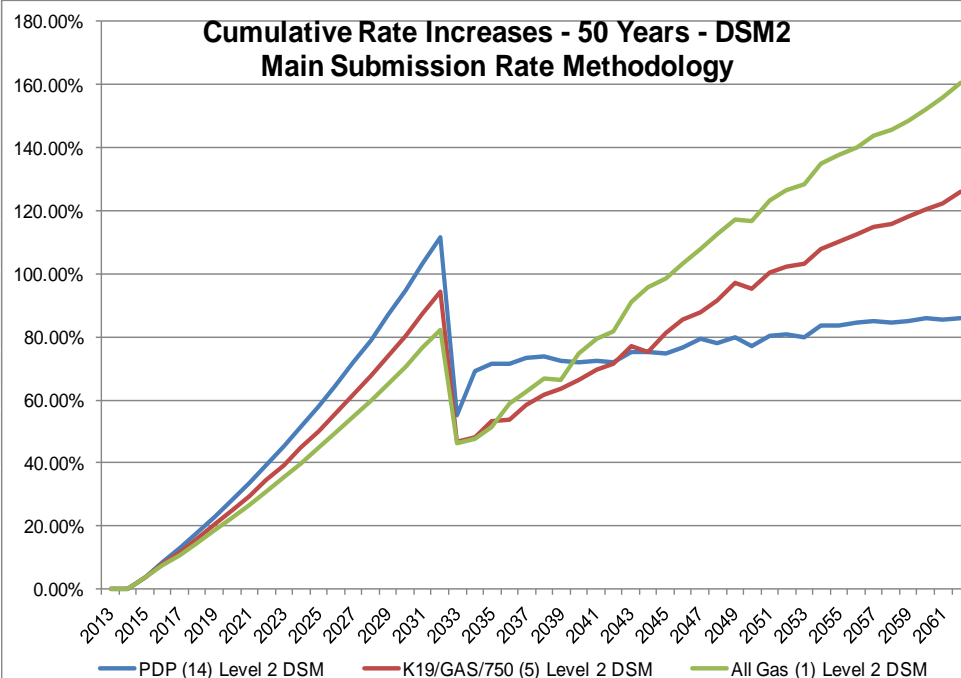
Cumulative NPV (\$millions) of amounts paid by Manitoba ratepayers -  
Lvl 2 DSM - 5.05% real discount - original rate strategy



# UPDATED ANALYSIS (MH-104-12; MH-129-4; MH171 (REV 3))

## Manitoba Benefits of the PDP

Impact	Construction	O & M (Annually)
Employment Direct and Indirect) in Person years.	19,200	300
Provincial and Local Taxes (\$thousand)	\$582,000	\$2,000
Provincial GDP (\$thousand)	\$1,945,000	\$15,000
Labour Income (\$thousand)	\$1,480,000	\$13,000



# **CONCLUSIONS FROM PRE-FILED TESTIMONY**

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## **(WITH UPDATES)**



# CONCLUSIONS FROM PRE-FILED TESTIMONY

1. Focus on key decisions that need to be made today.
  - a) Whether to take up the Minnesota Power (MP) export agreement (including its requirement for Keeyask for 2019 which requires construction contract awards in the near term) [Whether to proceed with Pathways #1/2 or with Pathways #3/4/5]; and
  - b) If yes, whether to build the required new line at 750 MW or 250 MW [Whether to proceed with Pathway #3 versus Pathways #4/5].

Update - The key focus has not changed – collapsed into one question

# CONCLUSIONS FROM PRE-FILED TESTIMONY

2. Recognize that despite the Plan selected, it is not possible to avoid major risks.

For industrial customers, next 20 years show higher than inflation rate increases. Includes either \$400 million to amortize planning costs (if the projects do not go ahead), or up to \$800 million for the full PDP.

**Update – new rate scenarios. Updated (higher) peak debt levels**

Peak debt values - \$16B Gas; \$20B Keeyask; \$30B for PDP.

“Manitoba citizens could be losing a fortune. It – the difference is that there would be no sort of symbol of the mistake. There would be no ‘thing’ sitting there that people could say, Well, that was wrong. It would just be money – a lost – a huge lost opportunity without a convenient symbol to – to point at. So I think it’s – it’s helpful to – it could be helpful to keep in mind that there’s no way out of this – of avoiding this risk. Either way there’s a big risk.” (Dr. Magee, Transcript page 6123-6124; Hydro 2010/11 and 2011/12 GRA).

# CONCLUSIONS FROM PRE-FILED TESTIMONY

3. “Pathways” are more important than “Plans”.

Optionality within pathways key to assessment. Future decisions (by MH, but also WPS, etc.) change look of Plans

Update – Fewer Pathways (no 250 MW line); better clarity on WPS:

## Short List: Three Pathways

1	Gas 2023 only for domestic load	Later gas generation or hydro
2	Keeyask 2023 only for domestic load	Later gas generation or Conawapa
3	<del>Keeyask 2019, 250 MW interconnection, MP 250 MW Sale, 125 MW NSP extension, 125 MW WPS Sale</del> <b>250 MW Interconnection now hypothetical, likely not viable</b>	<del>Later Conawapa or gas generation</del>
4	<del>Keeyask 2019, 750 MW Interconnection, MP 250 MW Sale, 125 MW NSP extension,</del> <b>308 MW WPS now signed, clearly beneficial with 750 MW line</b>	<del>Later Conawapa or gas generation</del>
5	Keeyask 2019, 750 MW Interconnection, MP 250 MW Sale, 125 MW NSP extension, 308 MW WPS Sale	Later Conawapa or gas generation

ANALYSIS

# CONCLUSIONS FROM PRE-FILED TESTIMONY

4. There are two possible competing visions – one based on Need and one based on Opportunity - both of which are valid. A possible optimized variant of Plan 1 (All Gas) focused on Need could be a reasonable outcome of the NFAT. Hydro has not yet provided a full scenario to assess this option.

Pathway 1 (e.g., An optimized All Gas variant) is credible. Benefits:

- Least debt (inherent risk)
- Longest time to make decisions
- Time to adapt now to buy even more time (e.g., DSM)
- Lowest near-term rates (depending on sunk costs treatment)
- BUT – new direction for MB, some exposure to gas price risks, less ability to deal with unexpected load growth risk; lost opportunity; lost social/government benefits.

# CONCLUSIONS FROM PRE-FILED TESTIMONY

## 4. Need Versus Opportunity (con't)

### Update:

**MH-95: Need for New Resources with additional DSM 2028/29 (DSM Level 1) – 2033/34 (DSM Level 3) [page 4]**

- Realistic 2026 to 2028
- Keeyask Advancement likely would be from 6 to 9 years [page 5]

**MH-171 (Revision 3):**

- Updated Economics for DSM & capital costs show erosion in economic benefits of Opportunity over Need



# CONCLUSIONS FROM PRE-FILED TESTIMONY

5. Given the information available, an Opportunity-Based vision (advance Keeyask, take up Minnesota Power (“MP”) export deal, build new transmission to US) is likely better than a Need-Based vision utilizing Plan 1 (All Gas).

Larger Opportunity-based options better than All Gas on most utility analytic metrics (NPV rates, risk/reward trade-off) - also better on other interests such as GHG emissions, First Nation investment, jobs, taxes, government revenues.

Plan 4 (K19/Gas/250MW) was best option.

Update - 250 MW Interconnection now “Hypothetical”; Plan 5/6 (K19/Gas/750MW) now smallest known option to secure MP, new transmission. NOW REFER TO RECOMMENDATION #7

# CONCLUSIONS FROM PRE-FILED TESTIMONY

6. Past experience with hydraulic generation and interconnections suggest added benefits from large infrastructure that should not be ignored.

- In Canada, hydro proven, lowest/stable cost power over long-term.
- Interconnections critical to MH.
- Already experienced (and experiencing) major adverse environmental and socio-economic impacts for further Nelson River hydro.
- Interconnections provide for diversity (e.g., thermal, wind). Added hydro in Manitoba not “putting all the eggs in one basket” – with interconnections MH build Manitoba’s strengths; achieve diversity through trading.
- More flexible to address unexpected load requirements.

Update – no change

# CONCLUSIONS FROM PRE-FILED TESTIMONY

7. The 750 MW transmission option (Pathway #4) should likely be pursued. Part of the rationale is based on future adaptation and optionality, which is not fully explored in Hydro's materials.

Plans 5/6 (k19/Gas/750MW) were not better than Plan 4 (K19/Gas/250MW) on economics/financial. However, 750 MW line was about options, flexibility. If ever to build Conawapa, made sense to have 750 MW line now.

Update: No option for 250 MW line, so 750 MW is now the smallest option for interconnection/Opportunity-based vision.

- if no 750 MW line, then back to Pathways #1 or #2.

At same time, Pathway #4/5 are now less beneficial than under original analysis. 750 MW line continues to provide optionality. But likely value of options less than originally assumed.



# CONCLUSIONS FROM PRE-FILED TESTIMONY

8. Evidence does not yet support Conawapa as being in ratepayer interests. The option for Conawapa for 2026 should continue to be protected. Minimize ongoing cost commitment. If conditions do not improve, Conawapa should not proceed. If a rebalanced relationship with the province can be secured, there may be ways for Conawapa to be beneficial for ratepayers even if market conditions do not improve.

Economics of Conawapa were poor – large risks; no expected return for ratepayers; higher cost for long horizon. Speculative.

At same time provides massive benefits to stakeholders other than ratepayers: Provincial Government (capital taxes, debt guarantee fee and water rentals), jobs, economic development, GHG, community investment.

# CONCLUSIONS FROM PRE-FILED TESTIMONY

8. Conawapa not supported by evidence filed (con't).

Updated analysis further confirms conclusion.

Conawapa called “development opportunity” – MPA – speculative. But also huge benefit for Manitoba as a province (includes government).

Having more of Conawapa’s output under firm contracts should improve the economics of Conawapa. Before 2018 focus on securing contracts for Conawapa.

The prospect of Conawapa is good enough to protect early in-service. But does not yet pass test for ratepayers - either need:

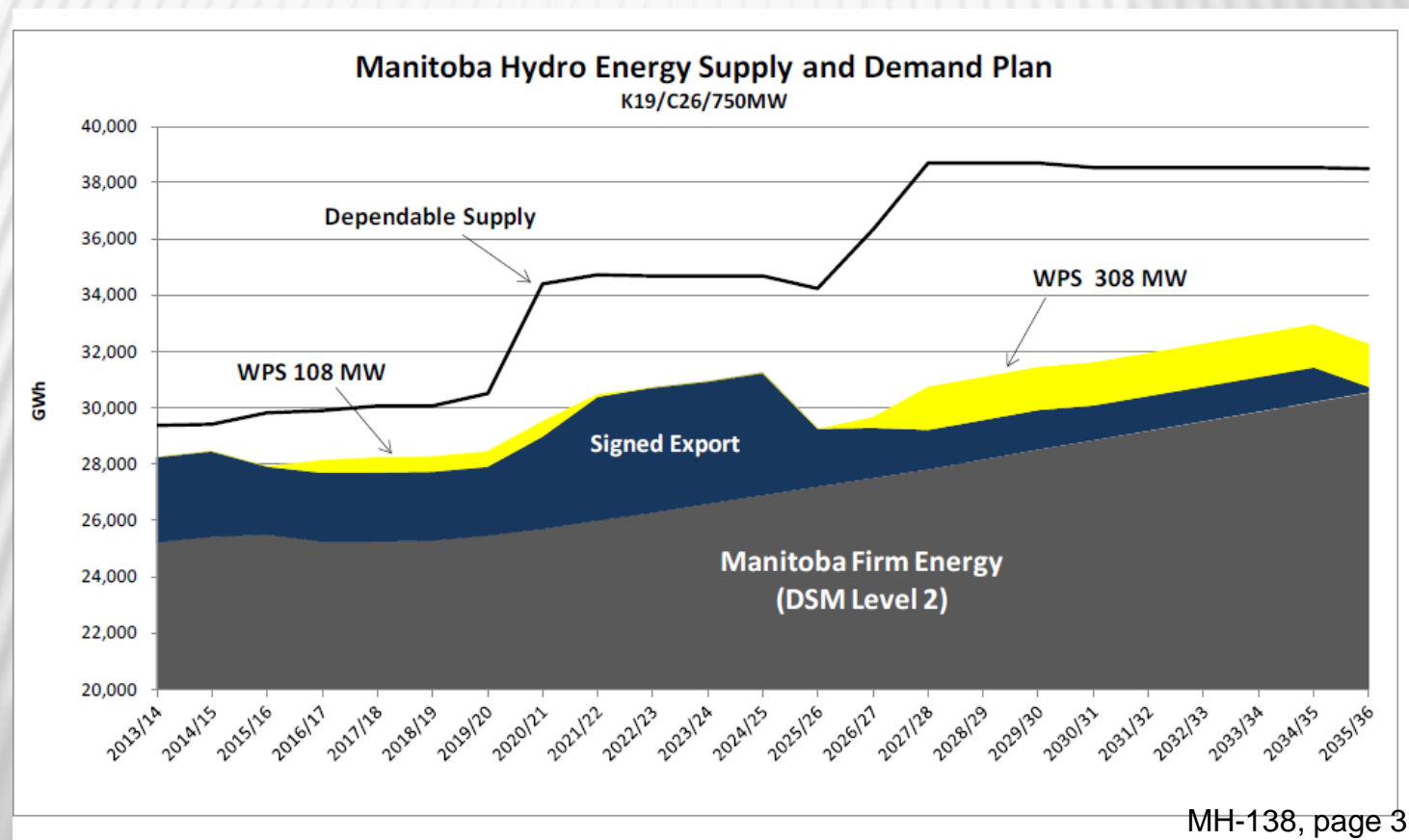
- Improved conditions, or
- Government charges rebalancing (or both). Could/(should) solve with stroke of pen tomorrow.

# CONCLUSIONS FROM PRE-FILED TESTIMONY

8. Conawapa not supported by evidence filed (con't).

**Update:**

Conawapa still speculative – not backed by contracts yet. NPVs not reliable.



# CONCLUSIONS FROM PRE-FILED TESTIMONY

9. Other planning activities and decisions should be continued or expanded, such as pursuing all economic DSM and customer self-generation, etc. These actions should occur starting in the near-term, regardless as to Pathway selected.

Original filing weak on DSM and related options (e.g., Self Generation, Fuel Switching). Industrials indicate Hydro has long-term history of cooperation on DSM, but not receptiveness to new options. DSM interest remains high. Often window is small – e.g., when replacing long-lived equipment

There are better ways to assess DSM than Total Resource Cost (TRC) test.

**Update – massive changes in assumptions. Most substantial update in entire process. [Keeyask capital cost changed \$300M NPV; Conawapa 100M NPV; versus DSM - \$600M NPV utility; combined \$2.2B utility and customer]**

# CONCLUSIONS FROM PRE-FILED TESTIMONY

9. Continue planning all economic DSM etc. (con't)

## Update:

Confirms assumption from original evidence that DSM complements development plans. Differs by plan – depends on generation “saturation” as compared to transmission (e.g., K/750 MW less saturated, K/C/750 more saturated; All Gas less saturated, K/Gas more saturated): DSM complements best when Manitoba less saturated/more transmission.

No plan obviates benefits of DSM; DSM makes no plan worse (up to Level 2). Changes ordering of plans.

Confirms the importance of analyzing domestic revenue impacts from DSM.



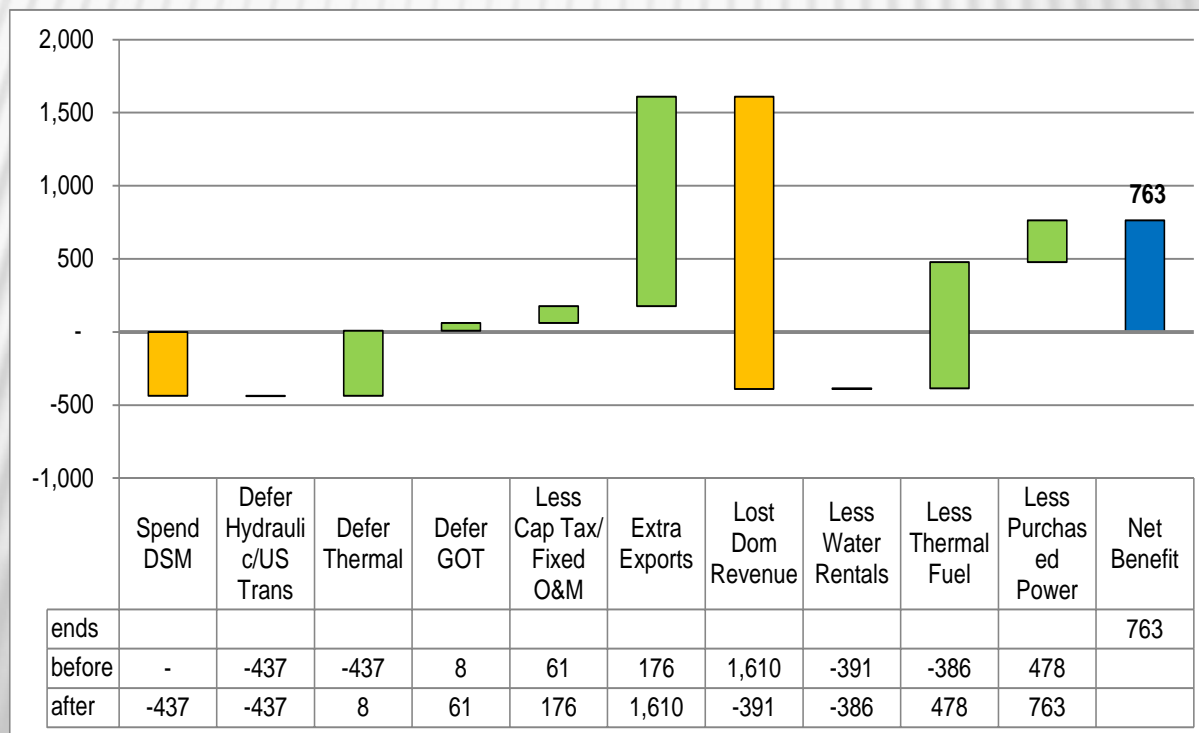
# CONCLUSIONS FROM PRE-FILED TESTIMONY

## 9. Continue planning all economic DSM etc. (con't)

### Update:

Impact on Hydro domestic revenues among the most important factors to track

Figure: Plan 5 (K19/Gas/750MW) Net Benefits of DSM Level 2 over Base DSM – MH perspective over 78 Years (\$ Millions NPV)



# CONCLUSIONS FROM PRE-FILED TESTIMONY

## Other Areas:

For next GRA: Board should direct removal of interim caps on the Curtailable Service Program (re: longer-term planning benefits). Also recognize Equal Life Group (ELG) depreciation puts pressure on near-term rates with hydro plants.

Not challenge Hydro on scenario approach (as opposed to Monte Carlo) – complicated system. Monte Carlo approach may lead to more problems than existing approach.

Hydro does not show enough possible variability in load forecast – should be more sensitivity tests (**update:** analysis benefits from pipeline assessment).

Integrated Resource Planning vs. merchant plant.

# SUPPLEMENTARY CONCLUSIONS

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# SUPPLEMENTARY CONCLUSIONS

- Basic Planning Concept – First Principles - What do you know for sure?
  - Shifting sands. A view that uncertainty *increased*.
  - Normal planning experience
  - What do we know?:
    - Inflation – favours hydraulic. Major reason why hydro has always been beneficial over long term.
    - Provincial benefits from hydraulic are large.
      - 19,200 Person-Years (MH-129-4 slide 4)
    - DSM complements plans.
    - GHG – price/no price, real pressure. Prices not internalize costs.
    - Debt is real commitment, real risk.
  - K19/750 MW – better on above points than Gas.
  - Conawapa – unknown – today's NPV is a distraction
  - Conawapa – Ontario Example

# SUPPLEMENTARY CONCLUSIONS (CON'T)

- Load growth/DSM disruption
  - Many possibilities noted that could lead to much lower/no load growth in Manitoba.
    - All ignore growth of industrial/commercial base (e.g., pipeline; also Vale 1-D etc.); also DSM Level 2 risk (**MH-169**)
      - Load displacement – (MH-104-10: \$457M NPV investment combined for TRC; MH-180: Hydro puts in \$83M simple sum over 15 years – assumed customer investment very large)
  - Are possibilities credible? Unknown, but possible, must consider as sensitivity.
  - MH-104-13, MH-156 – very important exhibit
    - If no load growth, K19/750 MW is \$402M NPV better than without. Uncertain rate impact, but intriguing if this is the load risk downside. [assumes any DSM is free]
  - Best treated as sensitivity – not scenario. Load disruptions can also go the other way (up).

# SUPPLEMENTARY CONCLUSIONS (CON'T)

- Increased imports possible?
  - Caution with La Capra scenarios/criteria.
  - Must distinguish three time concepts (not 2):
    1. Planning - Dependable energy/capacity (criteria). When to build?
      - Off peak criteria always governs without 750 MW line, not 10%.
      - Should not yield. Not advisable.
    2. Planning - Production costing/economics analysis (criteria plus 1,100 GW.h). What plans are better economically?
      - Understand the model assumes 1,100 GW.h more than criteria can be used.
    3. Operating time frame. Dynamic.
- La Capra gets to 6,600 GW.h/year imports (2036/37; MHEx104-14-2) for both #1 and #2 above. MH Plan 5 uses 3,100 GW.h (MHEx104-7) for #1 above, and 4,200 GW.h for #2. **If intrigued by option – revisit with MH. Critical to understand #1 vs #2 above.**

# SUPPLEMENTARY CONCLUSIONS (CON'T)

- DSM tests to apply?
  - Addressed in CAC/MIPUG-I-7.
  - Absolute standard –
    - RIM (Rate Impact Measure). Regardless as to where utility supply curve is, a positive RIM test means a win-win for ratepayers (participants versus non-participants).
    - Positive RIM DSM should almost always proceed..
  - Resource Planning phases –
    - when needing new resources, the PACT (Program Administrator Cost test – like Levelized Utility Cost) should be primary test. Compares different resources. Must include revenues in consideration.
- Both of the above are valid, even if program fails TRC. [because customer benefit not well measured]

# SUPPLEMENTARY CONCLUSIONS (CON'T)

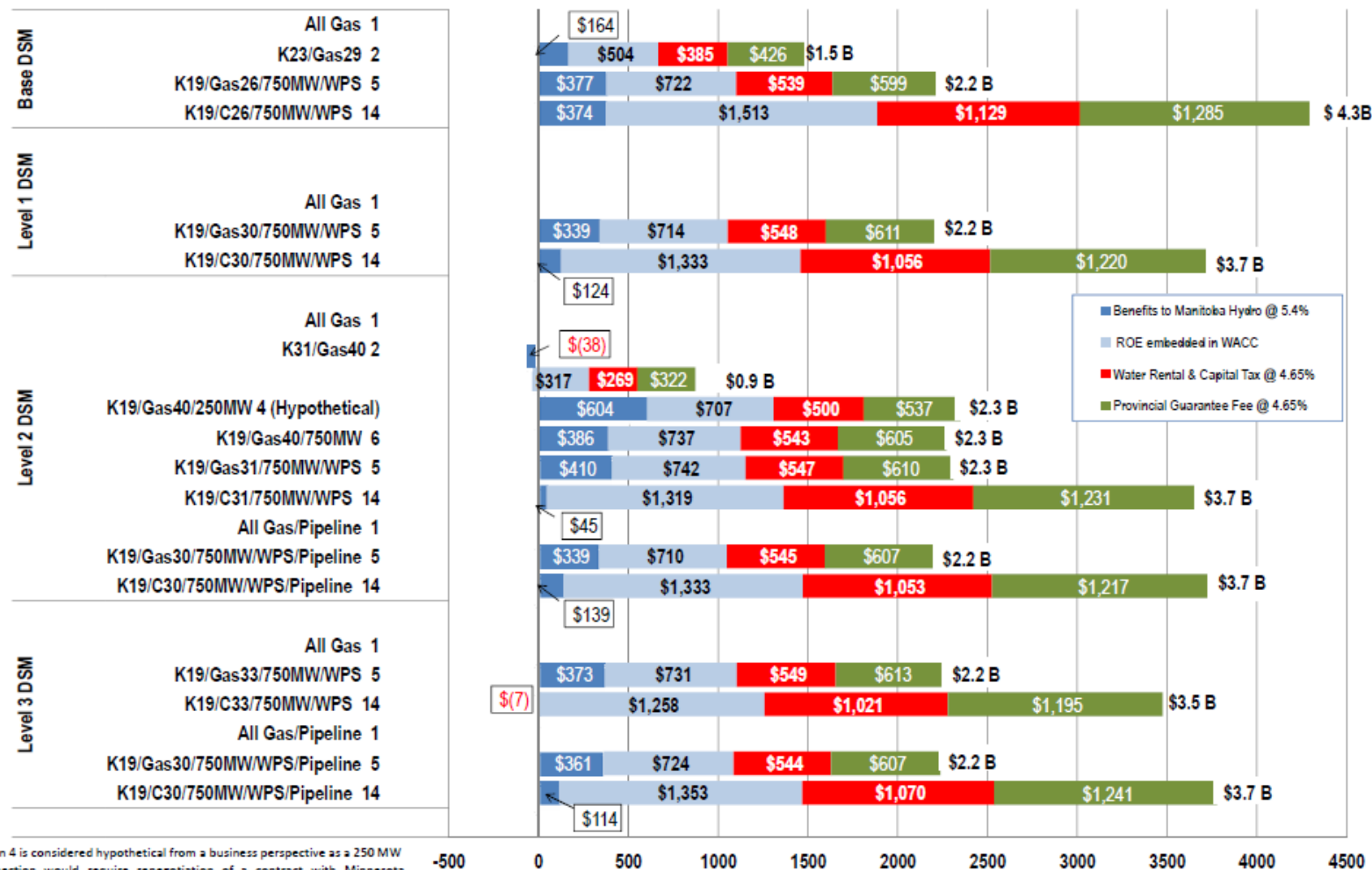
- Discount rate to use for customer view
  - Hydro proposes very low rate – 1.86% real.
    - Based on real return on risk free savings
    - As customer “investment” in power plan (future lower rates) this is not the appropriate measure:
      - Customer does face risk with future rates
      - Not double counting to look at the source of customer funds
      - Customer inherent time preference can be much different than source of funds.
  - Need to consider higher thresholds – businesses alternative investments; residences alternative savings/debt loads.
  - We have used 5.05% real, but also tested high and low.

# SUPPLEMENTARY CONCLUSIONS (CON'T)

- Embedded equity
  - Concept introduced late in process (MH-95)
  - Lowering economic discount rate to reflect a WACC 100% debt.
  - Premise - debt is the market signal, also the underlying financing of the project for many years. [incl. debt guarantee fee]
    - Poorly named concept – does not reflect any Return on Equity. Reflects discount rate sensitivity. Informative. Patience. Future oriented.
  - Not only MH – BC Hydro has used this concept at times.
  - MH has not proposed to use as main analytical tool. MH supports cautious use.
    - Must be used carefully with financials – reserves, risks, equity, return need to be carefully tracked.

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

2014 DSM Levels 1-3, 2013 Reference Scenario Assumptions, 2014 Capital Cost, NPV Relative to All Gas



Note: Plan 4 is considered hypothetical from a business perspective as a 250 MW interconnection would require renegotiation of a contract with Minnesota Power and is not likely to be approved by US authorities and proceed.

Millions of 2014 Net Present Value Dollars

MH-171(Rev 3) page 2



# SUPPLEMENTARY CONCLUSIONS (CON'T)

## Duration to ratepayer benefits

- Pre-filed testimony cited experience with 3-7 yrs to first sustained customer benefits from new hydro.
  - Gave examples in IRs (Site C, Mayo B, Mayo-Dawson, Snare Cascades, some materials on Muskrat Falls; also Wuskwatim CEC forecasts) MH/MIPUG-I-3
  - Hydro disputed in rebuttal – 3 issues noted:
    - Noted issues of comparing advancement versus different plans, government support or rate policies in many of the cases, and that many of the projects had high cost benchmarks (inefficient oil plants, diesel)
- No factual dispute with Hydro. But misses the point:
  - Each project was assessed against what the utility asserted was the lowest cost/lowest rate impact alternative (e.g., Wuskwatim 2019). Utility advocated a higher cost/higher rate impact alternative based on “cross-over” long-term benefits to customers. Same as with PDP.
  - For projects with gov’t support – this is precisely the conclusion intended: Governments can act to mitigate early rate pressures – and often do



# SUPPLEMENTARY CONCLUSIONS (CON'T)

- Conawapa Now/Conawapa Never
  - Plan 14 (PDP) is based on Conawapa ISD within a range of 2026 to 2031.
    - WPS requires commitment by 2029.
  - Other plans, such as Plan 5/6 (K19/Gas/750MW), and even Plan 1 (All Gas), are based on never proceeding to Conawapa.
    - For this reason, the long-term forecasts (financials in particular) can show nominal values that have unrealistic compounding.
  - Not recommending that conceptual scenarios such as K19/750/Gas/Gas/C47 be run.
  - However, it is a reason for caution in interpreting very long-term rate levels in the financial analysis.

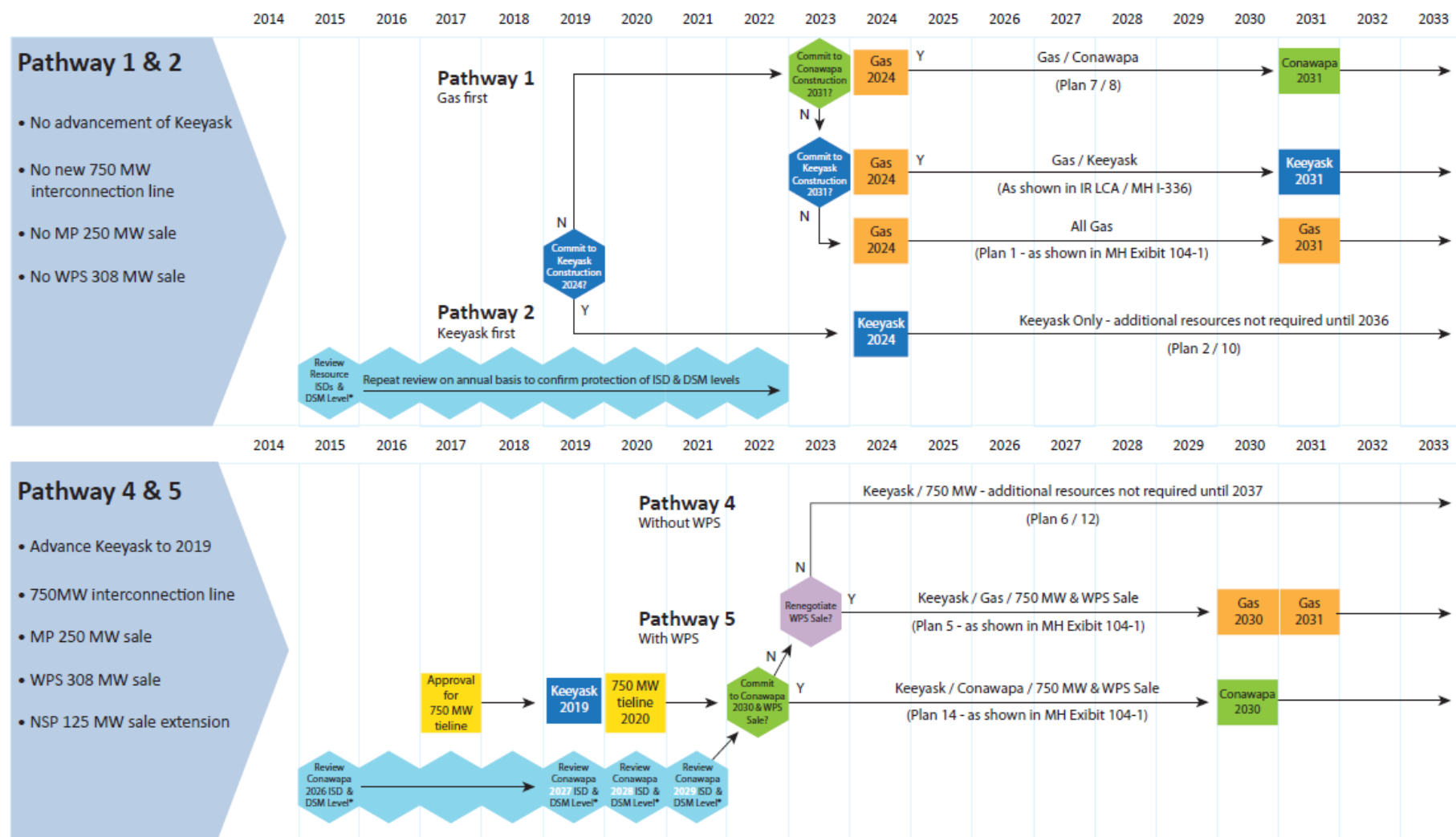
# UPDATED ANALYSIS

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# PATHWAYS/OPTIONALITY/THRESHOLDS

- Pathways narrowed. Need deferred. Clearer distinctions.
- What Needs to be Decided?
  - K19/750 not like “basement bedroom”, more like “suite”.  
Test to stand on its own either way.
    - More, but not much more, debt than All Gas
    - More flexibility to deal with load changes
    - Reliability/security benefits
    - Improved DSM economics
  - Conawapa – “apartment block across town” (merchant)
    - Threshold much higher – more debt, more advancement
  - Much more time to sort out DSM, self-generation, other options.

## Update to Figure 14.2 Pathway Decision Tree - ISD's based on 2013 Load Forecast, Level 2 DSM & Pipeline Load



\*ISD protection contingent on additional export contracts, export prices, load growth, DSM, etc.

# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

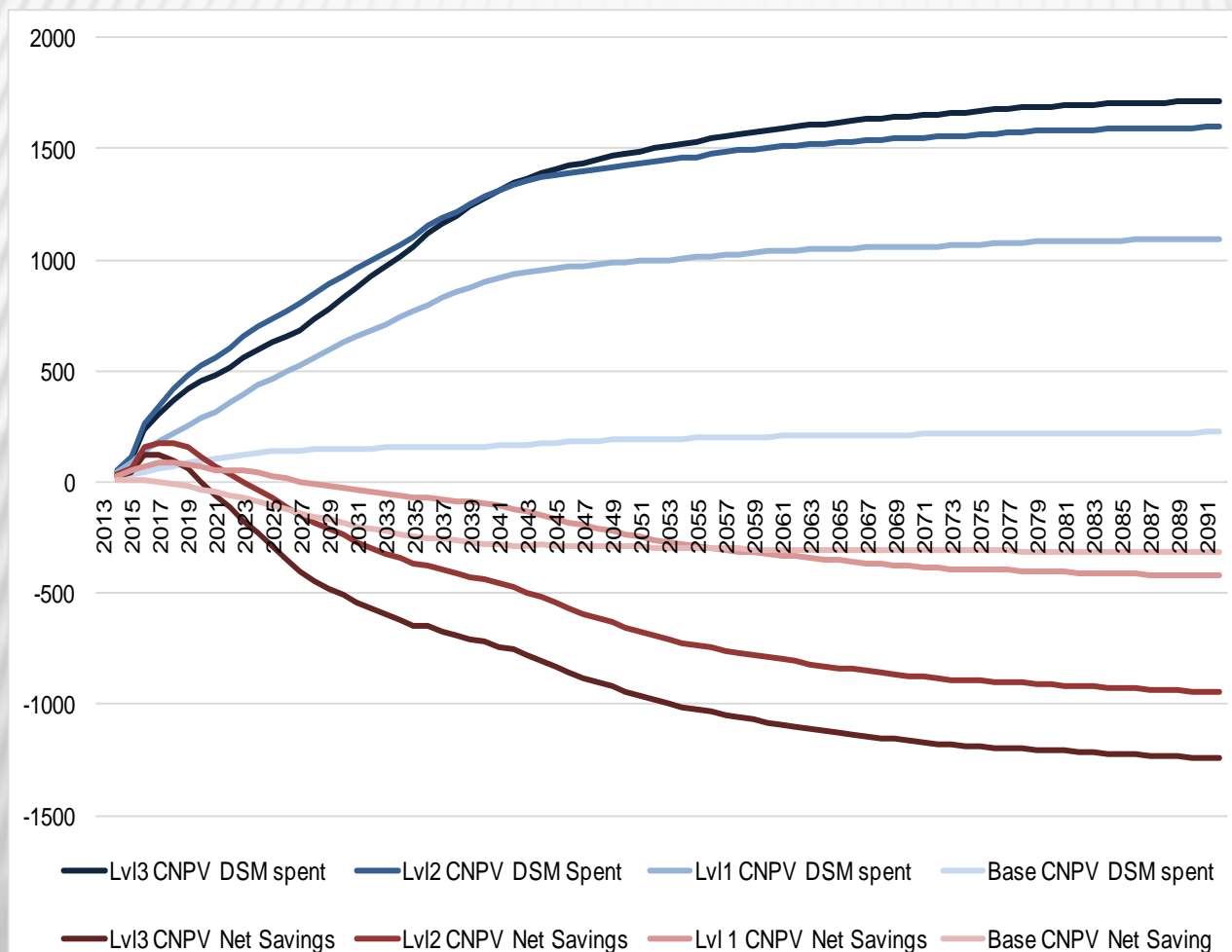
- Originally InterGroup largely ignored Hydro's economic analysis, other than REF-REF-REF.
  - Serious issues with portrayal of scenarios. MIPUG-9-2 Appendix B critique. Entirely related to scenarios that vary discount rate.
  - Dr. Borison rebuttal not address core issues.
- Not same degree of concern now:
  - (1) Hydro recognized error in common costs,
  - (2) only updating REF-REF-REF anyway.
- Some concerns remain about how quilt is presented by MH. Issues not present in La Capra approach or Harper approach (other limitations exist).

# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

- What do we know about DSM from the Updated Economic Analysis?
- The economics update allow for two important comparisons.
  - Customer Perspective; and
  - MH perspective.
- Uses:
  - First to consider the reasonableness of the various DSM Levels proposed,
  - Ultimately for main purpose – does it change which Development Plan is preferred?

# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

## Customer Perspective on Proposed DSM Cost vs. Net Saving (\$Million NPV) – All Plans



- Customers generally better off with bigger plans.

- Level 1 DSM costly to customers; Level 2 DSM less so; Level 3 DSM almost no cost.

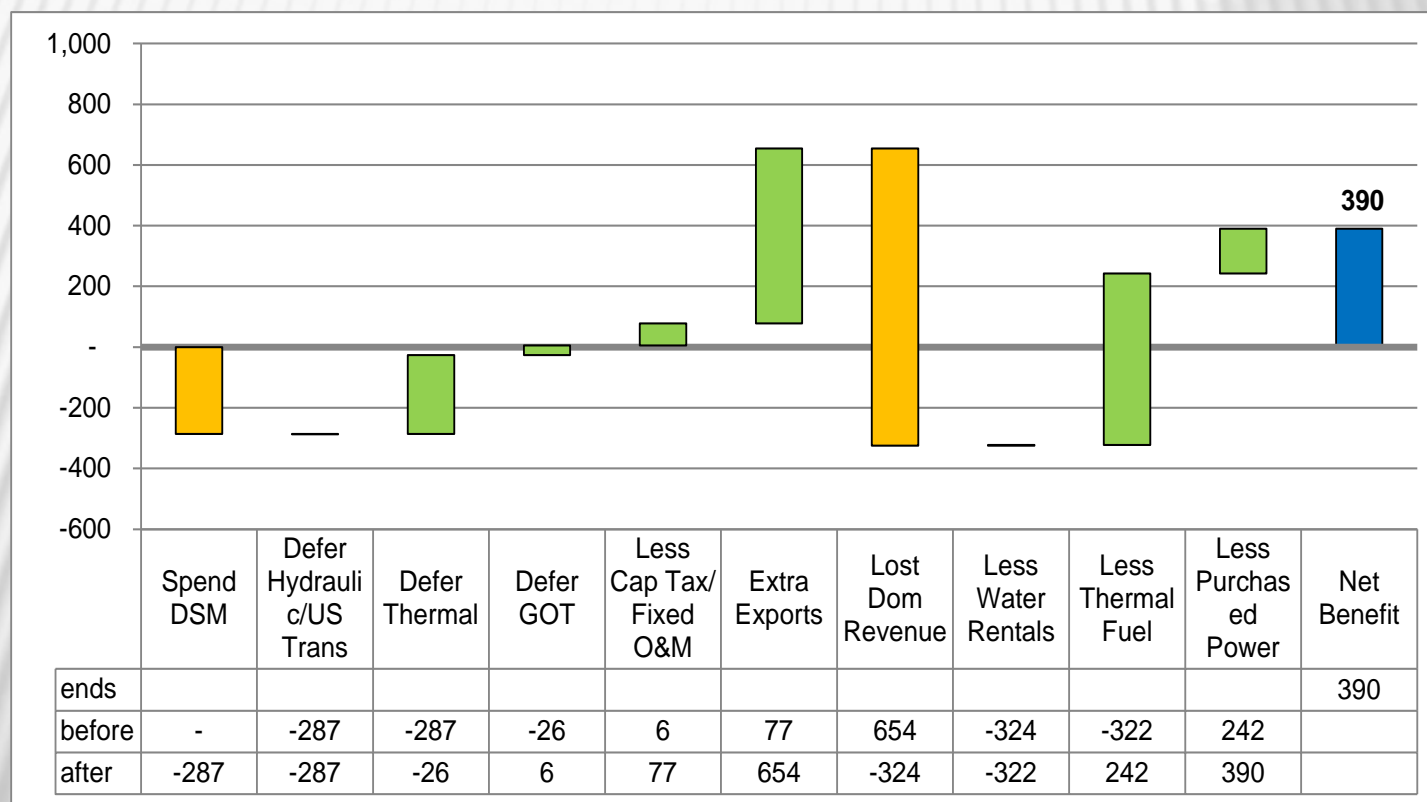
# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

- **Manitoba Hydro Perspective:**
  - Detail - Unable to quantify if Base DSM is positive, as a “No DSM” scenario was not provided.
  - Many variables that have effects for Hydro
    - DSM can lead to more exports, less power purchases, changed development sequences and timing, plant deferral, etc.
  - For updated analysis, tracked the costs/benefits for each subsequent level of DSM (eg. Level 2 vs. Level 1)
  - Presented based on Plan 5 (K19/Gas/750MW) – shows mix of effects on hydro resources and gas.
- Gives helpful perspective on MH, but also other customers who bear the utility costs.



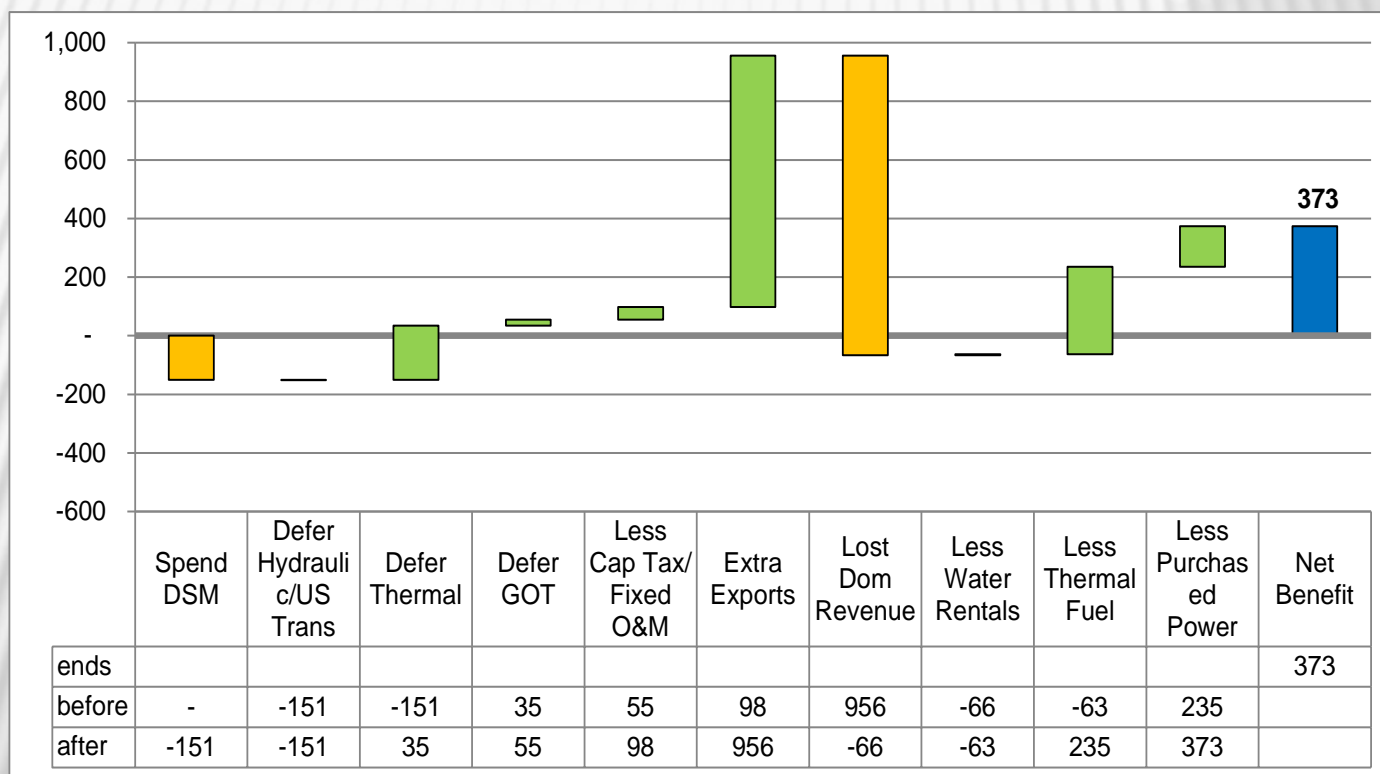
# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

Manitoba Hydro Perspective:  
Plan 5 (K19/Gas/750MW) – Benefits of DSM Level 1 over Base DSM  
(NPV \$millions over 78 years)



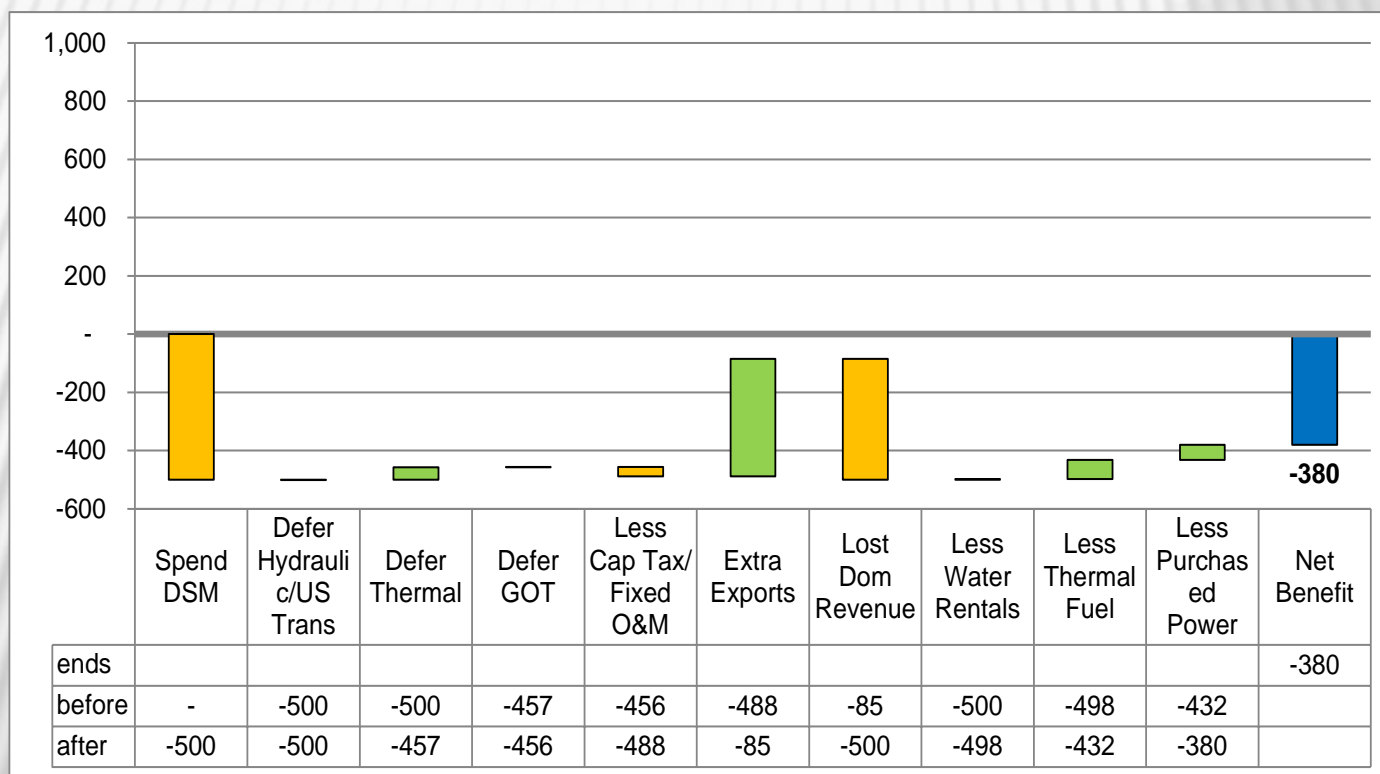
# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

Manitoba Hydro Perspective:  
Plan 5 (K19/Gas/750MW) - Benefits of DSM Level 2 over DSM Level 1  
(NPV \$millions over 78 years)



# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

Manitoba Hydro Perspective:  
Plan 5 (K19/Gas/750MW) - Benefits of DSM Level 3 over DSM Level 2  
(NPV \$millions over 78 years)

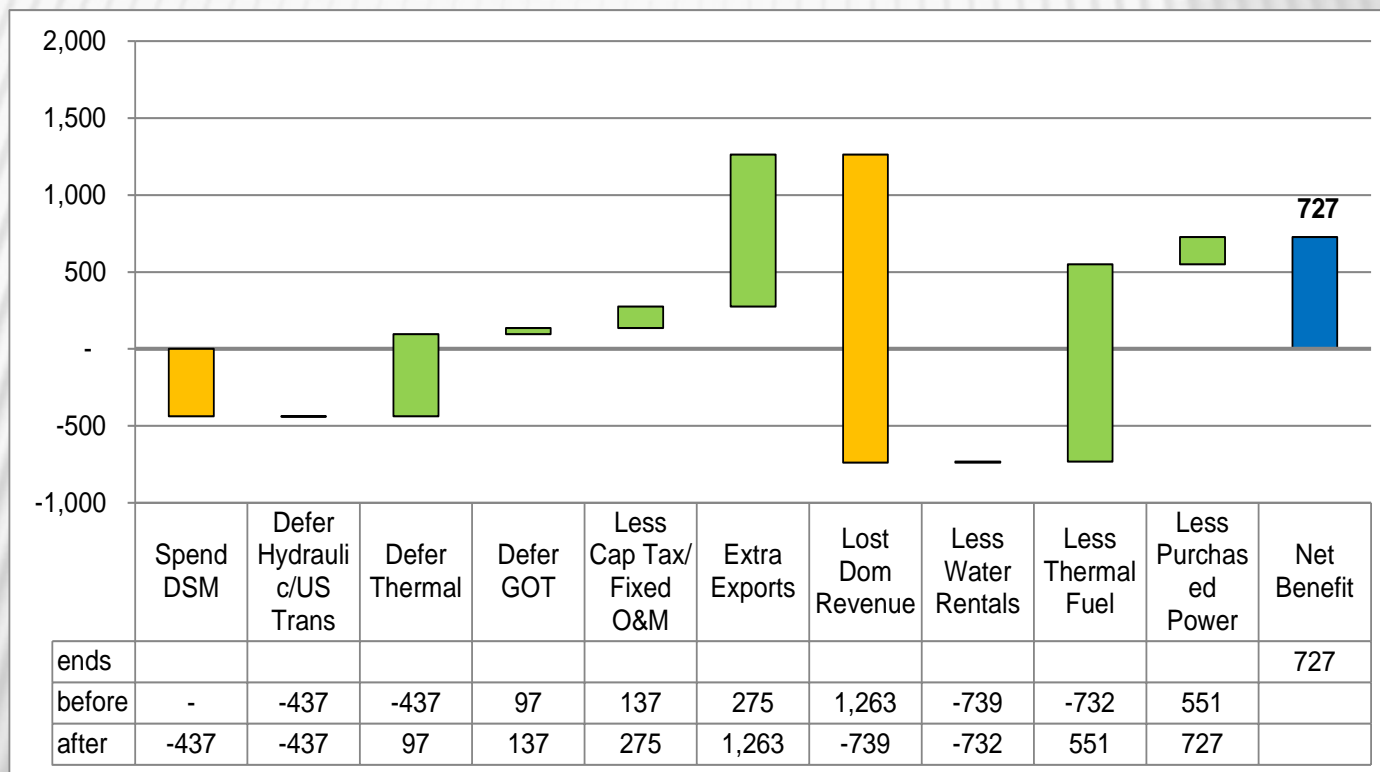


# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

- What does updated DSM do to the Plans?
  - Every plan benefits from adding Level 2 DSM.
  - In general, the more “saturated” plans (more generation relative to Interconnection) the less the DSM is of benefit.
    - Largest benefits under Plans 1 (All Gas) & Plan 5 (K19/Gas/750MW); least Plans 2 (K/Gas) & Plan 14 (PDP).
  - The largest factor is lost domestic revenue.
    - Underlines importance of tracking this impact, including non-participating customers
    - Use of variables such as the RIM test, PACT test advised. Still do not deal with intergenerational impacts.
  - Level 3 DSM is poorly designed or too large a scale – mismatches costs (far too much to Hydro) and benefits (entirely to the customer).
    - Fails TRC view as well

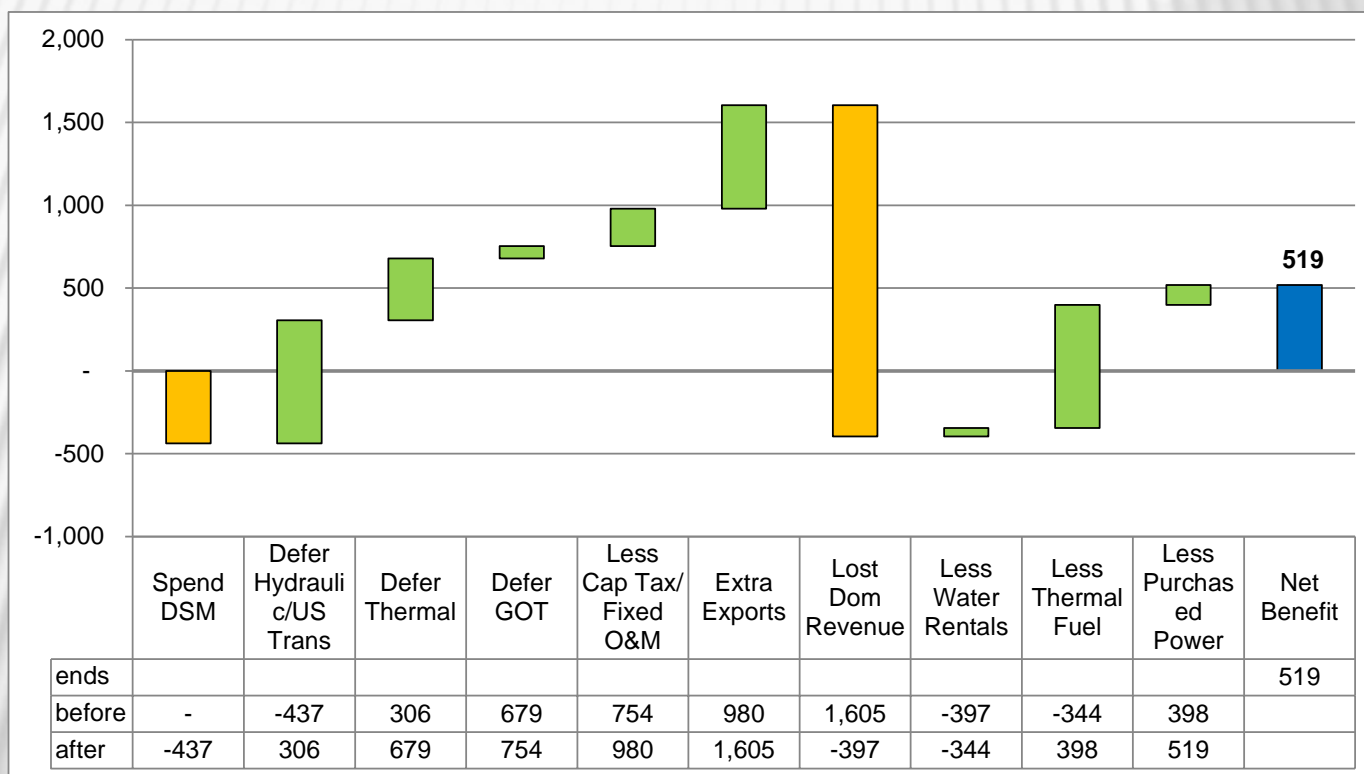
# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

Manitoba Hydro Perspective:  
Plan 1 (All Gas) – Net Benefits of DSM Level 2 over Base DSM  
(\$Millions over 78 years)



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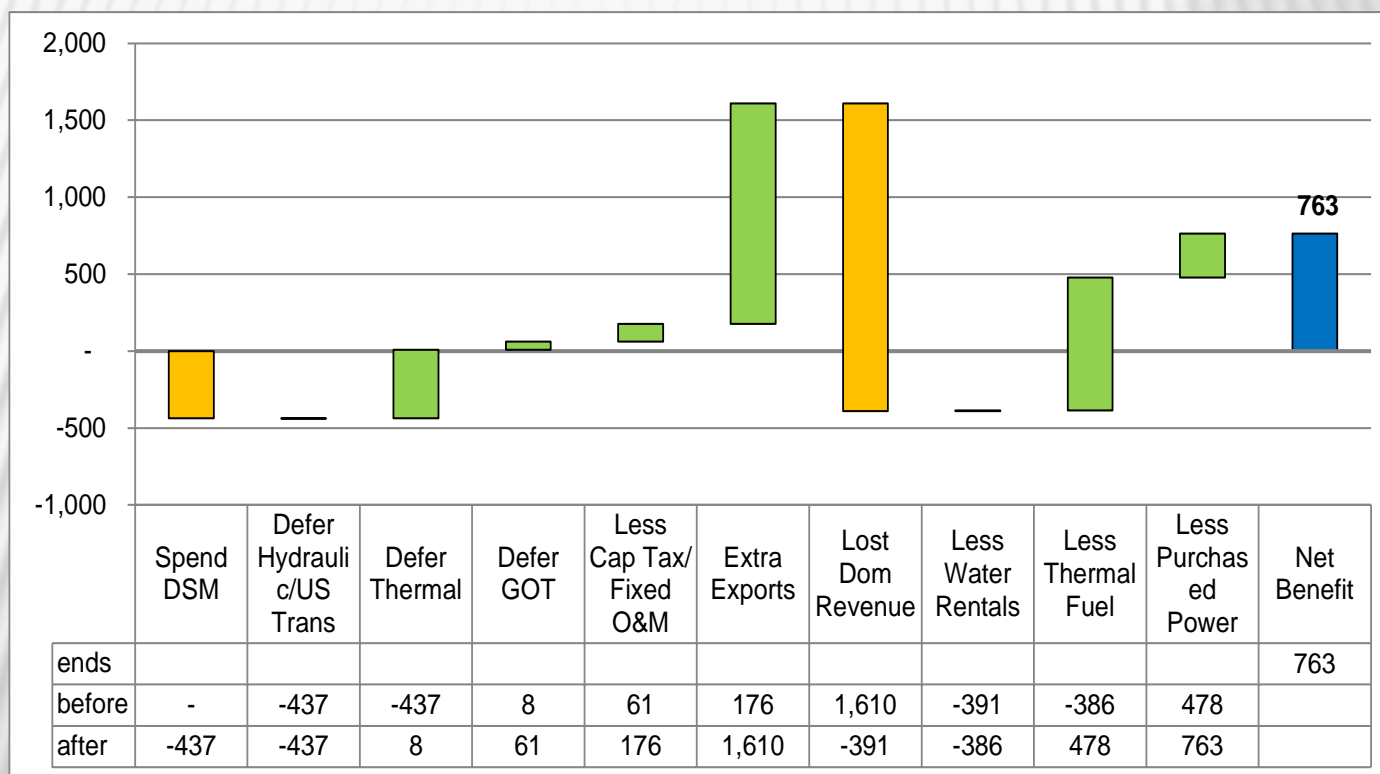
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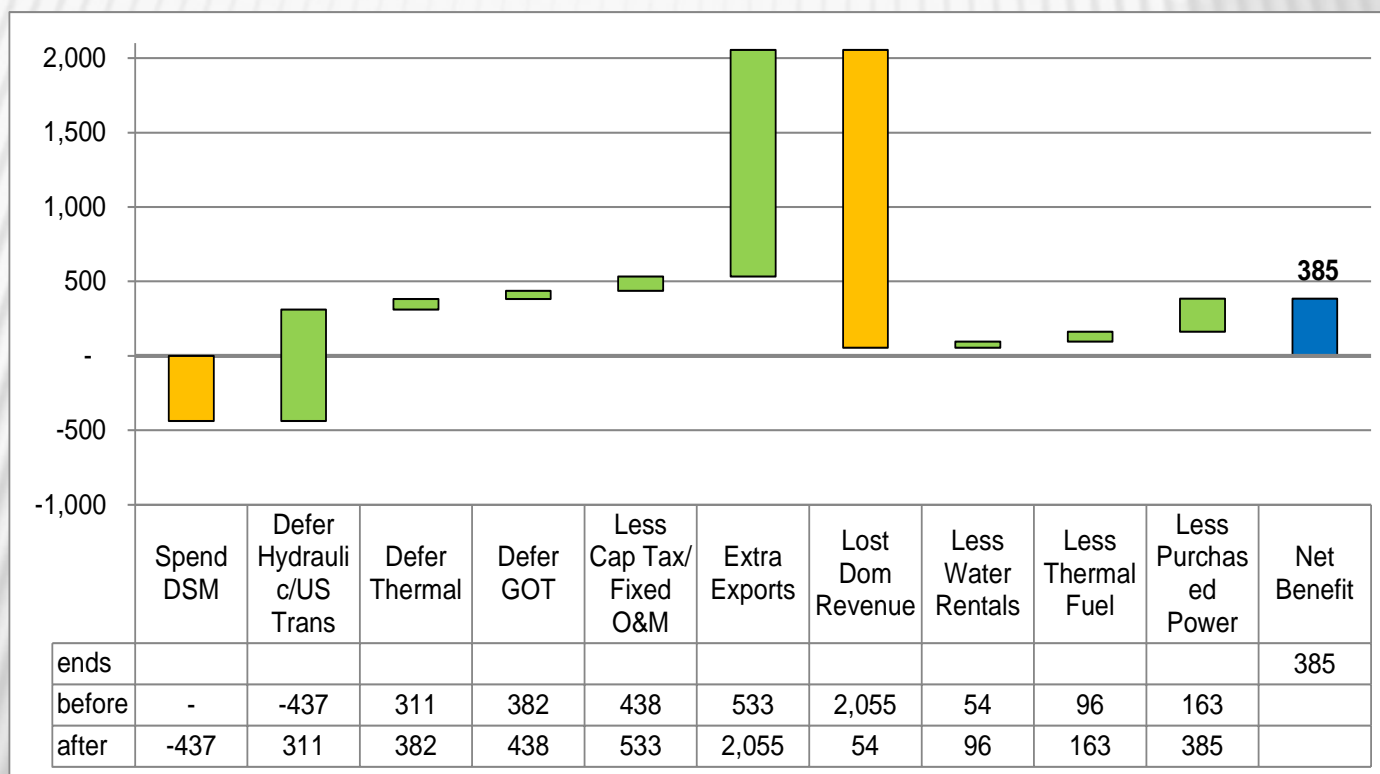
Plan 5 (K19/Gas/750MW) – Net Benefits of DSM Level 2 over Base DSM  
(\$Millions over 78 years)





# DSM ECONOMIC UPDATED ANALYSIS (MH-104)

Manitoba Hydro Perspective:  
Plan 14 (PDP) – Net Benefits of DSM Level 2 over Base DSM  
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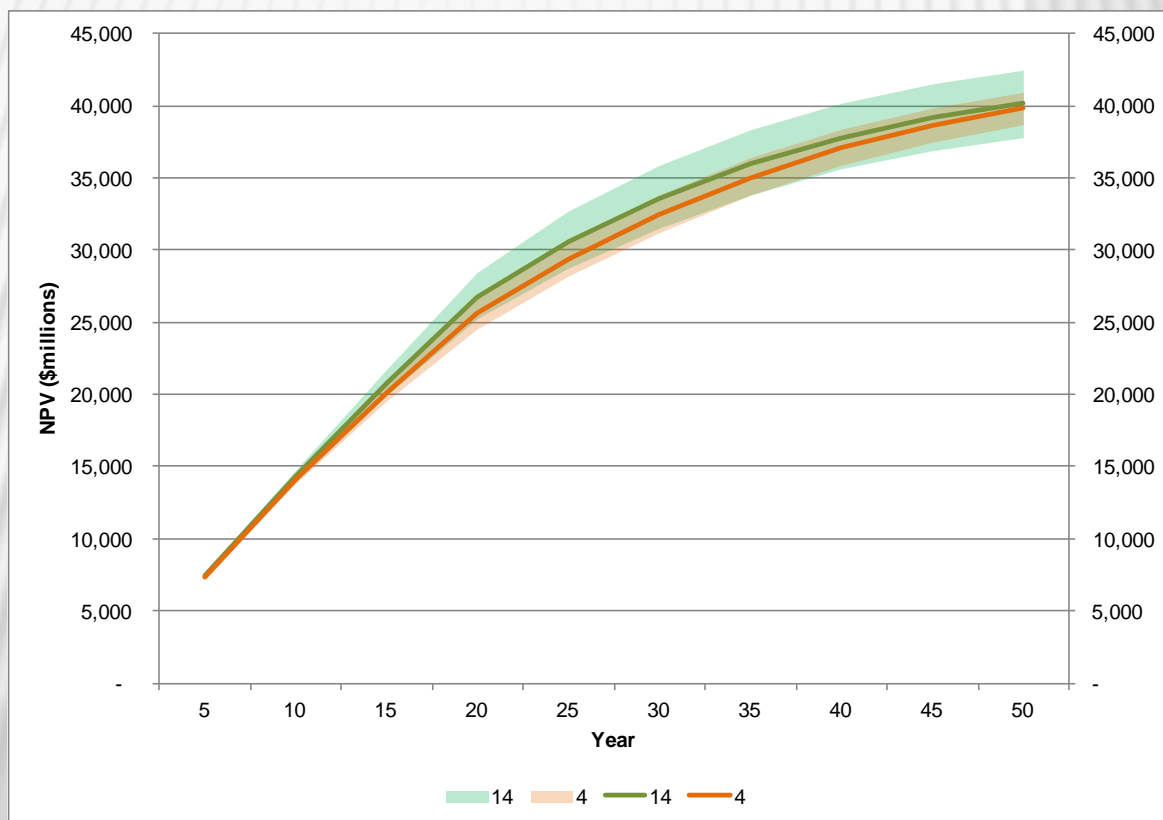
# DSM FINANCIAL UPDATED ANALYSIS (MH-104)

- Due to concerns about the MH economic approach, originally largely ignored Hydro's economic analysis, and focused on financials in MIPUG-9-2.
  - Not intended as a financial analysis, per se – still looking at economics of plans, but from ratepayer perspective.
- Focused on total amounts paid by ratepayers (cumulative NPV)
  - All plans had same load forecast so this was reasonable comparison. Cost for given quantity of energy.
- Had entire 27 scenario analysis to work with.

# ORIGINAL ANALYSIS – IMPACT ON RATES

## Original MIPUG-9-2 App. C, Figure 14

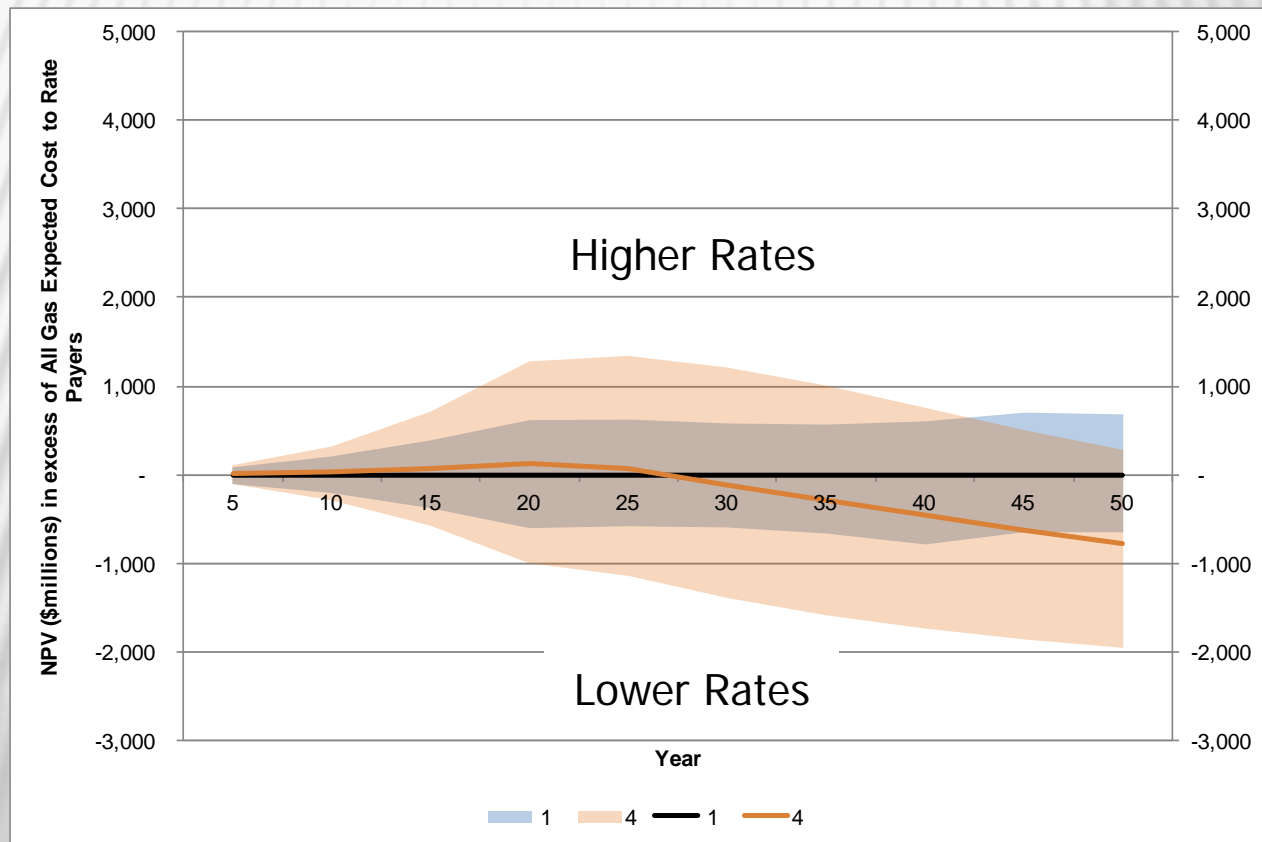
NPV Total Amount Paid in Rates at 5.05% Real Discount Rate Plan 4 (K19/Gas/250MW) vs. 14 (PDP) (\$ Millions)



# ORIGINAL ANALYSIS – IMPACT ON RATES

## Original MIPUG-9-2 App. C, Figure 16

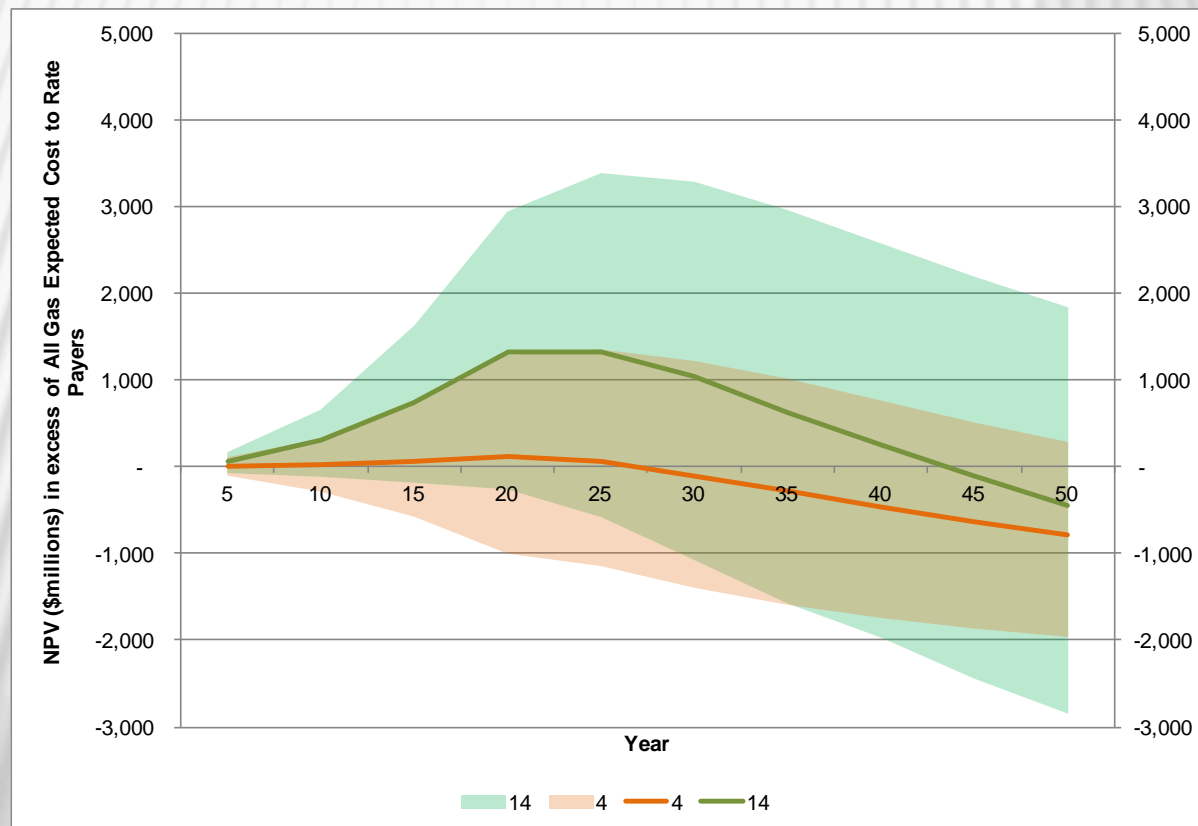
Plan 1 (All Gas) vs. Plan 4 (K19/Gas/250MW) at 5.05% Real Discount Rate - NPV of Incremental Domestic Costs as Compared to Plan 1 (All Gas) Expected Value (\$ Millions)



# ORIGINAL ANALYSIS – IMPACT ON RATES

## Original MIPUG-9-2 App. C, Figure 17

Plan 4 (K19/Gas/250MW) vs. Plan 14 (PDP) at 5.05% Real Discount Rate - NPV of Incremental Domestic Costs as Compared to Plan 1 (All Gas) Expected Value (\$ Millions)



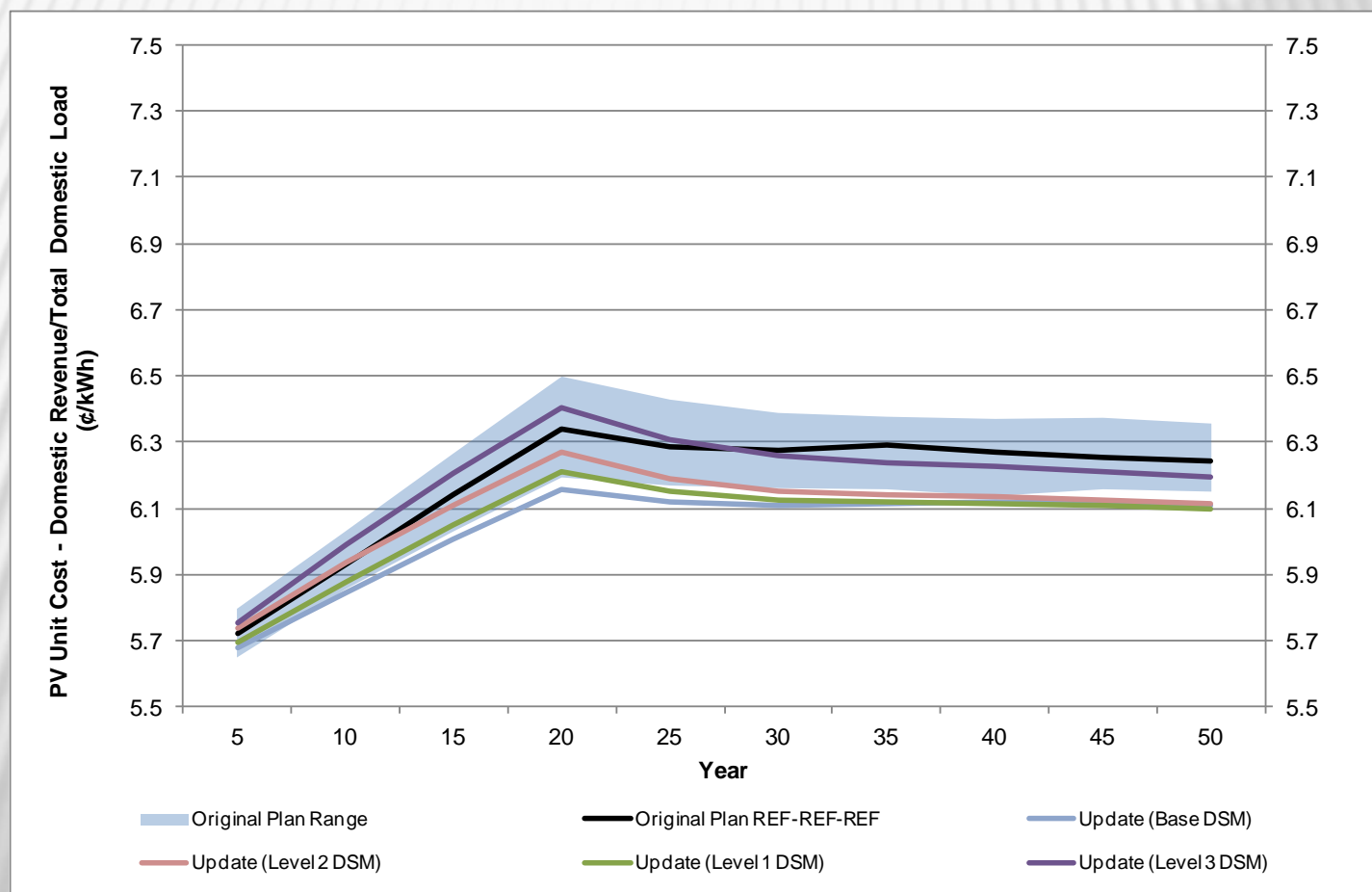
# DSM FINANCIAL UPDATED ANALYSIS (MH-104)

- Current situation different than in original filing:
  1. Do not have 27 scenarios updated
  2. Loads change across scenarios – new load forecast, changing DSM, pipeline.
- Required to adopt new approach – levelize across units.
  - Same NPV approach as before for amounts paid
  - Now divided by NPV of domestic load
- Can compare to original scenario to see if material changes.

Conclusion – with DSM Level 2, All Gas is improved over long term. Otherwise, overall rate impacts are largely as presented in original testimony.

# FINANCIAL UPDATED ANALYSIS (MH-104-12)

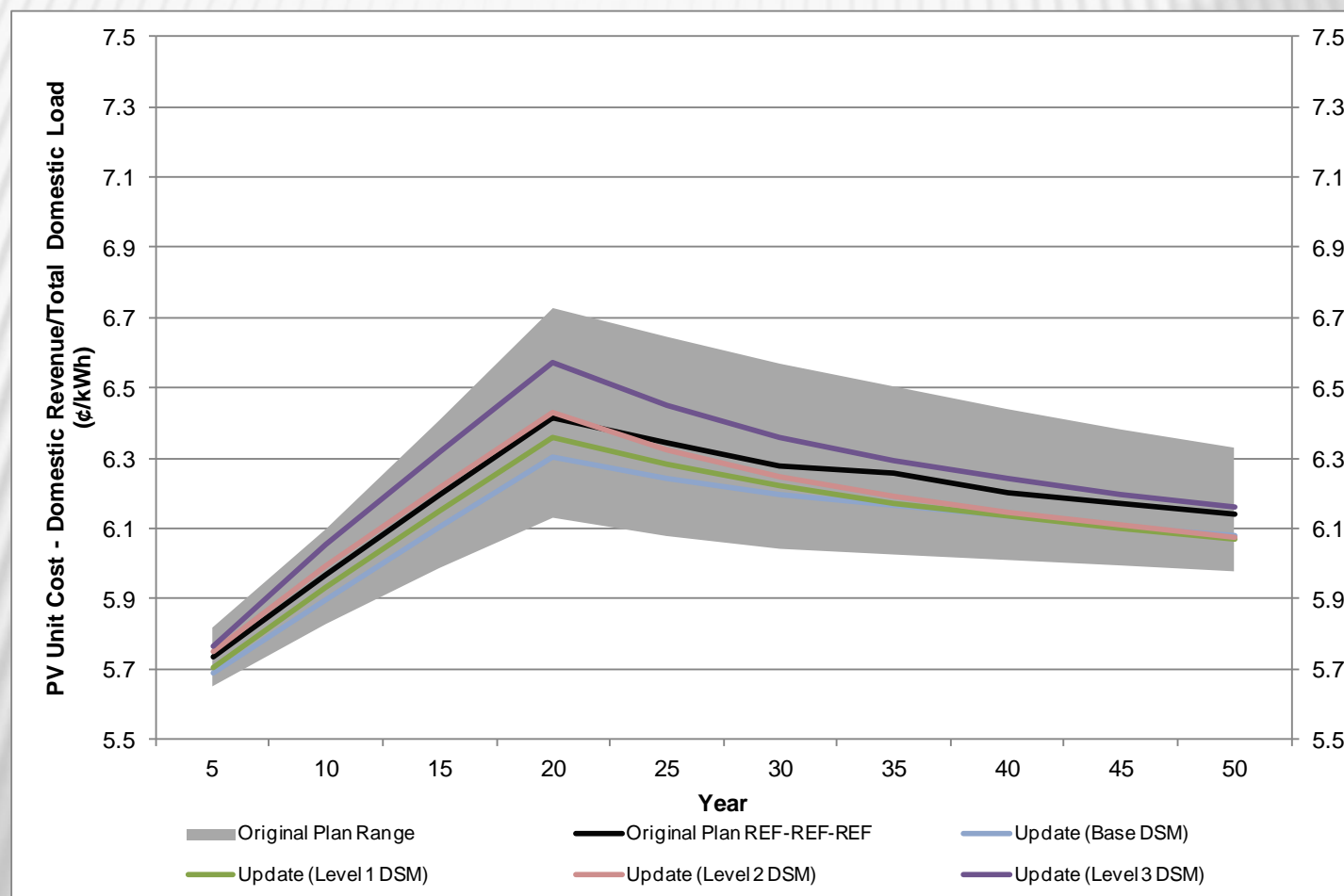
Plan 1 (All Gas) Unit Cost Comparison Original Filing (Range and REF-REF-REF) vs. Update (¢/kWh)





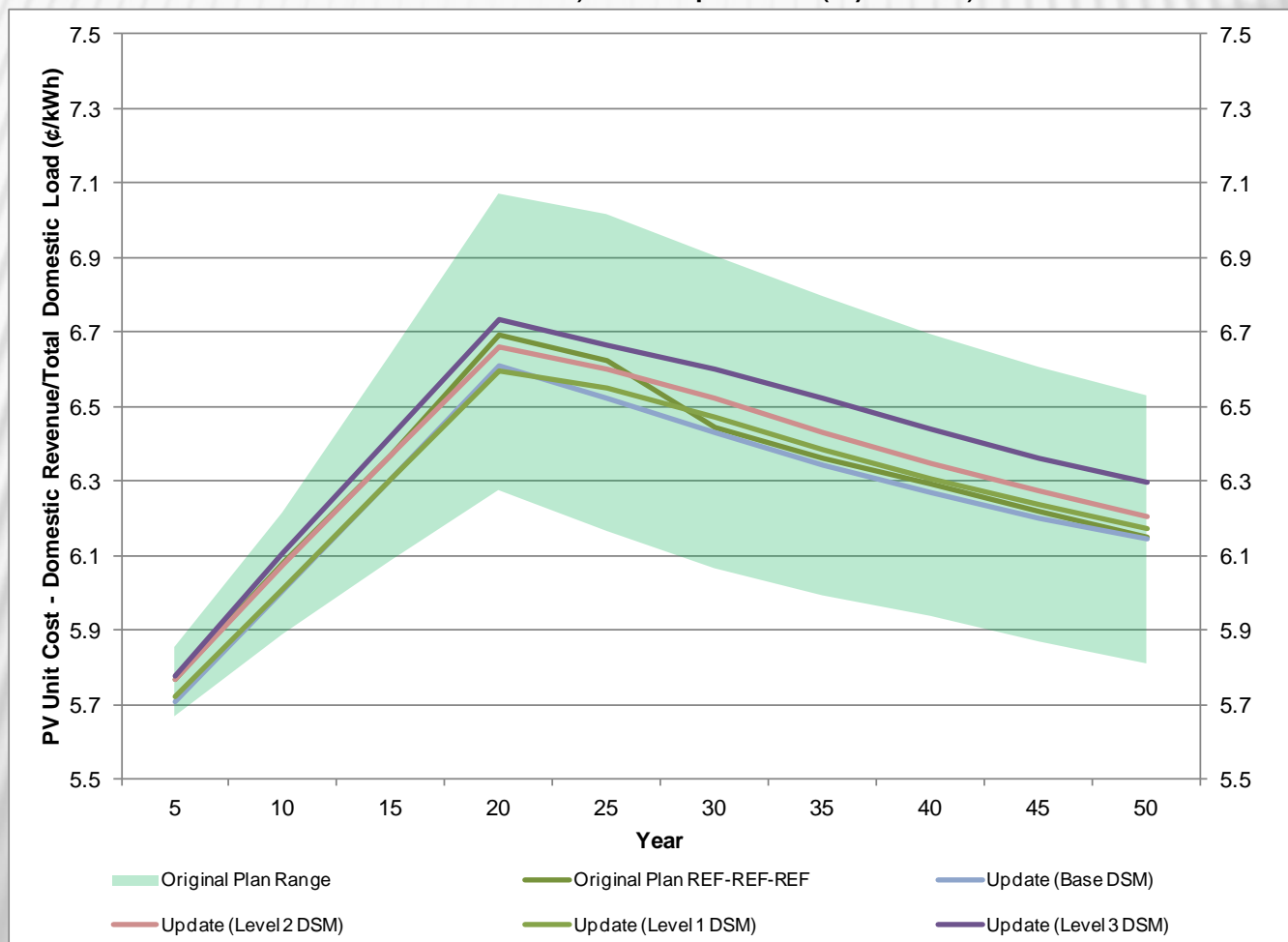
# FINANCIAL UPDATED ANALYSIS (MH-104-12)

Plan 5/6 (K19/Gas/750MW) Unit Cost Comparison Original Filing  
(Range and REF-REF-REF) vs. Update (¢/kWh)



# FINANCIAL UPDATED ANALYSIS (MH-104-12)

Plan 14 (PDP) Unit Cost Comparison Original Filing (Range and REF-REF-REF) vs. Update (¢/kWh)

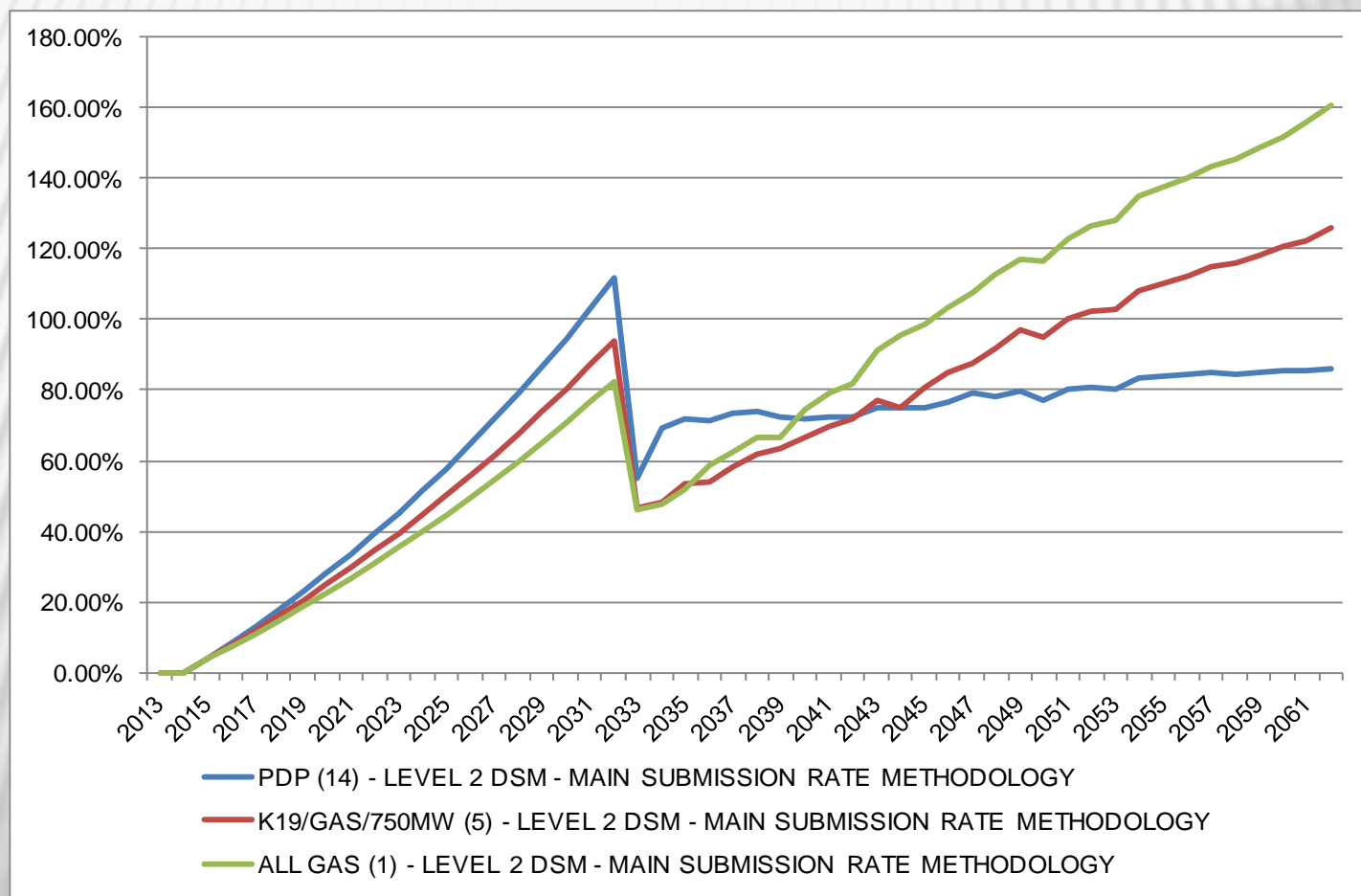


# DSM FINANCIAL UPDATED ANALYSIS (MH-104)

- Based on the above, no reason to change basic conclusions.
- Did also review new rate methodologies
  - Alternative 1 – 3.95% until 1.2 Int. Coverage ratio reached
  - Alternative 2 – Based on Alt. 1, add increases to minimize net losses
- Appears designed to favour Plan 14
  - worst impacts on plans that amortize sunk costs
  - Effect depends heavily on how sunk costs are modelled
- End result – largely same as original filing,
  - pushed Plan 14 “bump” 1-2 decades later;
  - sacrifices on financial targets.

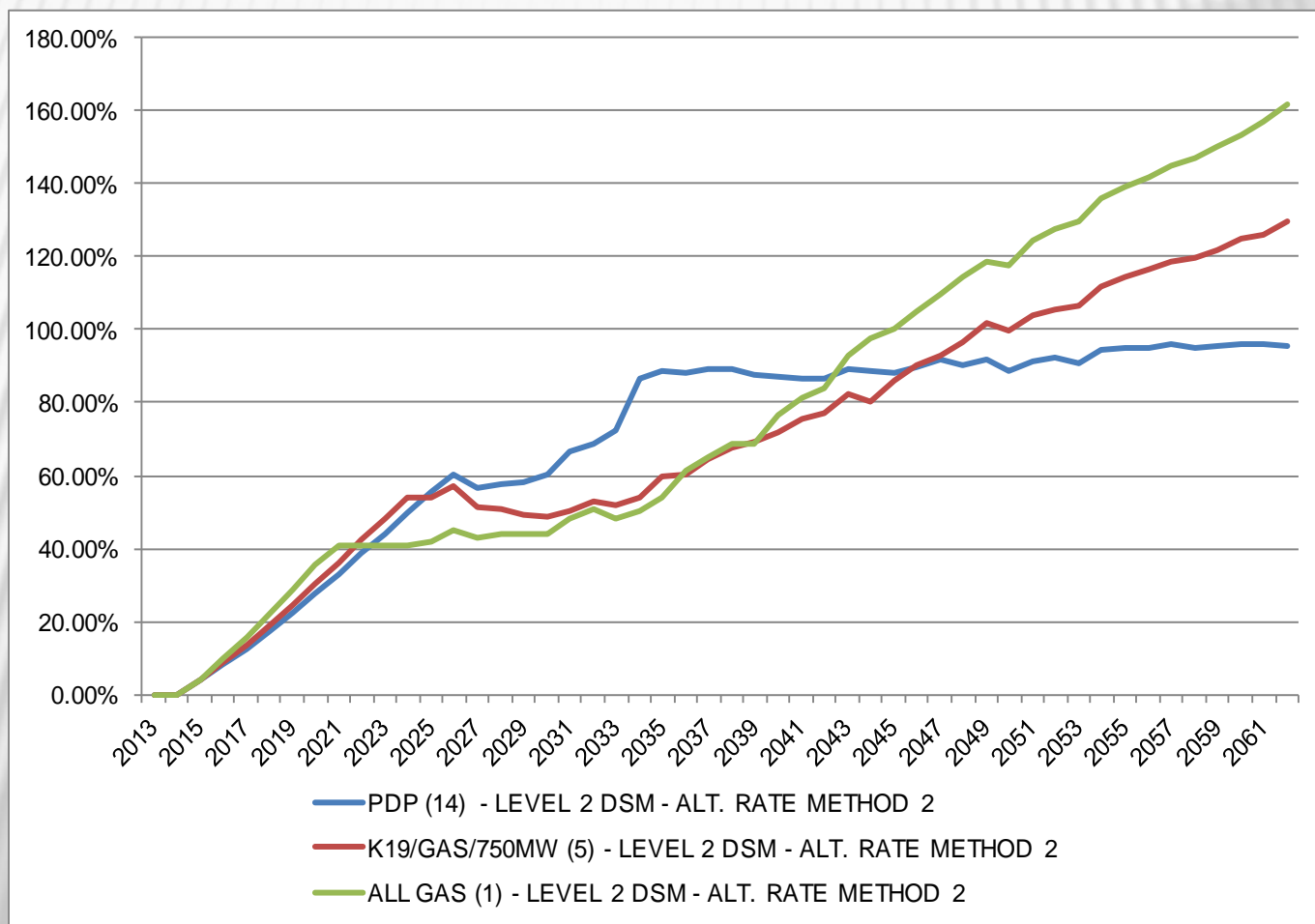
# FINANCIAL UPDATED ANALYSIS (MH-104-12)

## Comparison of Cumulative Rate Increases – Main Submission Methodology



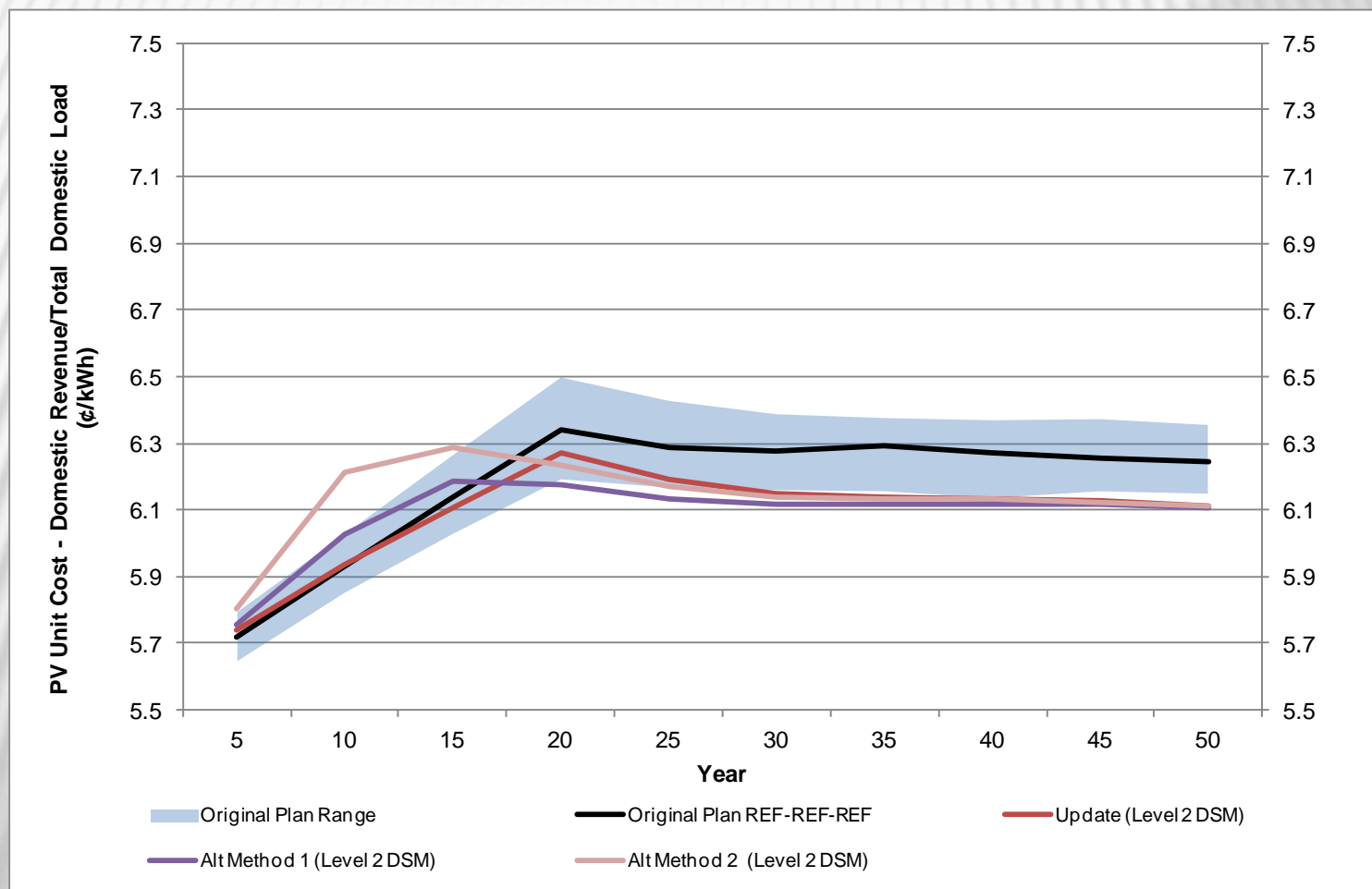
# FINANCIAL UPDATED ANALYSIS (MH-104-12)

## Comparison of Cumulative Rate Increases – Alternative Rate Methodology #2



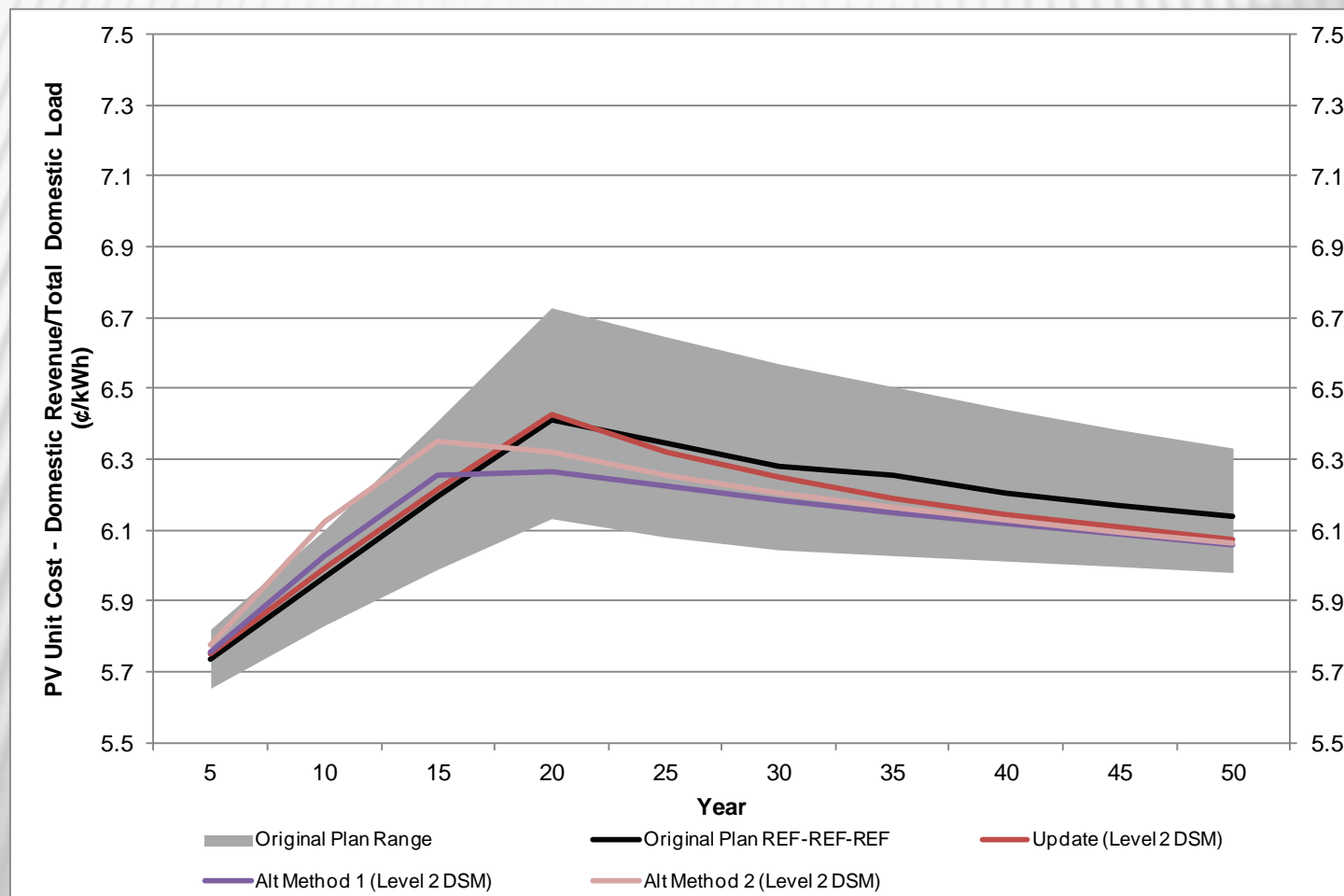
# FINANCIAL UPDATED ANALYSIS (MH-104-12)

Plan 1 (All Gas) Unit Cost Comparison Original Filing (Range and REF-REF-REF) vs. Updated Methods with Level 2 DSM (¢/kWh)



# FINANCIAL UPDATED ANALYSIS (MH-104-12)

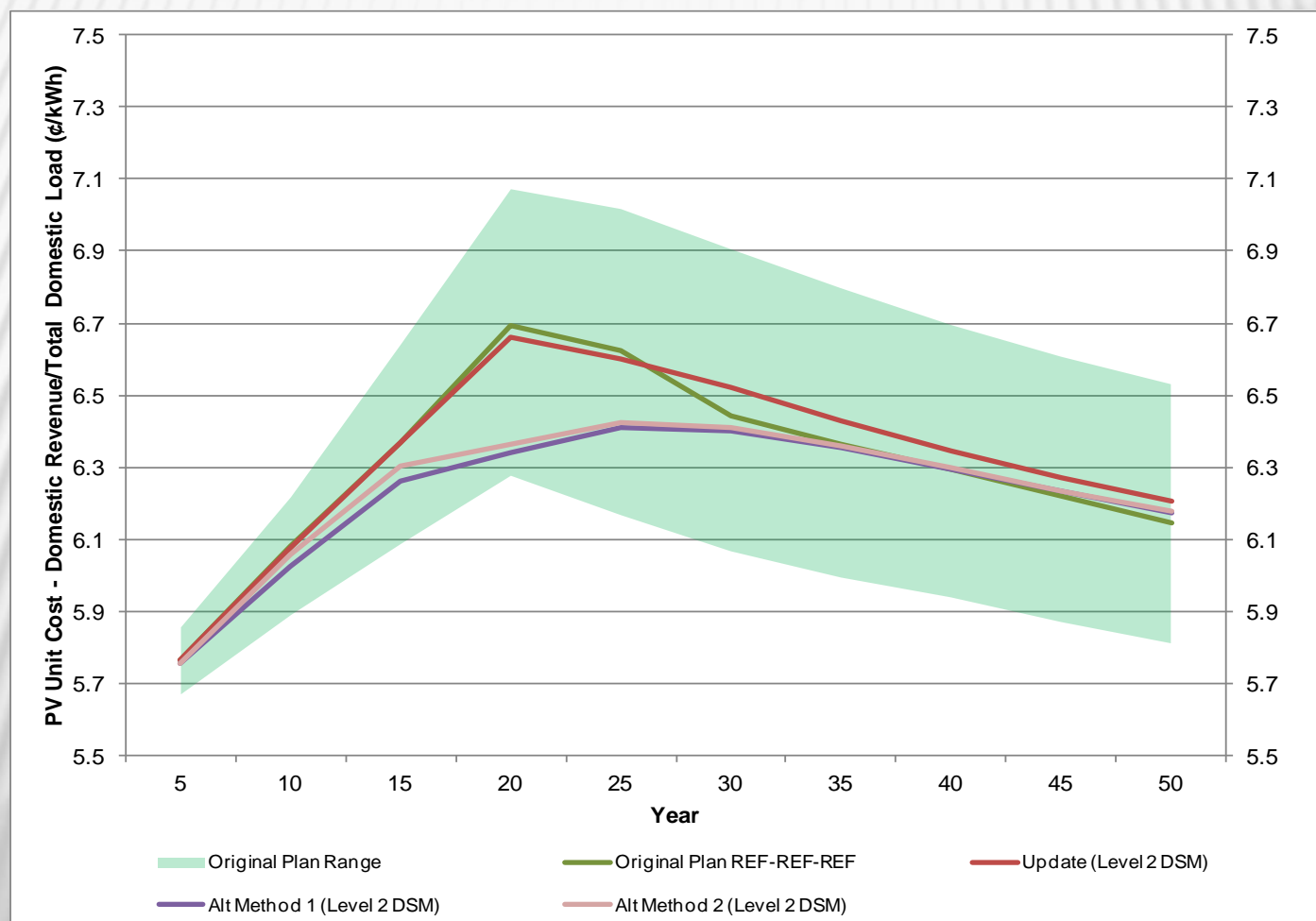
Plan 5/6 (K19/Gas/750MW) Unit Cost Comparison Original Filing (Range and REF-REF-REF) vs. Updated Methods with Level 2 DSM ( $\text{\$/kWh}$ )





# FINANCIAL UPDATED ANALYSIS (MH-104-12)

Plan 14 (PDP) Unit Cost Comparison Original Filing (Range and REF-REF-REF) vs. Updated Methods with Level 2 DSM (¢/kWh)

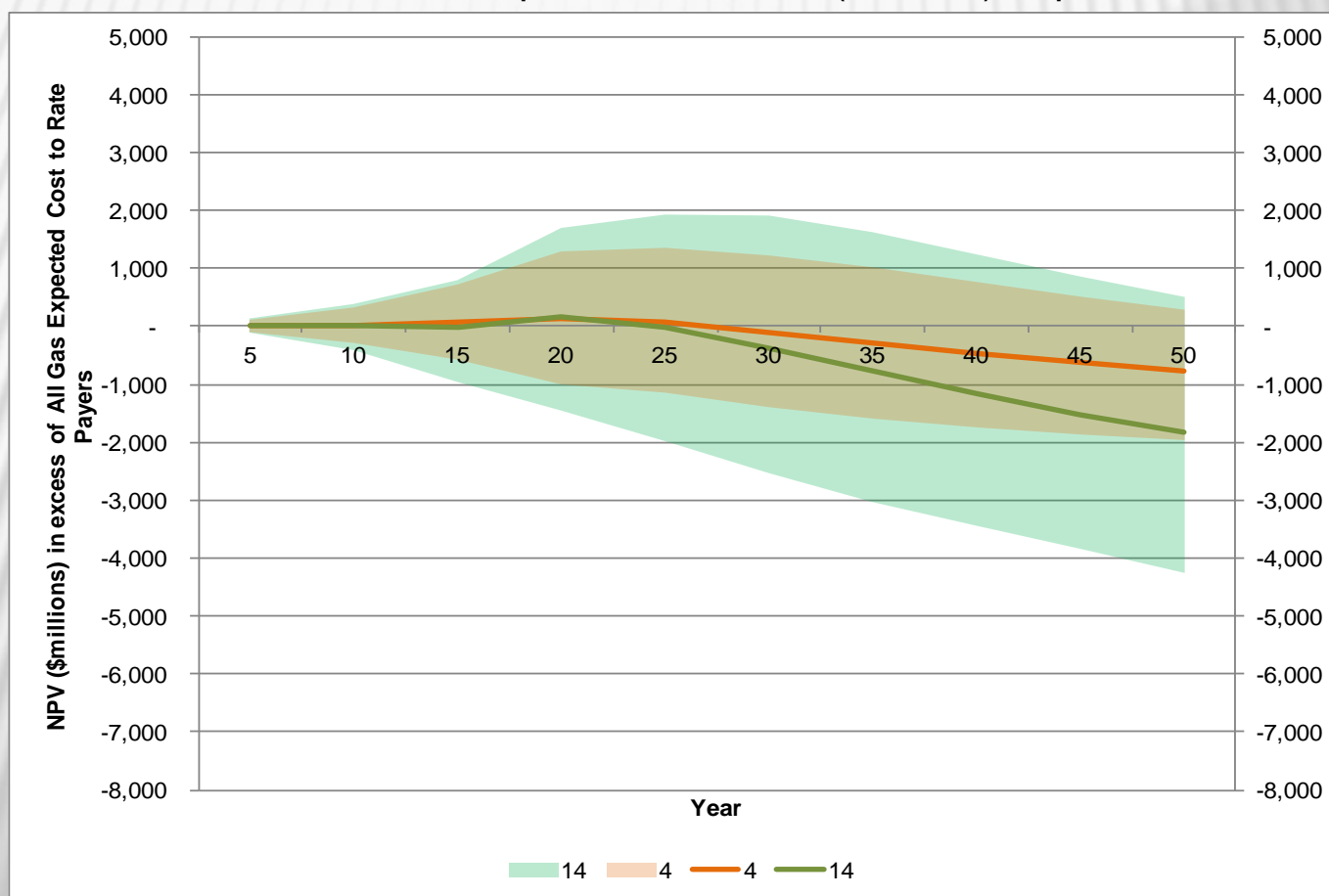


# MITIGATION (HOW TO MAKE PROJECTS WORK)

- Original evidence highlighted imbalance:
  - Plan 14 (PDP) not favourable to ratepayers – higher rates, more risk
  - Plan 14 (PDP) by far most beneficial to government
- Much like many other development projects
- There are ways to solve. Modelled easiest – government charges relief.
  - These revenues to government would not occur otherwise, so there is no net loss to government.
  - Degree of relief, length of time, which charges halted – needs to be further analyzed.
- Was clear that there is sufficient room to bridge gap – modelled only to 15 years post-ISD.

# FINANCIAL UPDATED ANALYSIS (MH-104-12)

Original MIPUG-9-2 App. C, Figure 35 – Plan 14 (PDP) vs Plan 4 (K19/Gas/250MW) with Government Benefits Sharing Relief – 5.05% discount rate – As compared to Plan 1 (All Gas) Expected Value



# FINAL SUMMARY

1. Maintain planning, DSM, monitor options.
  - Focus on tests for DSM that include domestic revenue.
2. Pursue Keeyask, MP 250, 750 MW T-line.
3. More work needed on Conawapa economics
  - a. Too much overall provincial benefit to abandon yet
  - b. Need proper info - contracts completed
  - c. Unlikely to become economic without rebalancing of provincial charges. If this is done properly, may make Plan 14 (PDP) the best economic plan even under today's assumptions.
  - d. Still must address absolute debt balances - risk.

# Surplus Energy - By Design

