PRE-FILED TESTIMONY OF

P. BOWMAN

IN REGARD TO THE MANITOBA HYDRO NEEDS FOR AND ALTERNATIVES TO ("NFAT") BUSINESS CASE SUBMISSION

Submitted to:

The Manitoba Public Utilities Board

on behalf of

Manitoba Industrial Power Users Group

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income tax on workers employed on Hydro projects, or from indirect impacts such as changes in the level of Manitoba economic activity that arise from higher or lower rate levels and the resulting wealth of Manitobans. The vast majority (>98%) relate to the provincial Government.

Each expected value and P10/P90 percentile is reported as an increment over the expected value of Plan 1 (All Gas)[55].

Note: These tables have been corrected for an error in the calculation of the P10 and P90 Government Benefits values for Plan 13 (K19/C25/250MW).

Table 3: NPV of Total Benefits to Ratepayers and Government at Year 20 (2031/32) for Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 20 years ($ Millions) [P10/90]	**Pthwy 1**	**Pthwy 2**		**Pthwy 3**		**Pthwy 4**		**Pthwy 5**
	Plan 1	**Plan 7**	**Plan 2**	**Plan 4**	**Plan 13**	**Plan 6**	**Plan 12**	**Plan 14**
Ratepayer Benefit	**0** [(623)/ 601]	**(954)** [(1995) /95]	**(177)** [(1,223) /802]	**(126)** [(1,285) /1,002]	**(1,379)** [(3,033)/ 258]	**(301)** [(1,543) /849]	**(914)** [(2,238) /275]	**(1,319)** [(2,935)/ 261]
Government Benefit	**0** [(357)/ 321]	**1,545** [1,201/ 1,822]	**1,354** [1,059/ 1,623]	**1,290** [892/ 1,661]	**2,948** [2,529/ 3,324]	**1,299** [885/ 1,689]	**2,830** [2,348 /3,210]	**2,954** [2,530/ 3,349]
Total Plan Benefits	**0** [(980)/ 922]	**591** [(794)/ 1,917]	**1,177** [(164)/ 2,425]	**1,164** [(393)/ 2,663]	**1,569** [(504)/ 3,583]	**998** [(658)/ 2,538]	**1,916** [110/ 3,485]	**1,635** [(405)/ 3,610]

Table 3 indicates the Expected Value (EV) benefits (in bold) with negative values indicating net negative impacts compared to the Plan 1 (All Gas) EV. The bolded values are the impact based on EV which the lower values in each cell reflect the upside and downside ranges associated with P90 and P10 conditions. All weighting are as per Hydro's NFAT.

The first set of values reflects benefits to ratepayers, while the second row is benefits to Government. The final row is the sum of benefits (which effectively represents benefits to Manitoba generally).

[55] Assuming 5.05% real discount rate and methodology explained in Appendix C: Results of InterGroup Financial Analysis.

Table 4: NPV of Total Benefits to Ratepayers and Government at Year 30 (2041/42) for Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 30 years ($ Millions) [P10/90]	Pthwy 1	Pthwy 2		Pthwy 3		Pthwy 4		Pthwy 5
	Plan 1	Plan 7	Plan 2	Plan 4	Plan 13	Plan 6	Plan 12	Plan 14
Ratepayer Benefit	**0** [(586)/ 593]	**(850)** [(2,316)/ 574]	**(164)** [(1,376)/ 1,083]	**110** [(1,215) /1,395]	**(1,263)** [(3,658)/ 964]	**(138)** [(1,524) /1,204]	**(1,078)** [(3,151) /840]	**(1,031)** [(3,277)/ 1,074]
Government Benefit	**0** [(384)/ 344]	**1,896** [1,492/ 2,229]	**1,666** [1,300/ 1,996]	**1,562** [1,093/ 1,959]	**3,577** [3,073/ 4,038]	**1,572** [1,100/ 1,989]	**3,601** [3,018/ 4,086]	**3,598** [3,093/ 4,089]
Total Plan Benefits	**0** [(970)/ 937]	**1,046** [(824)/ 2,803]	**1,502** [(76)/ 3,079]	**1,672** [(122)/ 3,354]	**2,314** [(585)/ 5,001]	**1,434** [(424)/ 3,193]	**2,523** [(133)/ 4,926]	**2,567** [(184)/ 5,163]

Table 5: NPV of Total Benefits to Ratepayers and Government at Year 40 (2051/52) for Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 40 years ($ Millions) [P10/90]	Pthwy 1	Pthwy 2		Pthwy 3		Pthwy 4		Pthwy 5
	Plan 1	Plan 7	Plan 2	Plan 4	Plan 13	Plan 6	Plan 12	Plan 14
Ratepayer Benefit	**0** [(609)/ 786]	**(392)** [(1,924)/ 1,069]	**100** [(904)/ 1,354]	**457** [(759)/ 1,742]	**(532)** [(2,971)/ 1,817]	**218** [(1,030) /1,540]	**(472)** [(2,664) /1,638]	**(240)** [(2,567)/ 1,967]
Government Benefit	**0** [(398)/ 367]	**2,010** [1,553/ 2,382]	**1,811** [1,384/ 2,205]	**1,686** [1,159/ 2,114]	**3,804** [3,231/ 4,321]	**1,690** [1,160/ 2,141]	**3,883** [3,242/ 4,420]	**3,830** [3,256/ 4,366]
Total Plan Benefit	**0** [(1,007)/ 1,153]	**1,618** [(371)/ 3,451]	**1,911** [480/ 3,559]	**2,143** [400/ 3,856]	**3,272** [260/ 6,138]	**1,908** [130/ 3,681]	**3,411** [578/ 6,058]	**3,590** [689/ 6,333]

Table 6: NPV of Total Benefits to Ratepayers and Government at Year 50 (2061/62) for Complete Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 50 years ($ Millions) [P10/90]	**Pthwy 1**	**Pthwy 2**		**Pthwy 3**		**Pthwy 4**		**Pthwy 5**
	Plan 1	**Plan 7**	**Plan 2**	**Plan 4**	**Plan 13**	**Plan 6**	**Plan 12**	**Plan 14**
Ratepayer Benefit	**0** [(688)/ 648]	**(12)** [(1,412)/ 1,353]	**444** [(393)/ 1,553]	**780** [(282)/ 1,960]	**105** [(2,259)/ 2,631]	**557** [(524)/ 1,760]	**141** [(2,001) /2,434]	**439** [(1,833)/ 2,841]
Government Benefit	**0** [(408)/ 381]	**2,048** [1,565/ 2,423]	**1,849** [1,396/ 2,264]	**1,731** [1,177/ 2,187]	**3,889** [3,277/ 4,442]	**1,729** [1,171/ 2,211]	**3,986** [3,307/ 4,542]	**3,918** [3,304/ 4,495]
Total Plan Benefit	**0** [(1,096)/ 1,029]	**2,036** [153/ 3,776]	**2,293** [1,003/ 3,817]	**2,511** [895/ 4,147]	**3,994** [1,018/ 7,072]	**2,286** [647/ 3,971]	**4,127** [1,306/ 6,976]	**4,357** [1,471/ 7,336]

As can be seen from the tables:

- None of the Plans start to become beneficial to ratepayers up to year 20 as compared to Plan 1 (All Gas) as per Table 3.
- Table 4 shows an initial NPV benefit to ratepayers by year 30 (2041/42) for Plan 4 (K19/Gas/250MW).

Other plans require until the 40 year (Table 5) or 50 year (Table 6) horizons to achieve positive NPV benefits for ratepayers.

Note that this is in contrast to Manitoba Hydro's evidence that the 'cross-over' point for some plans occur after 10-15 years following the in-service date of Conawapa[56].

Pathway #3 and #4 provide the highest expected benefit to ratepayers through Plans 4 (K19/Gas/250MW) and 6 (K19/Gas/750MW) compared to Plan 1 (All Gas). These two plans also provide significant benefits to Government. As reviewed elsewhere in Hydro's NFAT filing, these plans include material employment, business, environmental and First Nation benefits as compared to Plan 1 (All Gas).

Figure 2 below shows the 50 year rate benefits of pursuing Plan 4 (K19/Gas/250MW) as compared to Plan 1 (All Gas) which is further described in Appendix C to this submission.

[56] Manitoba Hydro NFAT Business Case, Chapter 14: Conclusions, page 22 (August 2013).

Figure 33 plots the comparison of Plan 4 (K19/Gas/250MW) with the expected value of Plan 1 (All Gas).

- The figures show that Plan 4 remains a viable option even under a high discount rate threshold.
- Plan 4 (K19/Gas/250MW) retains some risks (both upside and downside) compared to Plan 1 (All Gas), but the range is still relatively tight.

Under these circumstances the decision between Plan 1 and Plan 4 is not conclusively driven to either plan under the high discount rate. The decision regarding whether to pursue the vision consistent with a more interconnected system (Opportunity-Based) or with a more limited commitment of capital today (Need-Based) would therefore be expected to turn on less tangible or quantifiable benefits of the two Plans (i.e., outside of financial considerations).

In contrast, Plan 14 (PDP) as per Figure 34 above is not aided by the testing of a high discount rate sensitivity.

- The expected value NPV of rates remains above the rate levels paid under Plan 4 (K19/Gas/250MW) for all future periods.

This analysis would further support that Plan 14 (PDP) provides insufficient benefits to customers to pursue based on current conditions.

6.3 PLAN 14 (PDP) RATEPAYER IMPACT MITIGATION CONCEPT – REBALANCING BENEFITS WITH PROVINCIAL GOVERNMENT

As a result of the Financial Analysis review of benefits for ratepayers and the Provincial Government, it is apparent that the benefits to Manitoba overall (for ratepayers and Government are combined) as a result of Plan 14 (PDP) are high. For example, the situation with respect to the provincial Government and ratepayers is as follows (with reference to the earlier Figures 26 (Government) and 19 (Ratepayers) – the same values are shown below in Tables 9 and 10):

- **Government:** The green area of Figure 26 above (which sets out the Plan 14 (PDP) NPV of Incremental Government Benefits) highlights how Plan 14 (PDP) provides in excess of $3 billion NPV benefits to Governments over the first 20 years (the green line – this is not counting other non-utility items such as worker income taxes) which increases through year 30, and finally progresses up to $4 billion over 50 years, with relatively little risk (+/-$0.5 billion - the green shading).
- **Ratepayers:** In contrast Figure 17 above (which sets out the Plan 14 (PDP) - NPV of Incremental Domestic Ratepayer Costs) shows the ratepayer effects of Plan 14 (PDP) as being approximately a $1 billion *adverse* impact on ratepayers at year 20 (the green line; also note the

green shading showing this value to be +/-$1.5 billion) which improves somewhat through year 30, and reaches a small beneficial impact by year 50 of less than $0.5 billion (+/- $2 billion). This is still almost $0.5 billion less benefits than Plan 4 offers (K19/Gas/250MW).

Table 9 and Table 10 show the NPV benefits of the plans at the 30 years and 50 years (the years 2041/42 and 2061/62 respectively). The tables notes the EV benefits separately to ratepayers and Government (negative values are net costs), as well as the combined values. Tables 9 and 10 are indexed to the Expected Value of Plan 1 (All Gas) and show the NPV values at both the expected value level (in bold) and the variability from P10 to P90 for each Plan.

Table 9: NPV of Total Benefits to Ratepayers and Government at Year 30 (2041/42) for Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 30 years ($ Millions) [P10/90]	**Pthwy 1**	**Pthwy 2**		**Pthwy 3**		**Pthwy 4**		**Pthwy 5**
	Plan 1	**Plan 7**	**Plan 2**	**Plan 4**	**Plan 13**	**Plan 6**	**Plan 12**	**Plan 14**
Ratepayer Benefit	**0** [(586)/ 593]	**(850)** [(2,316)/ 574]	**(164)** [(1,376)/ 1,083]	**110** [(1,215) /1,395]	**(1,263)** [(3,658)/ 964]	**(138)** [(1,524) /1,204]	**(1,078)** [(3,151) /840]	**(1,031)** [(3,277)/ 1,074]
Government Benefit	**0** [(384)/ 344]	**1,896** [1,492/ 2,229]	**1,666** [1,300/ 1,996]	**1,562** [1,093/ 1,959]	**3,577** [3,073/ 4,038]	**1,572** [1,100/ 1,989]	**3,601** [3,018/ 4,086]	**3,598** [3,093/ 4,089]
Total Plan Benefits	**0** [(970)/ 937]	**1,046** [(824)/ 2,803]	**1,502** [(76)/ 3,079]	**1,672** [(122)/ 3,354]	**2,314** [(585)/ 5,001]	**1,434** [(424)/ 3,193]	**2,523** [(133)/ 4,926]	**2,567** [(184)/ 5,163]

The notable aspect of the results in Table 9 is that on a combined basis the total plan benefits even to year 30 (2041/42) favour Plan 14 (PDP). The year 2041/42 is approximately 15 years after Conawapa is scheduled to come into service in Plan 14 (PDP). The issues for ratepayers arise due to the large degree of charges paid to the provincial Government over the 30 year period. In particular, the relative adverse outcomes for ratepayers contrast with the large provincial Government charges over this period. This disparity supports a concept of rebalancing the impacts between ratepayers and Government through a revised relationship.

Table 10 sets out the same information at year 50.

Table 10: NPV of Total Benefits to Ratepayers and Government at Year 50 (2061/62) for Complete Financial Analysis ($ Millions) at 5.05% Real Discount Rate

NPV of (Cost)/Benefit at 50 years ($ Millions) [P10/90]	**Pthwy 1**	**Pthwy 2**		**Pthwy 3**		**Pthwy 4**		**Pthwy 5**
	Plan 1	**Plan 7**	**Plan 2**	**Plan 4**	**Plan 13**	**Plan 6**	**Plan 12**	**Plan 14**
Ratepayer Benefit	**0** [(688)/ 648]	**(12)** [(1,412)/ 1,353]	**444** [(393)/ 1,553]	**780** [(282)/ 1,960]	**105** [(2,259)/ 2,631]	**557** [(524)/ 1,760]	**141** [(2,001) /2,434]	**439** [(1,833)/ 2,841]
Government Benefit	**0** [(408)/ 381]	**2,048** [1,565/ 2,423]	**1,849** [1,396/ 2,264]	**1,731** [1,177/ 2,187]	**3,889** [3,277/ 4,442]	**1,729** [1,171/ 2,211]	**3,986** [3,307/ 4,542]	**3,918** [3,304/ 4,495]
Total Plan Benefit	**0** [(1,096)/ 1,029]	**2,036** [153/ 3,776]	**2,293** [1,003/ 3,817]	**2,511** [895/ 4,147]	**3,994** [1,018/ 7,072]	**2,286** [647/ 3,971]	**4,127** [1,306/ 6,976]	**4,357** [1,471/ 7,336]

The situation depicted in Table 10 clarifies the long-term trends. That is, over the period from years 30 to 50, the NPV benefits to ratepayers under Plan 14 (PDP) are significant (almost a $1.5 billion improvement from 30 years (Table 9) to 50 years (Table 10)). In short, the tables highlight that a rebalanced relationship with the provincial Government likely need not be a permanent feature, but solely a temporary measure to address at least the early in-service impacts of Conawapa.

A similar conclusion merits consideration for the impacts between Plans 4 (K19/Gas/250MW) which is the best outcome for ratepayers, and Plan 6 (K19/Gas/750MW) which is effectively required if Conawapa is to proceed. Although the benefit sharing through year 30 for Plan 4 (K19/Gas/250MW) is heavily skewed to the provincial Government, this is not in and of itself a sign that a rebalancing of benefits is necessary. In particular, ratepayers do not, under this analysis, appear any worse off under Plan 4 (K19/Gas/250MW) than they do under any other plan. Such a revised balance may be necessary in the event of P10 outcomes (where ratepayers would be adversely impacted to the sum of $1.215 billion NPV, while the provincial Government would continue to benefit $1.093 billion from pursuing this plan). In contrast, Plan 6 (K19/Gas/750MW) is clearly an added investment by ratepayers that provides little prospect, under expected Scenarios, of yielding net benefits. However the decision to pursue the 750 MW line based on decisions made in June 2014 is effectively a precondition for pursuing Plan 14 (PDP).

In short, in order for the entire Manitoba province to capture the upside that Plan 14 (PDP) may bring, there is a need for further consideration about (a) a degree of support outside of rates for the decision to proceed to a 750 MW line, and (b) a rebalanced relationship between ratepayers and the provincial Government covering a period a years after the in-service of Conawapa, in the event it proceeds.

There are many possible concepts for this to be implemented, which will require detailed consideration during the planning phases for Conawapa. One conceptual example is set out below. This option was selected on the basis that is easily modelled, and it clarifies the degree of impact that temporary changes can have on the ratepayer benefits. This NPV scenario was modelled as follows:

a. Calculate the full scope of government cash payment in each year (debt guarantee fees, water rentals, and capital taxes; does not include any effects on shareholder's equity or First Nation partners).

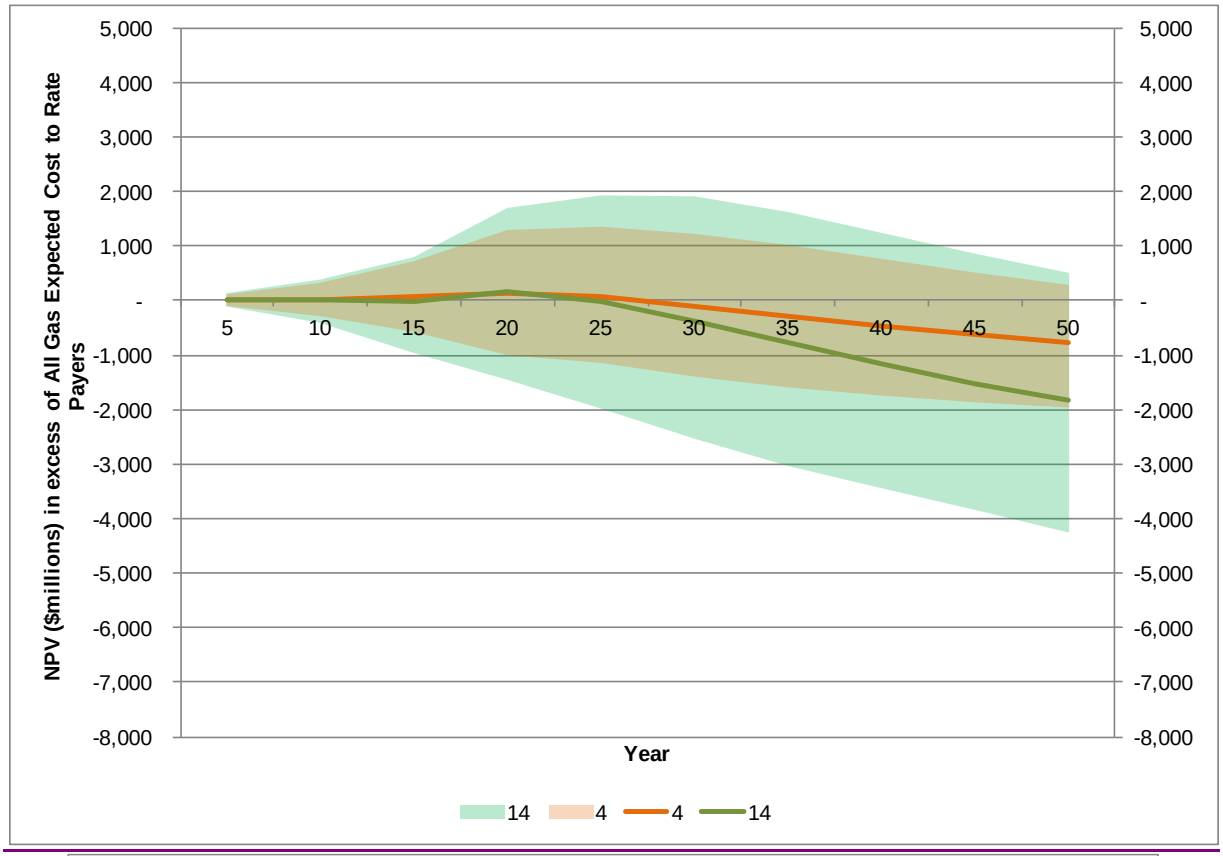
b. ~~Compare the values for Plan 14 (PDP) to Plan 6 (K19/Gas/750MW). This C~~compar~~eison serves as~~ a proxy for the charges that would be applicable for ~~only~~ the major projects in Plan 14 (Keeyask, 750 MW line, Conawapa). These payments are assumed to be 100% foregone for the relevant time horizon (Note: it is recognized that Plan 14 includes financial benefits of the WPS investment and sale while Plan 6 does not. Accordingly, the benefits of Plan 14 might be slightly overstated in this example).

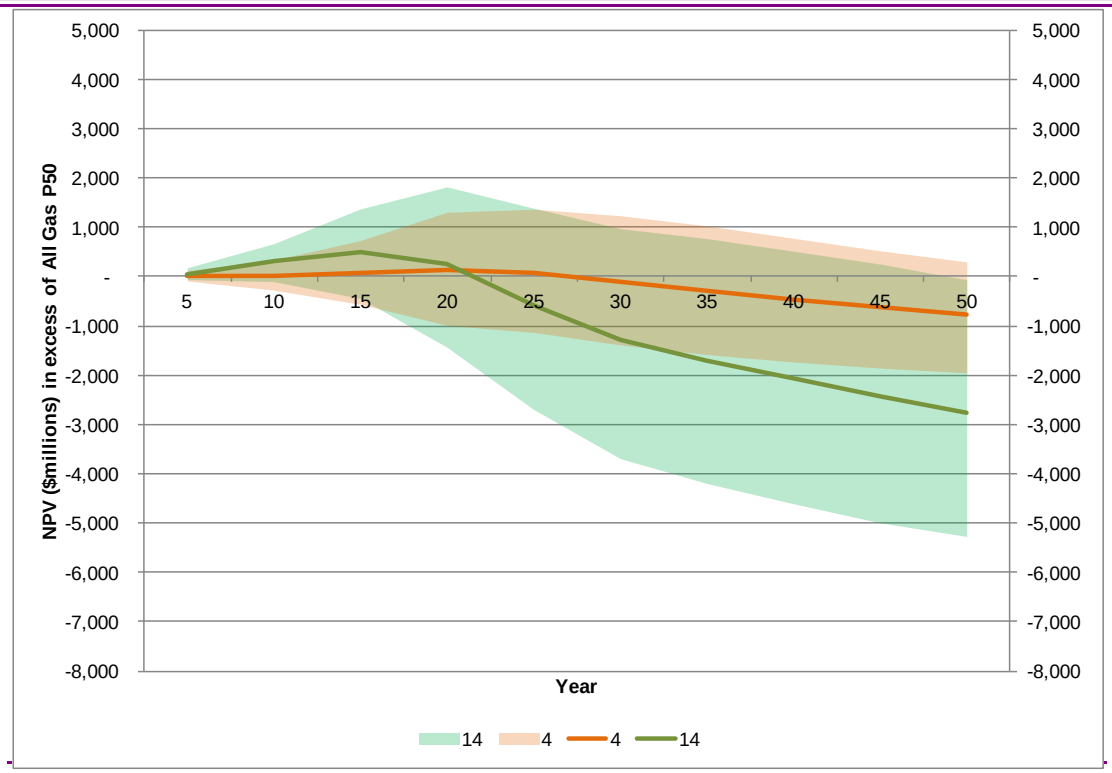
c. In each year of the relevant time horizon, revise downwards the level of rates charged to domestic ratepayers dollar-for-dollar with the foregone government charges in that year.

d. Implement the revised charge scheme for 15 years from the in-service date of each relevant project. For Conawapa ~~(i.e.,~~ this revised sharing ~~only~~ applies ~~from 2025/26~~ to 2039/40, while for Keeyask and the 750 MW line, the revised sharing applies until 2033/34~~)~~. For all other periods keep government charges at the levels forecast by Hydro.

This above approach is not a perfect representation of implementing such an approach – further consideration would need to be given to balancing rate impacts, reserve levels, etc. However within the bounds of an approach similar to the above, Figure 35~~Figure 35~~ shows the cone graph for impacts on ratepayers.

Figure 35: Plan 4 (K19/Gas/250MW) vs. Plan 14 (PDP) with Government Benefit Sharing Relief at 5.05% Real Discount Rate - NPV of Incremental Domestic Costs as Compared to Plan 1 (All Gas) Expected Value ($ Millions)





As shown in Figure 35 above, this type of approach over a limited number of years (in this case 15 years) can play a substantial role in addressing the risk and benefit sharing disparities between Government and ratepayers. Under this scenario, government revenues are reduced as compared to Plan 14 (PDP); however the ~~revenues~~ benefits remain higher than the government ~~revenues~~ benefits expected in Plan 4 (K19/Gas/250MW) and under the assumption that Plan 14 (PDP) would not proceed without this form of sharing (as it is not in the best interest of ratepayers without this type of sharing, based on present forecasts for energy and economic conditions at this time), there is no lost ~~revenue~~ benefits to the provincial Government in any event.

Other scenarios would need to be assessed as part of decisions regarding whether to proceed with Conawapa.