

1 **Meeting Manitobans' Electricity Needs**

2 Manitoba is growing and is expected to continue doing so. Over the last 10 years the province
3 has enjoyed an expanding population and economy. These increases have led to many positive
4 outcomes for Manitobans and they have led to growth in domestic electrical energy
5 consumption – growing 1.7% annually over those 10 years.

6

7 As a Crown Corporation and the province's energy utility, Manitoba Hydro's role is to provide
8 the safe and reliable service of electricity to over 540,000 customers.¹ The utility must ensure
9 not only that it can meet the demand of its customers today, but also be ready to meet future
10 demand. There is little doubt that future electricity demand will increase. There are three major
11 factors driving growth in Manitoba's energy consumption:

- 12 • increases in population and the related services required to accommodate that growth
- 13 • higher average electrical energy usage per residential customer due to increased use of
14 electricity for space and water heat, electronics and appliances
- 15 • continued expansion associated with Manitoba industrial and commercial customers.

16

17 Over the next 20 years the growth in Manitoba's electrical energy consumption is forecast to
18 increase at an average annual rate of 1.6%, or 1.5% with anticipated Demand Side Management
19 (DSM or Power Smart²) savings achieved through an aggressive program.

¹ All of these customers receive electrical service and many of them also receive natural gas. This NFAT submission focuses exclusively on the provision of electrical service.

² Manitoba Hydro is a licensee of the Trademark and Official Mark.

1 To meet this demand, new supply is forecast to be required in or around 2023. The 2023
2 requirement for new supply—which does not include supplying any new export contracts—is
3 dependent on many assumptions and could be required even sooner should:

- 4 • Power Smart electricity savings be less than planned,
- 5 • natural gas generation at Brandon and Selkirk cease, and/or
- 6 • provincial population and economic growth be higher than assumed.

7

8 Manitoba Hydro has spent years investigating a wide range of resource options to meet this
9 requirement for new supply. The result is a Preferred Development Plan, which Manitoba
10 Hydro proposes as the most effective way to meet the long-term energy needs of Manitobans.

11

12 **The Preferred Development Plan**

13 Manitoba Hydro has compared the following development plan against alternative plans and
14 has concluded that it is in the best long-term interests of Manitobans based on the evaluation
15 described below. This Preferred Development Plan consists of:

- 16 • Keeyask generation, 695 megawatts (MW), in-service date (ISD) of 2019
- 17 • Conawapa generation 1,485 MW, earliest ISD of 2026 (decisions on whether to
18 construct Conawapa and timing would be made over the next few years)
- 19 • domestic AC (alternating current) transmission associated with Keeyask and Conawapa
20 • the construction, subject to U.S. and Canadian regulatory approvals, of 750 MW
21 additional transmission interconnection import/export capacity between Manitoba and
22 Minnesota and Wisconsin with an ISD of 2020
- 23 • New major export sales with:
 - 24 ○ Minnesota Power (MP) — 250 MW (2020-2035)
 - 25 ○ Wisconsin Public Service (WPS) — 300 MW (2020-2040), subject to satisfactory
26 conclusion of negotiations

1 generation. Furthermore, expansion of interconnection capacity would both enhance the
2 service to Manitobans from the existing system and benefit any major expansion of hydro.

3

4 **Window of Opportunity**

5 There currently exists a window of opportunity both for the expansion of interconnections to
6 Minnesota and Wisconsin and for the signing of additional long-term export contracts. Several
7 factors have created this opportunity:

8

9 **Growing Demand from U.S. Utilities for Supply.** The combination of aging facilities, reduced
10 public and regulatory acceptance in the U.S. for coal and nuclear generation, new renewable
11 energy portfolio standards and environmental regulations, and the current low prices for
12 natural gas, is leading to the retirement of coal and nuclear facilities. These retirements
13 combined with continued load growth in the U.S. are resulting in U.S. utilities looking for supply
14 alternatives.

15

16 **U.S. Utilities' Desire to Avoid Coal and Overdependence on Gas.** U.S. utilities are becoming
17 increasingly dependent upon natural gas generation as a preferable economic option to new
18 coal. However, they are also keenly aware that the majority of long-term forecasts indicate
19 natural gas and wholesale electricity prices will increase from today's prices. The historic
20 volatility of gas prices and an overdependence on gas-fired base loaded generation create risk.
21 Consequently, these utilities are looking for stable, predictable supply alternatives which
22 provide clean energy, are not exposed to future greenhouse gas (GHG) and other emission
23 regulations, avoid natural gas price spikes and provide diversity of supply. Manitoba's hydro-
24 electric power meets these criteria.

1 **Export Contracts with Superior Returns.** Manitoba Hydro has signed or is in the process of
2 negotiating several new long-term export contracts with prices substantially more attractive
3 than those in Manitoba Hydro's existing firm export contracts.

4

5 **Support from MP.** The U.S. utility has committed to invest in and champion the construction of
6 a transmission interconnection through its service territory. To build this line, they are
7 leveraging their relationships with local land owners and state and federal regulators and
8 officials. This represents a window of opportunity for Manitoba Hydro because it would be
9 extremely difficult, probably impossible, for Manitoba Hydro to develop a line in the U.S.
10 without the enthusiastic participation of a U.S. partner such as MP.

11

12 **Minimal Downside Risk**

13 Manitoba Hydro has the ability to cancel the new export sale contracts should new generation
14 and/or transmission facilities in Manitoba not be approved. The MP export contract has already
15 received U.S. approvals; and the American regulatory approval process for the new
16 interconnection has already commenced. The MP and WPS export contracts allow for up to a
17 two-year delay in delivery commencement should there be regulatory delays in Canada or the
18 U.S. (currently both are planned to begin in 2020). The decision to commit to Conawapa
19 construction for a 2026 ISD does not have to occur until 2018, leaving four years for the U.S.
20 interconnection and new export sales to receive final approvals. This ability to defer Conawapa
21 or displace it with other resources assists in managing other risks as well.

22

23 **Combining Options and Sequencing to Create Development Plans**

24 The process of selecting a preferred development plan involved the compilation of a short list
25 of Manitoba Hydro's most competitive options, including: DSM programs, new sources of

1 supply, U.S. interconnections and import/export contracts — options which in various
2 combinations would meet future energy needs.

3

4 Development plans were then created based on appropriate combinations and sequences of
5 opportunities and resources to satisfy Manitoba load requirements for decades into the future.
6 These development plans continue to be assessed regularly as circumstances change, including
7 annually as part of Manitoba Hydro's Power Resource Plan.

8

9 The economic and financial evaluations carried out for this Needs For and Alternatives To
10 (NFAT) submission encompassed a range of uncertainties in assumptions and inputs
11 represented by 27 scenarios and multiple sensitivities. Testing for changing assumptions is
12 important because, as time passes, energy prices, capital costs, economic variables and many
13 other factors can change unexpectedly.

14

15 **From Plans to Pathways: Five Starting Points to Meet Future Manitoba Demand**

16 To provide clarity about how to balance the initial commitments required by the Preferred
17 Development Plan with the future flexibility to adjust that plan based on changing realities,
18 Manitoba Hydro created Development Plan Implementation Pathways. A pathway consists of:

- 19 • a choice to embark upon an initial development plan today
- 20 • a sequence of decision points that will occur in the future as information modifies or
21 eliminates current uncertainties, such as price forecasts for natural gas and exports and
22 approvals of new interconnections
- 23 • examples of alternative plans, or changes to the initial plan that can be chosen to
24 respond to emerging realities.

1 A pathway, therefore, represents the initial decision to commit to one development plan at the
2 outset – but not an obligation to rigidly see that plan through the long-term regardless of
3 circumstances. Over time, updated information will be available regarding the uncertainties
4 affecting the plan chosen for new generation. Load growth, Power Smart plans, export
5 contracts, natural gas price forecasts, export price forecasts, GHG restrictions, capital cost
6 estimates, interest rates and other parameters will be regularly monitored and reviewed.

7

8 If circumstances warrant, the plan will be modified at key decision points. For example, if the
9 Preferred Development Plan is adopted but then natural gas and export prices are found in a
10 few years to be following a low-price trajectory, Conawapa could be deferred or could be
11 completely displaced with other new generation such as natural gas. Similarly, Conawapa could
12 be delayed if there were a reduction in forecast load growth or an increase in DSM. Such an
13 increase in DSM could result from the 2013-2014 updates of the DSM plan, which will
14 incorporate information from the DSM Market Potential Study as well as other new
15 information.

16

17 Manitoba Hydro has developed five pathways and compared each of them. These pathways
18 and the corporation's conclusions for each are as follows:

19

20 **1) Natural Gas Generation Pathway:** This is a choice to count on natural gas generation to meet
21 domestic load requirements starting in or around 2023 and to forgo developing new hydro for
22 the 2023 time frame. Thereafter, as Manitoba load continues to grow and the need for further
23 new supply arises, there would be at least two future options to decide between: i) continuing
24 with natural gas generation expansion or ii) developing new hydro, depending on the
25 circumstances at that time. This pathway was not selected as the preferred option because of

1 all the pathways it has the highest net costs³ to Manitoba Hydro, the highest long-term
2 electricity rates for Manitobans, and least social, environmental and provincial revenue
3 benefits. A reliance solely on natural gas for the foreseeable future would greatly increase GHG
4 emissions and expose Manitoba Hydro to the risk of volatile price fluctuations.

5

6 **2) Keeyask 2023, No New Interconnection, No New Export Pathway:** This is a choice to rely on
7 Keeyask to meet domestic load requirements starting in or around 2023 and a choice not to
8 proceed with development of a new U.S. interconnection or associated long-term export
9 contracts. Keeyask is the only hydro option that can be constructed for such a time frame. This
10 pathway would also occur should regulatory approval not be obtained in the U.S. or Canada for
11 any new interconnection. The choices for next generation after Keeyask would depend on the
12 actual situation at that time and could include generation options such as hydro or natural gas.
13 This pathway was not selected as the preferred option because, compared to plans with new
14 interconnections, it has higher net costs, higher long-term rates for Manitobans, and lower
15 social, environmental and provincial revenue benefits.

16

17 **3) Keeyask 2019, 250 MW Interconnection, Small Export Pathway:** This is a choice to rely on
18 Keeyask to meet domestic load requirements and to proceed with a 250 MW new
19 interconnection, along with the 250 MW MP sale and the 125 MW NSP expansion but not the
20 300 MW WPS sale. This pathway would also occur should regulatory approval for the 750 MW
21 new interconnection not be obtained in the U.S. or Canada. The choices for next generation
22 after Keeyask would depend on the actual situation at that time and could be generation
23 options such as hydro or natural gas. This pathway was not selected as the preferred option
24 because, compared to the 750 MW Interconnection Pathway 5, it generally has higher net costs
25 and long-term rates for Manitobans.

³ Net costs are the capital and operating costs net of the revenues from the export market.

1 **4) Keeyask 2019, 750 MW Interconnection, Small Export Pathway:** This is a choice to rely on
2 Keeyask to meet domestic load requirements and to proceed with a new 750 MW
3 interconnection, along with the 250 MW MP sale and the 125 MW NSP expansion, but not the
4 300 MW WPS sale. This pathway could occur if the WPS sale negotiations did not conclude
5 successfully or if the sale did not receive regulatory approval in the U.S. or Canada. The choices
6 and timing for next generation after Keeyask would depend on the actual situation at that time
7 and could include generation options such as hydro or natural gas. Pathway 4 and Pathway 3
8 are competitive with each other in terms of net cost but Pathway 4 is preferred to Pathway 3
9 because the larger interconnection provides more upside potential, more flexibility, greater
10 energy security and greater reliability benefits. This pathway was not selected as the primary
11 preferred option because, compared to the Large Export Pathway, it generally is higher net cost
12 and does not have the export price certainty that is provided with the 300 MW WPS sale
13 contract. However, this pathway could contain the Preferred Development Plan if Pathway 5
14 and the 300 MW WPS sale do not go ahead.

15

16 **5) Keeyask 2019, 750 MW Interconnection, Large Export Pathway** This is a choice to rely on
17 Keeyask to meet domestic load requirements and to proceed with a new 750 MW
18 interconnection, along with the 250 MW MP sale, the 300 MW WPS sale and the 125 MW
19 NSP expansion. The choice for next generation after Keeyask most likely would be Conawapa
20 for an ISD in or around 2026, in which case this pathway results in the Preferred Development
21 Plan. During the capital intensive period involving both Keeyask and Conawapa, projected net
22 debt and cumulative rate increases are generally higher than other alternatives, but are lower
23 in the long-term. Development plans that include Keeyask and Conawapa have the strongest
24 projected balance sheets, with high levels of fixed assets and retained earnings, and provide the
25 most robust ability to absorb adverse financial impacts over the entire study period. The choice
26 of next plant after Keeyask would depend on the situation at that time and, as previously
27 noted, could include deferral of Conawapa (if load growth were slower than expected or a

1 much higher DSM level were achieved) or could instead involve cancellation of Conawapa and
2 the development of gas generation. Commitment to construct Conawapa for a 2026 ISD is not
3 required until 2018, which is after the 2017 scheduled approvals and construction start of the
4 750 MW interconnection.

5

6 Manitoba Hydro’s decision to seek approval for the Preferred Development Plan is based on
7 comprehensive comparative analysis of all five pathways and their associated development
8 plans. This analysis included evaluations of economics, domestic rates, financial impacts,
9 provincial revenue contribution, macro-environmental and socio-economic impacts and
10 benefits, reliability, energy security and risks. The economic, rate and financial evaluations
11 account for the inherent uncertainties in: i) energy prices, ii) capital costs and iii) economic
12 parameters such as interest rates, escalation and discount rate through comprehensive
13 evaluations under a wide range of scenarios. These scenarios involved low, reference and high
14 forecasts for each set of the three factors. In addition, sensitivities and stress tests evaluated
15 factors such as load growth, level of future DSM, severe drought and increases or decreases in
16 river flows due to climate change.

17

18 The Preferred Development Plan assumes the 300 MW WPS sale negotiations will conclude
19 successfully and that the plan will follow the Large Export Pathway 5; should the 300 MW WPS
20 sale negotiations not conclude successfully, the Preferred Development Plan would evolve into
21 the Small Export Pathway 4.

1 The analysis described in Manitoba Hydro's submission demonstrates that the Preferred
2 Development Plan:

- 3 • **Results in the best economic outcomes over a range of scenarios and lowest long term**
4 **rates to customers:** It has the overall highest net benefits to Manitoba Hydro resulting
5 in the lowest long-term domestic rates for Manitobans.
- 6 • **Supports Manitoba Hydro's long-term fiscal health:** It will result in a strong balance
7 sheet with high levels of fixed assets and retained earnings, which provide enhanced
8 protection against adverse events such as severe drought.
- 9 • **Protects customer service:** It provides the highest level of system reliability to address
10 generation or major transmission outages or unexpectedly high load peaks, and the
11 highest level of energy security to mitigate unexpectedly severe droughts or
12 unexpectedly high energy consumption.
- 13 • **Supports risk management and flexibility:** It provides the overall best means to respond
14 to changing conditions such as higher or lower load growth, uncertainty in level of
15 future DSM, increases and decreases in river flows due to climate change and additional
16 export market opportunities. The large new interconnection to the Wisconsin region
17 reduces export revenue risk by providing enhanced market diversification.
- 18 • **Provides the highest financial benefit to the Province and to Manitobans:** It has the
19 highest transfers to the Province in the form of provincial debt guarantee fees, water
20 rentals and capital taxes.
- 21 • **Offers the highest level of socio-economic benefits to Manitobans:** It provides the
22 highest employment, provincial economic growth and the above-noted financial
23 transfers to the provincial government. In terms of employment alone, the construction
24 of Keeyask and Conawapa will result in a combined 22,400 person-years in direct,
25 indirect and induced employment.

- 1 • **Provides the most beneficial package of socio-economic impacts and benefits to**
2 **northern and aboriginal communities:** It provides for training, employment, business
3 opportunities, income sharing and participation in environmental and socio-economic
4 protection.
- 5 • **Capitalizes upon Manitoba’s valuable endowment of renewable hydropower:** It relies
6 on renewable hydropower in Manitoba rather than non-renewable resources imported
7 from outside the province.
- 8 • **Supports Manitoba’s Clean Energy Strategy and sustainable development principles:** It
9 provides clean renewable energy (e.g. reducing global GHG emissions) and provides an
10 infrastructure legacy for future generations.

11

12 **Summary**

13 Manitobans are fortunate to live in a thriving province. With growth forecast to continue, steps
14 must be taken to ensure the province’s electrical energy needs are met. Through an extensive
15 process Manitoba Hydro has created a short list of viable options, conducted in-depth analysis,
16 and concluded that the Preferred Development Plan meets these energy needs at the lowest
17 overall cost and greatest benefits to Manitobans.

18

19 Manitoba Hydro is seeking government approval of the Preferred Development Plan on the
20 basis that it is in the best long-term interest of Manitoba Hydro customers and the Province of
21 Manitoba when compared to other options and alternatives.

22

23 Embarking on this plan would not preclude modifying its scope if future conditions warrant. The
24 immediate commitments in June 2014 are:

- 25 • approve start of construction of Keeyask for a 2019 ISD
26 • proceed with the 250 MW export agreement with MP

- 1 • proceed with the 100 MW export agreement with WPS
2 • proceed with the 750 MW U.S. interconnection subject to regulatory approvals
3 • proceed with the 300 MW export agreement with WPS subject to satisfactory
4 conclusion of negotiations currently underway.

5 Activities would continue to protect an ISD for Conawapa as early as 2026, but conditions will
6 be continually monitored to determine if such continued investments are worthwhile and,
7 ultimately, to determine if Conawapa should be constructed and for what ISD. These decisions
8 will be influenced by factors such as the 300 MW WPS export agreement, other export
9 agreement possibilities, energy prices, capital cost and load growth. The early ISD of 2026 for
10 Conawapa could be protected with a modest investment (approximately \$50 million) up to the
11 filing of the Environmental Impact Statement in the summer 2015 but the amount of
12 investment would increase after that.

13

14 The rigorous process that has resulted in Manitoba Hydro's recommendation of the Preferred
15 Development Plan is explained, in detail, in this NFAT submission.