Manitoba Hydro
Cost of Service Review

Summary of Key Issues

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2016 Cost of Service Review

- Darren Rainkie – Vice-President, Finance & Regulatory Affairs and CFO
- David Cormie - Division Manager, Power Sales & Operations
- Dr. David Swatek - Manager, System Planning (Transmission)
- Kelly Derksen – Manager, Cost of Service

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Objectives of Cost of Service Review

- Review key COS methodology, key defined in terms of those that affect 80% of MH's Revenue Requirement
- Confirm MH COS consistent with well accepted principles such that outcome represents a reasonable depiction of cost by class
- Review Manitoba Hydro's current approach to cost allocation
- Bring COS back into the rate-setting GRA process

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MH Cost of Service Overview

- There is no one right answer
  - Some solutions are better than others
- Good judgment has to prevail
  - Trying to assign the costs to a product that are indivisible, in large part, and which are invisible and travel at the speed of light
- As such, reasonability is sought, not perfection
  - Drilling down to a finite level through significant and complex analytics, if data exists, doesn't often provide a clear answer and judgment still has to prevail

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Key Issues for Oral Testimony

Generation

- What facilities should be included in the Generation Function?
- How should Generation costs be classified and allocated?

Transmission

- How should Transmission costs be classified and allocated?
- The unique role of US interconnections

Export Class

- Definition and cost responsibility
- Allocation of Net Export Revenue

DSM

-The assignment or allocation of DSM?

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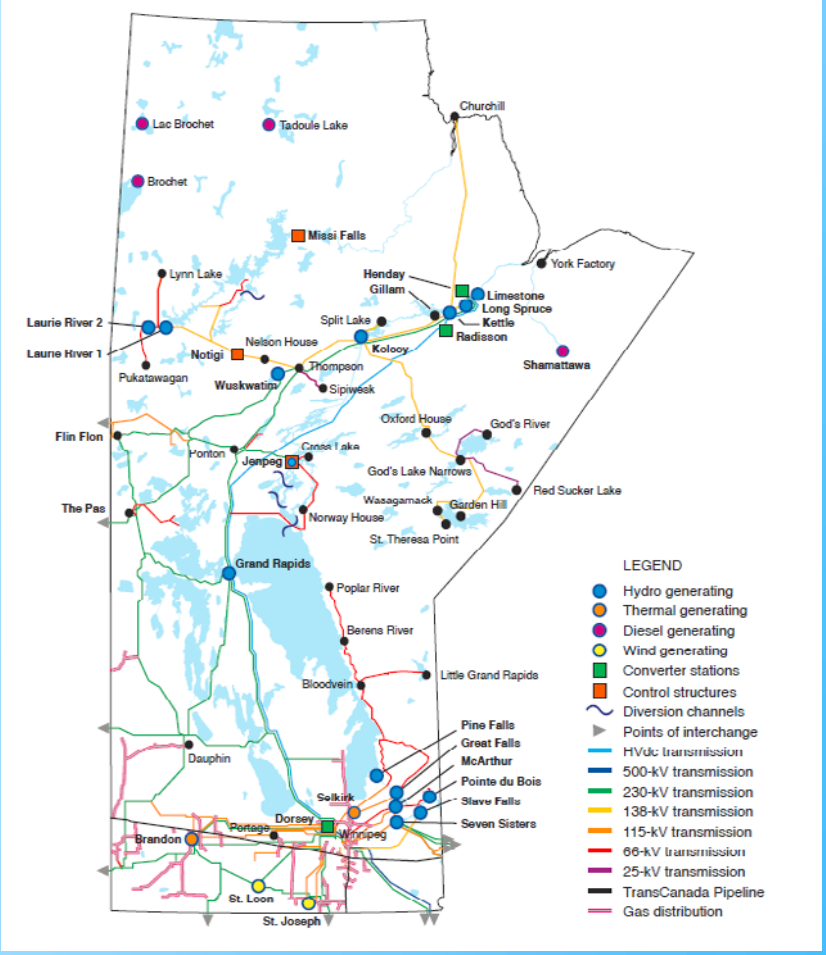
What facilities should be included in the Generation Function?



MH includes the following facilities in the Generation Function:

- 15 hydraulic generating stations
- Two thermal generating stations
- Generation Outlet Transmission
- Northern Converter Stations
  - Henday, Radisson & Keewatinohk (future)
- HVDC Lines
  - Bipoles I, II, III (future)
- Southern DC Converter Stations
  - Dorsey & Riel (future)

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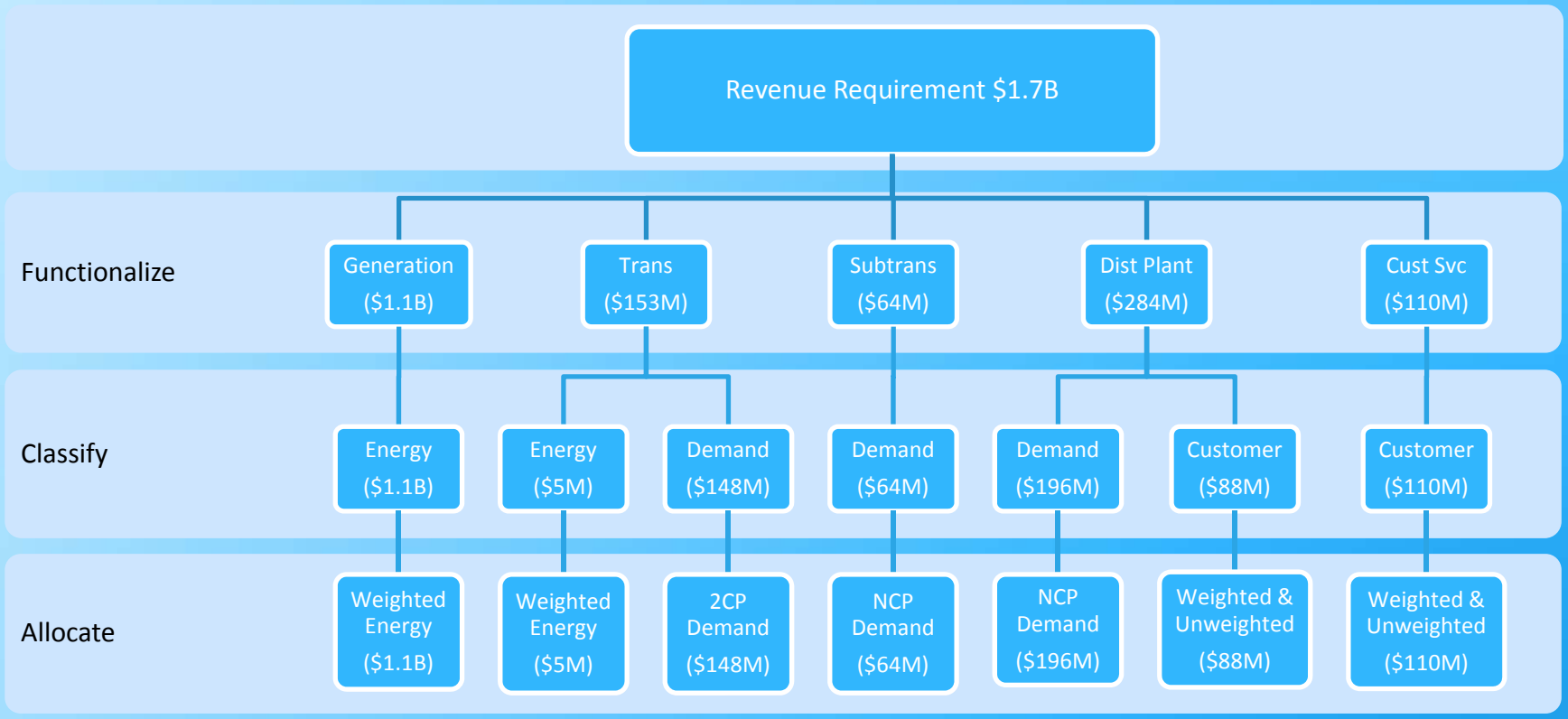
COS Schematic: PCOSS14-Amended



CP = Coincident Peak
NCP = Non Coincident Peak

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MH's Approach to the Functionalization of Generation

Supportive	Disagree
CA	Bowman
Harper	
Chernick	

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What facilities should be included in the Generation Function?

- Mr. Chernick and Harper agree overall
  - Recommend some minor additions to Generation
- Mr. Bowman disagrees with MH's treatment:
  - Bipole III
  - Dorsey & Riel Converter Stations

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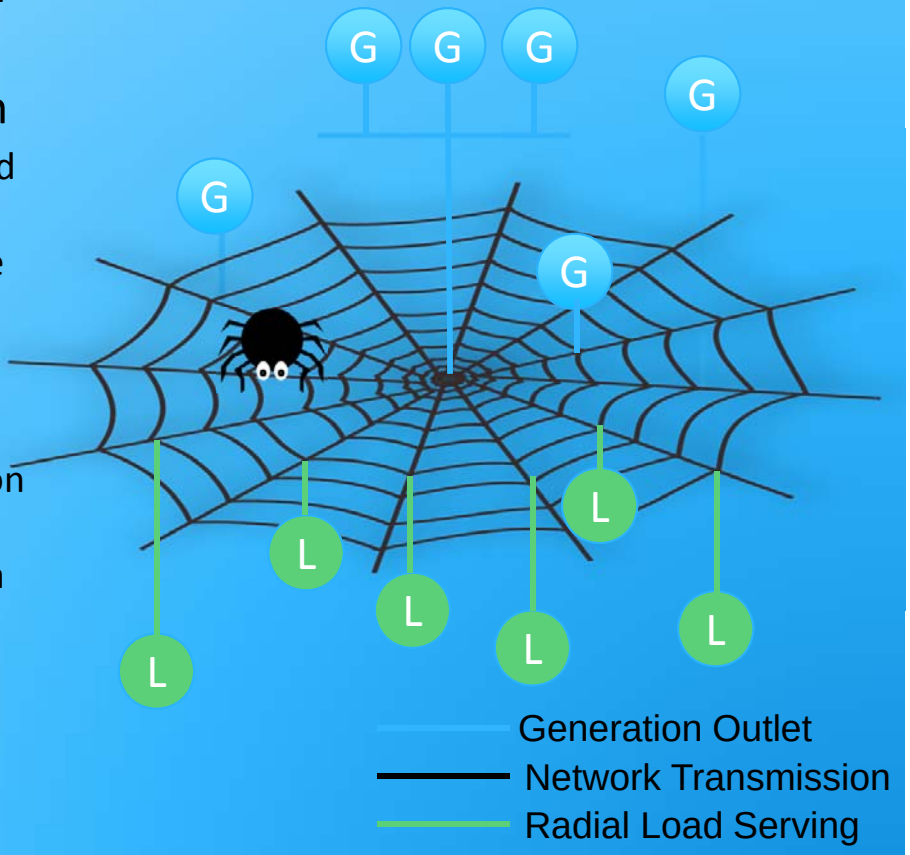
Bipole III is Generation Outlet Transmission

- Purpose and function identical to Bipoles I & II – i.e. Generation Outlet Transmission
- Bipole III not required in the absence of new and existing generation in the north
  - Existing northern generation would be isolated in the event of a Bipoles I and II outage
  - New northern generation would require some other generation outlet transmission
- Required for both energy and capacity reliability across many hours of the year
  - Role is to move energy from remote generation to transmission network 8760 hours a year
  - Required in Winter and Summer to cover for a loss of both Bipoles I and II
- Inappropriate to differentiate Bipole III from the existing Bipoles and Lower Nelson Generating Facilities



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Treatment of Bipole III

MH's treatment of Bipole III to be identical to Bipole I and II:

Functionalize	• Generation
Classify	• Energy
Allocate	• Weighted Energy

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Dorsey & Riel Converter Stations are Generation Outlet Facilities

- Converter facilities are dedicated to Bipoles
  - Required for interconnection of Generation.
- Main function of Dorsey and Riel is to make northern Generation available to the southern grid in all hours of the year.
- Role of Dorsey and Riel in assuring Grid Transmission stability is of secondary importance.
- MH review of former treatment upon advice of CA leads to conclusion to change the functionalization of Dorsey in COSS and exclude it from OATT.
- Bipole 3 and Riel Converter fulfill the same role as Bipoles I & II and Dorsey and should be treated consistently.
- AC facilities at Dorsey and Riel are properly functionalized as Transmission.

Treatment of Dorsey and Riel

MH's treatment of Dorsey and Riel:

Functionalize	• Generation
Classify	• Energy
Allocate	• Weighted Energy

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MH's Weighted Energy Approach to Classification and Allocation of Generation is Appropriate and Reasonable

- Captures the economic value of resources
- Reflects how Manitoba Hydro plans and operates its largely hydraulic system
- Places a heavier emphasis on energy as a cost driver of hydraulic facilities
- Incorporates both equity and efficiency goals within the context of embedded COS

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MH's Weighted Energy Approach to Classification and Allocation of Generation is Appropriate and Reasonable

Supportive Overall	Disagree
CA	Bowman
Harper	
Chernick	
LEI	

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Manitoba Hydro's Surplus Energy Prices are an Appropriate Source for Marginal Weights

- Proxy for short-run marginal cost/opportunity cost
- COS uses after-the-fact actual SEP prices not forecast SEP prices
- Actual SEP prices reflect Manitoba Hydro's ability to access the market due to system constraints
  - Largely MISO
  - Not always MISO, as will reflect MH system conditions

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Capacity Adder in Weighted Energy

- MH introduced a capacity adder to its Weighted-Energy allocator
- Based on advice of CA
- Reflects the de-rated value of a CT
  - the Reference Discount used in Curtailable Rate Program
- Applied to all peak hours

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Is Capacity Adder Necessary?

- MH continues to view that weighted energy implicitly provides some recognition to peak (even if capacity is zero)
- MH views that market conditions suggest that MISO energy prices likely reflect limited capacity
- Investment in large fixed cost generation facilities to secure energy costs
- MH builds to meet customers energy requirements even in the most adverse water conditions which means that in most conditions it can serve peak loads

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Functionalization of Transmission

- Once Generation-related Transmission is determined, little controversy regarding the functionalization of >100 kV transmission assets

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Manitoba Hydro's Classification and Allocation of Transmission is Appropriate

- Manitoba Hydro's current approach is to classify grid transmission as demand and allocate on 2CP
- With the exception of US Interconnections, all parties appear to support this approach

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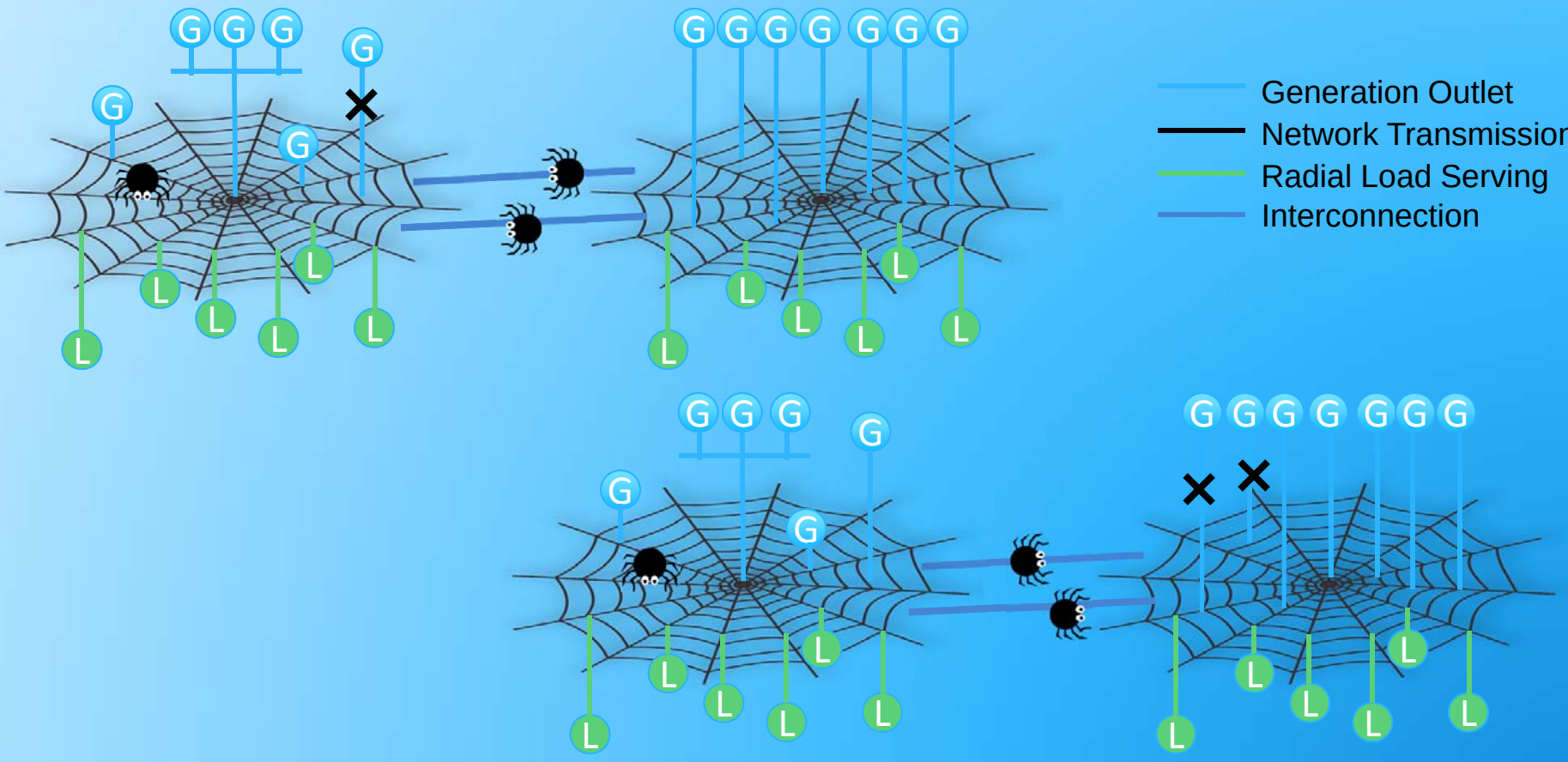
Unique Role of U.S. Interconnections



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Unique Role of U.S. Interconnections

- Provide Manitoba with access to US generating resources in times of drought or other emergency.
- Provide an outlet for Manitoba generation surplus to domestic need.
- Facilitate economic exchanges during all time periods.

MH's Treatment of US Interties

Manitoba Hydro's treatment:

U.S. Interties serve a unique role and should be classified and allocated on the same basis as Generation

Functionalize	• Transmission
Classify	• Energy
Allocate	• Weighted Energy

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Manitoba Hydro's treatment of US Interconnections is Appropriate

Supportive	Disagree
CA	Bowman
Harper	
Chernick	
LEI	

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Why does MH use an Export Class?

- To more fairly share Export Revenue among Manitoba customer classes

- No Export Class in the past led to an unfair sharing of export revenue

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Use of an Export Class is Reasonable

- A reasonable and transparent mechanism to accomplish the appropriate sharing of export revenue between customer classes
  - Once reasonable cost allocated to export class, residual NER allocated on GT&D can reduce absolute and relative distortion of cost responsibility by class for Manitobans

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Use of an Export Class is Appropriate and Reasonable

Supportive	Disagree
CA	
Bowman	
Harper	
Chernick	
LEI	

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Export Class Cost Responsibility

- MH distinguishes cost responsibility of exports:

Dependable	Opportunity
• Pro rata share of all Generation and Transmission Costs	• Variable Costs

- Class distinction is based on 5 year forecast
  - IFF12 resulted in 50-50 dependable/opportunity split

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Cost Distinction of Export Sales Warranted

- Dependable and Opportunity sales are very different sales types with different service levels
- To not recognize Dependable and Opportunity sales differences in COS would be similar to ignoring service level distinctions between a residential customer and an industrial customer

Assigning Only Variable Costs to Opportunity Sales is Reasonable

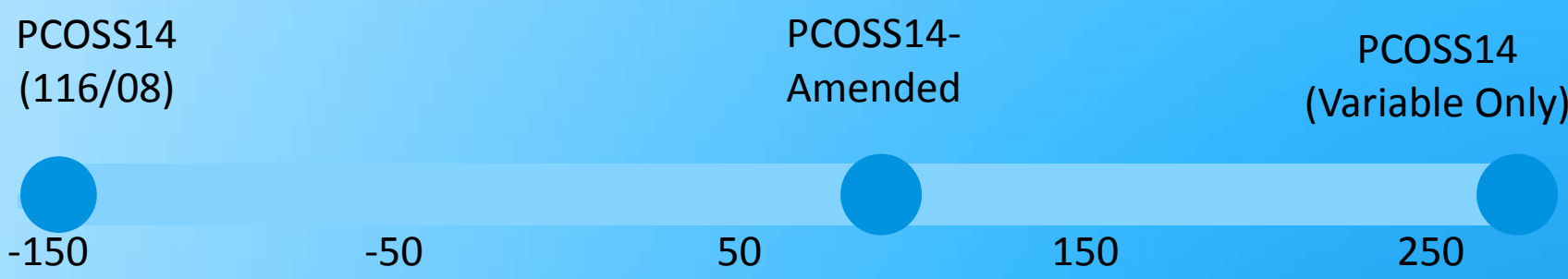
Operational Considerations

- May occur when favorable water conditions exist
- Results from salvaging temporary energy and capacity that is unused by Manitobans
  - While surplus water is expected in most years, what is not predictable is whether surplus water will be used for Manitobans, sold as an opportunity sale at whatever price above variable cost can be achieved in the market, or may be spilled
- They are short term and curtailable

Economic Considerations

- Most, i.e. 13 of 16 generating facilities did not consider potential opportunity sales revenue economics
- Opportunity sales revenues potential is not the only driver of current hydro; there are many factors that drove decision:
  - Environmental
  - Manitoba economic impacts
  - fuel price uncertainty

Potential Range of NER ($ million)



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Cost Distinction of Export Sales is Warranted

Supportive

- CA
- Harper
- Chernick
- LEI

Disagree

- Bowman

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Allocation of NER on GT&D is Reasonable

Generally Supportive

- CA
- Harper
- Chernick
- LEI
- Todd

Disagree

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Curtailable Rate Program

- Currently difference between accounting cost of CRP and annual value of CRP is being charged to participating Industrial customers
- MH believes full revenue requirement of CRP should be allocated to all classes

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Treatment of DSM Costs

- MH directly assigns DSM costs to classes based on program designation, i.e. the class that participates from program spending is charged the cost of the program

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Thank you

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