

# DIRECT TESTIMONY RE. MANITOBA HYDRO'S 2011 POWER SMART PLAN

**Philippe Dunsky**

**DUNSKY ENERGY CONSULTING**

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Before the

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**dunsky**  
ENERGY CONSULTING

[www.dunsky.ca](http://www.dunsky.ca)

(514) 504-9030 | [info@dunsky.ca](mailto:info@dunsky.ca)

# DUNSKY OVERVIEW



## EXPERTISE

- ▶ Energy Efficiency and Demand-Side Management
- ▶ Renewable Energy and Emerging Technologies
- ▶ Greenhouse Gas Reductions

## SERVICES

- ▶ Design and evaluation of programs, plans and policies
- ▶ Strategic, regulatory and analytical support
- ▶ New opportunities assessments

## CLIENTS

- ▶ Utilities
- ▶ Government
- ▶ Industry
- ▶ Non-profits

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# Demand-Side Management (DSM)



## ■ Two options to ensure sufficient supply

- ▶ Increase Supply
- ▶ Increase Efficiency (reduce demand)

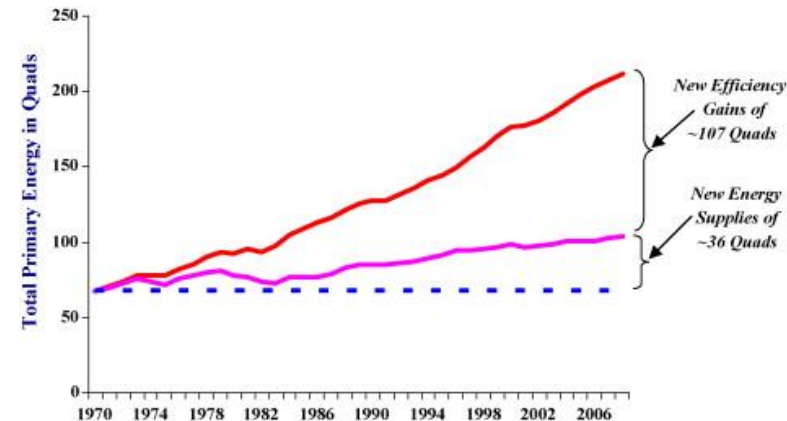
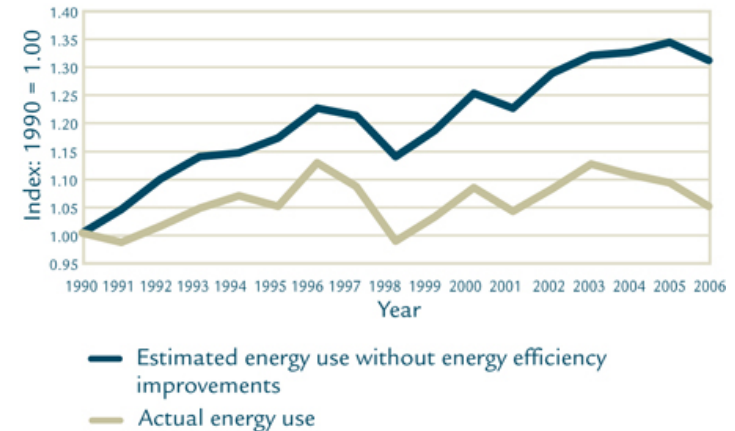
## ■ In U.S., since 1970 energy efficiency has supplied 75% of growth in demand

- ▶ Increased supply: 25%
- ▶ **Increased efficiency: 75%**

## ■ In Canada, from 1990 to 2006, energy efficiency (DSM) supplied majority of residential growth in demand for energy services

- ▶ Increased supply: 15%
- ▶ **Increased efficiency: 85% or \$6.6B**

Residential Energy Use, Actual and Without Energy Efficiency Improvements, 1990 to 2006



# EFFICIENCY'S BUSINESS CASE



## ✓ CHEAP

- ▶ 2-8 times cheaper than new supply (power plants)
- ▶ Also lower risk

## ✓ JOBS

- ▶ ~2-10 times more jobs per million dollars invested

## ✓ CLIMATE

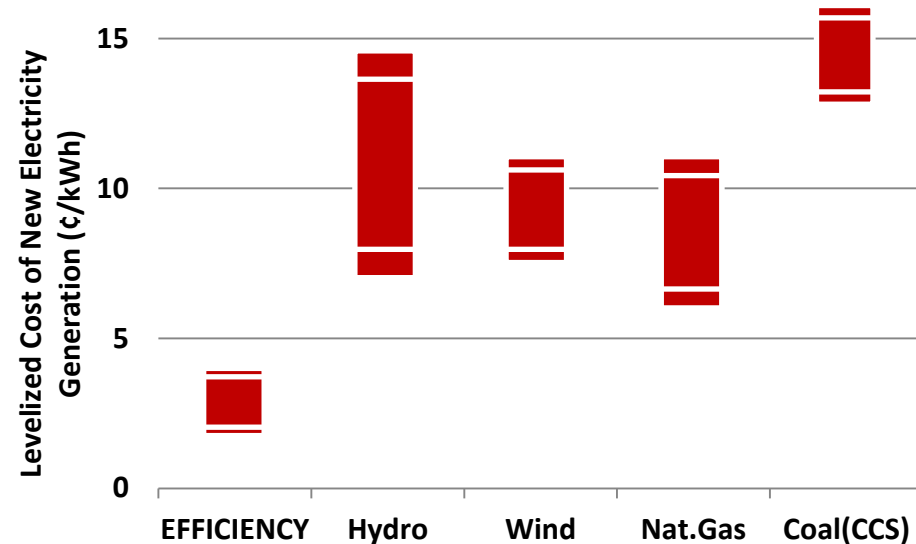
- ▶ 1<sup>st</sup> priority in reducing CO2 emissions

## ✓ ECONOMIC BENEFIT

- ▶ Increases household disposable income
- ▶ Frees business capital for productive use

## ✓ CUSTOMER SATISFACTION

- ▶ Opportunity to reduce bills and secure other benefits



# EFFICIENCY AS A RESOURCE



- **Renewable Resource** – CFLs, LEDs, ECMs, HPT8s, CIPs, DHPs, etc.

**INNOVATION REPLENISHES  
THE POOL OF OPPORTUNITIES**

- **Learning Curve** – Like mining, or oil & gas “drilling”, the more we look, the more we find

**INNOVATION ALLOWS US TO  
DIG DEEPER, MINE MORE**



# MANITOBA HYDRO



## ■ Strong history with energy efficiency

- ▶ A+ ratings
- ▶ Awards

## ■ Unique strengths to deliver DSM

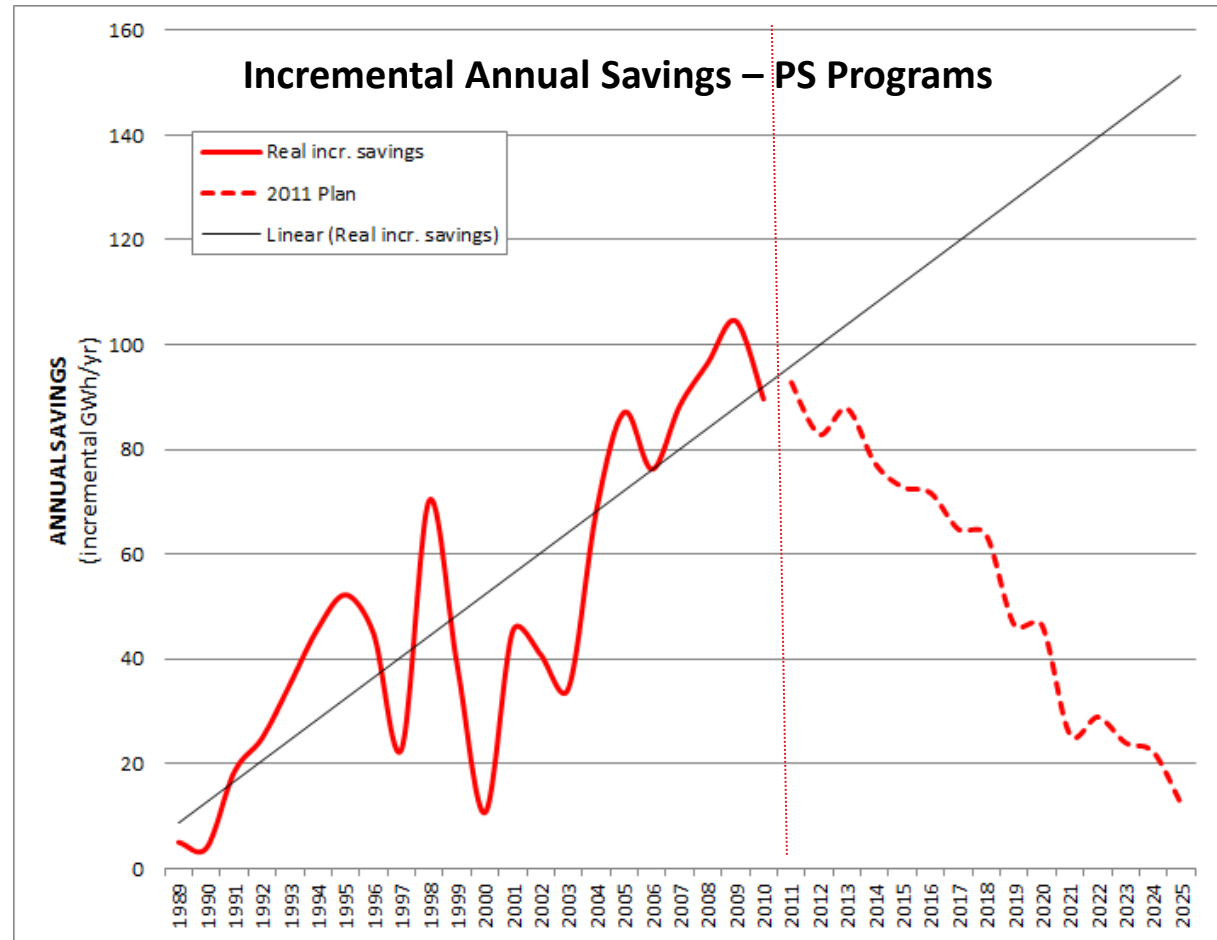
- ✓ Full territorial coverage
- ✓ Electric-Gas Integration
- ✓ History of DSM *incl. relationships with market channels, experienced/capable staff*
- ✓ Billing integration
- ✓ Data integration
- ✓ Others



# 2011 PowerSmart Plan



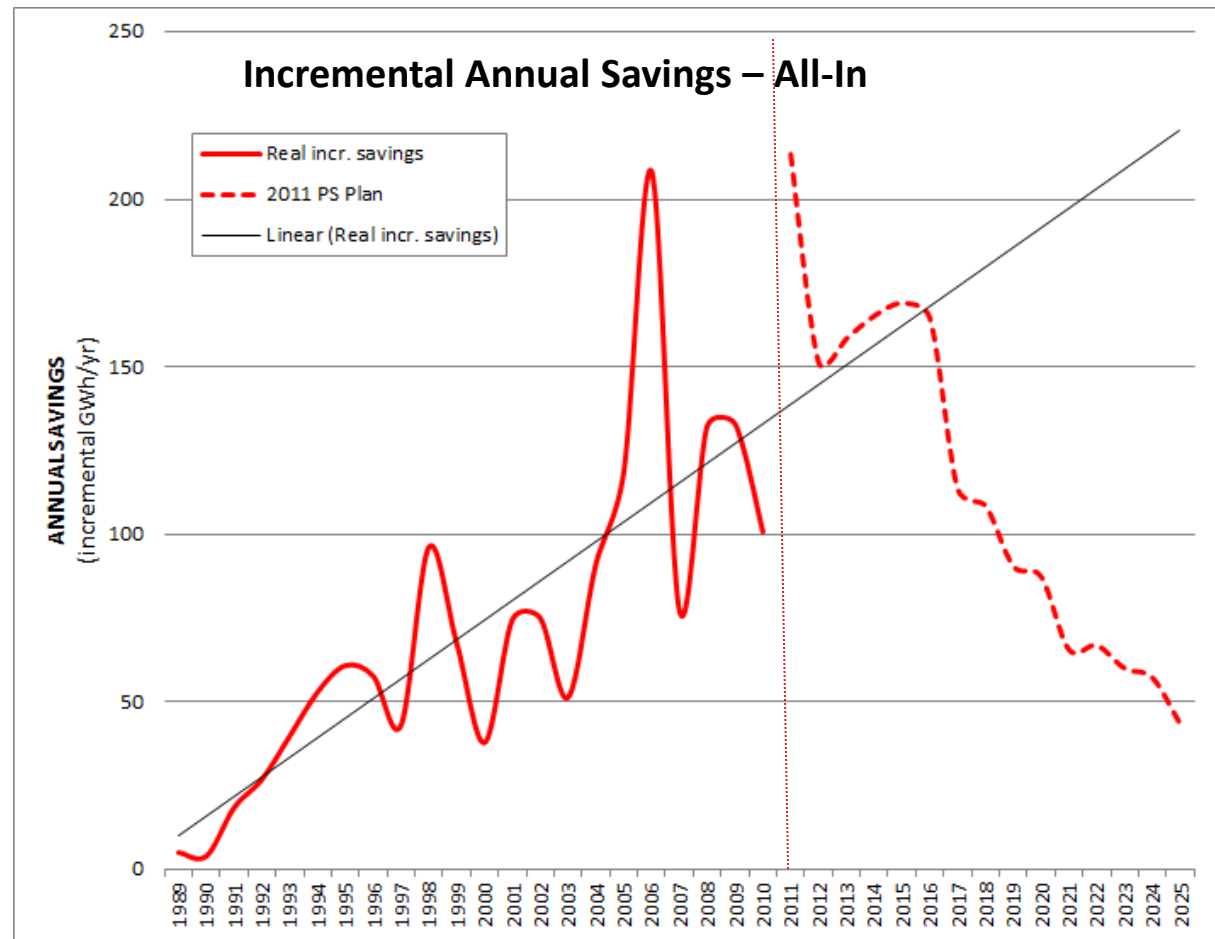
- PowerSmart has long and proud history of successful DSM  
*- including recognition beyond MB's borders*
- Reasonably stable growth since 2000 (industry-wide trend)
- 2011 Plan projects sudden and dramatic reversal



# 2011 PowerSmart Plan



- PowerSmart has long and proud history of successful DSM  
*- including recognition beyond MB's borders*
- Reasonably stable growth since 2000 (industry-wide trend)
- 2011 Plan projects sudden and dramatic reversal
- Reversal not explained by new codes and standards



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# ACHIEVED SAVINGS (2010)



## ■ Measure: % of sales

- ▶ Industry standard benchmark
- ▶ Preferable to alternative % of growth, especially in times of significant economic contraction/expansion
  - *alternative would likely hurt MH unduly*

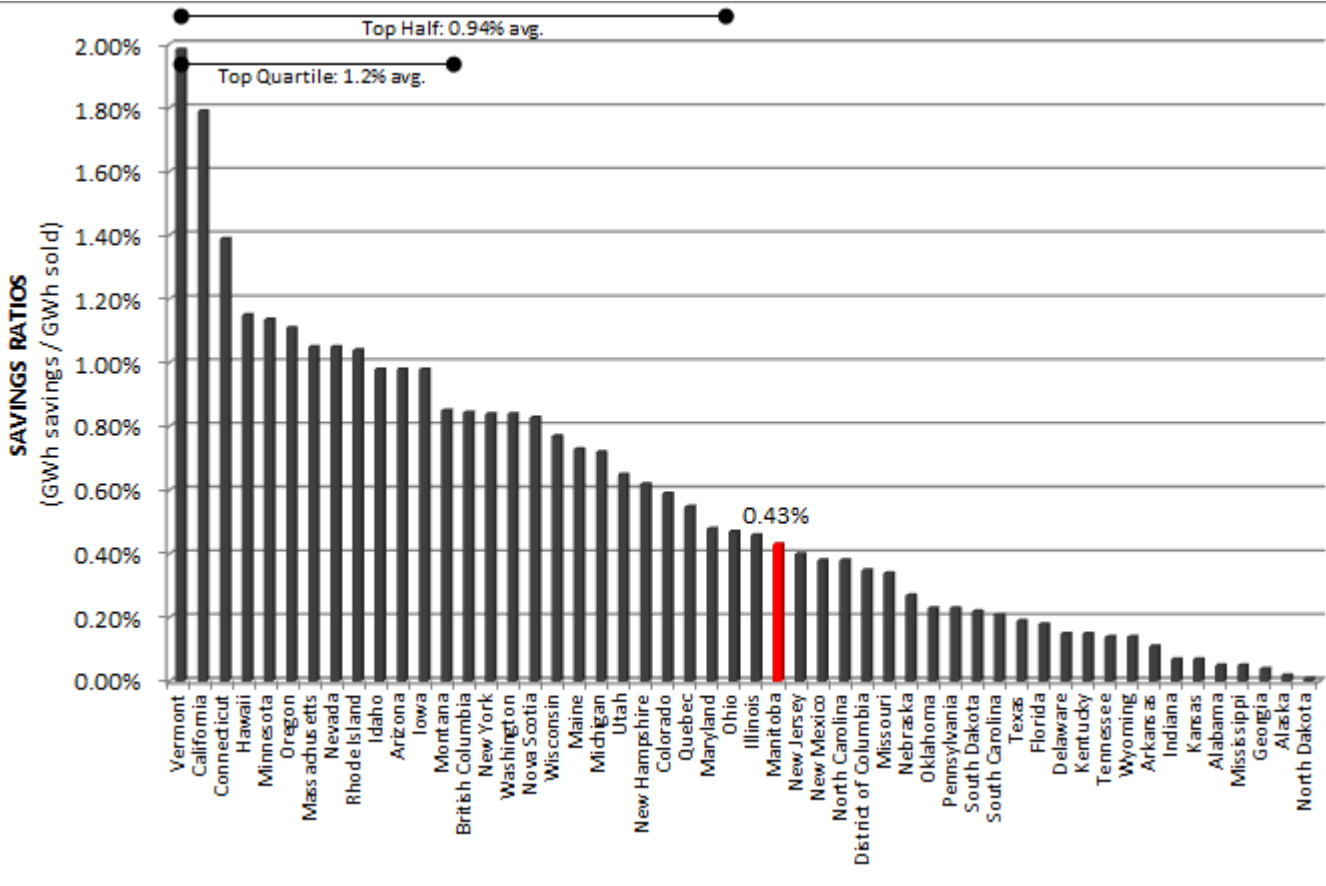
## ■ Focus: EE programs

- ▶ Excludes savings from codes, standards in order to focus on areas under utility's direct influence

## ■ Data

- ▶ Most data from most recent (2012) ACEEE Scorecard
  - *ACEEE = independent industry association*
  - *Scorecard = strong reputation; annual process*
- ▶ Complemented with select Canadian provinces
  - *Nova Scotia, Québec, Manitoba, British Columbia*
- ▶ Apples-to-apples
  - *Careful effort to remove non-program savings*

# ACHIEVED SAVINGS (2010): RESULTS



## SUMMARY

- Top Quartile: 1.2% avg.
- Top Half: 0.94% avg.
- MH at top of third quartile
- Other Canadians in 2<sup>nd</sup> quartile (BCH at top)

NOTES: goalposts moving over time (upward)

# PLANNED SAVINGS (2015+)



## ■ OBJECTIVES & NOTES

- ▶ Forward-looking analysis
  - *future ≠ past*
- ▶ Focus on voluntary programs
  - *but verify impact of other savings sources*
- ▶ Smaller group = greater depth
  - *Examine explanatory variables*
  - *“more than 1, less than 10” to avoid anomalies*
  - *choose based on data availability (cost), criteria (next slides)*
- ▶ Usefulness: helps position within ranges
  - *e.g. quartiles (“top quartile”) or deciles (“top 5”)*
  - *not individual positions (“#1”)*

# PLANNED SAVINGS (2015+)



**SETUP**  
*(ex-post)*

Step 1. Choice of Metrics

Step 2. Choice of Cohorts

**VALIDATE**  
*(ex-ante)*

Step 3. Impact of Other Savings

Step 4. Review Exogenous Factors

# Step 1. Choice of Metrics

- Three metrics considered

	Performance-Oriented?	Industry Standard?	Robust in Current Context?	Fair to MH?
% savings:	YES	YES	YES	YES
% growth:	YES	No	No	Maybe not
% spending:	no			



## Step 2. Choice of Cohorts

### ■ Seven criteria used for choosing cohorts

- 1. DSM Leadership:** Value lies in benchmarking against the “best”, given other constraints
  - *Cohorts: #1 (VT), #5 (MN), #7 (MA), #14 (BC), and #17 (NS) based on 2010 savings*
- 2. DSM History:** MH has longstanding history with DSM
  - *Cohorts: 3 regions with long DSM history (BC, MA, VT); one with medium history (MN)*
  - *Only one with relatively little DSM history (NS)*
- 3. Nations:** Canadian context may bring different challenges, opportunities re. U.S.
  - *Cohorts: 2 Canadian provinces, 3 U.S. States*

.../

## Step 2. Choice of Cohorts

*... criteria*

- 4. Organizations:** MH is utility (crown corp.), not independent agency
  - *Cohorts: three utilities (BC, MA, MN), and two third-party administrators (VT, NS)*
- 5. Climate:** MH has a uniquely cold climate
  - *Cohorts: 3 very cold climates (MN, NS, VT), 2 cold (MA, BC)*
  - *none quite as cold as MB, but all warm or hot climates excluded*
- 6. Size:** MH is not a large market
  - *Cohorts: mostly small (NS, VT) and mid-sized (MN, BC, MA) markets*
  - *no large states*
- 7. Rates:** MH has extremely low rates
  - *Cohorts include both low (MN, BC) and high (VT, MA, NS) rate regions*

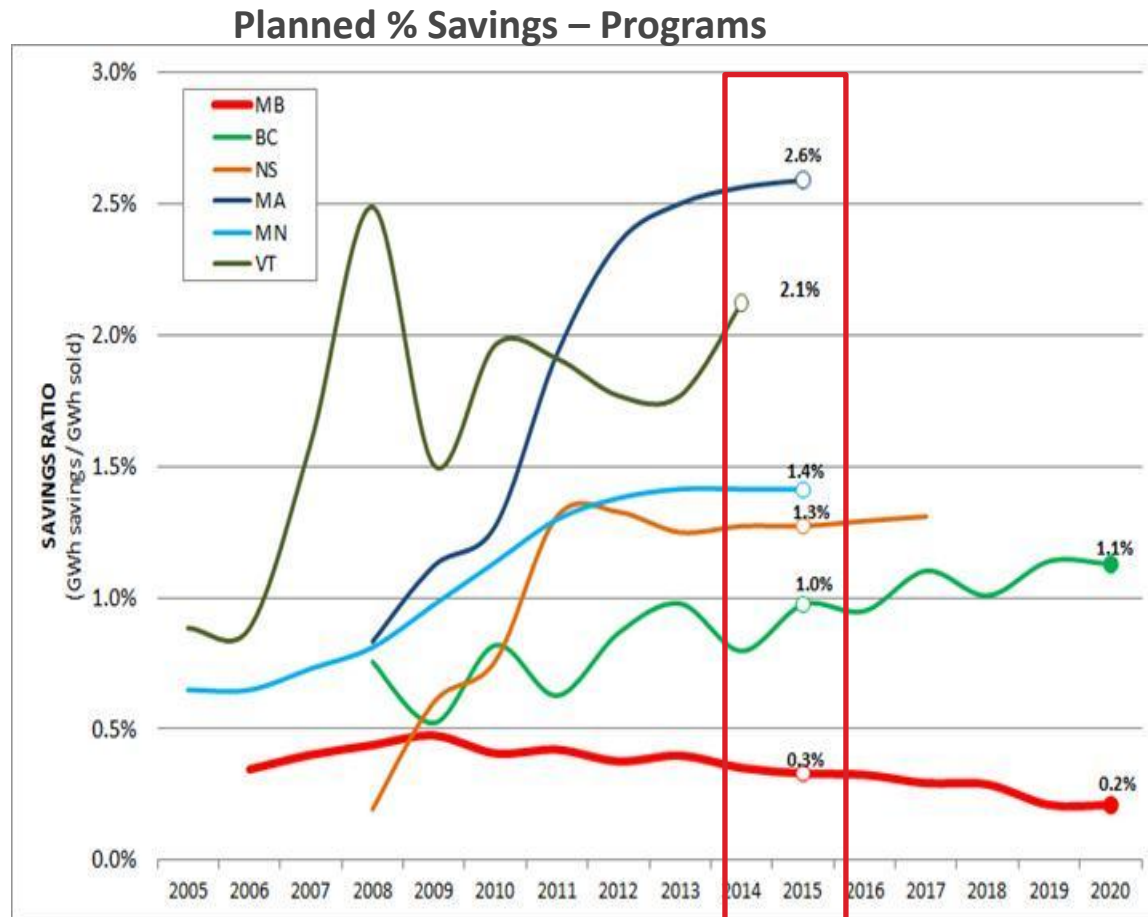
# PLANNED SAVINGS (2015+): RESULTS



■ 2010-2015:  
Cohorts largely continuing to increase planned savings, despite much higher starting points (2-5x MH's)

	2010	2015	x MH*
MA	1.3%	<b>2.6%</b>	7.8 x
VT	2.0%	<b>2.1%</b>	6.4 x
MN	1.1%	<b>1.4%</b>	4.3 x
NS	0.8%	<b>1.3%</b>	3.8 x
BC	0.8%	<b>1.0%</b>	2.9 x
MB	0.4%	<b>0.3%</b>	1.0 x

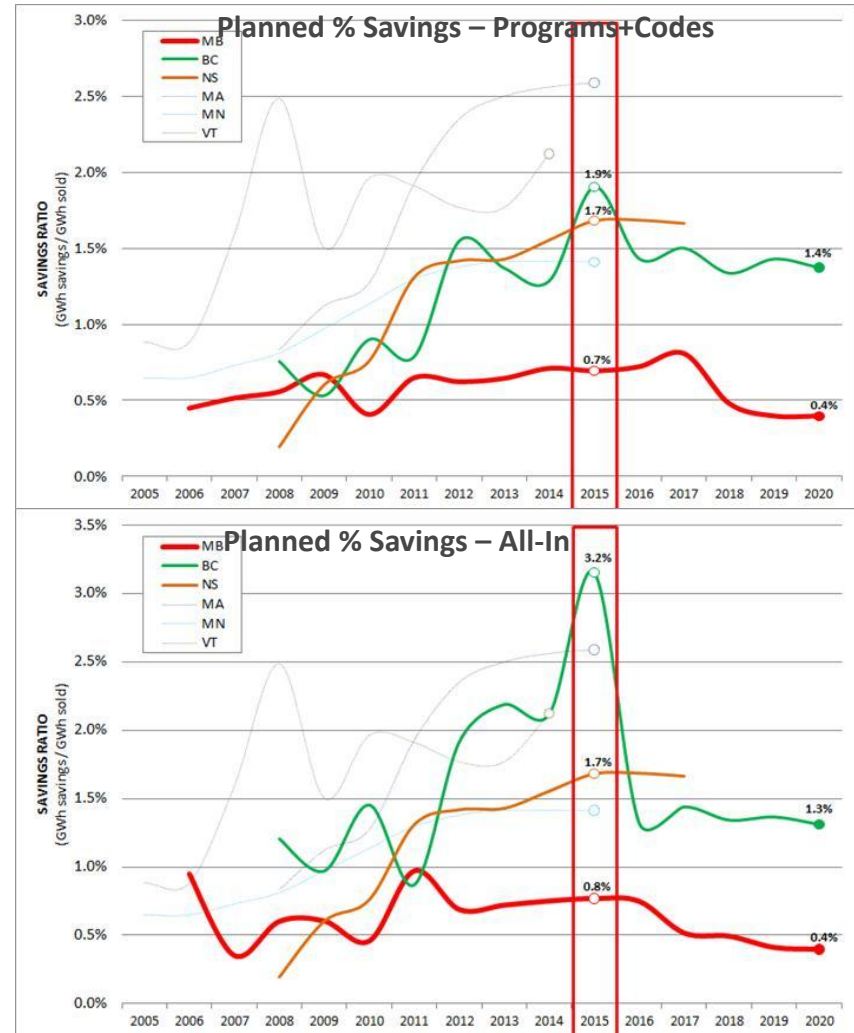
\* "xMH" column does not add up due to rounding



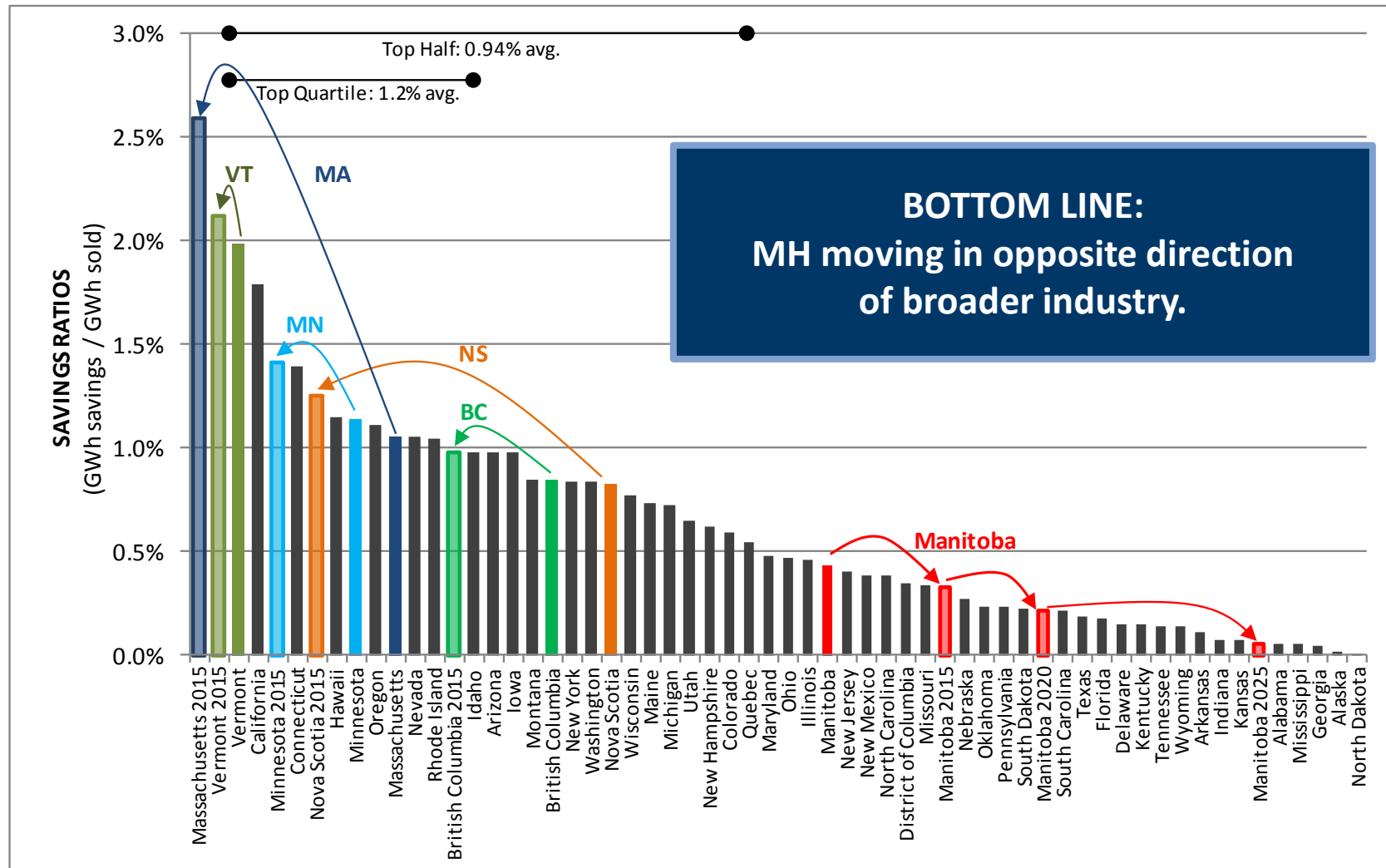
## Step 3. Impact of Other Savings

■ 2010-2015:  
Notionally, picture  
only marginally  
different when  
accounting for non-  
program savings

*Note: in all three  
cases, C&S expected  
to contribute  
roughly the same  
additional savings  
(~0.4%/yr)*



# PLANNED SAVINGS: ANOTHER VIEW



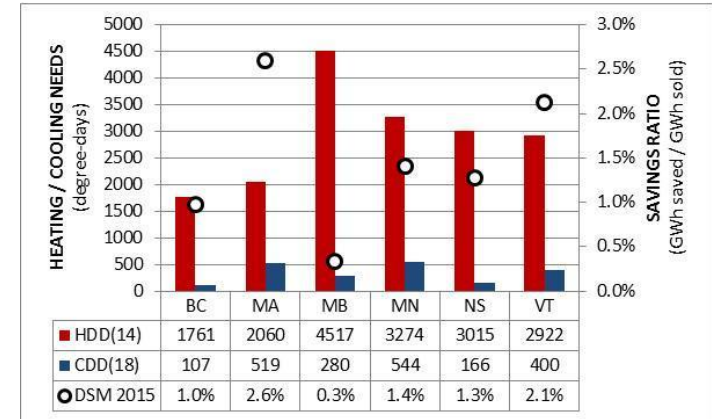
## Step 4. Explanatory Variables

- We sought to assess whether any key exogenous factors may explain stark differences, notably:
  - ▶ MB's cold climate (5<sup>th</sup> criterion)
  - ▶ MB's market size (6<sup>th</sup> criterion)
  - ▶ MB's electricity rates (7<sup>th</sup> criterion)
  - ▶ MB's industrial loads

# Step 4. Explanatory Variables

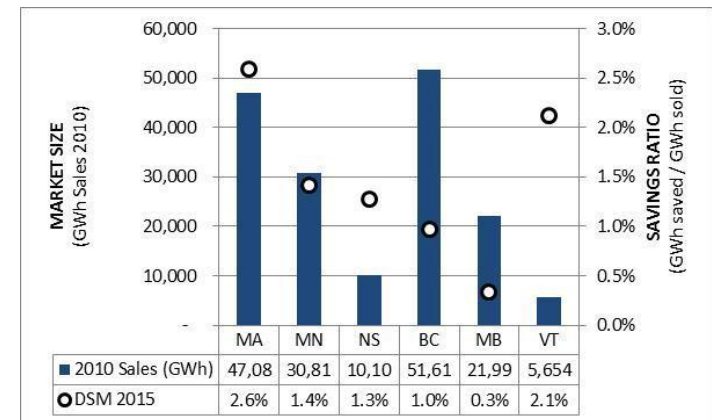
## ■ Climate

- ▶ Logic: Colder = ↑ savings / \$  
*but* Colder = ↓ unexploited savings  
*and* Colder = ↑ interactive effects
- ▶ Data: no obvious relationship



## ■ Market Size

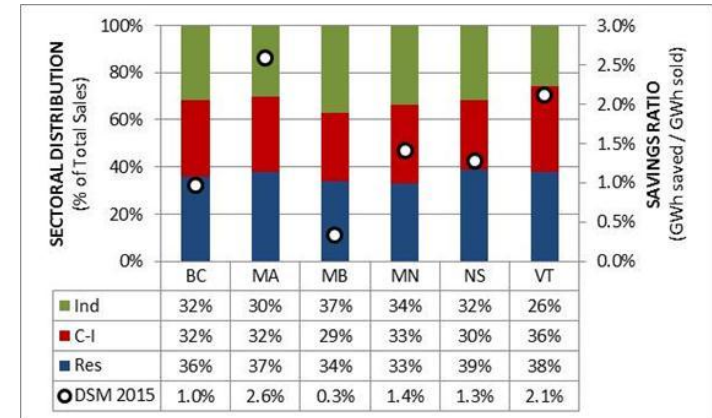
- ▶ Logic: Smaller size = ↓ market power  
*but* Smaller size = ↑ nimbleness
- ▶ Data: no obvious relationship



# Step 4. Explanatory Variables

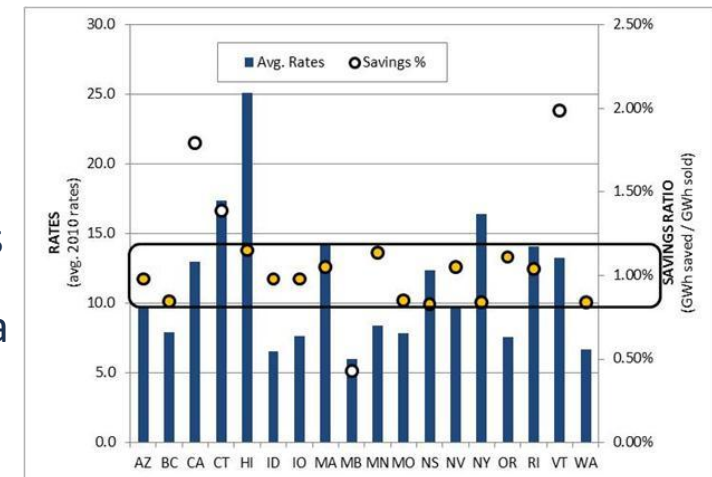
## ■ Industrial Loads

- ▶ Logic: Large Ind. =  $\uparrow$  savings / \$  
*but* MH Ind. sales not signif. higher  
*and* MH Ind. % sales no different
- ▶ Data: differences negligible compared to savings contrasts



## ■ Rates

- ▶ Logic: Low rates =  $\downarrow$  participation  
*but* low rates =  $\uparrow$  unexploited savings
- ▶ Data: initial cohort analysis suggested a relationship, however a subsequent expanded analysis found little if any at all





## Step 4. Explanatory Variables

### ■ Other possible factors?

- ▶ Manitoba Hydro's unique characteristics should actually give it a leg up...
  - *Full territorial coverage (vs MA,VT,MN)*
  - *Gas-electric integration (vs VT,NS,MN,BC)*
  - *Potential for on-bill integration (vs VT,NS)*
  
- ▶ ... while it shares the cohorts' other strengths:
  - *Innovative market players*
  - *Relationships with key market channels, and*
  - *Experienced/capable staff*

# PLANNED SAVINGS (2015+)



**BOTTOM LINE: No significant exogenous factors to stop Manitoba Hydro from achieving much higher savings.**

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# MH Rebuttal Evidence



- Manitoba Hydro has suggested several explanations for the large discrepancy in planned DSM savings:
  - ▶ Factors already addressed
    - *Climate*
    - *Rates*
    - *Industrial loads*
    - *History of DSM*
  - ▶ Factor not previously addressed: **lower Marginal Costs**

# REBUTTAL: Are Lower Marginal Costs the Cause?



**Q:** MH's marginal costs are somewhat lower than others' ( $\approx 1/3$ ), so might this explain that there are less economic DSM opportunities in Manitoba?

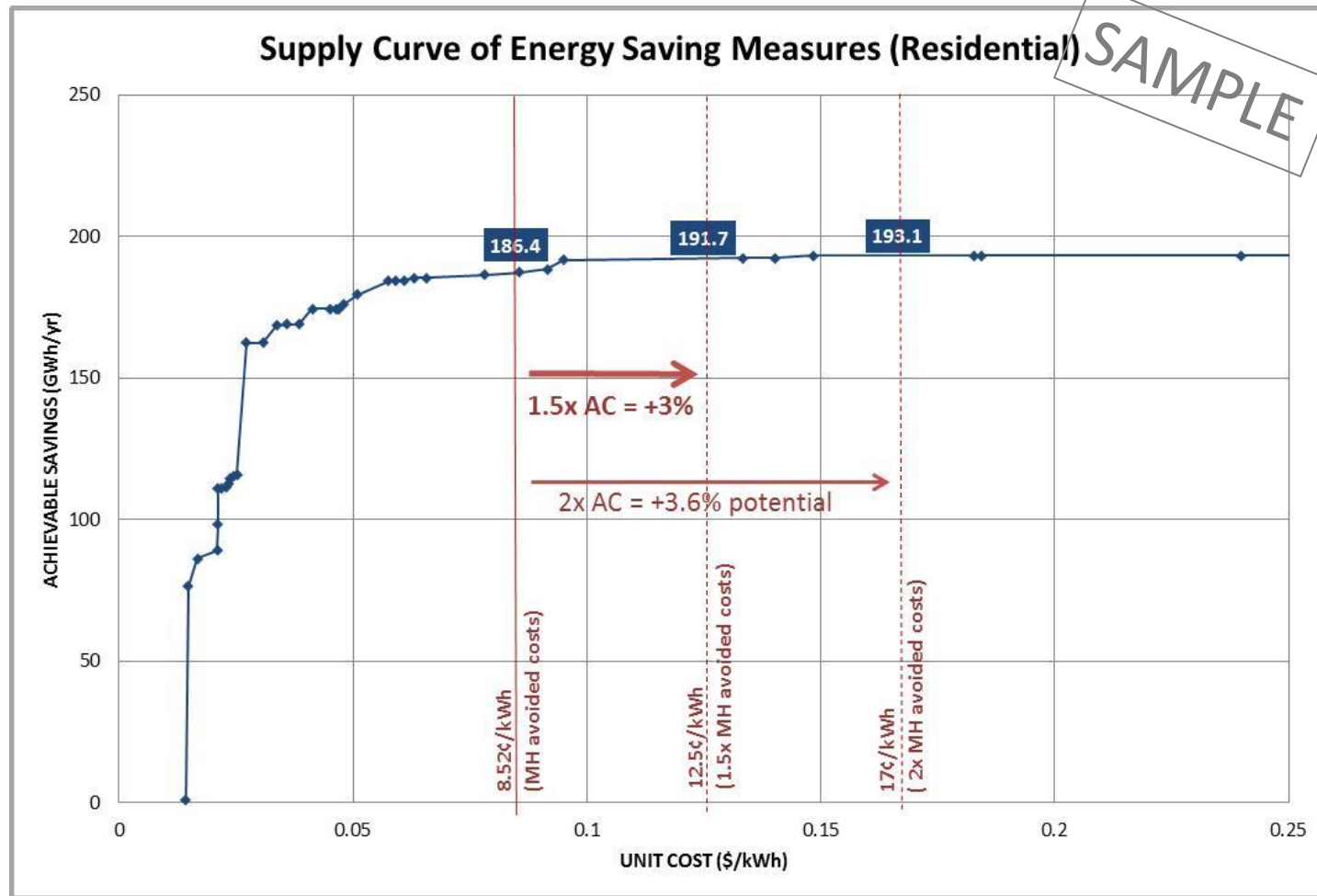
**A:** This should not be the case, for four reasons:

- i. Typically, very few discrete measures fall above MH's stated marginal costs
- ii. Average cost of DSM is several-fold lower than MH's stated marginal costs, including for the most aggressive plans
- iii. Measures that failed MH's screening are marginal (their inclusion would not materially change goals)
- iv. Current B/C approach appears unduly restrictive, and out of sync with best practices

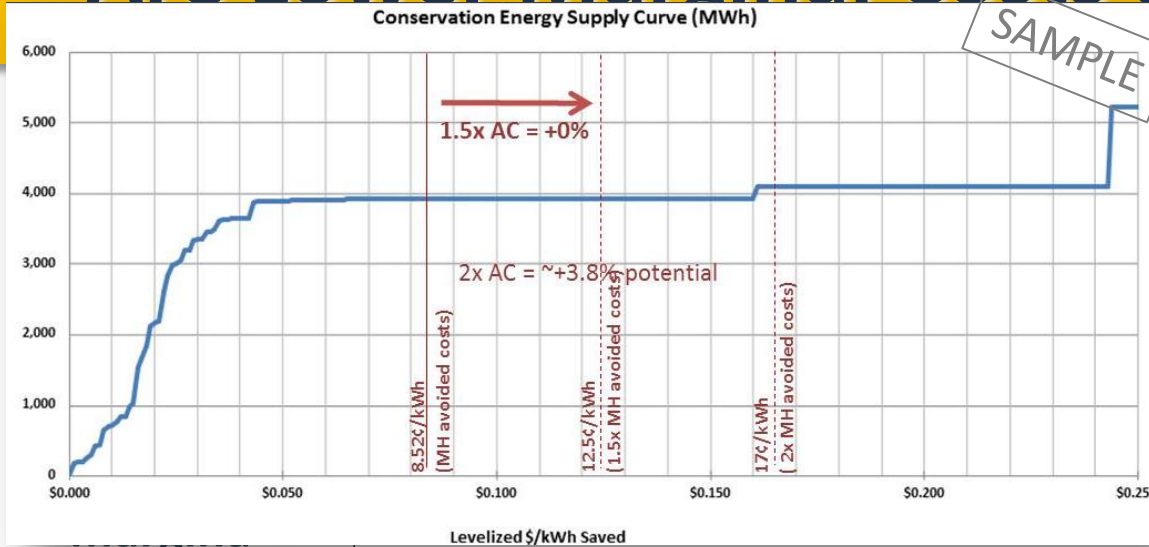
# REBUTTAL: Are Lower Marginal Costs the Cause?



- i. Typically, very few discrete measures fall above MH's stated marginal costs.



# REBUTTAL: Are Lower Marginal Costs the Cause?

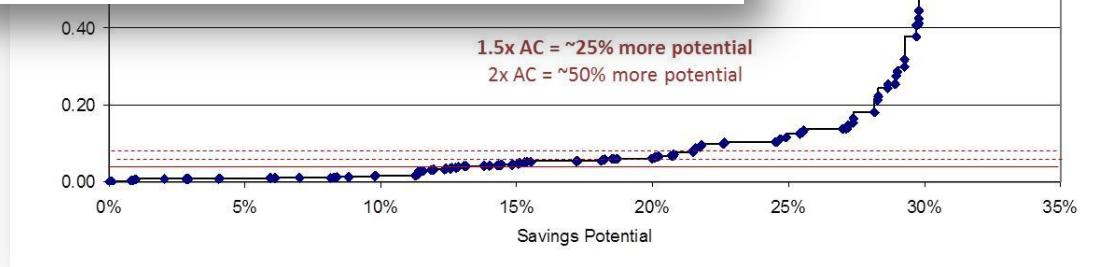
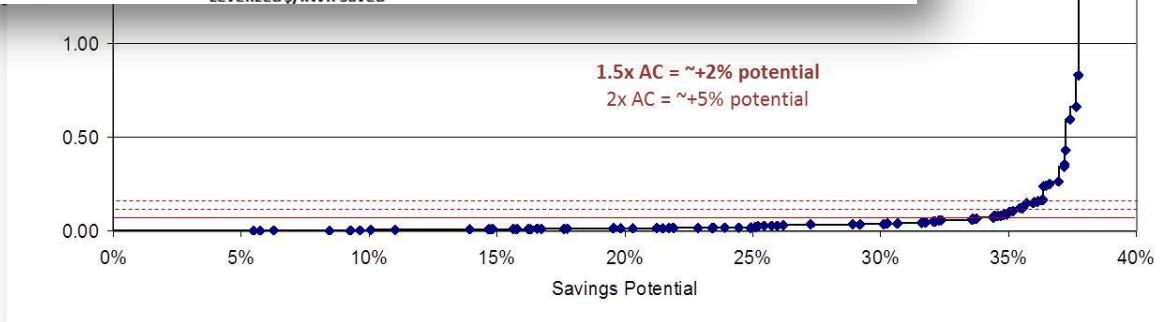


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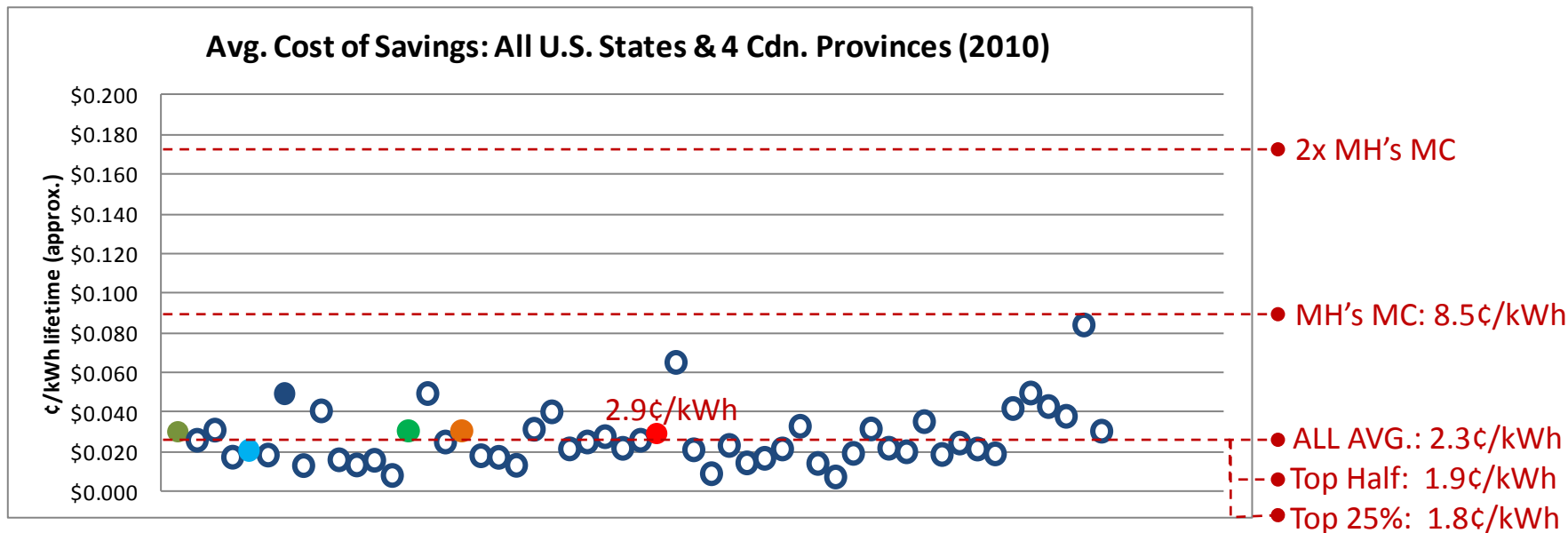
costs.



# REBUTTAL: Are Lower Marginal Costs the Cause?



ii. Average cost of DSM is several-fold lower than MH's stated marginal costs, even for the most aggressive plans



**BOTTOM LINE: Portfolio-level savings, including the most aggressive plans, cost ~1/4 as much as MH's Marginal Cost.**



# REBUTTAL: Are Lower Marginal Costs the Cause?



## iii. Measures that failed MH's screening are extremely marginal

- ▶ 7 measures, incl. commercial griddles and other largely negligible items

# REBUTTAL: Are Lower Marginal Costs the Cause?



## iv. Current B/C approach appears unduly restrictive, and out of sync with best practices

- ▶ Three legs to the B/C stool
  - *Test* – which test(s) should be prime?
  - *Inputs* – appropriate D.R., EULs, NEBs, Timeframe, etc.
  - *Application Level* – measure vs. program vs. sector vs. portfolio



**TEST**

**MH: RIM is/will be primary screen**

Note: almost no-one uses the very restrictive RIM as primary test (1/43 in U.S.).  
LUC for optimization similarly problematic.



**INPUTS**

**MH: various**

Discount Rate: WACC may be inappropriate  
NEBs: partially included  
EULs, others: not examined here.



**LEVEL**

**MH: Individual measure level**

No leader currently applies at measure level. Minimum = program level; ideal = sector.

# REBUTTAL: What Else Might Explain Discrepancy?



## ■ Strategic Orientation: Zero Rate Impact

- 21 It's important, particularly given our
- 22 current financial position, that any new DSM programs
- 23 have a sound business case. **I believe that DSM should**
- 24 **reduce the upward pressure on rates, not increase it.**
- 25 **That is the approach that we're taking.**

*Scott Thomson, Dec. 10 transcript, p. 269*

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# Value of DSM



Compared with new supply, DSM resource typically offers:

- ✓ Lowest utility **cost**
- ✓ Lowest utility **risk**
- ✓ Lowest **environmental impact**
- ✓ Only resource that can **reduce customer bills**  
*(though it can increase customer rates)*
- ✓ Only resource that provides **added customer value**  
*(comfort, productivity, functionality, 'green', others)*
- ✓ Highest **macro-economic benefits**  
*(jobs, GDP, tax revenue)*

Missed DSM = multiple lost opportunities

# Value of DSM: Lowest Utility Cost

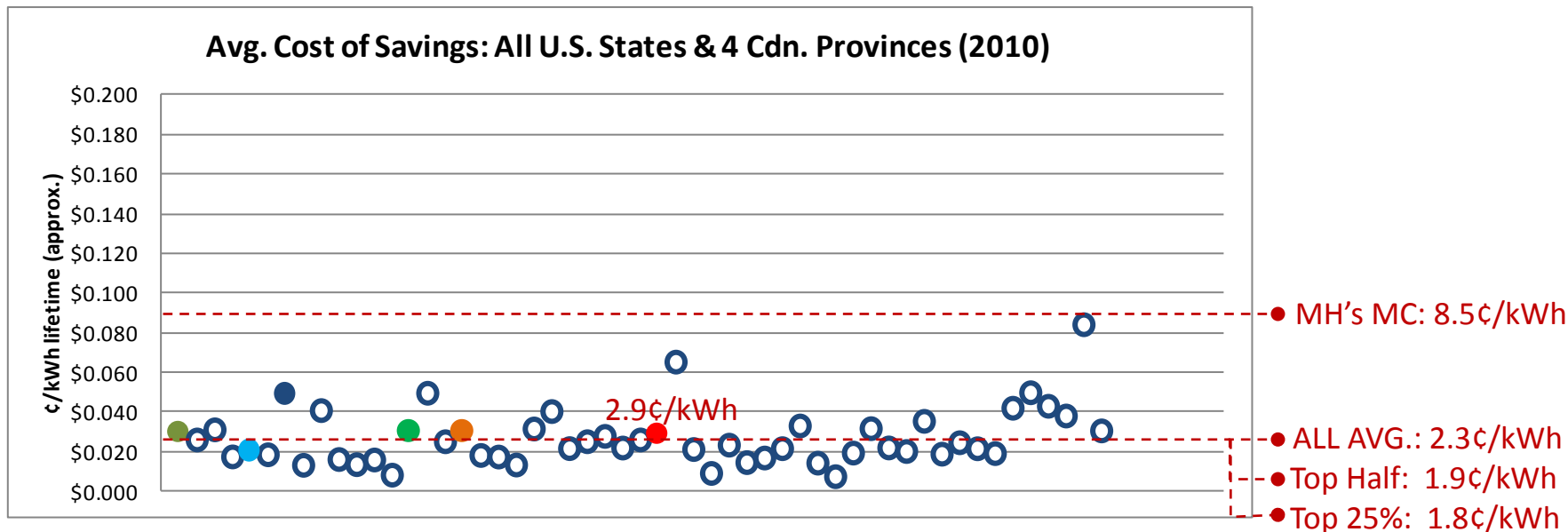


■ MH Marginal Cost: 8.52¢/kWh

■ Cost of DSM: <3¢/kWh

> 5.5¢/kWh net savings

- ▶ Current MH PS cost: 2.9¢/kWh
- ▶ Avg. of all 2010 b'marked utilities: 2.3¢/kWh
- ▶ Avg. of "top 25% b'marked utilities: 1.8¢/kWh



# LOST OPPORTUNITY COST



- DSM left on the table = lost opportunity cost for MH ratepayers of at least 5.5¢/kWh unrealized, from:
  - A. **Deferred capital projects** (assuming project costs  $\approx$  8.5¢)
  - B. **Additional exports** (notwithstanding system constraints)... or some combination of both depending on MH's energy context

# LOST OPPORTUNITY COST

## Three Scenarios



### ■ Three DSM Scenarios

- ▶ *Scenario 1: ramp-up programs from current 0.43% to 1% (~BC Hydro level) by 2015; hold*
- ▶ *Scenario 2: continue programs' ramp-up to 1.5% (~MN level) by 2018, then hold*
- ▶ *Scenario 3: ramp-up all-inclusive savings to 1.5% (~NS, BC levels) by 2017, then hold*

	2013	2014	2015	2016	2017	2018	2019	2020+...	Avg. 2013-20
Sc.1: Ramp to 1% w/Programs	0.6%	0.8%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	0.9%
Sc.2: Ramp to 1.5% w/Programs	0.6%	0.8%	1.0%	1.2%	1.4%	1.5%	1.5%	1.5%	1.2%
Sc.3: Ramp to 1.5% <u>All-In</u> (programs, codes, standards, rates, self-gen)	0.8%	1.0%	1.2%	1.4%	1.5%	1.5%	1.5%	1.5%	1.3%
* Metric: Savings / 2012 f'cast sales.									



# LOST OPPORTUNITY COST Three Scenarios

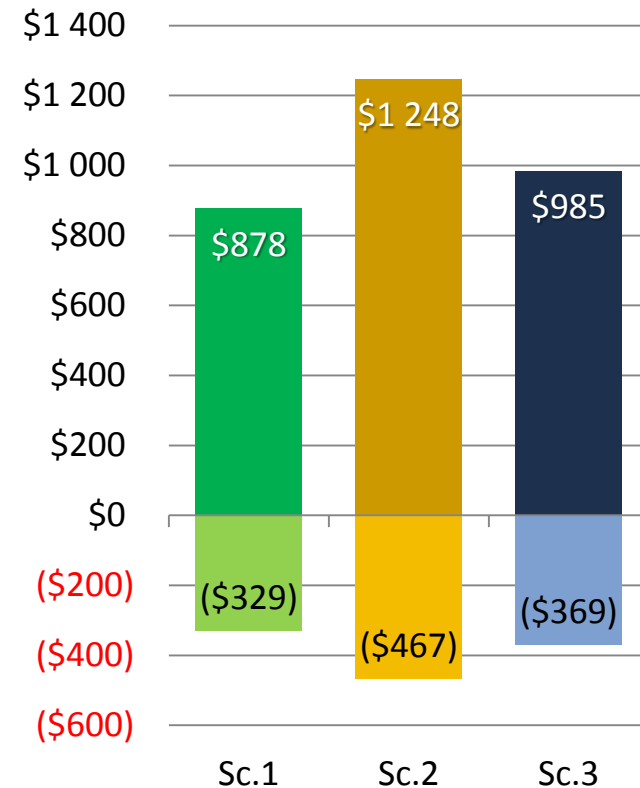


## ■ Sample Scenarios for period 2013-2020: \$550 - \$780M Net PV Savings

- ▶ **Costs: 3¢/kWh assumed**
  - 50% higher per kWh than MH's 2010 PowerSmart
  - 65% higher per kWh than avg. cost of Top Quartile performers in 2010
- ▶ **Savings: 8.52¢/kWh per Manitoba Hydro**
- ▶ **Discount Rate: 6.5% per Manitoba Hydro**
- ▶ **Savings assume +DSM = capital deferral, add'l exports, or combination thereof**  
(slide 41 caveats notwithstanding)

**Gradual increase to BC Hydro level  
(sc.1) would yield more than \$500 M  
in net savings from 8 years' DSM**

**Costs and Savings of 3 DSM  
Scenarios 2013-2020\***



\* 8 year DSM costs and associated lifetime PV savings

# LOST OPPORTUNITY COST A Note on Deferral



## ■ MH rebuttal evidence raised two concerns

MH Rebuttal		Response
<b><i>Energy deferral not accurate</i></b>	<p>“Mr. Dunsky’s response to PUB/CAC&amp;GAC 18 comments on the ability to defer Keeyask to 2031/32 under an accelerated DSM program which yields a savings of 1385 GWhs by 2019/20 Manitoba Hydro disagrees with this statement.</p> <p>Based on the No New Generation System Firm Energy Demand and Dependable Resource tables in the 2011/12 Power Resource Plan (pages 34-35), additional DSM savings of 1385 GWhs would defer the need for new energy resources until 2024/25 (shortfall of 1651 GWhs). An additional 3000 GWhs would be required to defer the need for new resources to 2031/32 (shortfall of 4400 GWhs).” (Rebuttal, page 37)</p>	MH assumed that our DSM scenario stops abruptly in 2019/20; in fact our scenario holds incremental DSM savings steady after 2019/20 (this was admittedly not spelled out clearly in our evidence).
<b><i>Capacity deferral not assessed</i></b>	<p>“In addition, it is acknowledged in the response provided by Mr. Dunsky to PUB/CAC&amp;GAC 18, that capacity was not a consideration in deriving the deferral dates. Based on the 2011/12 Power Resource Plan, new capacity resources are required in 2021/22. To defer this date to 2031/32 would also require in the order of 800 MW of DSM capacity savings. Mr. Dunsky’s evidence does not address if or how these required capacity savings will be found.” (Rebuttal, page 37)</p>	We subsequently ran a high-level capacity impact assessment using MH’s MW/MWh ratio.

## ■ As a result, we revised our preliminary deferral analysis

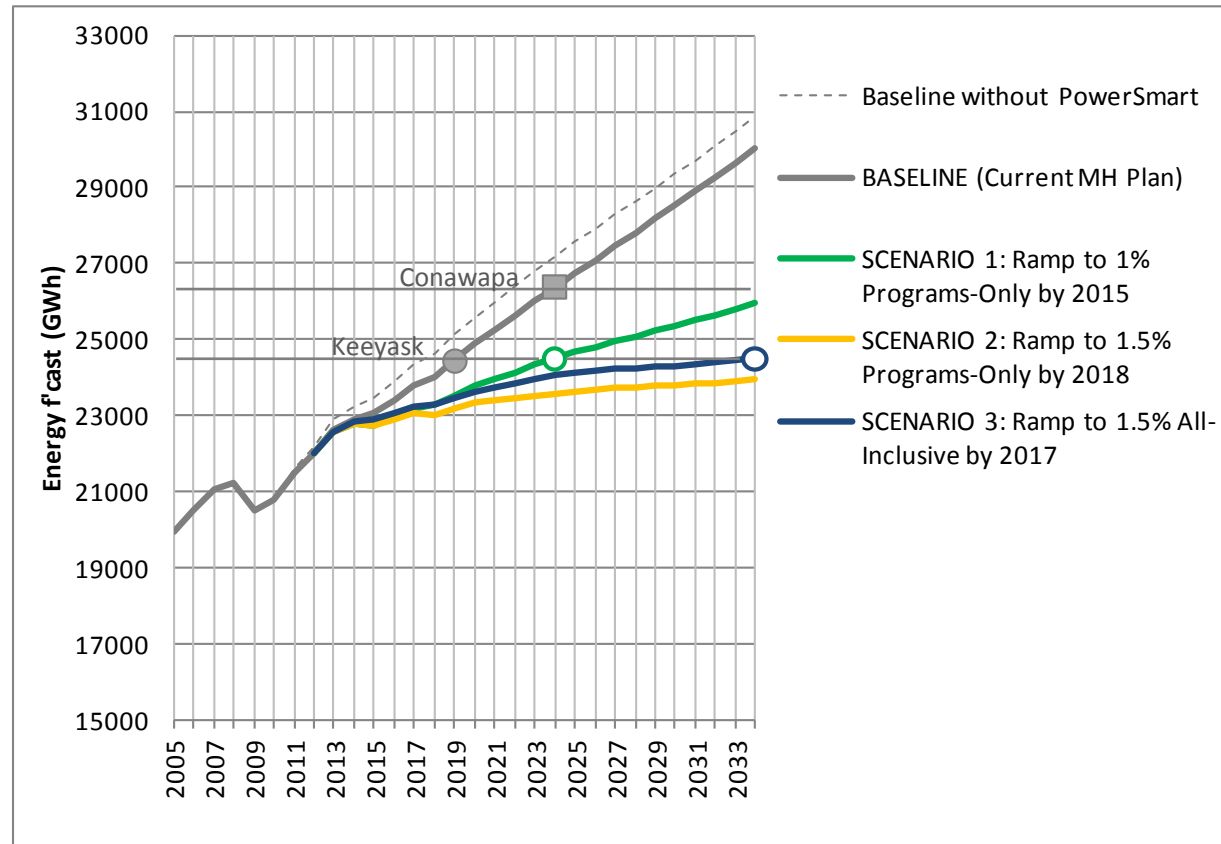
- ▶ Clarified timeframes; added MW analysis; added scenarios and ramp-ups

# LOST OPPORTUNITY COST A Note on Deferral



## Energy (GWh) Impact

- ▶ Keeyask deferred 5 years (scenario 1), 15 years (scenario 3), or Indefinitely (sc. 2)
- ▶ Conawapa deferred indefinitely (>10 yrs) in all scenarios



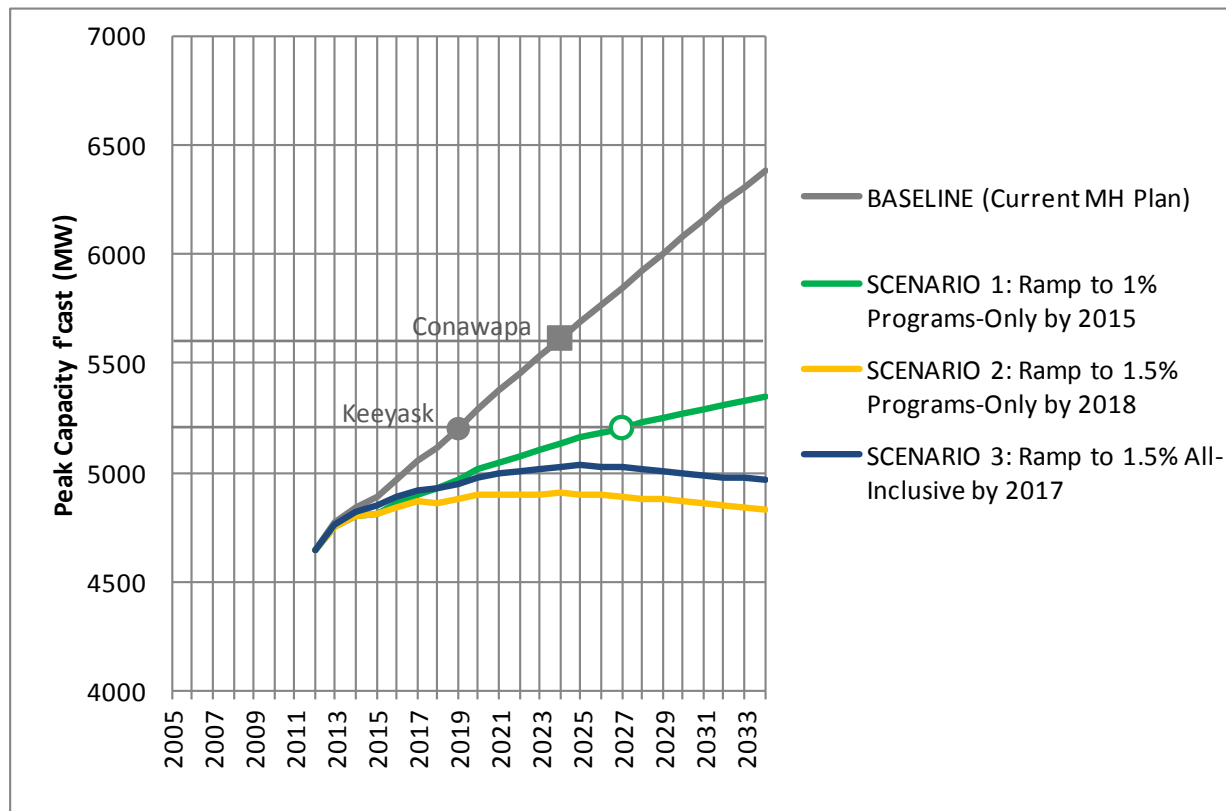
# LOST OPPORTUNITY COST A Note on Deferral



## Peak (MW) Impact

- ▶ Keeyask deferred between 8 years (scenario A) and Indefinitely (scenarios B, C)
- ▶ Conawapa deferred Indefinitely (>10 years) in all scenarios

*Note: MW based on Manitoba Hydro's projected PowerSmart MW/MWh ratio.*



# LOST OPPORTUNITY COST FROM NOT PURSUING ADD'L DSM



- **Manitoba Hydro:** Increased net cost of ~\$550-750 million due to DSM underfunding over coming 8 years alone
  - = more rapid capital expansion, reduced export revenue, or combination thereof
  - + loss of DSM expertise, leadership
  - + loss of ability to benefit from added time (preferred supply options)
  
- **Ratepayers:** Limited opportunity for assistance to improve efficiency / reduce consumption (bills), at a time when rates are projected to increase significantly
  - ▶ Fewer customers will be able to participate; savings will be less pronounced for those that do
  - ▶ note: DSM is only investment option with upside
  
- **Others:** Missed economic benefits (jobs, productivity); higher environmental footprint (carbon, ecosystems, or both)

# Is the Opportunity Truly Lost?



- **What if Manitoba Hydro finds new savings opportunities in future years?**
  - ▶ Hydro = capital intensive, long lead time investment
  - ▶ Extremely difficult to hold / reverse course after certain point in development process
  - ▶ At some point, project gets locked in, deferral option locked out
  - ▶ **i.e. VALUE OF SAVINGS MAY BE LOCKED OUT (LOST) IF NOT BUILT INTO PLANNING EARLY ENOUGH**
  - ▶ Loss of expertise, relationships, market credibility all add to difficulty of re-engaging DSM (additional lost opportunities)

**BOTTOM LINE:**  
**DSM cannot be an afterthought; its deferral value depends on its early integration in resource planning.**

# What About Rates?



## ■ **BROADEST VIEW: Customers pay bills, not rates**

- ▶ Bill = rate x consumption
- ▶ So long as consumption goes down further than rates go up, customers win

## ■ **EQUITY VIEW: there are winners and losers**

- ▶ **Current “no losers” policy = fewest winners**
  - *+ losers from other rate hikes have no opportunity to mitigate*
- ▶ **Equity best achieved by ability to participate**
  - *Robust programs ensure “something for everyone”*
  - *Protect most vulnerable through dedicated low-income programs (common throughout N.A.)*
- ▶ **Note: NOT A ZERO SUM GAME**
  - *8.5¢ vs. 2-3¢ means far more winning than losing*

## ■ **“PENNY WISE, POUND FOOLISH”**

- ▶ Can Manitoba afford *not* to pursue DSM?
- ▶ **Bottom Line: 8.52¢/kWh vs. 2-3¢/kWh**
  - *Current plan leaves hundreds of millions of dollars in savings on the table*

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# What Would MH Need to Do?



- **SALES:** Review / revise its strategies
  - ▶ FTEs, mid- and upstream efforts, marketing budgets, incentive levels, etc.
- **PRODUCTS:** Add new measures/services to its current portfolio
  - ▶ CFLs, DHPs, Home energy reports, etc.,
- **PROCESS:** Revise its DSM screening approach
  - ▶ Choice of Tests, Test components, Level of screening, program design optimization
- **EVALUATION:** Holistic performance evaluation plan
  - ▶ Ongoing NTG tracking, rolling independent evaluations, etc.
- **MANAGE TO GOALS**

# What Might PUB Wish To Do?



## ■ NOT...

- ▶ Order Manitoba Hydro to pursue specific measures, programs or strategies
  - *MH is very capable, has talented staff, can achieve goals*
  - *Opportunities are no more in individual measures than they are in “pushing harder, digging further”*
- ▶ Take undue risk by shelving generation plans immediately in favor of aggressive DSM goals...
  - *that would not be prudent*

## ■ BUT...

- ▶ Status quo – even temporarily – is unlikely your best option
  - *Lost opportunity cost far too high as higher-cost resources get locked in*

## ■ SO...

# A Way Forward



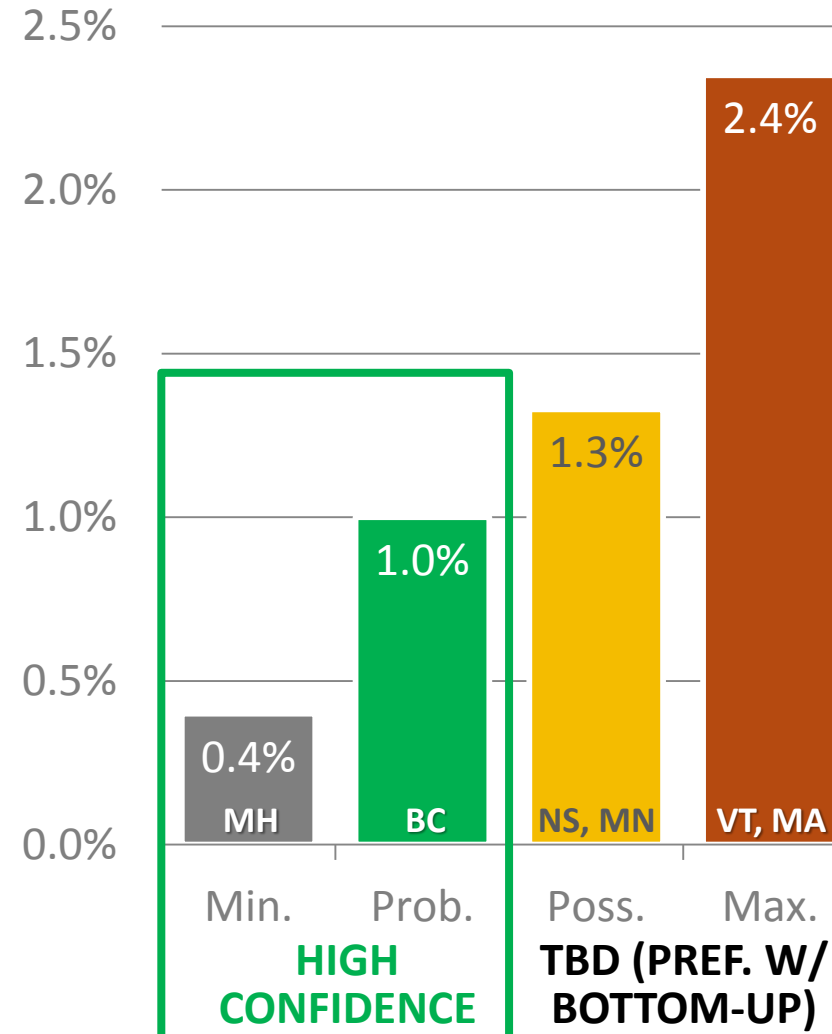
SO... prudent middle way:

## 1. Set conservative floor for 2013-15

- ▶ **Eg.: Programs only:**  
ramp up to 1.0%/yr by 2015  
(= 3-yr avg of ~0.8%/yr.;  
assume 1%/yr thereafter)
- ▶ Important to minimize lost opportunity cost of inaction

## 2. Conduct hearing to determine whether – and to what extent – target can/should be higher

- ▶ Starting point:  
**achievable potential study**



# QUESTIONS?

**PHILIPPE DUNSKY**  
**DUNSKY ENERGY CONSULTING**

**(514) 504 9030 x22**  
**philippe@dunsky.ca**  
**[www.dunsky.ca](http://www.dunsky.ca)**