PUB/COALITION - 1 Reference: Neme Evidence p.5; Daymark Evidence pdf p.24 of 234; Manitoba Hydro 2017/18 GRA PUB/MH II-56; Manitoba Hydro 2017/18 GRA Exhibit PUB-42-4 p.90; Manitoba Hydro 2012/13 GRA Appendix 26 p.2 and 25 of 39;

https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/general_rate_application_2017/information_requests/round_2_pub_irs.pdf
http://www.pubmanitoba.ca/v1/proceedings-decisions/appl-current/pubs/2017%20mh%20gra/pub%20exhibits/pub-42-4%20-%20volume%204%20-%20lf+ef+oma+paygov+deprec+regdef+bizopcap.pdf
https://www.hydro.mb.ca/docs/regulatory_affairs/pdf/gra_2012_2013/Appendix_26.pdf

Preamble:

Neme evidence: "For example, high efficiency electric heat pumps installed to displace natural gas heating can reduce total energy consumption while reducing GHG emissions. These measures can be promoted through Efficiency Manitoba's efficiency programs."

From Manitoba Hydro's 2017/18 general rate application PUB/MH II-56: "Heating an average single-detached home in Manitoba with an electric furnace instead of a natural gas furnace would reduce local emissions in Manitoba by 3 313 kg CO2e per year; however, it would also increase emissions in the MISO region by 12 454 kg CO2e per year, resulting in a net overall global increase in emissions of 9 141 kg CO2e per year."

Exhibit PUB-42-4 p.90 is an update to the Fuel Switching Report (Appendix 26) and provides the global GHG emissions increase resulting from a Manitoba Hydro residential customer switching from natural gas heat to a SCOP 2.5 heat pump, which is an increase of 1,688 kg CO_2e annually under current MISO emissions policies.

Request:

a) Does the Manitoba situation – where switches from natural gas space heating to electric space heating result in increases in global GHG emissions as described in PUB/MH II-56 and Daymark's evidence at pdf page 24 – alter Mr. Neme's recommendations that EM should more aggressively promote fuel switching from natural gas to air source heat pumps?

b) If EM were to be given a mandate to reduce GHG emissions, should the impact of fuel switching from natural gas to electricity in Manitoba described in PUB/MH II-56 inform

EM's programs such that it does not offer incentives for fuel switching from gas to electricity for space heating?

c) Explain how the accounting for GHG emissions works with respect to which jurisdiction may claim GHG savings for carbon-free electricity exports. Does this affect how EM should approach fuel switching from the perspective of the Act and Regulation 119/2019? Does this affect how EM should approach fuel switching from the perspective of societal benefits?

Response:

a)

To be clear, my testimony does not suggest that EM should aggressively promote fuel-switching from natural gas to electricity in its current three-year efficiency plan. Indeed, none of my recommendations to the Board addressed fuel-switching from electricity to gas. Instead, I suggested that EM should be directed to (A) increase its emphasis on heat pumps as an electric efficiency measure for Manitoban customers that currently use inefficient electric resistance heat, particularly lower income customers (my recommendation #3) but also for non-low income customers (my recommendation #2); and (B) to promote it as a fuel-switching measure for customers who both currently heat with propane or fuel oil and qualify for the Affordable Energy Fund (my recommendation #4). I believe that those changes would be the most appropriate ways in which EM could modify its near-term (2020/2023) plan to support electrification in the long-term.

That said, I also think the suggestion that Manitoba should not fuel-switch from gas to electricity because the emission reductions from reduced gas consumption could be more than offset by higher emissions from non-Manitoba generators (resulting from Manitoba's reduced ability to sell its low carbon electricity) is misguided. Most importantly, the presumption implicit in the question – i.e. that MISO emissions rates of a few years ago are the appropriate basis for estimating the GHG effects of modest reductions in Manitoba electricity sales across the border – is highly problematic. For a mixture of economic reasons (e.g. declining wind resource costs, lower costs of some natural gas generation relative to coal generation) and

climate policy reasons, MISO's generation mix has become cleaner over the past decade and is very likely to become even cleaner in the future. For example, Consumers Energy, one of the two large investor-owned utilities in Michigan, recently proposed and had approved a new integrated resource plan that anticipates retirement of all of its coal-fired power plants; replacement of all the retired coal capacity with clean resources such as energy efficiency, demand response and renewables; and a reduction of its carbon emissions by 80% by 2040.[1] As shown below, the potential for such changing policies is precisely why the Fuel Switching Report (Appendix 26) referenced in the PUB's question presents the impacts of fuel switching from gas heating to an SCOP 2.5 electric heat pump as a range, with one end of the range being a reduction in net global CO2e emissions of 3313 kg per year (the increase to 1688 kg referenced in the question is the other end of the range and assumes no change in past MISO generation mix).

[1] XX add reference XX

2016 Fuel Switching Analysis - Summary

Impact of Converting from Natural Gas Space Heating to Electric Space Heating

Average Residential Home from Natural Gas to:	Electric Furnace	Geothermal (SCOP 2.5)
Annual Energy Load Impact		
Electric Load Impact (kWh)	16,605	6,642
Natural Gas Load Impact ($m.^3$)	(1,744)	(1,744)
Economic Impact		
Utility Perspective (Electric)	($4,858)	($1,944)
Utility Perspective (Natural Gas)	($5,599)	($5,599)
Customer Perspective	($12,815)	($11,253)
Integrated Utility / Customer Perspective	($23,272)	($18,796)
Net Provincial Inflow (Leakage)	($10,612)	($647)
Annual Environmental Impact		
Manitoba (kg CO_2e/year)	(3,313)	(3,313)
US - MISO Region** (kg CO_2e/year)	0 to 12,454	0 to 4,982
Net Global**(kg CO_2e/year)	(3,313) to 9,140	(3,313) to 1,688

***The US-MISO Region and Net Global impacts are shown as a range, which includes the impact under today's emission policies in export regions and recognizes what the potential impacts could be under more aggressive emission policies in export regions.*

Finally, as I explain in my testimony, over the next several decades all North American jurisdictions – including those in the markets to which Manitoba's electricity are currently sold – are going to need to dramatically lower their GHG emissions. Put another way, to the extent that MISO will not be able to buy as much clean electricity from Manitoba as it otherwise could have (if the province does not fuel-switch from gas to electricity), the alternative is ultimately going to have to be buying clean electricity from other sources rather than burning more coal or gas. In that context, I think it would be more appropriate for Manitoba to focus its assessment of the impacts of EM's programs more narrowly on its own provincial emissions.

b)

No, for the reasons articulated in response to part a) of this question above, I would not recommend that EM be precluded from supporting gas to electric space heating based on recent MISO emission rates. That said, as also stated in response to part a), I think the principal

focus of EM efforts to support electrification in the short term (i.e. the next three years) should be to (A) develop the provincial market for cold climate heat pumps by promoting them as an electric efficiency measure; and (B) to promote fuel switching from unregulated fuels like propane and fuel oil to efficient electric heat.

c)

As explained in my response to part a) of this question above, because some jurisdictions south of the border are both changing policies and experiencing changes in energy economics that are driving increased investment in cleaner generation sources, and because all of them will ultimately have to change policies if the global climate crisis is to be addressed in a meaningful way, I think the most appropriate way to account for GHG emissions is to focus narrowly on those within EM's control – i.e. solely on Manitoba's emissions.

PUB/COALITION - 2 Reference: Neme Evidence p.10

Preamble:
EM's mandate is laid out in Act:
4(1)(a): implement and support demand-side management initiatives to meet the savings targets and achieve any resulting reductions in greenhouse gas emissions in Manitoba;
4(1)(c): mitigate the impact of rate increases and delay the point at which capital investments in major new generation and transmission projects will be required by Manitoba Hydro to serve the needs of Manitobans;

Request:

a) Will electrification of buildings result in increases in Manitoba Hydro's electric load compared to maintaining the existing natural gas fueled space and water heating systems?

d) If so, will electrification and the resulting increases in electric load lead to capital investments in major new generation and transmission projects?

e) How does promoting electrification reconcile with EM's mandate as set out in the Act s.4(1)(c)?

Response:
a)
Yes.
b)
Depending on the extent to which there is currently excess generation and transmission capacity in the Manitoba system, even if undertaken without other complementary policies, some amount of electrification could potentially be accomplished without such new capital investments. I have not analyzed the extent to which that may be the case. Moreover, when electrification is coupled with aggressive electric efficiency programs, the efficiency program savings could be enough to offset or even more than offset load growth resulting from electrification. Whether that is the case will depend on the degree of emphasis on electrification in future EM plans as well as the magnitude of other electricity savings.

c)

To be begin with, as long as EM produces enough electricity savings from electric efficiency measures to more than offset any increased loads from electrification, it could – in aggregate – "delay the point at which capital investments in major new generation and transmission projects will be required." Moreover, even if one considered the impacts of increased electric loads from electrification in isolation (rather than in tandem with other electricity savings), and even if one concluded that they would be large enough to materially accelerate the need for capital investment in transmission and generation, it is possible that electrification could lower rates by enabling both fixed costs and past costs still being recovered in rates to be spread across a larger volume of sales. In other words, there could be tensions between just the two objectives stated in this one part of the Act – lowering rates and delaying capital investments. Of course, there could also be tensions between those two objectives and others in the Act. In my experience, when there are multiple objectives which can be in tension with each other, judgement on how to value trade-offs between objectives is required.

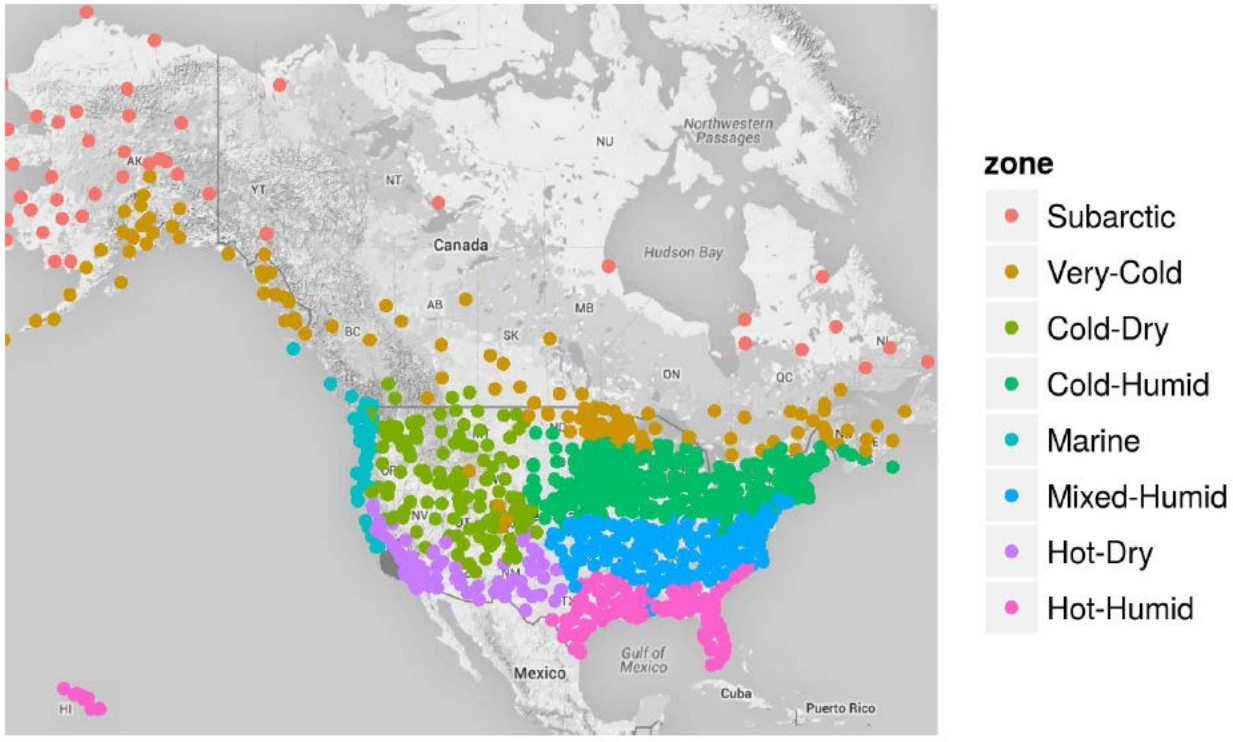
PUB/COALITION - 3 Reference: Neme Evidence p.15

Provide any data, such as existing efficiency programs, number of units in service (as a percentage of the number of customers), or technical performance in Mr. Neme's possession related to cold climate air source heat pumps in jurisdictions with winter climate similar to Manitoba's, such as from other central Canadian jurisdictions, territories, or Alaska.

Response:

Several years ago, the Canadian Standards Association (CSA), with support of the Natural Resources Canada and a variety of other organizations, embarked on a project to establish new testing procedures to assess the average seasonal efficiency of heat pumps for a variety of different climates across North America. As the following graphic shows, that included several different Canadian climates.

Climate Zones for Which CSA Is Developing SCOP Ratings for Air Source Heat Pumps[2]

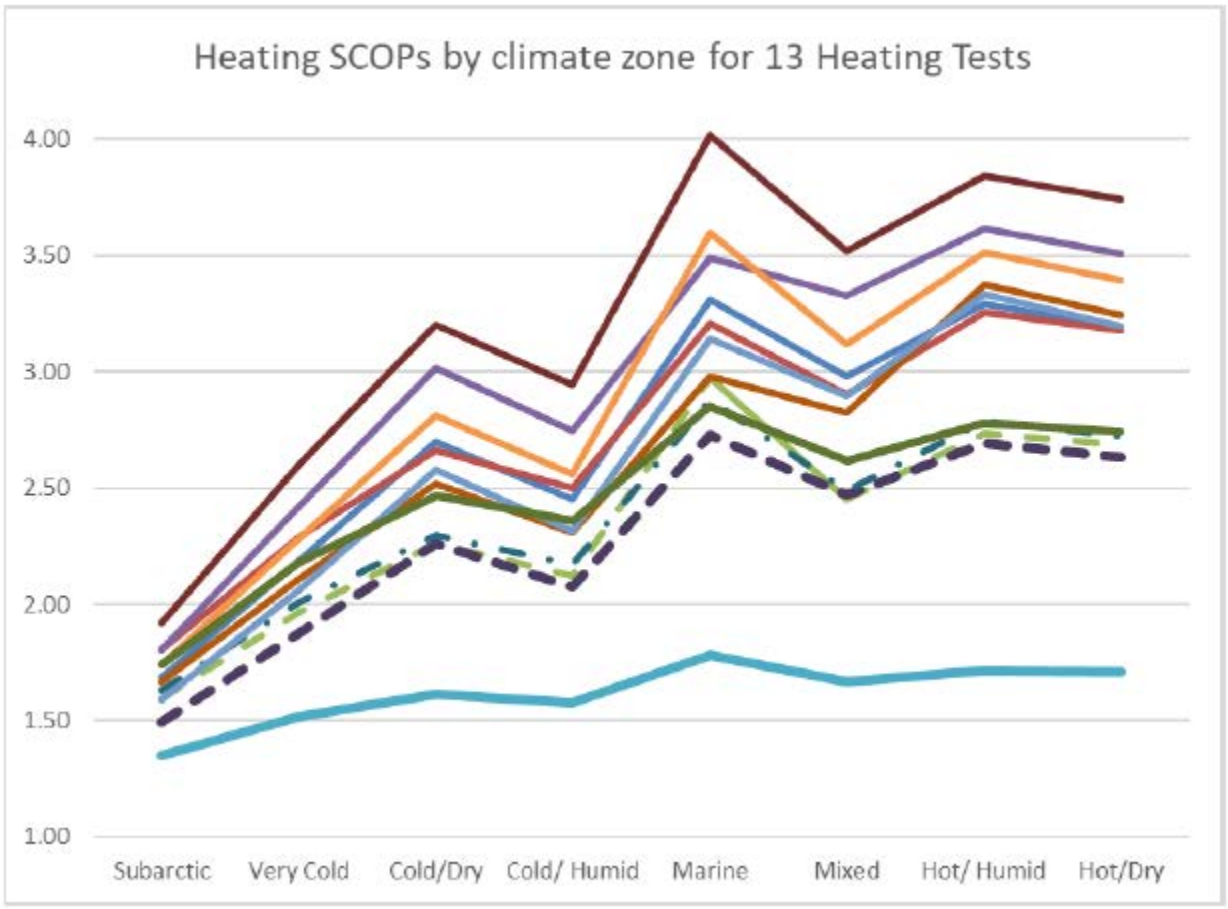


[2] Harley, Bruce and Christopher Dymond, *EXP-07 Preliminary Results*, presentation to the Northwest Energy Efficiency Alliance, November 26, 2019, Slide 9 (https://conduitnw.org/Pages/File.aspx?rid=4967).

Most of Manitoba's population resides within the second coldest of the climate zones developed – the "very-cold" zone. The far northern parts of the province would be within the "sub arctic" zone.

To date, a number of different air source heat pumps have been tested. Most of those tested have been ductless mini-splits and all tested are currently considered "cold climate" models as defined by the Northeast Energy Efficiency Partnerships. The testing has demonstrated that many models with high heating season performance factor (HSPF) ratings, the ratings historically used to assess heat pump heating performance in heating mode, are not necessarily good indicators of performance, particularly in cold climates like Manitoba's. And as one might suspect, their seasonal efficiency declines as winters get more severe. That said, as the Figure below shows, the heat pumps tested would provide substantial savings relative to electric resistance heating, even in climates as cold as Manitoba's. Indeed, 12 of the 13 heat pumps tested have a seasonal coefficient of performance (SCOP) ranging from 1.8 to 2.6 – with an average of about 2.3 – in the "very cold" climate zone that represents most of Manitoba. That means that they would provide 55% to 60% savings relative to an electric resistance heating system (electric resistance heating has an SCOP of 1.0). With the exception of the same outlier, the heat pumps tested had an SCOP ranging from about 1.6 to 1.9 – with an average of about 1.75 – in sub-arctic climates. That would translate to savings of 40% to 45% relative to an electric resistance heating system.

Heating SCOP of Air Source Heat Pumps Tested under New CSA Protocols[3]



[3] Ibid., slide 27.

PUB/COALITION - 4 Reference: Neme Evidence pdf p.18 of 34

Preamble:
The third option for counting savings by switching from gas to electricity described by Mr. Neme is to count the switch from a gas appliance to an electric appliance against (reduces) the electricity savings and towards (increases) the gas savings, but then to count the savings from any higher efficiency of the electric appliance towards (increases) the electricity savings.
Request:

a) Is the preamble an accurate summation of the third option described by Mr. Neme? If not, please provide a corrected summation.

b) Explain how this yields a different result than counting reduced gas consumption towards the gas savings and the electric consumption of the high efficiency electric appliance against the electric savings.

Response:

a)

No, if I understand the question correctly, its characterization of the third option I discuss in my testimony is not accurate.

Under the third option, the switch from gas or propane or other fuel (it is important to note that this would not apply just to natural gas) would be split into two steps. The first step would be to calculate changes in site energy consumption resulting from the fuel switch from gas to a standard form of electric heat (i.e. electric resistance heat). For example, if a home was consuming 1000 m3 of gas per year for heating using a furnace with a 90% efficiency rating and it was fuel-switched to an electric furnace with a 100% efficiency, there would be a ten percentage point improvement in efficiency. Thus, one would count 100 m3 of "gas equivalent" savings towards the gas efficiency savings target. This first step accounts for the fact that the reduction in gas consumption is not a reduction in total energy consumption.

The second step would be to estimate electricity savings relative to the assumed standard electric heating equipment. In the example above, a heating load equal to 900 m3 of gas would

require approximately 9575 kWh per year if met with an electric furnace. Needless to say, if EM promoted fuel-switching to an electric furnace, there would be no electricity savings to count. However, if a heat pump with a SCOP of 2.5 was installed instead of an electric furnace, it would reduce electricity consumption by about 60% – i.e. it would provide approximately 5475 kWh of electricity savings relative to an electric furnace. That 5475 kWh would count towards EM's electricity savings targets.

b)

In the two step process associated with Option 3, there would be modest gas savings and substantial electric savings associated with fuel switching to a high performance heat pump. In contrast, under EM's proposed approach, there would be very large gas savings (i.e. the entire amount of eliminated gas consumption – or 1000 m3 in my example above) counted towards the gas savings target and "negative" electricity savings (i.e. EM's electricity savings goal would effectively be increased by the entire increase in electricity consumption associated with a high performance heat pump).

PUB/COALITION - 5 Reference: Neme Evidence p.19; Efficiency Plan Attachment 3 p.516 of 591

Preamble:
Mr. Neme's Recommendation No. 3 states: "Direct Efficiency Manitoba to offer heat pumps as an electric efficiency measure for electrically heated low income customers eligible to participate in its Income Qualified program. Such measures should be offered at no cost to the participating low income customers. Furthermore, efforts should be made to ensure that such measures are installed in both single family and multi-unit residential buildings."

Request:
With respect to Recommendation No. 3, has Mr. Neme estimated the PACT levelized cost of providing air source heat pumps at no cost to Income Qualified electrically-heated customers? If so, please provide and compare the estimated PACT levelized cost to the Income Qualified bundle levelized cost.

Response:
I have not estimated the PACT levelized cost of providing air source heat pumps at no cost to electrically heated Income Qualified customers. Frankly, that is an analysis that EM should have performed to inform its program choices. I did not have the ability develop a defensible estimate of the levelized cost given the very time constraints for this proceeding. Furthermore, it is my understanding that low income efficiency programs are not required to be cost-effective in Manitoba (as in many other jurisdictions).

EFFICIENCY MANITOBA 2020-2023 EFFICIENCY PLAN

PUB INFORMATION REQUESTS OF CONSUMERS COALITION

DECEMBER 13, 2019

PUB/COALITION - 6 Reference: Grevatt Evidence p.5

Preamble:

"Measure level detail is needed to understand what a program is actually promoting. It is insufficient to say only, as EM does in reference to the Home Renovation Rebate Offers, that it 'will provide rebates to homeowners on a variety of energy-saving measures and technologies with higher upfront costs such as insulation, windows, HRV controls, drain water heat recovery units, and geothermal systems.'[3] In order to assess the value of such a program, it is necessary to understand the program's assumptions about the costs and savings for each measure, and how the relative prioritization of the measures is reflected in incentive levels."

Request:

Please comment on whether Mr. Grevatt would consider it to be more efficient and effective to review measure level detail along the lines suggested as part of the work of the Energy Efficiency Advisory Group, prior to the development of the filing of a three-year plan or through the information request and hearing process that is relied upon after a three-year plan is filed. Please provide the advantages and disadvantages of each approach.

Response:

In Mr. Grevatt's view, either of the two suggested approaches could work. A robust, focused and well-facilitated Energy Efficiency Advisory Group ("EEAG") has the potential to more collaboratively inform Efficiency Manitoba's proposed program approaches, including the specific measures that are promoted, proposed incentives and quantities of each. Such discussions, given sufficient time, could lead to a more streamlined approval process, with reduced need for

IR and evidence. This may be the preferable approach, though in any event the supporting documentation should be entered into the record. However, with adequate time provided in a procedural schedule, and clear requirements for Efficiency Manitoba's initial filing, there is no reason that the IR and hearing process could not also provide a reasonable forum for investigating and advising the Board on Efficiency Manitoba's plans. For either approach to succeed, the information provided by Efficiency Manitoba must be transparent, complete, and well-organized, and provided with adequate time to review, analyze, and comment on the proposed measure cost and savings assumptions, the quantities that are proposed, and the expected incentives.

PUB/COALITION - 7 Reference: Grevatt Evidence pp.6-8

Preamble:

"No measure level data were provided to the Coalition until IRR were received on November 27, 2019, a month after the Plan was filed—and even at this point the data were incomplete and difficult to interpret."

"A similar level of detail would greatly improve EM's future filings. Should the Board determine to recommend that EM provide more detail in future filings, it might consider requesting specific recommendations from stakeholders on the types of data that would facilitate their review and analysis."

Request:

a) Please provide a detailed list of the measure level data and other program information that should be provided as part of any future Efficiency Plan filings.

b) Please provide any additional measure level data and other information that should be provided in future efficiency plan filings that would be of assistance in a retrospective evaluation of the efficiency plan that was implemented in the preceding three-year period.

Response:

a) Mr. Grevatt recommends that the following be included with future Efficiency Manitoba Plan filings:

For each program Efficiency Manitoba should provide the following:

- Identification of the measures[1] that will be promoted
    - Measure end-use

[1] Mr. Grevatt discusses the common use of the term "measure" in his evidence, pdf p.20. In short, a measure, as defined in the Massachusetts TRM, is "a product (a piece of equipment), combination of products, or process designed to provide energy and/or demand savings."

  - Assumed quantity of each measure
  - Estimated incremental cost of each measure and the basis of the assumption
  - Estimated customer cost of each measure
  - Proposed incentive for each measure
  - Estimated first year and lifetime gross and net energy savings and capacity savings of each measure
  - Estimated useful measure lifetime
  - Cost per first year net kWh saved and levelized cost of kWh saved per measure

- At the program level
  - Total first year and lifetime gross and net energy savings and capacity savings that result from the total quantity of each measure
  - Total program first year and lifetime gross and net energy savings and capacity savings
  - Total program incentive budget
  - Total program non-incentive budget
  - Total expected number of participants (and program-specific definition of a “participant”)
  - Cost per first year net kWh saved and levelized cost of kWh saved at the program level
- Program narratives should also describe the types of customers that will be targeted, the barriers that have been identified to customer participation, and the strategies the program will employ to overcome those barriers.

b) Mr. Grevatt interprets "future efficiency plan filings that would be of assistance in a retrospective evaluation" to refer to ex-post reports of actual program accomplishments. It is common for energy efficiency programs to be required to file an annual report for each year of program implementation. Such reports generally include a comparison of projected/plan participation, costs, and savings with achieved values in the same categories at the program level, as well as actual quantities of each measure that was supported by the program.[2] In some cases annual reports also include third-party evaluations of the reported data, potentially including an assessment of the "actual" savings that the program achieved in comparison with the planned and reported savings. Annual reports should also include a discussion of the factors that contributed to or interfered with the success of the program in achieving its targeted participation, cost, and savings.

[2] See, e.g., the 2018 Year-End EmPOWER Maryland Report of the Baltimore Gas and Electric Company, https://www.psc.state.md.us/, ML 224024.

PUB/COALITION - 8 Reference: Grevatt Evidence pp.8-9

Preamble:

"For the vast majority of customers this means that they will have fewer opportunities to reduce energy use at their homes and businesses than they would have had under a plan that relies more heavily on broadly available programs."

Request:

a) Please comment on the trade-off from a customer's perspective of a plan that incorporates more opportunities to reduce energy use at their homes and businesses if those additional programs do not have PACT or TRC ratios that exceed 1.0.

b) What criteria should EM use to select measures that should be included in its Plan in the event that the additional measures will result in savings that exceed the minimum target set out by legislation?

Response:

Please note that Mr. Grevatt does not suggest in his evidence that Efficiency Manitoba should promote programs that are not cost-effective, and, with certain caveats, such as the exception of programs that are designed to grow emerging market opportunities or serve under-served markets, he does not generally support such an approach. This position assumes that cost-effectiveness testing appropriately includes the full complement of benefits values. Please also see IRR EM/Coalition 1-4 for additional discussion of Mr. Grevatt's views on cost-effectiveness. Mr. Grevatt notes that Efficiency Manitoba indicates that the gas Home Renovation Program PACT would be 1.20 and the electric program PACT would be 2.90 as proposed.[3] Especially for electrically heated homes, this

[3] Efficiency Manitoba 2020/23 Efficiency Plan, pdf pp. 511 and 516.

suggests that there is ample headroom to increase the comprehensiveness of the program even if it reduces the PACT somewhat. Unfortunately, Efficiency Manitoba's filing does not provide sufficient detail to allow further analysis by Mr. Grevatt.

a) In broad terms, a PACT test ratio that does not exceed 1.0 would result in overall utility costs increasing because the benefits that would result from program savings would not be enough to justify the program costs. For any individual customer who participates in the program, however, the savings at that premise would likely exceed the rate impact that the customer would experience. In other words, a PACT result of less than 1.0 does not provide any indication of what the financial implications for a participating customer might be.

   A TRC[4] ratio that is less than 1.0 does not directly indicate anything about the cost-effectiveness either to the utility system as a whole (that would be the PACT test) or to any individual participating customer (which would be determined by the Participant test). It is plausible that a project that is part of a program that passes PACT—because the utility program costs are low—might not pass the TRC test, and in spite of this, such a project might still be attractive to a customer. For example, when Mr. Grevatt managed the comprehensive home retrofit program at Vermont Gas in the 1990's the program came very close to failing the societal cost-effectiveness test, yet it passed both the PACT and the Participant test.

b) As noted in the question, the statute sets out *minimum* savings levels for Efficiency Manitoba to achieve. Mr. Grevatt suggests it would be reasonable for Efficiency Manitoba to pursue all savings opportunities that meet cost-effectiveness criteria, and that such pursuit should reflect a

[4] This is also true for the societal test, which is effectively a more comprehensive version of the TRC.

thoughtful growth trajectory that is mapped to a comprehensive project management plan. To the extent that the Board determines that Efficiency Manitoba should exceed its minimum savings targets, Mr. Grevatt suggests that in addition to pursuing measures with the lowest levelized cost of savings, a multi-criteria review of the portfolio is appropriate, including the following:

- Does each sector have savings opportunities, and how do those opportunities compare to the energy use of the sector?
- Are meaningful program opportunities available to all segments of the sector, including hard-to-reach and under-served customers?
- Are longer-lived, more comprehensive measures appropriately prioritized?
- Are customers who are more adversely affected by high energy bills given adequate opportunities to reduce their energy costs, given that they are also paying for the EM programs?
- Do savings that can be obtained in constrained delivery areas appropriately reflect the greater value they can provide in deferring capital expansion, and is this reflected in potentially more aggressive program designs?

PUB/COALITION - 9 Reference: Grevatt Evidence pp.8, 9, 20

Preamble:

"A few of the notable risks that EM faces are:

- Whether the required staff transition from Manitoba Hydro ("Hydro") will be successful and accomplished in a timely manner;
- Whether procurement for third party program implementers will be successful and accomplished in a timely manner;
- Whether all the programs will ramp up according to plan and meet participation and savings targets within the proposed budgets;
- Whether the proposed Customer Relationship Management ("CRM") tool and proposed Online Home Energy Questionnaire will be fully deployed and operational according to the expected timelines;
- And, whether the significant savings that are projected to come from Codes and Standards will be verified by the independent assessor."

"Taken together, even these few examples suggest a strong need for a risk mitigation strategy to assure that EM will be able to meet its savings requirements."

Request:

For each of the risks identified on pages 8 and 9, please provide recommendations with respect to actions EM could take to mitigate the risks.

Response:

The Efficiency Plan and IRR provided by Efficiency Manitoba do not provide Mr. Grevatt with an adequate basis for recommending specific risk mitigation strategies for the issues that have been identified. With that caveat, examples of the types of strategies that Efficiency Manitoba might consider include the following:

- Whether the required staff transition from Manitoba Hydro ("Hydro") will be successful and accomplished in a timely manner;
    - Mr. Grevatt has no information regarding EM's hiring protocols and makes no claim to expertise in human resources, however, based on his experience with the start-up District of Columbia Sustainable Energy Utility and with a rapid expansion of Efficiency Vermont, he offers the following observations. Presumably there are two aspects to the full staffing of Efficiency Manitoba once a complete organizational chart and staffing plan has been developed. The first is determining the extent to which Hydro staff are appropriately qualified and willing to make the transition to Efficiency Manitoba, and the execution of a plan to make those hires. The second is to identify the positions that won't be able to be filled by Hydro staff and implement a recruitment and hiring process for those positions.

      To the extent that fully staffing Efficiency Manitoba is dependent on it having sufficient staff resources to manage the transition and/or hiring processes through interviews, salary negotiations, compliance, etc., EM should reflect on the resources it has in-house and identify any supplemental resources that can be quickly engaged on a short-term contract basis to support an expedited process. If EM does not already have a fully staffed human resources department, or even if it does have the full complement of staff it expects to need on an ongoing basis once it is fully staffed, it would be reasonable, and in fact necessary in all likelihood, for EM to bring on additional resources to help manage the rapid staffing process.

- Whether procurement for third party program implementers will be successful and accomplished in a timely manner;
    - As with the question regarding staff transition from Manitoba Hydro, it is critical that Efficiency Manitoba establish an efficient and effective process for procuring the required third party implementers, and that it appropriately estimate the amount of time required to accomplish the needed tasks for each implementer. In other words, sound project management is critical, and it may be expedient for Efficiency Manitoba to contract with short-term independent project managers to help manage the process, as well as short-term contract specialists who can facilitate procurement and contracting. In addition to taking such steps to expedite procurement, Efficiency Manitoba should make frequent assessments of the program implementation capacity that it has procured, and the extent to which certain programs can be ramped up early in the program cycle to increase the savings and participation in those areas. Efficiency Manitoba should also consider the prioritization of program implementers to favor those that will lead to early program development and launch, with the potential for increased savings.

- Whether all the programs will ramp up according to plan and meet participation and savings targets within the proposed budgets;
    - Managing a portfolio of programs generally requires having a current understanding of the performance and trends of each, including its participation and savings trends and how those compare with projections. The development of “leading indicators” that help program managers see what is coming can provide a

valuable tool for projecting which programs are likely to exceed, meet, or fall short of participation, savings, and budget projections. Leading indicators, along with reports of actual participation, spending, and savings, should be developed and reviewed on a monthly basis by program managers and EM's management team. By watching these indicators in "real time" program managers can make decisions about interventions that may be required to scale up or down participation before it is too late to have the desired effect. This concept can be applied both to program launch and ramp-up, and to program operation once launched.

- Whether the proposed Customer Relationship Management ("CRM") tool and proposed Online Home Energy Questionnaire will be fully deployed and operational according to the expected timelines;
    - Mr. Grevatt first recommends that Efficiency Manitoba review its projection of the amount of time that will be required to deploy a fully functional CRM and Online Home Energy Questionnaire, and confirm that it is appropriately conservative. This by itself will reduce the risk associated with the seemingly optimistic projections in the plan. Secondly, Mr. Grevatt recommends that any contract that Efficiency Manitoba executes for the development of the CRM includes performance penalties and/or rewards, so that the contractor is financially motivated to meet agreed-upon deliverable dates. Efficiency Manitoba should also assess the savings that it expects to obtain through programs that rely on the CRM and Online Home Energy Questionnaire and identify other programs that could be expanded to make up for any savings shortfall if required.

- Whether the significant savings that are projected to come from Codes and Standards will be verified by the independent assessor.
    - In the case of Codes and Standards, given Mr. Grevatt's general concerns and the concerns presented by Daymark, which states that "the potential for over-counting codes & standards impacts is potentially significant,"[5] Mr. Grevatt recommends that Efficiency Manitoba reduce its projected savings from Codes and Standards to a more conservative level, and that it increase projected savings from other programs in its plan, including comprehensive residential building envelope improvements and heat pumps, to make up the difference. Mr. Grevatt also recommended in his evidence that a first order of business for the independent evaluator, once under contract, should be to review the reasonableness of Efficiency Manitoba's estimates for codes and standards savings. While this is not the same as a full impact evaluation of the savings, it should give all parties more confidence in the reliability of Efficiency Manitoba's estimates.

[5] Daymark Energy Advisors, Independent Expert Report: Demand Side Management & Energy Efficiency, Prepared for Manitoba Public Utilities Board, pdf p.135.

EFFICIENCY MANITOBA 2020-2023 EFFICIENCY PLAN

PUB INFORMATION REQUESTS OF CONSUMERS COALITION

DECEMBER 13, 2019

PUB/COALITION - 10 Reference: Grevatt Evidence pp.10, 14; PUB/EM I-28

Preamble:

Mr. Grevatt at page 10 states: "However, EM does not seem to fully acknowledge the risk or provide a level of assurance that EM has contingency plans in case it is not fully staffed—with staff that are fully trained—in time to launch its programs and meet its projected participation and savings targets. In IRR EM simply states that '[i]t is not anticipated that Efficiency Manitoba will be operating with insufficient staff levels on April 1, 2020.'"

Mr. Grevatt at page 14 states: "Second, it simply defies logic and experience to think that all aspects of the launch of EM will occur on schedule and on budget, and that participation will meet or exceed projections, within expected budgets."

EM states: "The revised electric energy savings in the 3-year Plan represent an average of 1.46% of the electric load. Efficiency Manitoba is confident that the flexibility of the Plan will allow for modifications to the offerings to enable the achievement of the 1.5% target."

Request:

a Does Mr. Grevatt agree that Efficiency Manitoba's Efficiency Plan has sufficient flexibility to achieve its targets even if individual measures do not achieve the planned savings? If not, please explain.

b Please provide Mr. Grevatt's recommendations for Efficiency Manitoba to achieve its targets over the three-year term of the plan if EM fails to achieve its target results in the first or second year.

c Given the concerns raised what level of contingency does Mr. Grevatt consider prudent to include in the 2020-2023 Efficiency Plan. Please provide reasons, or experience in other jurisdictions, that support the recommended level of contingency.

d Does Mr. Grevatt expect that it will become easier or harder for Efficiency Manitoba to achieve its annual target over the 15 year period for which the Act establishes legislated targets. Please explain.

Response:

a Mr. Grevatt's view, as stated in his evidence, is that by assuming such a high level of savings from low-cost Codes and Standards initiatives, Efficiency Manitoba is effectively boxing itself in to a potentially untenable budget. Should the independent evaluator determine that EM's projected savings from codes and standards is unreasonable, Mr. Grevatt fears that there will not be sufficient budget available to reach the savings targets, despite any flexibility EM may have to shift budget to programs where participation can be increased.

b Mr. Grevatt finds that answering this question would require an unreasonable amount of speculation as to why EM would fail to meet its first and second year targets. Further, if EM fails in the first two years of the plan, depending on the amount of savings it is short by it may not have enough time to recover in the third year to meet the combined three-year target. However, regardless of the savings that are reported in the first two years of the program, if EM focuses on building delivery infrastructure that has the potential, once in place, to rapidly ramp up and deliver savings, it may be able to recover in the third year. For example, were EM to develop an infrastructure that would support aggressive sales of heat pump water heaters or heat pumps through midstream program channels, it might be able to turn up the volume on these measures to help make up for shortfalls in the first year or two of the program. The same could be true for commercial lighting measures. However, it must be noted that it takes time to build the infrastructure, so waiting until the third year of the plan to start would not allow significant savings to be achieved within the cycle.

c Mr. Grevatt suggests that adequately planning for the demands of start-up is more likely to lead to success than will the approval of an inadequate plan that has some added contingency planning attached to it. Succeeding in a rapid launch of the EM portfolio will require, in Mr. Grevatt's view, flexibility, and a sufficient budget to allow EM to increase incentives and marketing/outreach or shift funds from less costly, lower-producing programs to more costly, higher-producing programs. Importantly, the EM budgets must reflect a willingness to incur startup costs, such as potentially over-hiring with the expectation that not all staff will succeed or want to stay, and possibly bringing on specialized project managers simply to help manage all of the myriad tasks that must occur in the process of launching this new crown corporation.

d Mr. Grevatt notes that there could be many aspects to this question, related to such disparate things as the growth in experience of EM's staff, maturity of program implementation systems and the CRM, changing economic conditions in the province, emerging energy policy, the availability of new technology, and the generalized reduction in incremental savings that will be available, to name just a few. In other words, it will be both easier and harder in different ways, but there are too many variables involved in this question to speculate on a clear cut answer to whether it will be easier or harder for EM to achieve its annual target.

PUB/COALITION - 11 Reference: Grevatt Evidence p.19

Preamble:

"However, it is interesting to note that EM appears to expect to count savings from codes and standards towards its savings goals beginning in 2020/21—before it has taken any action to advance codes and standards in the province. In fact, EM proposes to claim savings for activities that were undertaken by Manitoba Hydro, and that occurred before EM began implementing any programs."

Request:

a Please provide examples of the treatment of savings related to prior year savings from codes and standards in other jurisdictions.

c) Given the transition of DSM from Manitoba Hydro to EM, please explain the rationale for not including savings from Manitoba Hydro's DSM activities as benefits that are included as EM savings given that they would have been recognized if DSM responsibility had not been transferred.

Response:

a) Please see attached report by Cadmus, titled Attributing Codes and Standards Savings to Program Administrator Activities,6 filed in BC Hydro's current F20-F21 Revenue Requirements Application, for a comprehensive review of energy efficiency program administrator savings attribution approaches related to codes and standards. The report "reviewed policies and practices

[6] https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/rra/bch-f20f21-rra.pdf

in 27 jurisdictions outside of British Columbia to understand how C&S savings are attributed to utility or PA efforts,"7 and to Mr. Grevatt's knowledge is the most current and complete review of codes and standards savings attribution policies and practices for North American energy efficiency program administrators.

b) As indicated in the report referenced in response a) above, most jurisdictions that allow program administrators to claim savings associates with codes and standards activities have some approach for determining the portion of those savings that the administrator can reasonably claim. The reason for this, presumably, is to have a basis for assessing whether those administrators have accomplished what is required of them. Statutory language aside, it is not clear to Mr. Grevatt how it would be logical for any program administrator to be credited for activities that they did not have anything to do with. It is not clear to Mr. Grevatt what the reasoning behind that would be. In the instance of Efficiency Manitoba, if their mandate is to achieve savings, it would seem to imply that they are expected to take actions that result in those savings being achieved.

   Even if one accepts an interpretation of the statute as allowing Efficiency Manitoba to claim savings that could have been attributed to Manitoba Hydro, Mr. Grevatt has questions regarding the attribution of those savings. Indeed, even if Hydro had continued to operate the programs, the question of whether the claimed savings would have stood up to the scrutiny of independent evaluation is significant.

[7] Cadmus, *Attributing Codes and Standards Savings to Program Administrator Activities*, December, 2018, Page 9 of 57.

BC Hydro
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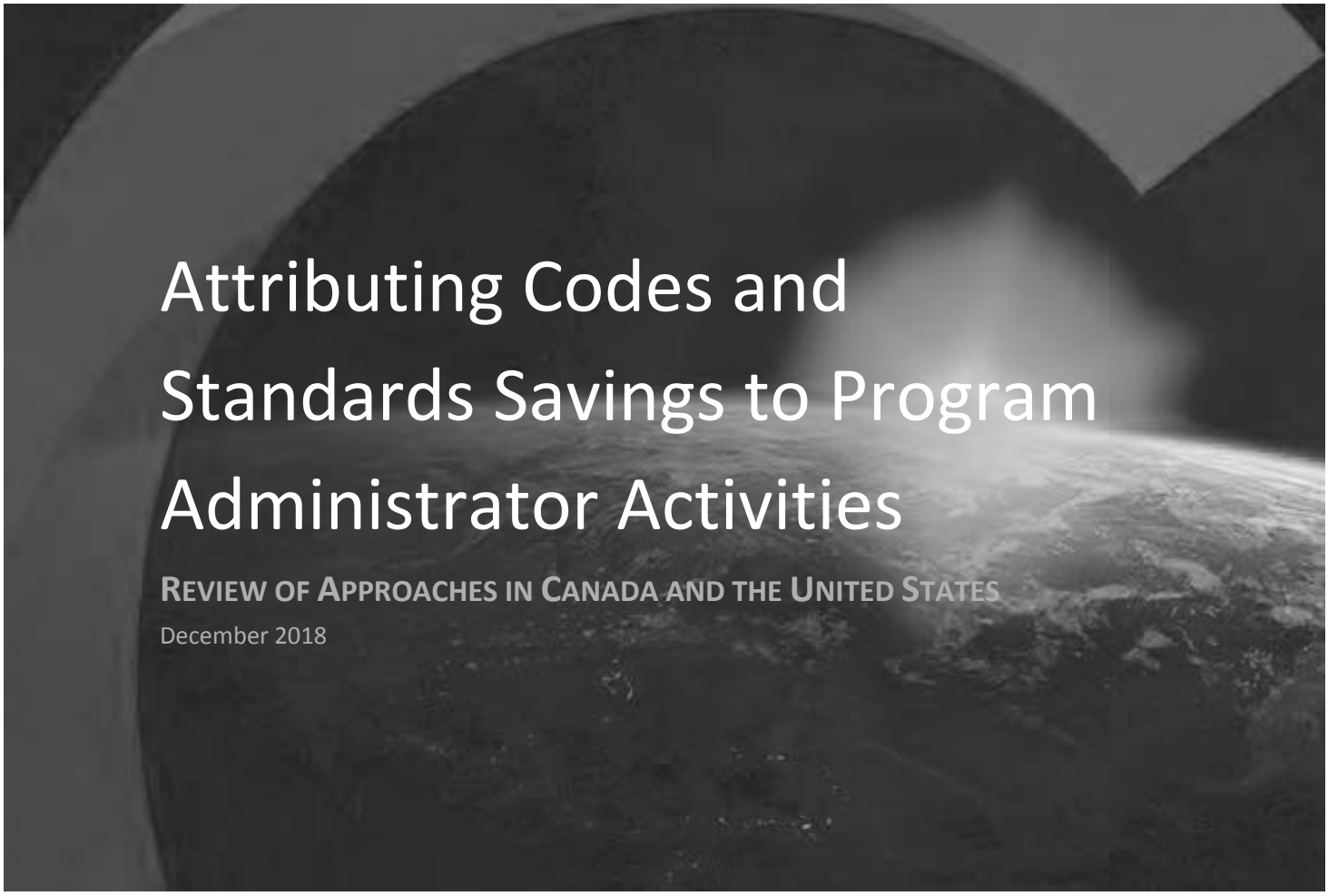
Revenue Requirements Application

Appendix CC

Codes and Standards Attribution Report

CADMUS



Attributing Codes and Standards Savings to Program Administrator Activities

REVIEW OF APPROACHES IN CANADA AND THE UNITED STATES

December 2018

Prepared for:

BC Hydro

333 Dunsmuir Street, 5th Floor

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CADMUS

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Abbreviations

Abbreviations	Description
ACC	Arizona Corporation Commission
AEGB	Austin Energy Green Building
APS	Arizona Public Service
ASAP	Appliance Standards Awareness Project
BC	British Columbia
BCUC	British Columbia Utilities Commission
BPU	Board of Public Utilities
CCEI	Compliance Enhancement Initiative
CCSI	Code Compliance Support Initiative
CEE	Center for Energy and Environment
CPUC	California Public Utilities Commission
C&S	Codes and Standards
DCEO	Department of Commerce and Economic Opportunity
DCRA	Department of Consumer and Regulatory Affairs
DCSEU	DC Sustainable Energy Utility
DER	Division of Energy Resources
DOEE	Department of Energy and Environment
DSM	Demand-Side Management
ECCCNYS	Energy Conservation Construction Code of New York State
EERS	Energy Efficiency Resource Standard
EVT	Efficiency Vermont
IECC	International Energy Conservation Code
IESO	Independent Electricity System Operator
IMT	Institute for Market Transformation
IOUs	Investor-Owned Utilities
LDCs	Local Distribution Companies
MEEA	Midwest Energy Efficiency Alliance
NECB	National Energy Code for Buildings
NEEA	Northwest Energy Efficiency Alliance
NEEP	Northeast Energy Efficiency Partnerships
NOMAD	Naturally Occurring Market Adoption
NTG	Net-to-Gross
NYSERDA	New York State Energy Research and Development Authority
OED	Office of Energy Development (Utah)
PA	Program Administrator
RNC	Residential New Construction
SBC	System Benefits Charge
SRP	Salt River Project
SWEEP	Southwest Energy Efficiency Partnership
TEP	Tucson Electric Power Company

Introduction and Methods

BC Hydro commissioned Cadmus to examine how various jurisdictions in North America attribute or determine the share of energy savings[1] to credit energy efficiency program administrators (PAs) for supporting codes and standards (C&S). This study is in response to a directive to BC Hydro from the B.C. Utilities Commission in their F2017-F2019 Revenue Requirements Application that asked BC Hydro to review the industry practice for attribution of C&S savings.

Program Administrators' Support for Codes and Standards

Building energy codes and appliance efficiency standards can offer cost-effective opportunities to produce significant energy-savings (Edison Foundation; Stellberg et al. 2012). Program Administrators (PAs), including utilities, are in a strong position to support C&S; however, without appropriate policies that credit PAs with savings, PAs are disincentivized from supporting C&S because this raises the baseline from which traditional programs' energy savings are derived (Cadmus et al. 2013; Drexler 2012; Cooper and Wood 2013).

Jurisdictions are recognizing the potential for PAs to support codes and standards in conjunction with developing policies that incentivize PAs to take the following actions:

- Support the adoption of new C&S by helping design new codes or standards, increasing the market share of energy-efficient products or practices through their programs and promoting the adoption of new C&S.
- Enhance compliance with and enforcement of new C&S by offering code training programs, supporting third-party inspectors and plan reviewers, spreading awareness, and listing and publicizing complying products (Cooper and Wood 2013).

Public utility commissions have an interest in ensuring that ratepayer dollars are spent on cost-effective programs and activities to influence the market, but adopting new C&S is a complex process that involves multiple stakeholders and key players.[2] Also, it is not always clear how much PAs impact the adoption of new regulations, and whether those regulations would have been adopted at the same time absent PA efforts. When PAs sponsor programs to support code and standard compliance, it may seem simple to attribute impacts since the PA is responsible for the program activities; yet, determining the share of savings credited to PA programs can be challenging due to multiple non-programmatic influences such as local enforcement efforts or building industry education campaigns. However, these

---

1 Quantifying the energy impacts from codes and standards is beyond the scope of this study, although the attribution process is often closely related to the other steps for determining savings.

2 Depending on the code or standard, stakeholders could include those from the federal government (Natural Resources Canada) or provincial government, energy efficiency advocates, the BC Association for Advancement of Conservation and Efficiency, nongovernmental organizations such as Pembina or Sierra Club, and other utilities such as FortisBC or FortisElectric.

non-programmatic influences are also increasingly complicating the determination of attribution for traditional utility programs "because multiple agents contribute to a decision-maker's awareness and deliberation; these agents are diffused throughout the community and are themselves subject to numerous influences, including program administrator efforts" (Peters and McRae 2008).

Industry Drivers for Attribution

As noted in subsequent sections, the involvement of PAs in C&S activities, as well as the interest in and methods for attributing energy savings to such activities, is changing over time. Several factors are influencing PAs to assess C&S savings and claim energy savings; however, the drivers for each PA can differ and often depend on the specific regulatory framework for each PA. These drivers include:

- *State and local legislated policy targets*. Energy savings targets for PAs, often included in a statewide energy efficiency resource standard (EERS), provide an incentive for PAs to claim C&S savings towards their energy reduction goals.[3]
- *Effect of more stringent C&S on program savings*. Existing codes and standards usually provide the baseline against which PA program savings are measured. As the stringency of codes and standards increases, the options for achieving savings targets through incentive programs decline. PAs can reduce this challenge if they are able to claim some of the C&S savings.
- *Cost-effectiveness of incentive programs*. A corollary of the effect of C&S on savings from incentive programs is the effect on cost-effectiveness. If conventional programs increase the market readiness for C&S, attributing part of the C&S savings to the programs could improve their cost-effectiveness. We are unaware of any jurisdiction where this has been implemented, though the California utilities have proposed considering it.
- *Accurate program savings and load estimation*. If C&S are used as the baseline for estimating incentive program savings but compliance is less than 100%, program savings and load forecasts will be inaccurate. In addition, C&S savings are estimated for the purpose of determining the net load forecast.
- *C&S program impact.* PAs are using attribution assessments to demonstrate the impact of code compliance support programs on code compliance and to estimate the energy savings resulting from increased code compliance. This effort highlights the importance of funding C&S programs.

British Columbia Context and the DSM Regulation

In British Columbia (BC), a key driver for determining C&S savings is to reflect the impact in the net load forecast. However, Section 4(1.4) of the Demand-Side Measures (DSM) regulation (Province of British Columbia, Utilities Commission Act 2008) provides that the British Columbia Utilities Commission (BCUC)

[3] The California Public Utilities Commission has taken a unique position regarding savings from utility support of C&S. They have set specific savings targets for C&S separate from the rest of the portfolio. C&S program costs and benefits are not included in the overall cost-effectiveness calculation and utilities are awarded a given percentage management fee for their C&S advocacy activities.

may determine the cost-effectiveness of a measure proposed in an energy efficiency plan or portfolio by increasing the benefit of the measure if the measure increases the use of an item that will be regulated by a future building code or appliance efficiency standard.[4] The adjustment can be applied if there is either a specified standard that has not yet commenced, or a specified proposal.

The guidance provided for the regulation (Province of British Columbia 2014) explains that the BCUC can attribute a portion of the savings that will result from the standard to a program that includes the measure and helps transform the market for the measure. The BCUC can determine what share of savings from the standard will be attributed to the program and for what period.

This regulation is unique in that it seeks to account for the effect of programs on readying the market for standard adoption and advancing the effective date of standards. The intent of the regulation is to bolster the cost-effectiveness of a program, rather than to claim the energy savings within that program, (i.e., to attribute "benefits" but not attribute energy savings). The regulation and guidance do not provide any direction for how the BCUC should determine the amount of benefits to be attributed to the program.

Methodology

Cadmus reviewed policies and practices in 27 jurisdictions outside of British Columbia to understand how C&S savings are attributed to utility or PA efforts. Table 1 lists the two other provinces in Canada and numerous jurisdictions in the United States Cadmus examined.

[4] BC's DSM regulation was enacted in 2008 and amended in 2011, 2014, and again in 2017. Section 4(1.4) has been unchanged since 2011.

Table 1. Reviewed Jurisdictions

Jurisdictions	
Canada	
Manitoba	Ontario
United States	
California	Colorado
Connecticut	District of Columbia
Hawaii	Illinois
Iowa	Massachusetts
Minnesota	Missouri
Nevada	New Hampshire
New Jersey	New York
Pacific Northwest (ID/MT/OR/WA)	Pennsylvania
Rhode Island	Texas (Austin)
Utah	Vermont
Arizona	

Three main sources of data were used to support this study:

- Publicly filed reports
- Communications with stakeholders in various regions
- Literature review of papers and presentations discussing PA involvement with C&S

Cadmus examined whether each jurisdiction has program activities related to codes, standards, or both. We then characterized each jurisdiction based on the type(s) of activity we observed: support for new C&S or compliance enhancement efforts. Lastly, we outlined whether savings attribution is determined in each jurisdiction and, if so, the process for determining attributable savings.

We have categorized the attribution process in each jurisdiction depending on how substantive and formal it is. Although the process in most jurisdictions fits a specific category well, we found a few processes that were combinations or hybrids of different processes, so were difficult to assign to a single category. Also, we found the process in several jurisdictions had not been fully defined yet. In both these cases, we decided which categorization fit best and explained our rationale.

This report builds on previous Cadmus attribution research. In 2014, Cadmus examined and summarized the attribution efforts of 14 jurisdictions across North America (Cadmus 2014). Comparisons to Cadmus' previous research are made throughout the document and many conclusions are based on notable changes and trends.

We have made every effort to be as comprehensive as possible, but the involvement of PAs in C&S activities is changing over time so any review is a snapshot of the situation at a point in time. In addition, entities other than PAs have primary responsibility for most activities associated with building codes and appliance standards so there is not much documentation of the role of PAs that are involved. However,

Cadmus believes that the jurisdictions and PAs covered here capture the full range of energy savings and attribution approaches that exist.

The next section of this report presents the findings for building codes. The section after presents our findings for appliance standards. More PAs have programs that support building codes than appliance standards. Of 18 jurisdictions where PAs are involved in building energy codes, nine also support appliance standards.[5] In recent years, there has been a trend toward PAs supporting code compliance enhancement rather than building code adoption, and the number of PAs supporting standards activities has grown recently.

[5] For accounting purposes, this report treats the Pacific Northwest—Oregon, Washington, Idaho, and Montana—as a single jurisdiction because of the high degree of coordination and integration provided by the Northwest Energy Efficiency Alliance and other regional bodies.

Building Codes Policy Results by Jurisdiction

Summary of Findings

Table 2 provides a high-level overview of the role PAs play in building codes in several jurisdictions, including whether PAs support code adoption and support efforts to increase compliance with codes, and how savings are or are not attributed to PAs for their building code activities. We did not find any other jurisdictions that followed BC's DSM regulation approach of attributing benefits to DSM programs prior to the adoption of a code or standard that regulates a measure or measures included in the DSM program.

Table 2. Summary of Building Code Results

Jurisdiction	Status	Activity for Adopting Codes?	Activity for Compliance Enhancement?	Program Administrator Attribution Method
Formal Attribution Approach				
California	Program and attribution process in place more than 10 years	✓	✓	Use evidentiary record, expert panel; focused on code adoption only
Pacific Northwest	Attribution process in place 10 years	✓	✓	Use evidentiary record; attribution based on share of funding for regional market effects program; focused on code adoption only
Massachusetts	Attribution completed in 2018		✓	Use evidentiary record, expert panel; focused on compliance enhancement
Rhode Island	Attribution completed in 2017		✓	Use evidentiary record; focused on compliance enhancement
New York	Process established; attribution not yet completed	✓	✓	Use evidentiary record, expert panel; focused on compliance enhancement only
Arizona – Salt River Project	Attribution process in place several years and multiple analyses completed	✓	✓	Use evidentiary record, evaluate attribution percentage, not-to-exceed 50%; focused on code adoption
Illinois	Process established; attribution not yet completed		✓	Use evidentiary record, expert panel; focused on compliance enhancement
District of Columbia	Process not developed yet		✓	Considering California and others
Deemed Attribution Approach				
Arizona – Investor Owned Utilities	Program and attribution process authorized for eight years	✓	✓	Evaluate portion of maximum allowable attribution percentage
Texas (Austin)		✓	✓	Deemed savings are claimed

Jurisdiction	Status	Activity for Adopting Codes?	Activity for Compliance Enhancement?	Program Administrator Attribution Method
Pennsylvania	Attribution permitted in late 2018		✓	Evaluate portion of maximum allowable attribution percentage
Full Savings Without Determining Attribution				
Ontario				No support for codes; regional savings goal
Manitoba		✓		No attribution; claim full territory savings as a result of advocacy efforts
Attribution Permitted: No Approach Specified				
New Jersey	Attribution permitted in mid-2018		✓	No approach specified
Minnesota	Permitted since 2007		✓	No approach specified
No Attribution: Codes Savings Considered Non-Resource[a]				
Vermont			✓	No attribution; code program is non-resource
New Hampshire			✓	No attribution; code program is non-resource
Missouri			✓	No attribution; code program is non-resource
Iowa			✓	No attribution; code program is non-resource
Colorado			✓	
Utah			✓	No attribution; code program is non-resource
Hawaii		✓	✓	No attribution; code program is non-resource

[a] The term non-resource refers to programs that are not expected to result in direct savings but contribute to the acquisition of energy efficiency through education, outreach, training, or other general approaches.

Formal Attribution Approach

In 2014, Cadmus found that while many jurisdictions recognized energy savings arising from building energy codes, only two instituted a formal assessment of attribution—California and Massachusetts—and Massachusetts' process was in the pilot stage. More recently, three additional states have proposed or initiated formal attribution processes: Rhode Island, New York, and Illinois. Additionally, Cadmus determined the Pacific Northwest's attribution process was better categorized as a formal approach for this report. The following sections detail how each state is claiming or proposes to claim savings for their code adoption support or compliance enhancement programs.

California

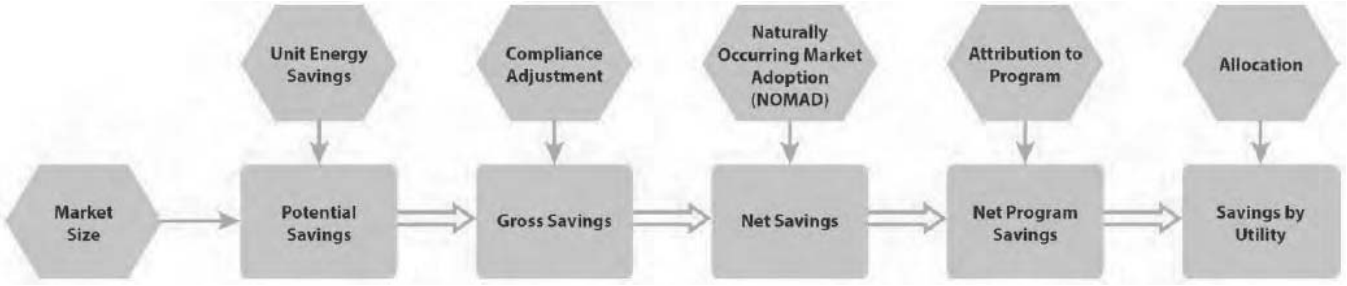
California investor-owned utilities' (IOUs') Codes and Standards program supports technical and market research of new technologies and practices, advocates for the adoption of more efficient regulations, and provides compliance enhancement support of California's Building Energy Standards (Title 24) and Appliance Standards (Title 20), as well as federal appliance and equipment standards implemented by the Department of Energy's Building Technologies Office. According to a recent report (California Public Utilities Commission [CPUC] 2018), "Savings from Codes and Standards are consistently the most cost-effective savings available to IOU efficiency programs, since these programs impact all new buildings constructed and appliances purchased in the state."

The California IOUs initiated their efforts to support codes and standards in the late 1990s and treated them as a non-resource program (that is, they claimed no savings from their efforts). For the 2006-2008 program cycle, the CPUC authorized IOUs to claim and receive credit toward their savings goals for C&S activities. Because this was the first time C&S savings were analyzed and accredited, the CPUC directed that the savings be discounted by 50%. For the 2010-2012 and 2013-2015 program cycles, IOUs received full evaluated savings credit for the program using the California Codes and Standards Advocacy Program Evaluation Protocol.

California Evaluation Protocol

The California Codes and Standards Advocacy Program Evaluation Protocol, illustrated in Figure 1, shows the steps and major factors used to identify program attributable net savings for efforts advocating for new C&S (Cadmus and DNV GL 2016).

Figure 1. Codes and Standards Advocacy Program Evaluation Protocol



Source: (Cadmus and DNV GL 2016)

The potential energy savings attributable to the C&S program is based on the estimated unit energy savings and the number of those units (building code measures or appliances) entering the market each year. To derive gross energy savings, evaluators apply a compliance adjustment to potential savings. Net savings result from adjusting the gross savings by the naturally occurring market adoption (NOMAD) of measures or appliances meeting the code or standard that would have occurred in the absence of the code or standard. Net program savings that are credited to the statewide C&S program are then determined by applying an attribution score; each of the four IOUs is then allocated net savings attributable to the program based on their share of the statewide energy market (for electricity or gas).

In California, the California Energy Commission has responsibility for adopting new codes or standards. The rationale for including the attribution step is that the statewide C&S program is designed to influence which C&S are adopted and at what level, so a portion of the credit for the C&S savings can be attributed to the utilities' efforts. For each technology or building practice, the evaluator must establish the percentage of savings resulting from program efforts. As there are no limits on the proportion of savings that are attributable to C&S initiatives, scores can range from 0% to 100%.

The process of determining attribution is formally done through an attribution panel consisting of independent C&S experts. The evaluator's process of determining attribution entails the following steps:

1. The evaluator collects information and compiles documentation on stakeholder activities from a range of sources, including rulemaking dockets, code change theory reports (written by the IOUs), and stakeholder interviews. [6]
2. A panel of independent C&S experts assesses the information compiled by the evaluator on the program's contributions to the adoption of each C&S based on a careful and systematic review of the evidence. Having independent experts evaluate program contributions lessens concerns about potential biases from having utility representatives directly involved in determining credit for their own efforts.
3. The evaluator researches and estimates the relative effort necessary to adopt a new code or standard based on three general factor areas required for adoption: (1) development of compliance determination and other special analytic methods, (2) development of technical information, and (3) stakeholder outreach and feasibility of code or standard. The evaluator then applies these relative measures of effort to the contribution made by the program in each area to produce a weighted attribution score for each C&S (Cadmus and DNV GL 2017).

To date, the IOUs have claimed and received energy savings credit for only advocating for adoption of building codes. However, they have engaged in an ongoing program to enhance code compliance for several years, so are likely to pursue getting credit for savings from this program as well. When that occurs, the current evaluation and attribution methodology will need to be modified as needed.

Since California's protocol has been in practice the longest, it is often referenced by other states and jurisdictions.

Code Compliance Savings from New Construction Program Spillover

The California IOUs have argued unofficially that their incentive programs for new buildings should receive some credit for savings from building codes because they "ready the market" for new codes. This claim was the only case we found in our research that relied on logic similar to that presented in the

[6] The California IOUs provided Code Change Theory Reports to evaluators, which provided the IOU perspective about the C&S team's contributions to rulemaking. This information from the reports is used in the determination of program credit for applicable standards and building codes.

BC DSM regulation. The CPUC has not accepted that position, however, because the IOUs are receiving savings credit directly from their statewide C&S program.

In an October 2007 Decision (D.07-10-032), though, the CPUC issued a directive to explore possible market effects of building programs on code compliance rates and the ability to credibly quantify and credit such nonparticipant spillover. When the decision was issued, the IOUs' residential new construction (RNC) programs encouraged high-performance building designs that exceeded the 2005 Title 24 energy-efficiency requirements by 15% or more, while also aiming to increase the adoption and installation of individual high-efficiency measures (KEMA 2010). Using market data and two Delphi panels, a consultant's study estimated that the IOUs' 2006-2008 RNC programs were responsible for approximately 23% of the gross electricity savings from achieving code compliance in non-program homes (Massachusetts Group and NMR Group, Inc. 2010). Although these savings could, in theory, be attributed to the RNC program, they would be accounted for in the C&S program evaluation and the CPUC has not authorized any crediting of the savings to the incentive program.

Pacific Northwest (Idaho, Montana, Oregon, and Washington)

The Northwest Energy Efficiency Alliance (NEEA), a regional nonprofit organization, manages the Pacific Northwest's market transformation efforts, which include work supporting building codes and appliance standards. From NEEA's website: "The long-term goal of NEEA's market transformation programs is often to lock in energy savings through progressively effective energy codes and standards. NEEA supports regional stakeholders in energy code development and adoption, training and implementation. Program staff serve as technical experts during U.S. Department of Energy rulemakings to encourage the adoption of federal appliance and equipment efficiency standards." NEEA has been supporting regional building codes since 1997 and, recently, has become more active in efforts to adopt national model energy codes. After the adoption of a code, NEEA provides technical support and training for regional compliance.

NEEA is classified as having a formal attribution approach as it has conducted studies to quantify attribution to NEEA's efforts in the past, though NEEA has not continued to update these analyses. As with some other jurisdictions, the approach in the region is a hybrid involving a mix of formal attribution, allocation, and integration of savings with the load forecast.

In 2008, Cadmus (formerly Quantec) developed and implemented a method for assessing attribution of energy code savings to NEEA's regional efforts to support code adoption and implementation. We did not find any information documenting a more recent assessment of attribution. The assessment used the following approach:

- Estimate regional energy savings from code adoption.
- Calculate net savings as a portion of total regional savings by subtracting the market baseline (typically estimated through independent evaluations) that would occur naturally without NEEA or programmatic intervention.
- Subtract savings claimed by sponsors' efficiency programs (to avoid double counting).

- Estimate attribution to NEEA's efforts by counting the number of times various entities are mentioned in response to open ended questions regarding organizations that influenced code adoption in each state.

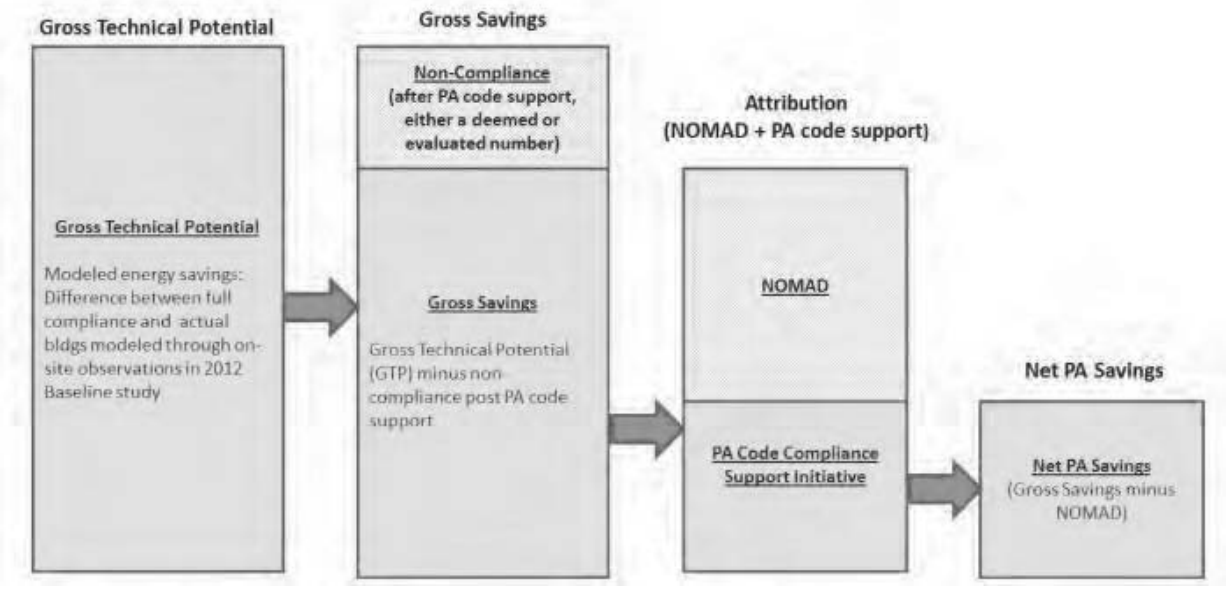
NEEA's energy savings are claimed by its funding partners (Bonneville Power Administration, public utilities, etc.) in proportion to the amount of funding provided to NEEA. This is a reasonable way to allocate savings among regional parties and similar to the approach agreed to by the California IOUs.

Utilities in the Pacific Northwest usually do not try to claim savings outside of NEEA efforts because of the increased level of scrutiny that would invite, and because of the additional documentation requirements such as providing sales data.

Massachusetts

Since 2014, the Massachusetts PAs have funded the Code Compliance Support Initiative (CCSI), a compliance enhancement effort aimed at educating code officials and building professionals on the residential and commercial building energy codes implemented throughout the Commonwealth of Massachusetts. The program initially ran as a pilot (through 2015) with no claimed savings (described later as a non-resource program). A preliminary savings methodology for evaluating the PAs' effort was developed by the PAs in 2015 and presented to the Massachusetts Department of Energy Resources. The methodology, as shown in Figure 2, calculated gross savings and net energy savings, or the portion attributable to the CCSI, after considering such factors as non-compliance and NOMAD (Massachusetts Program Administrators 2015).

Figure 2. Massachusetts PA Preliminary Net Savings Calculation Methodology



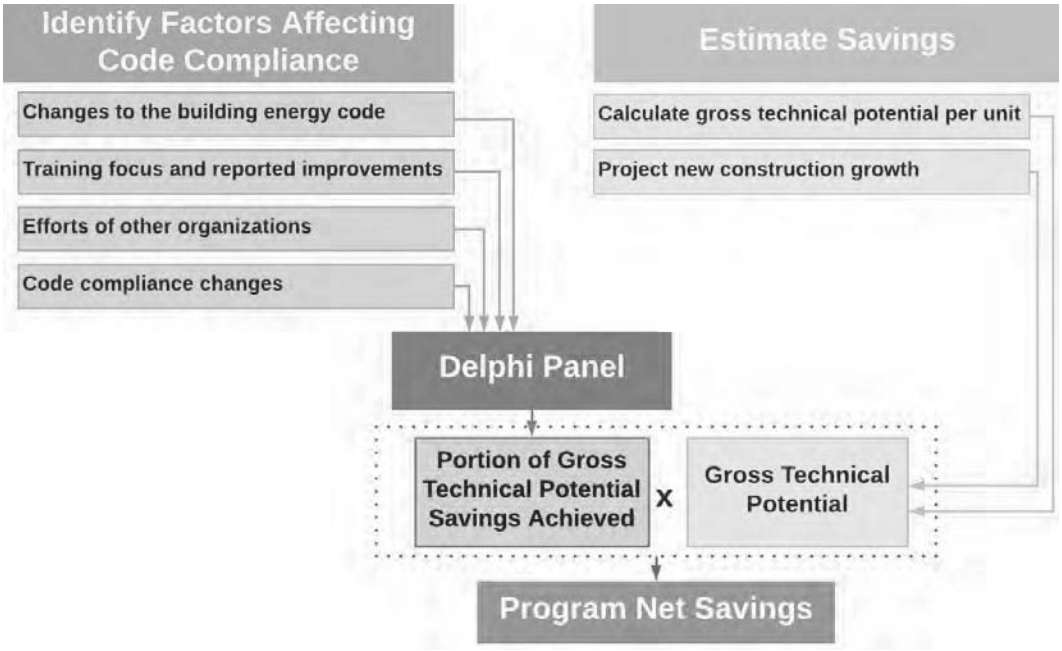
Source: (Massachusetts Program Administrators 2015)

In 2018, the Massachusetts PAs and the Energy Efficiency Advisory Council consultants contracted with the Massachusetts Cross-Cutting Research Area evaluation team to estimate prospective savings attributable to the PAs from the code compliance enhancement efforts of the CCSI. The evaluation teams used the net savings calculation presented to Massachusetts Department of Energy Resources as the starting point for the commercial and residential attribution assessments, as discussed in subsequent sections.

Commercial New Construction and CCSI Attribution Assessment

To develop an attribution score and project CCSI net savings for 2019-2021 for new commercial buildings, the Massachusetts Cross-Cutting Research Area evaluation team (NMR and Cadmus) used a Delphi panel approach modeled after the California protocol. For this evaluation, a panel of code experts reviewed documentation on CCSI activities and provided estimates of code compliance over the period under two scenarios: (1) with CCSI activities continuing at a similar level to previous efforts and (2) without implementation of the CCSI. Figure 3 illustrates the process used by evaluators to assess attribution and calculate estimated savings from the CCSI.

Figure 3. Massachusetts Attribution Study Approach



Source: (NMR and Cadmus 2018)

The first step in the process was to identify and provide to the expert panel the factors affecting code compliance. Documentation supplied to the panel included the following:

- Background information on the initiative
- Baseline and follow-up compliance study results
- Key changes to energy code requirements
- Reported impacts of training and technical assistance

- Gross technical potential modeling results for compliance enhancement
- Compliance enhancement efforts of other organizations throughout the state

From this documentation, the Delphi panel estimated compliance under two scenarios: (1) with the CCSI continuing code enhancement activities in the future at a similar level to historical efforts and (2) with the CCSI never having been implemented. The Delphi panel deliberated compliance in two rounds. In the first round, panelists provided estimates and their rationale for compliance under the two scenarios. In the second round, the panelists reviewed a compilation of their peers' first-round estimates and revised their estimates, if desired.

The team then estimated the gross technical potential using the baseline technical potential and projected commercial building new construction. Finally, to estimate program net savings, we multiplied the CCSI attribution as determined by the Delphi panel by gross technical potential, as shown in the following equation:

$$Program\ Net\ Savings_{year} = Program\ Attribution_{year}\ x\ Gross\ Technical\ Potential_{year}$$

The evaluation team provided the Massachusetts PAs and the Energy Efficiency Advisory Council with estimated program net savings for 2019-2021 program period (Cadmus and NMR Group, Inc. 2018).

Residential New Construction and CCSI Attribution Assessment

Using a methodology similar to the commercial attribution assessment, NMR forecasted net-to-gross (NTG) ratios for the low-rise RNC program and the residential portion of the CCSI for the 2019-2021 program period. [7] The assessment covered both programs, which target the single-family residential new construction market, together to avoid double counting savings and to ensure all savings attributable to the PAs were documented (NMR Group, Inc. 2014).

The evaluation team calculated a retrospective NTG ratio for the 2015 program year and prospective NTG estimates for 2019-2021. To estimate retrospective NTG ratios, the team conducted the following activities:

- A Delphi panel of codes experts estimated measure-level efficiencies as if the RNC and CCSI programs never existed (referred to as the counterfactual scenario) in two rounds.
- The energy consumption of program and non-program homes was modeled as constructed (referred to as the as-built scenario) and under the counterfactual scenario determined by the Delphi panel.
- Evaluator estimated retrospective net savings and NTG estimates using analysis of the as-built and counterfactual energy consumption.

To develop prospective NTG estimates, the team then produced and presented to the Delphi panel an internal forecast of the impact of the programs in 2019-2021. The Delphi panelists, in a third-round,

[7] The methodology was consistent with NMR's 2014 Residential New Construction Net Impacts Study.

suggested changes to the forecasted estimates, which the team used to adjust retrospective findings and develop NTG ratios for 2019-2021 (NMR Group, Inc. 2018).

Rhode Island

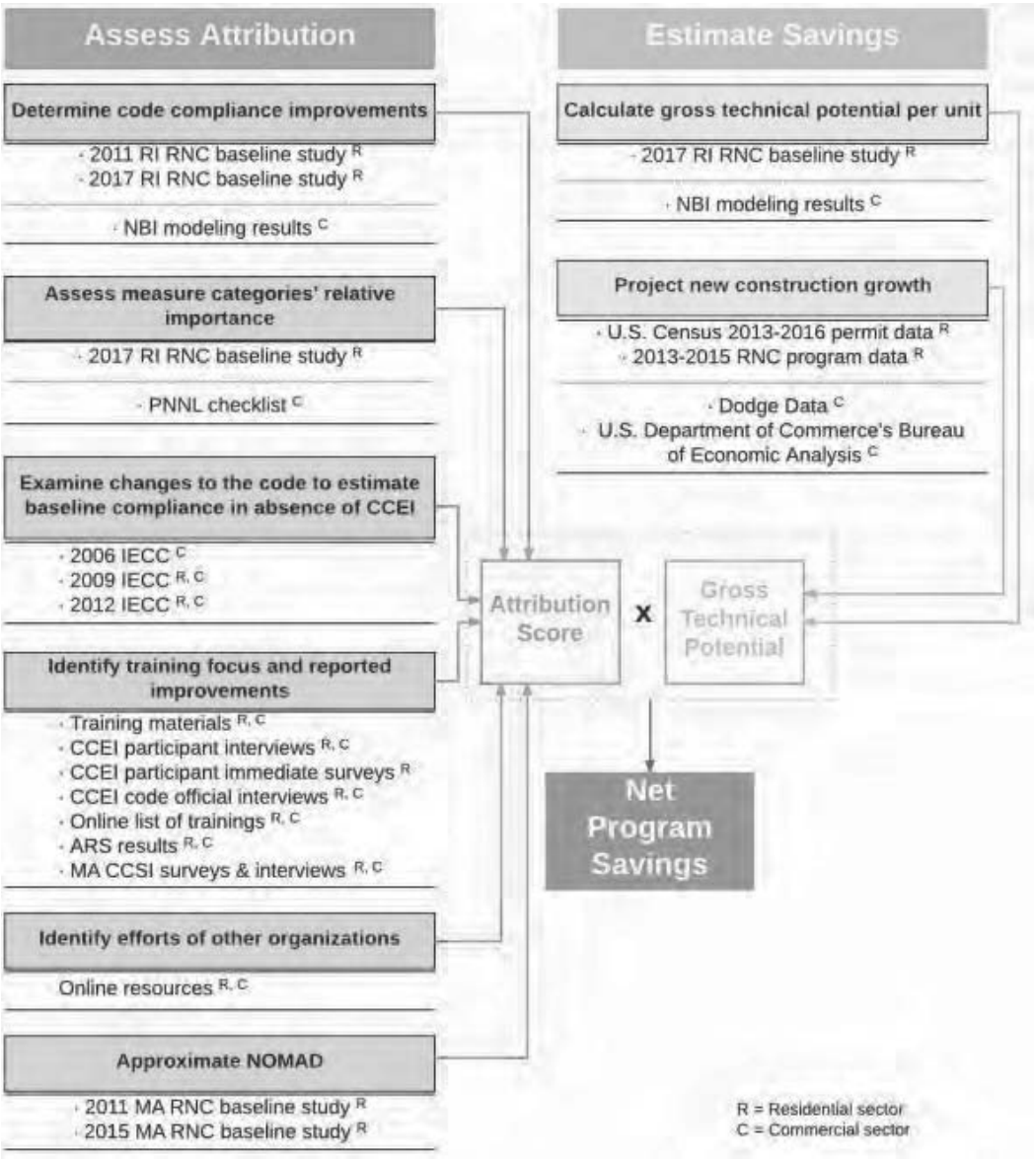
National Grid, the only IOU in Rhode Island, implements a code enhancement program like Massachusetts' CCSI; the Code Compliance Enhancement Initiative (CCEI) provides trainings, circuit rider[8] technical assistance, third-party inspection support, and other code compliance tools and resources covering both the residential and commercial energy codes. The CCEI also focuses on stakeholder engagement activities, such as attending local code official meetings and industry or trade group events, and program implementers visit each building department throughout the state. These CCEI activities, which began in 2013, have been National Grid's initial short-term focus and are a part of National Grid's larger C&S initiative, which encompasses four components: code compliance through CCEI; appliance standards development and advocacy; stretch code development; and base code advocacy.

In December 2012, National Grid, with the support of the Energy Efficiency Resource Management Council, developed a model for attribution that was approved by the Rhode Island Public Utilities Commission. In 2017, NMR estimated the savings in the residential and commercial new construction markets attributable to the CCEI in the 2018-2020 period due to its code compliance enhancement efforts.

Figure 4 illustrates the iterative attribution approach used by the evaluators. This approach is like the approaches used in California and Massachusetts in that a broad range of resources, including baseline compliance studies, reported impacts of training, and NOMAD estimates, were used to determine an attribution score. However, unlike California and Massachusetts, the attribution score was determined solely by the evaluation team rather than a Delphi panel (NMR Group, Inc. 2017).

[8] An energy code circuit rider provides statewide energy code training, technical support, and code interpretations to design and building professionals, permitting departments, and code officials.

Figure 4. Rhode Island Attribution Assessment Approach



Source: (NMR Group, Inc. 2017)

New York

The Energy Conservation Construction Code of New York State (ECCCNYS) is updated regularly by the State Fire Prevention and Building Code Council. The New York State Department of State Division of Building Standards and Codes serves as secretariat to the Building Code Council; the Building Standards and Codes administers the energy code, provides training and education, and supports local code enforcement (New York Department of State 2018). The New York State Energy Research Development Authority (NYSERDA) also serves as the program administrator for code compliance and enforcement programs, including the Advanced Energy Codes and Standards Program and the Clean Energy Fund.

Advanced Energy Codes and Standards Program

In 1996, the New York State Public Service Commission established a System Benefits Charge (SBC) to fund initiatives that serve all energy consumers throughout New York State. The SBC was renewed several times over the last two decades, with the most recent extension ending in December 2016. The SBC program was primarily administered by NYSERDA, and the 2012-2016 order funded a Technology and Market Development Portfolio comprising nine initiatives, including the Advanced Energy Codes and Standards Program (New York State Energy Research Development Authority 2013).

The Advanced Energy Codes and Standards Program aimed to reduce energy use by increasing compliance with the ECCCNYS; developing a voluntary stretch code for local adoption; and contributing to the development of appliance and equipment standards, specifically those not covered by federal standards. Through the energy codes component of the program, NYSERDA coordinated code enhancement services and resources for code officials, design professionals, and third-party energy professionals; these included training opportunities, technical assistance, plan review and inspection support, and code enforcement and implementation tools.

To date, NYSERDA has not claimed savings from its code activities. However, two process evaluations on NYSERDA's energy code training efforts have been completed and an impact evaluation to attribute energy savings to the program's code enhancement activities is underway (Industrial Economics, Incorporated 2016 and 2017). The impact evaluation consists of two separate Delphi panels. The first Delphi panel,[9] completed in 2015, established an energy code compliance baseline and the second, expected to be completed in 2018, will evaluate the program's effectiveness and estimate the change in compliance between the two points in time (ERS and Industrial Economics, Incorporated 2016). The Delphi panel will be asked to estimate the change in compliance and how much of the change can be attributed to NYSERDA's efforts, natural market changes, and technology progress. This information will feed into a model that considers the construction volume and estimated energy savings due to code changes to estimate the energy savings attributable to NYSERDA's activities.

Clean Energy Fund

Currently, NYSERDA has 25 Clean Energy Fund Investment plans intended to reshape the energy efficiency landscape in New York by providing clean energy and energy innovation programs to a wide range of consumers and help meet the state's commitment of 50% renewable energy by 2030 (NYSERDA 2016). The Codes Chapter of the Clean Energy Fund, issued November 2017, is designed to support compliance with and enforcement of the ECCCNYS, advance the development of stretch energy codes, and provide technical assistance and other services to support the enactment of state and local energy codes. Code to Zero, the first initiative of the Codes Chapter, has three main goals:

- Code compliance reaches 90% throughout New York
- 20% of jurisdictions adopt a stretch code

[9] The process for the first Delphi panel consisted of three rounds of one-on-one interviews.

- Jurisdictions that adopt alternative code enforcement structures or receive training and supplemental services report improved enforcement of the energy code (NYSERDA 2017)

For each goal, NYSERDA has established performance metrics that will be analyzed over the length of the initiative, including the number of training attendees and percentage of market complying with the energy code. Although the evaluation plan has not been finalized, NYSERDA anticipates using a Delphi panel process to establish a compliance baseline, estimate NOMAD, and measure the impact of the initiative over time. Additionally, it is expected that the evaluation team will conduct ongoing interviews with representative jurisdictions to compare to the Delphi panelists' responses. NYSERDA will use these evaluations to quantify long-term, indirect energy savings impacts attributable to the Code to Zero initiative.

Arizona—Salt River Project

Salt River Project (SRP), a community-based not-for-profit electric provider in Phoenix, claims savings for supporting C&S adoption and implementation activities. As described later, the Arizona Corporation Commission (ACC) adopted rules that allow IOUs to claim savings from codes and standards, but as a political subdivision of the State of Arizona, SRP is not regulated by the ACC (Cadmus September 9, 2018). SRP's board, however, decided to allow the utility to claim up to 50% of the savings from a code or standard if it demonstrates influence over the adoption of the new code or standard (Cadmus 2012).

SRP's Building Energy Code Initiative offers education, training, and support to city councils and the state legislature to influence the adoption and enforcement of building energy codes within the cities and code jurisdictions SRP serves (SRP 2018). Aside from working with local code officials to drive adoption and consistent enforcement practices across the Phoenix metropolitan area, SRP leverages its governmental status and voting rights to influence the development of new building energy codes at the national level to better serve Arizona and the Southwest region.

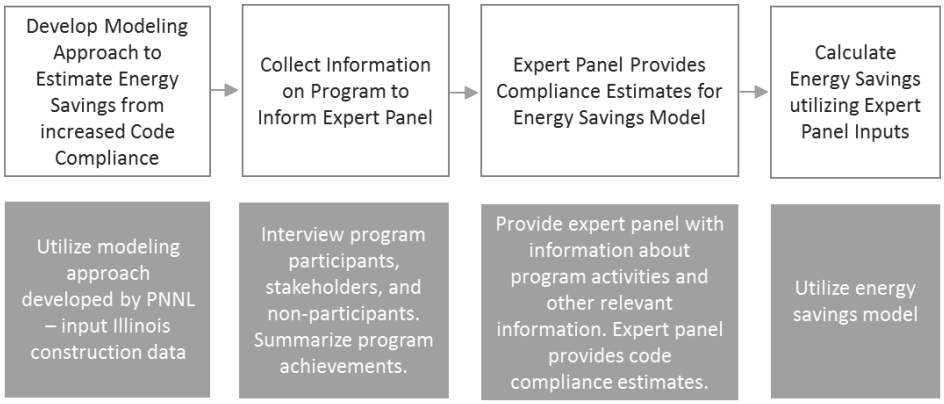
SRP has worked with Cadmus and other third-party evaluators to document the initiative's influence and attribute the appropriate amount of energy savings from building codes to its portfolio. SRP modeled its attribution approach after California and Massachusetts, with modifications to make it more applicable to home rule states. Evaluation activities have included interviews with stakeholders and jurisdictions, and assessments of materials developed by SRP to determine the influence SRP has had on the process. Cadmus has used building simulation data to estimate code savings and implemented an innovative billing data analysis to estimate residential code savings (Bonesteel 2017).

Illinois

For several years, the Illinois Department of Commerce and Economic Opportunity (DCEO) administered the Building Energy Codes Education and Technical Assistance Program, a comprehensive program aimed at supporting the adoption, implementation, compliance, and enforcement of the Illinois Energy Conservation Code. The program effectively ended in 2016 due to a lengthy impasse over the state budget, with energy efficiency program administration responsibilities shifting to the utilities.

At the request of DCEO, Cadmus, as a subcontractor to ADM Associates, evaluated the impact of the program on energy savings for the 2014, 2015, and 2016 calendar years and for program years 7, 8, and 9; each program year ran from June 1 to May 31 (Cadmus 2017). Cadmus' formal approach, summarized in Figure 5, utilized a panel of experts to estimate the difference in the level of compliance due to the program. Cadmus calculated the energy savings estimates for both the residential and commercial sectors using input from the expert panelists and Pacific Northwest National Laboratory's energy consumption models.

Figure 5. DCEO Energy Codes Education and Technical Assistance Analysis Approach



Illinois' Future Energy Jobs Act (FEJA) became effective in June 2017 (MEEA August 2018), requiring significant energy savings by the state's electric utilities.[10] To meet the savings goals, FEJA requires utilities to include proposals for C&S programs, as shown below (State of Illinois Public Act 099-0906 2016*)*.

Excerpt from FEJA:

> *In submitting proposed energy efficiency and demand-response plans and funding levels to meet the savings goals adopted by this Act the utility shall:*
>
> 1. *Demonstrate that its proposed energy efficiency and demand-response measures will achieve the requirements that are identified in subsections (b) and (c) of this Section, as modified by subsections (d) and (e).*
> 2. ***Present specific proposals to implement new building and appliance standards that have been placed into effect. (****Note: emphasis added by Cadmus).*

[10] The bill, passed in December 2016, amended the Public Utilities Act and the Illinois Power Agency Act. It requires Ameren Illinois to attain 16% and Commonwealth Edison Company to attain 21.5% cumulative annual persisting savings by 2030. Gas utility targets, as determined by 2009 amendments to the Illinois Power Agency Act, were unaffected.

Additionally, utility procurement plans must include an analysis of "the impact of energy efficiency building codes or appliance standards, both current and projected," along with opportunities to expand the programs.

In response to savings and C&S program requirements, Illinois gas and electric utilities have joined together for a potential statewide code compliance enhancement program. The utilities are currently involved in the Illinois Energy Codes Compliance Collaborative and are funding the Midwest Energy Efficiency Alliance (MEEA) and Cadmus to complete pre-program residential and commercial field studies; the studies will establish a compliance baseline and identify opportunities for improved compliance. The utilities will use results from the field studies to design and implement an Integrated Compliance Support Program, a suite of programs targeted at improving the compliance issues observed in the field. Savings from the programs will be verified through post-program studies and used to meet the utilities' savings targets, but the specific attribution analysis method has not been defined yet (MEEA September 2018).

District of Columbia

The District of Columbia Department of Energy and Environment (DOEE) oversees the DC Sustainable Energy Utility (DCSEU). Created as part of the Clean and Affordable Energy Act of 2008, DCSEU implements energy efficiency and renewable energy programs in the DC area (DOEE 2008). "The DCSEU operates under a performance-based contract with DOEE, with input and recommendations from the SEU Advisory Board, and oversight from the Council of the District of Columbia" (DOEE October 2018).

In a 2017 presentation developed by the DCSEU Advisory Board, savings attribution was included as a new strategy for efficiency savings. Per the presented material, attribution "accounts for the numerous ancillary service offerings the DCSEU offers to customers in addition to incentives" and it is noted that attribution was recommended in the 2016 draft of DC's energy and climate action plan, Clean Energy DC (DCSEU Advisory Board 2017).

Clean Energy DC was finalized in August 2018. The plan recommends that DCSEU invest in compliance enhancement efforts and receive credit for associated savings:

> *The DCSEU should assist DOEE, DCRA [Department of Consumer and Regulatory Affairs], the Green Building Advisory Council and the Construction Code Coordinating Board to develop and implement building-code improvements. The DCSEU should also design outreach and incentive programs for building owners, designers, and contractors with an eye to laying the foundation for future building code improvements. To incentivize such investments, the DCSEU should be credited for a portion of any energy savings attributable to the adoption of energy-saving building code improvements, as is the case in Arizona utilities. To maximize the energy savings realized from building code improvements, the DCSEU should invest resources in training, outreach, technical assistance, design assistance, marketing, explanatory materials, and other efforts to increase compliance with building codes. As codes become more ambitious, the DCSEU should receive credit for bringing poor performing buildings up to code. As the District has little history of crediting a demand-side management administrator for code-related energy savings …*

this would need to be resolved through an evaluation, measurement, and verification review and the subsequent development of appropriate guidelines.

The plan also notes: “other jurisdictions, such as California, also provide utilities attribution for energy code adoption, but the Arizona model is most appropriate for a small jurisdiction like the District (DOEE August 2018).”

Staff at the Institute for Market Transformation (IMT), DCSEU’s subcontractor for code compliance trainings, and the DCRA, the department that supports code compliance and enforcement activities, indicated that they are actively working on an appropriate attribution approach. Per our correspondence with IMT staff: "Attribution is indeed being considered in association with the DC Sustainable Energy Utility’s work on building code development and implementation. These plans are still at a formative stage and will require further development, then extensive review before approval. Therefore, it’s premature to present details” (Cadmus October 3, 2018).

DCRA receives funding for code enhancement, as it is available, from DCSEU and is interested in helping DCSEU achieve its savings target through savings related to these activities. According to correspondence with DCRA staff, the department has proposed a baseline study that follows a building project from plan review to inspection to certificate of occupancy, and notes compliance issues throughout the process. Programs designed specifically to address the issues in compliance will then be proposed, with savings associated to the programs attributed to DCSEU. DCRA staff noted, “the traditional utility program has to transition to a world where the energy code is the law and support those laws through compliance support” (Cadmus October 2, 2018). Attribution details are still being developed.

Deemed Attribution Approach

Through our research, we identified three jurisdictions —Arizona (investor owned utilities), Austin, Texas, and Pennsylvania—that use a deemed approach to estimate energy savings attributed to PA energy code programs (that is, the deemed savings specify what portion of the savings are attributable to the PAs). The following sections detail how each state or jurisdiction is claiming savings for their code adoption support or compliance enhancement programs.

Arizona—Investor Owned Utilities

In 2010, the ACC adopted rules (Docket No. OOOOOC-09-0427) that require IOUs and rural electric cooperatives to achieve annual energy savings of at least 22% by 2020 (Southwest Energy Efficiency Alliance 2016). As a result, the regulated electric utilities, Arizona Public Service (APS) and Tucson Electric Power Company (TEP), have developed energy efficiency programs from which they can claim savings. The ACC allows the regulated utilities to claim electricity savings from building codes and gas savings from both building codes and appliance standards. The regulations do not establish an attribution process that is purely formal or purely deemed. The rules state that utilities can claim up to one-third of the savings generated by the codes or standards, but they must be quantified through a measurement and evaluation study conducted by the utility (ACC 2018).

TEP's 2018 Energy Implementation Plan and APS' Amended 2018 Demand Side Management Implementation Plan both include a codes and standards component. The objectives of TEP's Energy Codes and Standards Enhancement Program, approved by the ACC most recently in Decision No. 75450, are to improve compliance with current energy codes and standards and support the adoption of newer codes and standards (TEP 2017). TEP claims savings from its codes and standards program but has not allocated budget to conduct an evaluation of the program. APS' DSM plan includes the Building Codes and Appliance Standards Initiative, which offers compliance enhancement support to code officials, building professionals, and other market actors. APS claims significant electricity savings from the initiative (APS 2017), which are reviewed and verified annually as part of APS' Measurement, Evaluation, and Research Reports. Per an interview with a consultant working on APS' attribution, savings are estimated using publicly available sales data, field research within the APS territory, and market baselines (Cadmus October 9, 2018).

The 2017 APS Codes and Standards Report states that the savings "*reflect increased adoption of federal, state, and jurisdictional codes and standards (C&S) that are directly influenced by APS' portfolio of demand-side management (DSM) programs. This increased adoption results in more efficient baselines that, in addition to driving greater savings for C&S programs, reduce the savings potential for measures currently incentivized by APS' DSM programs. Therefore, each year APS adjusts its savings accordingly to reflect these baseline changes, which drives APS to pursue new program opportunities focused on the latest, most efficient technologies"* (Navigant 2018).

Texas (Austin)

The Austin City Council adopted the Austin Climate Protection Plan in 2007. The resolution includes goals for energy codes, including a goal in the 2012 update to the resolution to "implement the most energy efficient building codes in the nation" (Austin Energy 2012). Austin Energy, a publicly owned electric utility in Texas, administers many energy efficiency programs in support of the Climate Protection Plan, including the Austin Energy Green Building (AEGB) program. The program has been providing support to the design and construction communities to reduce building energy use and meet the climate protection goals of the city since 1990. AEGB oversees the City of Austin's energy code; every three years, the program amends the code to reflect innovation in construction materials and practice, as well as any policy changes (Austin Energy Roadmap).

Austin Energy reports significant savings from the AEGB, with the greatest share due to code efforts (Austin Energy 2018). Cadmus did not find documentation indicating that an attribution analysis of code savings was conducted for this publicly owned utility. Instead, per email correspondence with Austin Energy's Evaluation and Development Group, deemed savings factors based on energy models of various prototypical buildings are applied to building permits. The deemed savings factors represent the kW and kWh savings of the energy code to which the building is permitted over the baseline energy code in effect in 2007 (2001 International Energy Conservation Code [IECC] and by reference, ASHRAE 90.1-2001) (Cadmus September 21, 2018). A similar approach was proposed to evaluate AEGB's Multifamily Rating Program, but Cadmus could not locate documentation of this effort (Reed 2014).

Pennsylvania

Pennsylvania is the most recent state to permit PAs to claim savings resulting from energy code programs. Per the General Assembly of Pennsylvania, Senate Bill No. 1235, September 2018 amendment to Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, Pennsylvania utilities may claim up to one-third of the energy savings resulting from their involvement in building energy codes. The statutory language (shown below) is very similar to that in the regulation promulgated by the Arizona ACC:

Excerpt from Senate Bill No. 1236:

> *(3) The term includes up to one third of the energy savings and reductions resulting from energy efficiency building codes, provide that:*
>
> *(i) The electric distribution utility played a direct role in achieving the savings and reductions through program implementation.*
>
> *(ii) The savings and reductions are quantified and reported throughout an independent measurement and evaluation study.*
>
> *(iii) The savings and reductions are commensurate with the direct role that the affected utility played to achieve the savings and reductions.*

Senate Bill No. 1236 ensures savings from code efforts can be applied to the energy reduction goals of Pennsylvania's seven major electric distribution companies, as required by Act 129 of 2008 (The General Assembly of Pennsylvania, House Bill No. 2200).

We did not find any details yet on whether the savings would be counted for code adoption or compliance enhancement efforts, or both. Also, there is no information available yet on whether attribution would be assessed, or utilities would just be able to claim one-third of resulting energy savings without having to quantify attribution.

Full Savings without Determining Attribution

In Ontario and Manitoba, code and standard savings are counted in a PA portfolio or regional savings model, without consideration of attribution. For perspective, this is the approach that BC Hydro takes, with the savings estimates subsequently used to develop a net load forecast.

Ontario

In 2015, Ontario Power Authority merged with the Independent Electricity System Operator (IESO), which oversees Ontario's local distribution companies (LDCs) and electricity market (IESO Power Authority Amalgamate 2018). IESO supports the LDC's conservation programs and aids with meeting the required savings targets outlined in the Conservation First Framework (IESO Conservation Delivery Tools 2018).

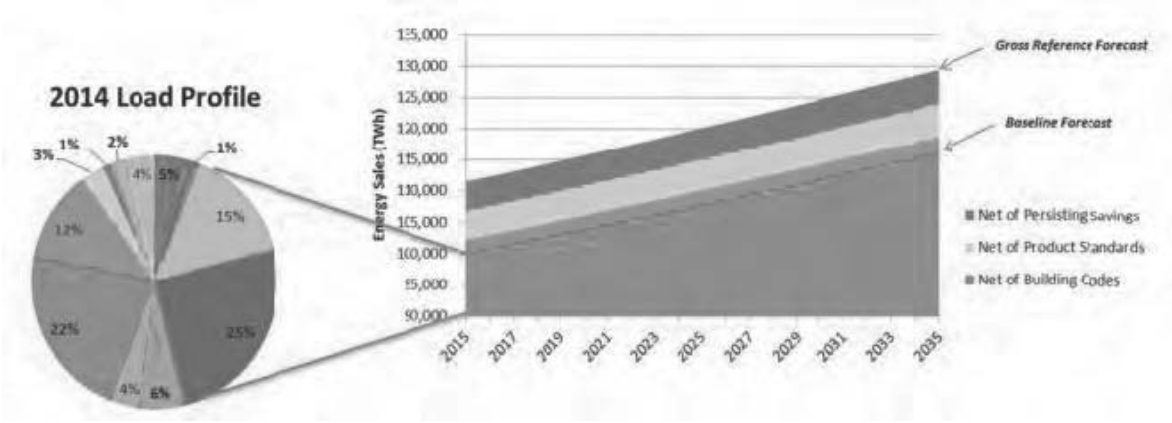
Savings are not estimated for C&S programmatic efforts claimed as contributing to each LDC's Conservation First Framework targets. They are addressed by subtracting forecast codes and standards savings from top-line gross load forecasts to develop a reference forecast for each LDC, with the result

being a lower target. This process is explained in IESO's *2016 Achievable Potential Study: Short Term Analysis* report (Nexant 2016):

> *Subtract codes and standards and persisting savings from gross forecast: Nexant worked with IESO's staff to obtain the respective energy savings through the long term study horizon anticipated by end use due to the adoption of more stringent building codes (e.g. HVAC and lighting) and the adoption of more efficient product standards (e.g. appliances). Data provided by IESO summarized the persistent savings by measure from 2015, and Nexant allocated the appropriate persistent savings by LDC, by sector, and by end use and subtracted the savings from the gross reference forecast. These codes and standards, and persistent savings were subtracted from the top-line gross reference forecast to establish the baseline forecast.*

Figure 6 illustrates how each LDC's baseline load forecast was determined with consideration for codes and standards; the baselines reflect codes and standards savings regardless of an LDC's energy code efforts. IESO documents do not provide any assessment of possible LDC involvement in building code adoption or compliance enhancement.

Figure 6. IESO Illustration of Baseline Load Forecast Development by LDC



Source: (Nexant 2016)

Manitoba

Manitoba Hydro is the primary electric and gas utility in Manitoba, Canada. Its *2014-2017 Power Smart Plan* indicates that DSM targets include savings from C&S, which are considered separate from electric and natural gas DSM programs (Manitoba Hydro 2015). Per Manitoba Hydro's DSM plan for the 2016/17 fiscal year, "Manitoba Hydro's overall DSM strategy involves taking a broad approach to capturing energy efficiency opportunities: education to build awareness and understanding, creating foundations through the support of standards, motivating customers with the aid of financial tools, and entrenching energy savings through the support of federal and provincial codes and regulations" (Manitoba Hydro 2016).

The *Power Smart Plan* acknowledges: "A code or a regulation ensures permanent market transformation for the specific energy efficiency opportunity since a potential always exists that the market could revert back to the non-efficient option once Power Smart has reduced or eliminated its program support."

Manitoba Hydro's code activities include market intervention strategies, such as being an "aggressive and active participant" on provincial and national energy efficiency codes and standards committees. "Manitoba Hydro is heavily engaged in both Federal level and Provincial level committees that work to establish ongoing updates to minimum energy performance standards for technologies and to determine the appropriateness of their adoption into a code or a regulation."

The national commitment to update the 1997 National Energy Code for Buildings (NECB) was initiated in Manitoba by the Energy Code Advisory Committee which was led by Manitoba Hydro. Manitoba Hydro also chaired the national Building Energy Code Collaborative, which was formed in response to the recommendations provided by the Energy Code Advisory Committee. Manitoba was instrumental in getting jurisdictions across Canada to undertake the work to update the 1997 NECB. The Province still moved forward with its own energy strategy and, in January 2011, the energy efficiency amendments developed for the Manitoba building code were approved by the Building Standards Board of Manitoba and the Minister of Labour. Manitoba Hydro Power Smart staff contributed to the process of adopting specific amendments for Manitoba and staff continues to contribute to the national process for the development of the 2015 edition of the NECB.

Manitoba Hydro's influence on codes and standards is shown in the following example from the *2014-2017 Power Smart Plan:*

> *Effective December 1st, 2010, Manitoba implemented changes to the building and plumbing codes that increased energy and water efficiencies. These changes were the result of extensive consultations by the Office of the Fire Commissioner involving new homebuilders, contractors and technical experts. The new efficiencies incorporated into new construction and homes undergoing extensive renovations included:*
>
> - *specifying minimum energy-efficiency requirements for windows,*
> - *eliminating the pilot light in gas fireplaces,*
> - *increasing the required level of attic insulation to R50,*
> - *requiring a minimum 94 per cent fuel-efficiency rating for furnaces,*
> - *specifying a mid-efficient heat-recovery ventilator, and*
> - *introducing energy-modeling software that will allow builders to model alternatives to the code requirements.*
> - *Requiring a maximum flow rate for primary showerheads to 1.75 GPM*
>
> *Through its close working relations with key industry stakeholders and the Power Smart New Home Program offering, Manitoba Hydro succeeded in advancing these changes to the Manitoba Building code. In fact, a majority of the technologies adopted by the Manitoba Building Code for the December 1, 2010 update were part of the aforementioned Power Smart Gold Home standard requirements. Without the program*

providing information, education, training, and incentives for these technologies and building practices, the industry would have been less likely to adopt these technologies and transform the market. The program created demand for these technologies, provided builders an opportunity to gain experience using them, and provided trades and contractors training opportunities to advance their expertise and knowledge of the technologies.

Manitoba Hydro prepares an annual forecast of the expected influence of currently implemented regulated and nonregulated codes and standards; the forecast is used to adjust Manitoba Hydro's system load forecast. The full savings are counted toward the utility's savings goals without any estimation of attribution.

Attribution Permitted: No Approach Specified

Utility interest in claiming C&S energy savings is increasing and the initial framework necessary to claim savings is emerging in various jurisdictions. Cadmus identified two states that permit attribution, but that have not yet defined exactly how savings are credited.

New Jersey

In May 2018, New Jersey's Act Concerning Clean Energy (Clean Energy Act), Bill A-3723, was signed into law. The act, effective immediately, requires utilities to establish energy efficiency and peak demand reduction programs to be approved by the Board of Public Utilities (BPU). Load reduction targets vary by gas and electric public utilities (The Senate and General Assembly of the State of New Jersey 2018). Gas utilities will be required to achieve, within five years of program implementation, reductions of at least 0.75% of the average annual usage in the prior three years; electric utilities must achieve reductions of at least 2% under the same scenario (Day Pitney Alert 2018).

Within one year of the Clean Energy Act, the BPU must adopt performance indicators for each public gas and electric utility to "establish reasonably achievable targets for energy usage reductions and peak demand reductions and take into account the public utility's energy efficiency measures and other non-utility energy efficiency measures including measures to support the development and implementation of building code changes, appliance efficiency standards, the Clean Energy program, any other State-sponsored energy efficiency or peak reduction programs, and public utility energy efficiency programs that exist on the date of enactment of P.L.2018, c.17 (C.48:3-87.8 et al.)."

To achieve the targets established by the board, the Clean Energy Act permits utilities to "apply all energy savings attributable to programs available to its customers, including demand side management programs, other measures implemented by the public utility, non-utility programs, including those available under energy efficiency programs in existence on the date of enactment of P.L.2018, c.17 (C.48:3-87.8 et al.), building codes, and other efficiency standards in effect, to achieve the targets established in this section."

It is unclear at this time how savings will be attributed to codes and standards programs.

Currently, the BPU is also administering New Jersey's Clean Energy Program, a statewide program that offers energy efficiency programs, incentives, and services. The BPU does not count energy code savings in its savings reporting except for the incremental amount above current code, determined by the Protocols to Measure Resource Savings (State of New Jersey Board of Public Utilities 2018). According to correspondence with a senior policy advisor from BPU, the gas and electric utilities with programs supplementary to the New Jersey's Clean Energy Program account for energy savings in the same manner (Cadmus September 27, 2018).

Minnesota

In 2007, Minnesota passed the Next Generation Energy Act with a goal of reducing emissions by 80 percent by 2050. The policy allows utilities to claim savings credit for building codes and appliance standards toward the annual energy savings target (State of Minnesota 2017).

Excerpt from the Next Generation Energy Act of 2007:

> ***Sec. 4. [216B.2401] ENERGY CONSERVATION POLICY GOAL.***
>
> *It is the energy policy of the state of Minnesota to achieve annual energy savings equal to 1.5 percent of annual retail energy sales of electricity and natural gas directly through energy conservation improvement programs and rate design, and indirectly through energy codes and appliance standards, programs designed to transform the market or change consumer behavior, energy savings resulting from efficiency improvements to the utility infrastructure and system, and other efforts to promote energy efficiency and energy conservation.*

Minnesota's electricity and natural gas utilities administer the Conservation Improvement Program ([CIP]; Minnesota Department of Commerce 2018). Historically, CIP program policies did not allow programs to claim savings for code efforts; however, "numerous developments within the last several years have suggested that CIP-funded programs that increase code compliance could be given credit for energy savings in Minnesota" (Center for Energy and Environment 2018).

In March 2018, the Center for Energy and Environment (CEE) provided the Minnesota Department of Commerce, Division of Energy Resources (DER) with a summary of opportunities for CIP-funded code compliance programs and recommendations for an approach to estimating savings for code efforts.

CEE recommended that energy savings for code programs be based on a third-party impact evaluation but did not provide a detailed approach. However, CEE proposed guidelines to "meet the need for utilities to have confidence in the ability to claim savings while also providing a degree of rigor in the savings quantification process." These guidelines include the following:

- "Utilities should be encouraged to file for cost-effective code-compliance programs, and to work collaboratively with the DER and other utilities to come up with an appropriate evaluation plan in their filing.

- During program implementation, the evaluation should be carried out by a third party. Evaluation contractors could either be directly contracted by DER with program funds provided by the utility, or at least have the evaluation firm credentials approved by DER.
- Utilities should be encouraged to work together to jointly implement programs that would be evaluated together as well. In addition to having the benefit of being able to be more easily evaluated, it would also be a more efficient use of ratepayer dollars.
- During program development, each individual utility (or ideally, a group of utilities) is responsible for contracting directly with a DER approved evaluation firm to develop the evaluation plan, in a form that will provide for competitive bidding of the implementation evaluation. The integration of savings evaluation planning into the program development process is meant to provide utilities with a degree of confidence that a proposed program will be able to count an appropriate level of savings.
- DER approval of evaluation firms should be based on minimum standards for experience with program evaluations and with energy code compliance programs, and be a third party (i.e. a firm cannot evaluate a program it is delivering). Certain, reasonable limits on claiming savings could also be established by DER through the TRM [Technical Resource Manual] (e.g. a limit of 30% of savings compared to the previous code for general education only programs). As precedents for specific types of compliance programs are established through individual program approvals, the TRM can be updated with guidance for future, similar programs."

According to correspondence with a MEEA policy manager, the state has not yet acted on CEE's recommendations.

No Savings: Codes Considered Non-Resource

Most utilities, PAs, and regulators do not treat building energy codes as a reliable energy efficiency resource. Consequently, PA programs supporting code adoption and compliance enhancement are referred to as non-resource programs, and the PAs do not claim savings from them. Further, many states throughout the U.S. do not have an energy efficiency resource standard (EERS), or a quantitative, long-term energy savings target for utilities (American Council for an Energy-Efficient Economy 2018); states without an EERS are likely not claiming savings. The following section provides a high-level overview of the non-resource efforts in the U.S. by region and identifies states that have an EERS.[11]

C&S Non-Resource Efforts by Region

Cadmus corresponded with representatives from each of the regional energy efficiency organizations, shown in Figure 7, to better understand utility and PA code activities.

[11] All information on state Energy Efficiency Resource Standards is from the American Council for an Energy-Efficiency Economy EERS database.

Figure 7. Regional Energy Efficiency Organizations and Associated States

Source: Building Codes Assistance Project

Northeast

Massachusetts, Rhode Island, New York, and Washington D.C. are leading the attribution efforts in the Northeast. The Northeast Energy Efficiency Partnerships (NEEP) actively works to help educate utilities and PAs on attribution approaches. In its 2017 *Building Energy Codes for a Carbon Constrained Era: A Toolkit of Strategies and Examples,* NEEP recommends strategies to advance energy code development and adoption and to improve energy code administration to ensure performance levels are achieved. One such recommendation is to allow PAs to claim savings for compliance support activities. NEEP is also working on an exemplar of Massachusetts attribution efforts (Cadmus September 14, 2018).

National Grid, whose service territory spans Massachusetts, New York, and Rhode Island, is also a champion of attribution for code programs and has developed many resources for utilities and PAs to consider when looking to claim savings for code programs. Among those is the recent 2018 American Council for an Energy-Efficient Economy (ACEEE) paper, *Polishing a Hidden Gem: A Novel Evaluation Method for Energy Codes & Standards Programs* (Na'aim et al. 2018).

Every state in the Northeast has an EERS, although the EERS in Delaware is voluntary.[12] Many utilities and PAs also provide some form of support or funding for energy code education; however, with the exception of the Northeast states highlighted throughout this report, the efforts are considered non-resource. According to an interview with a NEEP senior policy manager, New Jersey Natural Gas provides robust energy code training; Vermont utilities support C&S through Efficiency Vermont; and New Hampshire utilities support energy code training by providing funding to NHSaves. Vermont and New Hampshire, described in greater detail below, have the most defined non-resource C&S efforts in the Northeast.

Vermont

Efficiency Vermont's (EVT's) 2018-2020 Triennial Plan (Vermont Energy Investment Corporation 2017) outlines the services and activities necessary to achieve the goals of the Vermont General Assembly's 2008 Energy Efficiency and Affordability Act and the 2016 Comprehensive Energy Plan (Efficiency Vermont 2018). Under the 2018-2020 plan, Efficiency Vermont will provide energy code training, market partner support, and technical assistance; distribute code materials; support energy code updates; and provide code assistance to various agencies, committees, and customers.

EVT has offered code support services for many years as part of its development and support services. According to the plan, "these efforts continued to be essential to Efficiency Vermont's efforts to deepen energy savings and to have a lasting, positive impact on Vermont households, businesses, institutions, and communities." EVT's 2017 savings claim summary does not indicate that EVT received credit for savings associated with the development and support services (Efficiency Vermont 2017). According to NEEP's *2013 Attributing Building Energy Code Savings to Energy Efficiency Programs* report: "the [Department of Public Safety] and [EVT] have had a long history of explorations of the concept of claiming energy savings from code support. Neither organization has found it necessary or worthwhile to endeavor to evaluate and assign savings for this activity" (Cadmus et al. 2013).

New Hampshire

New Hampshire's energy efficiency programs and policies are administered by NHSaves, a program jointly operated by New Hampshire utilities with oversight from the New Hampshire Public Utilities Commission. In 2016, the commission approved Order Number 25,932, establishing an EERS. In response to the EERS, NHSaves submitted the 2018-2020 New Hampshire Statewide Energy Efficiency Plan (New Hampshire's Electric and Natural Gas Utilities 2018).

The 2018-2020 plan details the "comprehensive customer outreach and education" New Hampshire utilities offer in support of energy codes. These activities include offering classroom and in-field training courses and disseminating educational materials to builders, inspectors, installers, contractors, real estate professionals, auditors, and Home Energy Rating System raters. The educational programs are

[12] Northeast states include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Washington D.C.

intended to "raise awareness of the benefits of energy-efficient products, homes, and businesses and establish a foundation for a more positive customer experience." No energy savings are attributed to PAs for these programs.

Southeast

The Southeast has made perhaps the least progress implementing utility C&S programs. According to a phone interview with a senior staff from the Southeast Energy Efficiency Alliance, utilities in the Southeast do not typically have a large role in the code adoption process and, while there has been some limited funding provided by utilities to support training, there are no utility energy code enhancement programs either (and as such, no utilities are claiming savings) (Cadmus September 17, 2018).

Two states in the Southeast, Arkansas and North Carolina, have an EERS. Virginia also has an EERS, but energy savings targets are considered voluntary since there are currently no regulatory requirements in place for energy efficiency programs. There is no EERS in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, or Tennessee.

Midwest

While no attribution approaches have been finalized in the Midwest, Illinois and Minnesota are moving toward claiming savings for code support efforts. Cadmus interviewed a senior policy manager at MEEA who reinforced that while many utilities and state agencies support some level of code training or education, none are currently claiming savings (Cadmus September 13, 2018).

Five states in the Midwest have an EERS: Illinois, Iowa, Michigan, Minnesota, and Ohio. Missouri and Kentucky have a voluntary EERS and the remaining states (Indiana, Kansas, Nebraska, North Dakota, South Dakota, West Virginia, and Wisconsin) do not have an EERS.

Missouri and Iowa, as described below, have included recommendations for code programs or initiatives in their energy efficiency plans. It is unclear if the utilities will seek attribution.

Missouri

Ameren Missouri's 2019-24 Missouri Energy Efficiency Investment Act plan proposes an "aggressive expansion of the portfolio," and includes six new education programs. One of these programs, the Home Building Code Compliance Education Program, is designed to provide energy code training and education to builders and other market actors "focused on high-energy impact measures that are commonly missed in residential code compliance." While the draft plan is publicly available, the appendices, which include draft program evaluation plans, are not (Ameren Missouri 2018).

Iowa

The 2016 Iowa Energy Plan, developed by the Inova Energy Group for the Iowa Economic Development Authority and the Iowa Department of Transportation, recommends the Department of Public Safety "work with local jurisdictions, utilities and other energy stakeholders to identify sources for long-term monetary support and resources for ongoing energy code education and training of local inspectors." It

also cites the attribution efforts in Illinois as a way to claim savings for compliance enhancement as part of their programs (Inova Energy Group 2016).

South-Central

Oklahoma and Texas are the two South Central states that are supported by SPEER, the South-central Partnership for Energy Efficiency as a Resource. As stated on the organization's website, SPEER's purpose is "to advance the understanding and adoption of energy efficiency as a low-cost energy resource." SPEER currently administers an Energy Code Compliance Program that supports compliance by providing energy code training, outreach, and peer support to building professionals and code officials in Oklahoma and Texas. Savings from the program are not currently being claimed.

Texas was the first state to adopt an EERS in 1999; Oklahoma does not have an EERS.

Southwest

Arizona's deemed savings attribution approach has been the Southwest's flagship for claiming energy savings. Cadmus corresponded with the Southwest Energy Efficiency Partnership's (SWEEP's) buildings efficiency program director on the status of attribution in the Southwest. SWEEP confirmed that Arizona is the only state claiming savings for codes although each state, except Wyoming, has an EERS.

Utilities in Nevada, Colorado, and Utah currently provide funding for code trainings, although savings for these efforts are not being claimed. In 2018, according to its website, the Nevada Governor's Office of Energy, NVEnergy, and Southwest Gas have collaborated to fund energy code training. Efforts in Colorado and Utah are described in greater detail in the following sections.

Colorado

Since 2011, Colorado's Strategic Compliance Plan has served as the framework for energy code adoption and compliance throughout the state. The plan outlines strategic outreach and training efforts, including the role utilities and state departments play in the funding and implementation of such programs (Colorado Department of Local Affairs 2011).

According to Colorado Energy Office's website, Colorado has two IOU electric utilities, Black Hills Energy and the Public Service Company of Colorado (also known as Xcel Energy), regulated by the Public Utilities Commission. Through the State of Colorado's proceeding number 16A-0512EG, Xcel Energy agreed to co-fund energy code training in 2017 and 2018 with other stakeholders. Xcel Energy included the training in its 2017 DSM Annual Report, but no savings were claimed (Xcel Energy 2018). Energy code training is offered by other utilities and organizations as well, such as Garfield Clean Energy and Clean Energy Economy for the Region. The Colorado Energy Office also offers code training and technical assistance, as cited in ACEEE's State and Local Policy database. No attribution efforts are currently underway for code or standard support from these organizations either.

According to Colorado's Strategic Compliance Plan: "As a fellow home rule state that does not have a statewide mandatory energy code, Arizona's work to incorporate energy code implementation efforts into its energy efficiency targets offers a model for Colorado to consider."

Utah

Utah's 10-Year Strategic Energy Plan, published first in 2011, includes a recommendation for a statewide energy consumption reduction program with an energy code training component "supported through partnerships with Rocky Mountain Power and Questar [Dominion Energy] in conjunction with utility DSM programs" (Utah Office of Energy Development 2014).

In support of the plan, per the Utah Governor's Office of Energy Development's (OED's) website, OED has partnered with Rocky Mountain Power and Dominion Energy to offer the Building Talks Program. The Building Talks Program provides residential and commercial energy code training to builders, design professionals, code officials, and other building professionals, as well as other energy code resources. While there is little available information about the Building Talks program, a reference to the program is included in OED's 2018 budget (FY2018 Base Budget Presentation); Rocky Mountain Power has included energy code training as part of its 2017 portfolio level expenditures (Rocky Mountain Power 2018); and Dominion Energy lists "State Energy Program (SEP) Codes Training" in its 2018 budget notes (Dominion Energy 2017). SWEEP indicated that neither Rocky Mountain Power nor Dominion Energy are claiming savings for training efforts and this was confirmed through correspondence with the Managing Director of Energy Efficiency and Renewable Energy: "Presently, no savings are being claimed from this effort. It has been an ongoing discussion and the utilities are interested in the prospect of attribution, but it would require a [Public Service Commission] decision (and potentially state legislation)" (Cadmus October 1, 2018).

Northwest

The code support efforts of the Northwestern states are described in detail in the Pacific Northwest (Idaho, Montana, Oregon, and Washington) section above. Two of the four states, Washington and Oregon, have an EERS; Idaho and Montana do not have savings targets.

Hawaii

The State of Hawaii has committed to an aggressive clean energy goal of 100% by 2045. Under contract with the Hawaii Public Utilities Commission, Hawaii Energy acts as a PA and offers a suite of energy efficiency programs aimed at helping the state achieve its Energy Efficiency Portfolio Standards goal of a 4,300 GWh reduction by 2030 (Hawaii Energy 2018). A key feature of Hawaii Energy's 2018 Annual Plan is "advocacy and outreach support for advanced building energy codes and standards." C&S support is included as part of Hawaii Energy's Market Transformation Program "to drive energy savings in both public and private sectors" through adoption support at the county-level, code compliance improvement, and standards advocacy.

Since 2014, Hawaii Energy has participated in State Building Code Council monthly meetings, completed several code compliance studies, developed and distributed educational materials, offered circuit rider trainings, provided written and oral testimony in support of the 2015 IECC, created (and currently chairs) the State Building Code Council, Energy Efficiency Code Coordination Investigative Committee, advocated for county-level code adoption, and advocated for enhanced appliance standards through legislation.

To understand the savings associated with a more stringent energy code, Hawaii's Department of Business, Economic Development, and Tourism commissioned an energy impact forecast, completed in 2016, for the 2015 IECC with Hawaii amendments (Cadmus 2016). The savings forecast was used, in part, to inform a review "on behalf of the Public Utilities Commission to try to understand opportunities for energy savings from codes and standards activities in Hawaii, and what role the Hawaii Energy programs might be able to play in achieving these savings" (Mitchell-Jackson et al. 2016).

Hawaii Energy's team has since developed a logic model that "will guide how the Program will measure and propose energy savings attributable towards [its] resource acquisition goals." The team is actively researching attribution approaches that may be applied to their program (Cadmus, Hawaii Energy September 27, 2018).

Appliance Standards Policy Results by Jurisdiction

Summary of Findings

Table 3 provides a high-level overview of the role PAs play in appliance standards in several jurisdictions, including whether PAs support standards adoption, whether they support efforts to increase compliance with standards, and how savings are or are not attributed to PAs for their appliance standards activities.

Table 3. Summary of Appliance Standards Results

Jurisdiction	Status	Activity for Adopting Standards?	Activity for Compliance Enhancement?	Program Administrator Attribution Method
Formal Attribution Approach				
California	Program and attribution process in place more than 10 years	✓	✓	Evaluation using evidentiary record, expert panel; focused on adoption only
Pacific Northwest (ID/OR/MT/WA)	NEEA program in place for several years; attribution analyzed in recent years	✓		Attribution determined for energy efficiency advocates using evidentiary record and expert panel or evaluator
Massachusetts	Program in discussion	Proposed, likely in 2019		To be developed; likely to follow approach similar to codes
Rhode Island	Program likely following Massachusetts implementation	Likely		To be developed; likely to follow approach similar to codes
Arizona—SRP	Savings credited to program for several years	✓		Used deemed approach; method is being revised to analyze attribution
Deemed Attribution Approach				
Arizona—IOUs	Savings credited to program for several years	✓		Attribution limited to one-third of savings; evaluation required, but no information available
Full Savings Without Determining Attribution				
New York	Program supports adoption	✓		Counted without attribution
New Jersey	Program accounts for standards			No information available on attribution
Illinois	Utilities required to account for standards			None

Jurisdiction	Status	Activity for Adopting Standards?	Activity for Compliance Enhancement?	Program Administrator Attribution Method
Minnesota	Utilities can claim savings from standards			No information available
Hawaii	Hawaii Energy provides support	✓		No information available
Ontario	Standards subtracted from forecast load			No attribution
Manitoba	Utility supports appliance standards	✓		No analysis of attribution
No Attribution				
Vermont	State adopted new standards			No attribution

Evidence, such as the results of evaluations of California IOUs' C&S program, suggests that appliance standards offer a very large potential for energy savings, likely more than the savings possible through energy code upgrades and building code compliance enhancement efforts. Consequently, appliance standards could be a largely untapped resource from which PAs could harvest energy savings through efforts supporting standard adoption.

Activities to adopt standards at the state level have ramped up in recent years, while the process of adopting standards at the federal level has slowed. A recent study by the Appliance Standards Awareness Project (ASAP) and ACEEE identified a large number of standards that could be adopted by states, and some states have moved ahead to adopt some of these standards (Mauer et al. 2017). Much of the information in this section was provided through an interview with a representative of ASAP (Cadmus September 18, 2018).

The same study notes that most states have to adopt standards through legislation, so any effort by PAs to influence standard adoption would have to be directed at the legislative process. This policy issue could require PAs to take on an unaccustomed role and could be an obstacle to some advocating for appliance standards. California is one major exception to standards being adopted through legislation because the California Energy Commission has the authority to adopt state appliance standards (as well as building codes). This has made it more feasible for PAs in California to engage in efforts to support appliance standards and get energy savings credit.

Given the relatively recent state activities adopting standards and the usual process of requiring adoption through legislation, PA involvement has been modest to date, and processes for attributing savings credit to PAs have been limited.

Formal Attribution Approach

Overall, fewer jurisdictions attribute energy savings from standards than building energy codes, although there has been some increase in the number of jurisdictions that do so in recent years. In 2014, Cadmus found that only California had a process for attributing savings to appliance standards; since then four additional jurisdictions have conducted formal attribution analyses or are likely to initiate formal attribution processes. The following sections detail how each state is claiming savings for their standard adoption support or compliance enhancement programs.

California

In California, the IOUs have received energy savings credit for appliance standards supported through their C&S program based on an approach essentially the same as that described earlier for building codes. In addition to savings credit for California standards, the IOUs can get credit for adoption of federal standards they have supported. In most cases, federal standards are adopted through the U.S. Department of Energy's procedures, but some federal standards are adopted legislatively. The attribution process for federal standards has been tailored to account for the unique features of the federal adoption process.

To date, the IOUs have not claimed savings for efforts to improve compliance with appliance standards. Their most recent program includes efforts to increase compliance with standards, so it is likely they will want to claim savings credit for increased compliance at some point, and this will trigger development of a method to assess attribution.

Pacific Northwest (Idaho, Montana, Oregon, Washington)

Just since 2012, NEEA and other Pacific Northwest parties have been involved significantly in the adoption of 20 federal appliance standards (State of Oregon 2018). According to recent estimates from NEEA's quarterly performance report, appliance standards contribute 28% of regional electricity savings, more than any other regional energy efficiency investment (NEEA 2018).

NEEA has supported recent studies to assess the effectiveness of NEEA's standard advocacy efforts and the influence of NEEA and other organizations on energy savings from adoption of various standards. NEEA has not specified a standardized methodology for calculating attribution, but the basic approach starts with data collection through a literature review and interviews with knowledgeable stakeholders. The evaluators then assess NEEA's effectiveness in the adoption process by identifying how well it accomplished each step in its standard development logic model. Calculation of attribution to the efforts of energy efficiency advocates then follows an approach like that used for the evaluation of California IOUs' C&S program described earlier. It relies on estimating the relative significance of barriers to standard adoption and the relative influence of different stakeholders in overcoming those barriers (Cadmus June 2016; Cadmus 2018). The attribution assessment has been done in evaluations so far by either an expert panel or the evaluator.

Massachusetts and Rhode Island

Although PAs have not implemented appliance standard support programs yet in either Massachusetts or Rhode Island, we anticipate that they will in the near future. ASAP has been working with stakeholders in both states for almost 10 years, and both have adopted state standards over that period (Cadmus September 18, 2018). PAs in Massachusetts have put forth preliminary specifications for an appliance standard advocacy program, which are being considered in the policy making process. National Grid is a leader of these efforts in Massachusetts and, as the only IOU in Rhode Island, we anticipate it will make a similar push there because appliance standards development and advocacy are one step in its overall C&S initiative.

Given that the programs are undefined, the approach for evaluating attribution has not been developed yet in either state. However, given the precedence in the building codes area, Cadmus expects that the regulators in both states will pursue formal attribution approaches similar to the approaches applied to the building code support programs.

Arizona—SRP

SRP's Appliance and Equipment Standards program is designed to increase awareness of and advocate for more robust efficiency standards at the national, state, and local levels. SRP has claimed energy savings from its efforts influencing the statewide adoption of a minimum efficiency standard for pool pumps effective January 1, 2012. The legislated standard applies to pool pumps of one horsepower and larger and requires pumps that can operate at a minimum of two speeds. SRP takes credit for energy savings attributable to its advocacy work, contributing to Arizona's change in standards from single-speed pumps to two-speed pool pumps.

The savings credited to the standard interact with savings SRP claims for its pool pump incentive program. SRP provides incentives for variable speed pool pumps, which are more efficient than the two-speed pumps required by the standard. SRP claims 50% of the savings for a two-speed pump compared to a single-speed pump, and attributes those savings to its standards program.

SRP's initial approach was to set attribution at the 50% level. For the next program evaluation, Cadmus understands that SRP will use a process like the one used to determine attribution for the codes program to reassess the reasonableness of this attribution factor.

Deemed Attribution Approach

Arizona—IOUs

As for building codes, the Arizona IOUs have claimed savings for appliance standards under the ACC regulations. TEP's Energy Codes and Standards Enhancement Program is designed to improve compliance with current energy codes and standards and support the adoption of newer codes and standards (TEP 2017). APS' Building Codes and Appliance Standards Initiative offers compliance enhancement support to code officials, building professionals, and other market actors (APS 2017).

The regulation allows the IOUs to claim up to one-third of the savings from appliance standards as quantified through a measurement and evaluation study conducted by the utility. The regulation does not say the IOUs can claim electricity savings from appliance standards so there is some ambiguity about whether they are claiming the savings for credit toward their savings targets. The IOUs have not allocated budgets to evaluate savings either so there is uncertainty about whether or how they are claiming savings from standards.

Full Savings without Determining Attribution or Attribution Permitted without Approach Specified

Given the status of appliance standards advocacy by PAs in most states, the most common situation is that savings from standards are included in savings and load forecasts, but attribution is not estimated, or the estimation method has not been defined yet. Several jurisdictions in this situation are described briefly below.

New York

The Systems Benefit Charge program administered by NYSERDA includes the Advanced Energy Codes and Standards Program. One component of this program has been contributing to the development of appliance and equipment standards, specifically those not covered by federal standards (NYSERDA 2013). Savings from standards are accounted for, but no effort has been made to determine attribution.

In his 2018 State of State address, Governor Cuomo directed NYSERDA to propose new 2025 energy efficiency targets by Earth Day, April 22. Appliance standards were one key component of the targets, but they have not been implemented to date.

New Jersey

In 2018, New Jersey's Clean Energy Act, Bill A-3723, required utilities to establish energy efficiency and peak demand reduction programs to be approved by the BPU. The BPU is required to adopt performance indicators for each utility to establish reasonably achievable targets for energy usage reductions and peak demand reductions, taking into account appliance efficiency standards.

The act permits utilities to apply all energy savings attributable to programs available to its customers, as well as energy efficiency standards. However, there has been no information to date about how savings will be attributed to codes and standards programs.

Illinois

Illinois' FEJA requires utilities to include proposals for C&S programs and utility procurement plans must include an analysis of the impact of energy efficiency appliance standards, both current and projected, as well as opportunities to expand the programs.

In response to these requirements, Illinois utilities have joined together for a potential statewide code compliance enhancement program. However, they have not taken similar steps yet to address appliance standards and no information is available yet on how they might determine savings and attribution.

Minnesota

The Minnesota Next Generation Energy Act allows utilities to claim savings credit for appliance standards toward the annual energy savings target. No information is available yet on the process for estimating savings or attribution (State of Minnesota 2017).

Hawaii

In addition to its building codes activities, Hawaii Energy provides advocacy and outreach support for advanced standards. One role of the Department of Business, Economic Development, and Tourism's 2016 energy impact forecast was to understand opportunities for energy savings from standards activities in Hawaii, and what role the Hawaii Energy programs might play in achieving these savings. Hawaii Energy's team has since developed a logic model to guide its standards and codes activities (Mitchell-Jackson et al. 2016).

In the standards area, one strategy Hawaii Energy is implementing is requiring efficiency levels above current codes and standards (Hawaii Energy 2018). Hawaii Energy is also increasing strategic efforts advocating for minimum product standards for electric appliances brought to Hawaii. Hawaii Energy will partner with other agencies to understand the market dynamics of appliances shipped to Hawaii, their shelf life, and the impact California's appliance standards may have on Hawaii in the absence of Hawaii standards. While Hawaii has not adopted any state standards, the Standards Enhancement target for program year 2018 is the implementation of three engagements to advance legislation for Hawaii to explore and adopt state appliance efficiency standards. A bill was developed to adopt California standards, but it did not pass this year.

How savings and attribution will be addressed for appliance standards has not been determined.

Ontario

As for codes, savings from forecast appliance standards are subtracted from the gross reference load forecast. There is no information indicating LDCs engage in activities to support and standards, and no attempt is made to assess attribution.

Manitoba

As it does for building codes, Manitoba Hydro engages in activities to support appliance standards. Forecast savings are counted toward the utility's savings goals without any analysis of attribution.

No Savings: Standards Considered Non-Resource or No Program

Vermont

In 2016, Vermont passed a law (House Bill H.410) adopting 16 new state appliance standards (Granda 2018). The adopted standards are the complete set of standards recommended by ASAP. The state also adopted all existing federal standards into law to avoid the possibility of a rollback at the federal level.

Like efforts supporting building energy codes, we found no evidence that EVT or any other entity in Vermont would claim savings from the standards.

Other States

There are activities in several states supporting the adoption of appliance standards that have not involved PAs. These include the following:

- Connecticut: standards can be adopted administratively
- Oregon: an executive order has been issued for the state to develop a plan to adopt new standards
- Washington: a bill was proposed in 2018 to adopt 19 new standards, but it has not passed

Findings

This report provides a review of how various jurisdictions in North America attribute or determine the share of energy savings to credit to program administrators for their efforts supporting codes and standards. To provide a broader context, we also documented the status of PA involvement in codes and standards in jurisdictions where there is no process for crediting savings to the PAs' efforts.

Our key findings from this study are presented below:

Energy savings from building codes and appliance standards affect load forecasts and utility revenue requirements. Load forecasts based on econometric models capture the effect of existing codes and standards and can be adjusted to account for new codes and standards. Similarly, end-use load forecasts can adjust estimates of end-use loads to account for existing or new codes and standards. Load forecasts and utility revenue requirements can be adjusted to account for adopted codes and standards that have known effective dates. The savings from codes and standards are applied, along with estimated energy-efficiency program savings, to the energy forecast estimates based on underlying load growth to produce the net load growth estimate. The savings from new codes and standards can be a significant fraction of the total energy-efficiency savings.

The relationship between programs to support codes and standards and other DSM programs is complex. Most PAs and regulators recognize that adoption of more stringent building codes and appliance standards by policy makers make it more difficult for conventional DSM programs to produce energy savings. This has motivated several PAs to seek ways to explicitly support the adoption of codes and standards and enhance compliance with them, and some of these PAs have sought to claim energy savings attributable to their efforts. Some PAs have suggested that conventional DSM programs ready the market for the adoption of new codes and standards and that these DSM programs should receive indirect energy savings credit for allowing these codes and standards to be adopted sooner than they would otherwise be. This argument is similar to the logic underlying the BC DSM regulation issued in 2008. Another approach that has been considered is increasing the amount of codes and standards savings attributed to the PA because prior PA programs helped ready the market for adoption of the subsequent codes and standards. None of the jurisdictions that Cadmus investigated outside BC have instituted a policy or process for measuring and attributing such savings, possibly because of the complexities involved.

***While attribution continues to be a topic of interest among utilities, PAs in most states and jurisdictions do not claim savings for their C&S efforts*.** Some PAs that do not claim attribution for C&S savings do fund code enhancement programs or otherwise provide C&S support that result in energy savings that are reflected in their net load forecasts and revenue estimates.

No standardized attribution method exists, but most methods have some common features. Attribution approaches for C&S programs implemented by PAs range from no attribution to attribution based on a rigorous, formal analytic process. There is a trend toward formalized approaches, especially in cases where PAs are engaged in well-defined code or standard programs and they have specific

energy savings goals to meet. The most common features of the formal approaches include basing attribution on a documented evidentiary record of influence and relying on the professional judgment of objective experts or evaluators to assess attribution, usually through a Delphi panel process.

The number of jurisdictions attributing energy code savings has increased. Six jurisdictions have formal processes for attributing savings to building code activities. This is a three-fold increase since 2014. PA efforts in these areas include both code adoption and code compliance support. Formal attribution processes are split about equally between code adoption and code compliance enhancement efforts. The number of jurisdictions with deemed attribution approaches has remained at three, though the jurisdictions have changed.

Number of jurisdictions attributing appliance standard savings has increased, but there are still relatively few that do. Counting the Pacific Northwest as a single jurisdiction, five jurisdictions have, or are expected to have soon, a formal or deemed process for attributing energy savings to standards activities by PAs. PA standard support activities have focused almost exclusively on adoption rather than compliance.

Standards advocacy offers opportunities for significant energy savings if barriers can be overcome. While the number of PAs advocating for appliance standards and the number of jurisdictions allowing PAs to receive energy savings credit for these efforts has been small to date, experience indicates that appliance standards may offer the potential for larger energy savings opportunities than new building codes or improved code compliance. PAs have been slower to get involved with appliance standards for several reasons including PAs are less familiar with appliance standards and the common mechanism of adopting standards legislatively is a political process in which PAs are reluctant to get involved. Identifying and overcoming these barriers could open more opportunities for PAs to support appliance standards.

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PUB/COALITION - 12 Reference: Grevatt Evidence p.21

Preamble:

"4. Based on the available information, it appears that Efficiency Manitoba is unreasonably conservative in the scope and scale of its proposed residential sector programs."

Request:

a) Please provide examples of programs that Mr. Grevatt would recommend that EM adopt.

b) Please identify any evidence that demonstrates that the programs in (a) can be adopted while increasing the overall portfolio PACT.

c) If there are no programs that can be recommended to increase the PACT, please explain why the scope and scale of the proposed residential sector programs should be increased.

Response:

a) The proposed Efficiency Manitoba residential programs would likely provide a suitable framework for increasing residential savings simply by increasing budgets and expected participation. Mr. Grevatt's statement cited above suggests that Efficiency Manitoba should increase residential budgets and increase the comprehensiveness of the projects it promotes.

b) Mr. Grevatt is unclear as to why the question asks about <u>increasing</u> the PACT. A PACT result greater than 1.0 indicates that the investment is a worthwhile investment of ratepayer funds, and while it may generally be desirable to increase the PACT, it is arbitrary to omit cost-effective savings opportunities from a portfolio simply because they do not result in a <u>higher</u> PACT result. In other words, programs should not only be designed to <u>increase</u> PACT- rather, they should maximize the promotion of cost-

effective benefits. If the program can increase benefits while remaining cost-effective, it is a good thing.

c) There are several reasons why residential sector programs should be increased:

   a. To the extent that residential customers pay for the costs of Efficiency Manitoba, they should have opportunities to share in the benefits. As currently proposed, the vast majority of residential savings result from codes and standards that are already in place, and that Efficiency Manitoba did nothing to advance. Residential customers who are not purchasing new homes or covered appliances will receive no direct benefits from codes and standards, and the reach of the proposed residential programs is tiny in comparison with the number of customers;

   b. As demonstrated in Mr. Neme's evidence, the acquisition of residential energy efficiency will be critical if the province is to achieve its climate goals.

PUB/COALITION - 13 Reference: Dr. Fitzpatrick Evidence p. 7

Request:

Please provide a statement of the EEAG mandate that would reflect the clarifications and recommendations that are included in the evidence of Dr. Fitzpatrick.

Response:

My research into independent oversight/ advisory bodies such as the EEAG identify the importance of a clear mandate.[1] "Since independent oversight can serve various purposes, the framework must specify the roles and responsibilities of the agency and its stakeholders." The mandate establishes the activities of the group, which is necessary for adequately resourcing (including time and money) its work and identifying an appropriate evaluative framework.

Section 27(3) of the Efficiency Manitoba Act (S.M. 2017, c.18) is an important consideration:

> 27(3)The role of the stakeholder committee is to
>
> (a) provide advice to Efficiency Manitoba about the development and implementation of efficiency plans;
>
> (b) provide advice to Efficiency Manitoba on the selection of the assessor and terms of reference for the independent assessment required undersection 16 and assist the board to review the assessment results; and
>
> (c) perform other advisory responsibilities as determined by the board.

In the application there are different descriptions of the role of the EEAG. This includes:

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1 Diduck, A. P., Fitzpatrick, P., & Robson, J. P. (2012). Guidance from adaptive environmental management, monitoring and independent oversight for Manitoba hydro's upcoming development proposals: A report prepared for the consumers association of Canada (Manitoba) and the public interest law centre of legal aid Manitoba. Retrieved from Winnipeg, MB: Fitzpatrick, P. (2016). Independent oversight: Homework assigned by the panel. Retrieved from Ottawa, ON: http://eareview-examenee.ca/view-submission/?id=1482348060.2959

- Advising functions (as outlined in the legislation)
- Communication functions (e.g., “help facilitate communication”)
- Engagement functions (e.g., “encourage participation”; “representing the public”)

My recommendation is that the mandate of the organization be clear and consistent. It should be developed collaboratively amongst the Board, Efficiency Manitoba and the EEAG, recognizing with increased roles and responsibilities, there is commiserate need for additional resources for the EEAG.

PUB/COALITION - 14 Reference: Dr. Fitzpatrick Evidence p.7

Preamble:

“It is important to highlight that the EEAG is a voluntary committee.”

Request:

a) Please explain the implications of the EEAG being a voluntary committee for its ability to fulfill its mandate as set out in the evidence of Efficiency Manitoba.

b) Please explain the implications of the EEAG being a voluntary committee for its ability to fulfill its mandate if it corresponded to the mandate as set out in the response to PUB/Coalition – 13.

Response:

a. The EEAG is voluntary committee, made up of representatives of variety of organizations, including not-for-profits. As it base, it is required to provide advice to Efficiency Manitoba, drawing upon the expertise of the organizations its members represent. This takes time and resources away from the everyday activities of those organizations.

As such, there is growing practice to include compensation for members and/or organizations for their time and expertise through travel expenses and an honorarium. [2] For example:

- The Technical Advisory Committee for the Impact Assessment Agency: “An amount will be provided to all members to recognize their preparation for and participation in meetings. The Agency will also reimburse members’ approved travel expenses in accordance with relevant Government of Canada policies including the National Joint Council Travel Directive.”[3]

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2 Stewart, M. K., Boateng, B., Joosten, Y., Burshell, D., Broughton, H., Calhoun, K., ... & James, L. (2019). Community advisory boards: Experiences and common practices of clinical and translational science award programs. Journal of clinical and translational science, 3(5), 218-226.

3 https://www.canada.ca/en/impact-assessment-agency/advisory/advisory-

- Research Oversight Committees (ROCs) with Genome Canada Projects "Members and the Chair receive an honorarium for the work they do on behalf of the ROC. In addition, all reasonable expenses related to their attendance at meetings will be reimbursed."[4]

See also the Government of Yukon Policy for compensating Board and Committees [5]

If the mandate were to expand to communication functions and/or engagement functions, additional compensation would be needed for EEAG members. In addition, the EEAG (or its individual) may have to retain its own independent expertise to fulfill a task, so money and resources should be set aside.

c. Please see answer to a)

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groups/technical-advisory-committee-science-knowledge/interim-terms-reference-sept-2019.html

4 http://www.genomeprairie.ca/files/8814/3343/2635/guidelines-funding-research-projects-june-2014.pdf

5 http://www.eco.gov.yk.ca/pdf/FINAL_GAM_1._8_Boards_and_Committees_EN_version.pdf

PUB/COALITION - 15 Reference: Dr. Fitzpatrick Evidence p.14

Preamble:

“Overall, the application demonstrates limited interaction with the public, low income and hard-to-reach customers in the design of the three-year plan. Although Efficiency Manitoba has, at times, assigned this responsibility to the EEAG, and the PUB – Efficiency Manitoba has the obligation under the Act to include the public in the development of the application.”

Request:

a To what extent could the “limited interaction” noted by Dr. Fitzpatrick be attributed to the limited time and resources available to EM in developing its 2020 – 2023 Efficiency Plan?

c) If Dr. Fitzpatrick has a view of “best practices” that could be adopted by EM for the development of its next Efficiency Plan (2023 – 2026), please provide a description of those best practices with supporting explanation and, if available, references.

Response:

a) I (Dr. Fitzpatrick) cannot speak, specifically, to how Efficiency Manitoba allocated its time and resources in the development of the plan.

Section 9 of the Efficiency Manitoba Act identifies thirteen pieces of information which must be included in the plans submitted to the Public Utilities Board. Subsection (h) (or seventh on the list), seeks “a description of the input that Efficiency Manitoba received from stakeholders — including the stakeholder committee established under section 27 — and the public in preparing the plan, and the process established for receiving the input.”

As a member of the public, I interpret this clause as a requirement to include these constituents in preparing the plan - not something which could be done if

time and money permit. As such, I am troubled by the limited interaction documented in the report.

Involving the public can be done using a variety of mechanisms and can be scaled so as to be commensurate with time or resources available (see also EM/Coalition I9-e). At a minimum, I would have expected Efficiency Manitoba to address the recommendation of the EEAG documented in the minutes, such as:

- Coordinating an approach with the leadership of First Nations (6/13)
- Indigenous representation in the design and delivery of programs (6/13)
- [Have/ implement] a plan to consult with the public/consumers (6/13), etc.[6]

In addition, as noted in my evidence, an issue tracking table would more systematically document the feedback, improve transparency in the process, and demonstrate that input was treated meaningfully.

c) There is a significant body of literature which focus on best practices in public engagement. Best practice principles includes[7]:

1. Make sure public can influence decision
2. Ensure integrity and accountability
3. Give fair notice, and adequate time to be involved
4. Be inclusive, to have broad participation
5. Have fair and open dialogue
6. Use multiple methods
7. Ensure the public has access to the information
8. Encourage 2 way dialogue

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6 See EEAG minutes and/or the response table in Dr. Fitzpatrick's evidence. Brackets represent the date of the meeting.

7 https://blogs.dal.ca/melaw/2018/02/23/meaningful-public-participation-in-the-proposed-canadian-impact-assessment-act-ciaa/; Diduck, A. P., Reed, M., & George, C. (2015). Participatory approaches to resource and environmental management. In B. Mitchell (Ed.), *Resource and environmental management in canada* (5th ed., pp. 142-170). Toronto, ON, Canada: Oxford University Press; Sinclair, A. J., & Diduck, A. P. (2016). Public participation in Canadian environmental assessment: Enduring challenges and future directions. In K. Hanna (Ed.), *Environmental impact assessment: Process and practice* (3rd edition ed., pp. 65-95). Toronto, ON, Canada: Oxford University Press; Stewart, J., & Sinclair, A. J. (2007). Meaningful public participation: Perspectives from participants, proponents and government. *Journal of Environmental Assessment Policy and Management, 9*(2), 1-23.;

9. Consider learning outcomes

(see also EM/Coalition I-9c).

Beyond the references associated with the above list, I would recommend:

Diduck, A. P., Reed, M., & George, C. (2015). Participatory approaches to resource and environmental management. In B. Mitchell (Ed.), Resource and environmental management in Canada (5th ed., pp. 142-170). Toronto, ON, Canada: Oxford University Press.

This is an accessible chapter which canvases important aspects surrounding public involvement, including the purpose of involvement, a list of different mechanisms for involvement, and best practices.

Fung, A. (2006). Varieties of participation in complex governance. Public Administration Review, 66(Supplement 1), 66-75.

This article provides a basic framework for considering the design of a participation program, including who participates, how they interact, and how decisions are made.

Baldwin, E., Rountree, V., & Jock, J. (2018). Distributed resources and distributed governance: Stakeholder participation in demand side management governance. Energy Research & Social Science, 39, 37-45.

Based on case studies involving public involvement in DSM programs, the authors identify six propositions related to the design of said programs.

My colleague, Dr. A. John Sinclair, compiled a small sample list of guidance material.[8] Without endorsement from either of us, his list includes:

1. American Petroleum Institute. 2014. Community Engagement Guidelines, ANSI/API Bulletin 100-3.
2. Asian Development Bank. 2012. Strengthening Participation for Development Results: An Asian Development Bank Guide to Participation.
3. Canadian Wind Energy Association. 2017. Wind Energy Development: Best Practices for Indigenous and Public Engagement.
4. Community Places. 2014. Community Planning Toolkit: Community Engagement (available at https://www.communityplanningtoolkit.org).
5. International Association for Public Participation Australasia. 2016. Quality Assurance Standard for Community and Stakeholder Engagement, IAP2 Australasia (available at www.iap2.org.au).
6. International Petroleum Industry Environmental Conservation Association. 2012. Indigenous Peoples and the Oil and Gas Industry: Context, Issues and Emerging Good Practice, IPECA

8 https://sencanada.ca/content/sen/committee/421/ENEV/Briefs/2019-04-28_C-69_FLWUP_Sinclair_Com_e.pdf

7. International Finance Corporation and Brunswick Group. 2012. Changing the Game: Communications and Sustainability in the Mining Industry.
8. International Finance Corporation. 2014. A Strategic Approach to Early Stakeholder Engagement: A Good Practice Handbook for Junior Companies in the Extractive Industries (available at www.commdev.org).
9. Organization of Economic Cooperation and Development. 2017. Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector.
10. United Kingdom Minister for Communities, National Standards for Community Engagement: Best practice guidance for engagement between communities and public agencies (available at http://www.scdc.org.uk/what/national-standards/).
11. United Kingdom National Consumer Council Deliberative. Public Engagement: Nine Principles 2011 (available at https://www.involve.org.uk/).
12. United Nations Educational, Scientific and Cultural Organisation. 2017. Communication and Stakeholder Engagement Guide.
13. United States Environmental Protection Agency. 2012. Public Participation Guide.
14. World Bank. 2018. Environmental and Social Framework - Environmental and Social Standards 10: Stakeholder Engagement and Information Disclosure Guidance Note.

PUB/COALITION - 16 Reference: Dr. Fitzpatrick Evidence

Preamble:

Dr. Fitzpatrick makes numerous suggestions about actions EM could undertake "going forward".

Request:

Please provide a detailed list of the actions that Dr. Fitzpatrick would recommend that EM undertake to address the concerns raised in her evidence.

Response:

Given the timeline, I am not sure what, if anything, Efficiency Manitoba can do to engage the public, including low income and hard-to-reach customers in the design of the 2020/23 Plan.

I would encourage Efficiency Manitoba to use the time between the PUB hearing, and the decision to develop and implement a public input strategy, and follow the advise of the EEAG with respect to how to do that in a meaningful way.

EEAG

Clearly establish and articulate the mandate, roles and responsibilities of committee members, particularly with respect to the public.

Outline a transparent appointment processes, responsibilities (including relationships with specific sectors), what constitutes quorum, and general time commitments.

Review compensation for members of the EEAG. At a minimum, representatives who are not representing the provincial/federal government, or industry should be compensated for time and expenses incurred.

Efficiency Manitoba

Seek professional advice and direction prior to implementing a public survey and/or public workshops and engagement sessions.

Develop, implement and publish an issues tracking table. This table should be updated on a monthly basis based on feedback received.

Provide more mechanisms for public contact, including a telephone number and a storefront.

Redevelop the stakeholder engagement model to include missing members of the policy community, including First Nations, Metis, the public, low income and hard to reach customers. This model should become prospective – setting out what will be done in preparation of the three-year plan.

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PUB INFORMATION REQUESTS OF CONSUMERS COALITION

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PUB/COALITION - 17 Reference: PUB/EM I-28; PUB/EM I-39R

Preamble:

On December 3, 2019, EM revised the electric codes and standards savings in PUB/EM-39R, affecting the savings forecasted by the Plan. The Plan no longer appears to meet the legislated savings targets.

In PUB/EM-28, EM advises that: "The revised electric energy savings in the 3-year Plan represent an average of 1.46% of the electric load. Efficiency Manitoba is confident that the flexibility of the Plan will allow for modifications to the offerings to enable the achievement of the 1.5% target."

Request:

Provide Mr. Harper's view whether the Plan has the flexibility to achieve the 1.5% electric savings target, as claimed by EM. Provide any concerns or reservations Mr. Harper has about EM meeting the 1.5% target with the proposed Plan, considering EM forecasts electric savings less than 1.5%.

Response:

The issues addressed by Mr. Harper are set out on page 7 of his Evidence (dated December 13, 2019). These issues did not include an assessment of either the reasonableness of the projected savings in Efficiency Manitoba's 3-year plan or Efficiency Manitoba's overall ability to meet its savings targets. As a result, Mr. Harper is not in a position to directly respond to the question posed. However, Mr. Harper would note that the fact that: i) the electric portfolio PACT results are considerably greater than 1.0 and ii) Efficiency Manitoba made refinements to the preliminary portfolio in order to reduce the energy savings so as to align them with the target (see PUB/EM I-4) would suggest that there is flexibility in the Plan to achieve higher electric energy savings.

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PUB/COALITION - 18 Reference: Harper Evidence p.16; Manitoba Hydro 2018 Electric Load Forecast (PUB/EM-45)

Preamble:

In its 2018 electric load forecast at page 7 of 88, Manitoba Hydro states: "The 2018 electric load forecast reflects future DSM savings associated with existing Provincial building codes and improved equipment efficiency standards and regulations (Codes and Standards). This is the only effect of DSM initiatives that is specifically accounted for within the forecast. DSM savings arising from future program-based offerings incremental to the above mentioned Codes and Standards are not reflected in this forecast. They are accounted for separately in Manitoba Hydro's DSM Plan and Power Resource Plan."

Harper states: "…the forecasts in the 2016/17 Power Smart Plan - 15-year Supplement for the years beyond 2017/18 are likely to include additional impacts attributable to new Codes and Standards anticipated to come into effect post 2017/18 on new building and appliances added in those years. These effects were not included in the 2018 Load Forecast and therefore do not need to be "added back".

Request:

a) Does the clarification in the Preamble from the electric load forecast alter Mr. Harper's observation?

b) Does Mr. Harper agree that when EM deducts the entire 2019/20 DSM plan savings from the forecast for 2019/20 in the 2018 Electric Load Forecast, EM is also deducting the codes and standards savings which are included in the 2019/20 DSM plan? If so, should the codes and standards savings be added back, since Manitoba Hydro has already deducted them from the load forecast?

Response:

a) No. The clarification provided in the Preamble is acknowledged by Mr. Harper on page 14 of his Evidence and was taken into account in the preparation of his comments.

b) Yes, Mr. Harper agrees that when EM deducts the entire 2019/20 DSM plan savings from the forecast for 2019/20 in the 2018 Electric Load Forecast, EM is also deducting the codes and standards savings which are included in the 2019/20 DSM Plan (i.e., the impact of codes and standards on incremental load added in 2019/20). Mr. Harper is of the view that it is necessary "add back" the Cumulative 2018 Codes and Standards effect (i.e., the impact of Codes and Standards introduced prior to 2018/19) as these impacts are included in both the 2018 Load Forecast and Efficiency Manitoba's planned savings from Codes and Standards. What is not clear to Mr. Harper is whether the forecast Codes and Standards savings in the 2016/17 Power Smart Plan - 15-year Supplement for the years beyond 2017/18 which were used to calculate the "add back" also include the impact of new Codes and Standards expected to be introduced after 2017/18 and therefore not recognized in the 2018 Load Forecast. Hence Mr. Harper's conclusion that additional discovery was required.

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PUB/COALITION - 19 Reference: Harper Evidence p.12-16; PUB/EM I-45

Request:

a) Prepare a table showing the calculations Mr. Harper proposes be used to determine the electric consumption baseline to be used for each year of the Plan, in a similar format to PUB/EM I-45. The calculations should reflect Mr. Harper's suggested methodology for calculating the baseline, including: use of metered sales, excluding construction power and station service, excluding unmetered loads, inclusion of an adjustment for 2018/19 DSM plan savings, and any other adjustments Mr. Harper included in his evidence and considers appropriate.

b) Should electricity sales made in the Diesel Zone communities be included in the baseline?

Response:

a) As noted in Mr. Harper's Evidence (page 13) the most important point with respect to establishing the targets is that the methodology used be clearly understood and non-controversial. In Mr. Harper's view this is best achieved by following the definitions as set out in the Act.
The following table sets out the calculation of the reference load for each year based on Mr. Harper's understanding of the definition of electrical energy consumption as set out in the Act. The Table also includes the resulting savings targets for each year.

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Table: PUB/Coalition 19 a) -1

Determination of Reference Load Forecast (GWh)

Plan Year	2020/21	2021/22	2022/23
Previous Year's General Consumer Forecast Sales[1]	22,917	23,199	23,420
Less - Unmetered Sales[2]	91	91	89
Previous Year's Forecast Metered Sales	22,826	23,108	23,331
Less 2018/19 DSM[3] (@meter)	315.5	315.5	315.5
Less 2019/20 DSM[4] (@ meter)	310.6	310.6	310.6
Less EM Plan Cumulative Savings[5] (@ meter)	0	331.1	674.1
Plus 2017/18 Cumulative Codes and Standards[6] (@ meter)	140	196	244
Reference Electric Load	22,340	22,347	22,275
Target Savings (@1.5%)	335	335	334

Notes:

1) Page 7 of Manitoba Hydro's 2018 Load Forecast (PUB/EM I-45)

2) Total of Residential-FRWH, General Service-FRWH and Lighting - same page

3) Based on Manitoba Hydro's 2018/19 DSM Plan (355 GWh) adjusted for losses. For purposes of the adjustment it is assumed that savings attribued to Load Displacment Generation, the Industrial Performance Optimization Program and the Commercial Custom Measures Program (totalling 129.5 GWh) are transmisson-connected and a loss adjustment of 110% was applied. For the balance of the savings a loss adjustment of 114% was applied.

4) Based on Manitoba Hydro's 2019/20 DSM Plan (350 GWh) adjusted for losses. For purposes of the adjustment it is assumed that savings attributed to Load Displacment Generation, the Industrial Performance Optimization Program and the Commercial Custom Measures Program (totalling 111.6 GWh) are transmisson-connected and a loss adjustment of 110% was applied. For the balance of the savings a loss adjustment of 114% was applied.

5) Based on EM's Plan. 2020/21 adjustment based on 2019/20 Plan results (373 GWh) with savings attributable to Load Displacement Generation and Customer Programs (123.2 GWh) being transmission-connected and the balance distribution-connected. For 2022/23 the adjustment is based on the cumulative impact of the 2019/20 and 2020/21 plannd savings (759 GWh per PUB/EM I-39R) with 261.6 GWh being transmission-connected.

6) Based on the Codes and Standards savings at the meter per the 2016/17 Power Smart Plan - 15-Year Supplement assuming no further adjustments are required.

b) Yes electricity sales made in Diesel communities should be included in the "baseline". These sales are metered and sold to customers in Manitoba and therefore meet the definition of electrical consumption per the Act.

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PUB/COALITION - 20 Reference: Harper Evidence p.34, 35 (Updated Evidence pages 47-48)

Request:

Provide a table showing the allocation percentages and allocated dollars of Enabling Strategies and Corporate Overhead to the electric and gas portfolios based on the methods identified in Mr. Harper's evidence including: a) EM's proposed method, b) allocation by benefits, c) allocation by program costs, and d) allocation by program staff costs.

Response:

As noted in Mr. Harper's Evidence (pages 46-47) not all of the Enabling Strategies costs are allocated between the two portfolios. A small portion is directly assigned. In order to respond to the question it is first necessary to identify that portion of the Enabling Strategies costs that are directly assigned. The following table from Coalition/EM I-44 shows Efficiency Manitoba's allocation of Enabling Strategies costs and those areas where the allocation differs from standard 75/25 split.

			Annual Average			Allocation	
Attachment 3 Cost Categories	Appendix A - Section A9 Categories	A9 Sub Categories	ELECTRIC BUDGET	NATURAL GAS BUDGET	OVERALL BUDGET	Electric	Natural Gas
Enabling Strategies: Program Support and Education	Engagement Initiatives	Program Support & Education (Efficiency Manitoba Staff)	$483,000	$147,000	$630,000	77%	23%
		Emerging Technologies Support (Efficiency Manitoba Staff)	$115,000	$0	$115,000	100%	0%
		Contracted program support services	$290,000	$60,000	$350,000	83%	17%
		Program support expenses (energy advocates, travel, curriculums)	$259,000	$86,000	$345,000	75%	25%
		Creative design support, materials and supplies.	$172,000	$57,000	$229,000	75%	25%
	SUBTOTAL (Attachment 3 - Enabling Strategies: Program Support & Education)		**$1,319,000**	**$350,000**	**$1,669,000**	**79%**	**21%**
Enabling Strategies: Innovation, Codes & Standards, Evaluation	Engagement Initiatives	Business Communications (Efficiency Manitoba Staff)	$145,000	$48,000	$193,000	75%	25%
		Business Communications	$337,000	$112,000	$449,000	75%	25%
		CRM/DSM and enterprise systems	$414,000	$138,000	$552,000	75%	25%
	Emerging Technologies and Codes & Standards	Codes & Standards (Efficiency Manitoba Staff)	$16,000	$5,000	$21,000	75%	25%
		Evaluation & Planning (Efficiency Manitoba Staff)	$418,000	$139,000	$557,000	75%	25%
		Innovation / Research & Development (Market Potential Study)	$535,000	$178,000	$713,000	75%	25%
		Codes & Standards	$366,000	$122,000	$488,000	75%	25%
		Contracted program support services	$1,213,000	$406,000	$1,619,000	75%	25%
	Other (Not specifically referenced in A9)	Contracted business support services	$460,000	$153,000	$613,000	75%	25%
		Legal / business consultants	$857,000	$286,000	$1,142,000	75%	25%
		Professional development, memberships and training	$179,000	$60,000	$239,000	75%	25%
	SUBTOTAL (Enabling Strategies: Innovation, Codes & Standards, Evaluation)		**$4,940,000**	**$1,647,000**	**$6,586,000**	**75%**	**25%**
		SUBTOTAL Efficiency Manitoba Staff (See Table 4.7, Plan, p.115 of 591)	$1,177,000	$339,000	$1,516,000	78%	22%
		SUBTOTAL Private Sector (See Table 4.7, Plan, p.115 of 591)	$5,082,000	$1,658,000	$6,739,000	75%	25%
		TOTAL	$6,259,000	$1,997,000	$8,255,000	76%	24%

Note. Currency is expressed in nominal dollars. Totals may not add up exactly due to rounding.

Using the 79/21 split for $1,669,000 in cost for Enabling Strategies: Program Support and Education it is estimated that $269,000 is directly assigned to the electric portfolio leaving $7,986,000 in Enabling Strategies costs plus $2,921,000 in Corporate Overheads - for a total of $10,907,000 to be allocated. The following Tables set out the overall allocation of Enabling Strategies and Corporate Overheads (percentage and dollars) based on: a) EM's proposed method, b) allocation by program costs, and c) allocation by program staff costs.

Table: PUB/COALITION20-1 A

ALLOCATION OF ENABLING STRATEGIES AND CORPORATE OVERHEADS
EFFICIENCY MANITOBA'S PROPOSED METHOD
(Average Annual Costs)

	Electricity		Natural Gas		Total	
	%	$ '000s	%	$ '000s	%	$ '000s
Directly Assigned	100%	269	0%	-	100%	269
Allocated	75%	8,180	25%	2,727	100%	10,907
Total	75.6%	8,449	24.4%	2,727	100%	11,176

Table: PUB/COALITION20-1 B

ALLOCATION OF ENABLING STRATEGIES AND CORPORATE OVERHEADS
BASED ON PROGRAM COSTS
(Average Annual Costs)

	Electricity		Natural Gas		Total	
	%	$ '000s	%	$ '000s	%	$ '000s
Directly Assigned	100%	269	0%	-	100%	269
Allocated	68.9%	7,515	31.1%	3,392	100%	10,907
Total	69.6%	7,784	30.4%	3,392	100%	11,176

Table: PUB/COALITION20-1 C

ALLOCATION OF ENABLING STRATEGIES AND CORPORATE OVERHEADS
BASED ON PROGRAM COSTS
(Average Annual Costs)

	Electricity		Natural Gas		Total	
	%	$ '000s	%	$ '000s	%	$ '000s
Directly Assigned	100%	269	0%	-	100%	269
Allocated	69.8%	7,613	30.2%	3,294	100%	10,907
Total	70.5%	7,882	29.5%	3,294	100%	11,176

PUB/COALITION - 21 Reference: Harper Evidence p.27 (Updated Evidence, page 36); Centra 2019/20 GRA Compliance Filing Schedule 6.8.8; Efficiency Plan p.107 of 591

http://www.pubmanitoba.ca/v1/proceedings-decisions/appl-current/pubs/2019-centra-gra/centra-public-redacted-compliance-filing-161-19.pdf

Preamble:

Centra's cost of capital, as shown in Schedule 6.8.8 of the referenced compliance filing from the 2019/20 GRA, is 5.78%, which at this point in time is nearly the same as Manitoba Hydro's cost of capital as determined by Mr. Harper.

Funding for the gas programs in the Plan will come from Centra.

Request:

a) Since Centra's cost of capital may differ from Manitoba Hydro's in the future, in Mr. Harper's view should Centra's specific discount rate be used for gas PACT evaluation and Manitoba Hydro's specific discount rate be used for electric PACT evaluation?

b) If Mr. Harper recommends using the same discount rate for both gas and electric PACT evaluations, please provide the recommended method for determining the discount rate to be used.

Response:

a) As noted in the Preamble there is currently a minimal difference between Centra's cost of capital and Manitoba Hydro's cost of capital. Indeed the difference is within the range of uncertainty Mr. Harper's Evidence notes (pages 36-37) exists regarding Manitoba Hydro's cost of capital and addressed in Mr. Harper's conclusion (page 38) that "In considering the Plan the PUB will need to take into account the sensitivity of the cost-

effectiveness of the Plan to the discount rate assumptions made in calculating the PACT results."

However, to be responsive to the question, it is Mr. Harper's understanding that Centra's cost of capital is based on its embedded cost of debt and therefore would not be appropriate to use for purposes of evaluating future DSM expenditures. In view of this, it is Mr. Harper's view that Manitoba Hydro's cost of capital should be used and along with a consideration of sensitivity analyses results.

b) See the response to part (a).

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PUB INFORMATION REQUESTS OF CONSUMERS COALITION

DECEMBER 18, 2019

PART 2 (Update Evidence)

PUB/COALITION - 22 Reference: Harper Evidence Updated, p. 24-26

Preamble:

"The three criteria used by Efficiency Manitoba can be found in the above list. However, there are also a wide range of other factors that could have been included as evaluation criteria.

…

Based on this response, it would appear that customer rate and bill impacts are an after the fact consideration. Also, based on the question, the same presumably applies to other potential factors Efficiency Manitoba could have considered in its evaluation of the portfolios.

…

Overall, Efficiency Manitoba's choice of evaluation criteria is not consistent with what one would expect from an integrated resource planning process."

Request:

a) Of the factors listed on pages 23 – 24 of Mr. Harper's evidence, please identify all factors that he considers appropriate to include as factors considered in screening individual DSM programs and explain whether each should be included in a quantitative or a qualitative consideration.

b) Of the factors listed on pages 23 – 24 of Mr. Harper's evidence, please identify all factors that he considers appropriate to include as factors considered in the multi-criteria of alternate efficiency plans.

Response:

a) At page 21 of his Evidence Mr. Harper notes that Efficiency Manitoba uses various evaluation criteria at different stages in the development of

its Plan. The criteria Efficiency Manitoba uses for purposes of screening individual DSM programs in order to determine whether they should be considered for inclusion in the Plan are set out on pages 21-22 of Mr. Harper's Evidence. Some of the criteria (e.g., approved for use in Canada and meets municipal permitting requirements) can be quantified in terms of yes or no. However, many of the criteria are more subjective and require a qualitative consideration. On page 23 of his Evidence, Mr. Harper concludes that the criteria used by Efficiency Manitoba for this initial high level screen are reasonable.

b) The various factors listed on pages 23-24 of Evidence are ones that could be considered in establishing the evaluation criteria to be used in the multi-criteria analyses for purposes of assessing alternative portfolios.

Ideally, the factors to be considered in a multi-criteria analysis of alternative energy plans (i.e. portfolios) would be determined based on input from the affected stakeholders per page 26 of Mr. Harper's Evidence. However, to be responsive to the question and recognizing the need for manageable list of criteria, in Mr. Harper's view key evaluation criteria would include:

- Energy Savings Achieved – kWh / meters cubed
- Cost Effectiveness – in this case based on the PACT in accordance with the Regulation.
- Customer Rate Impacts – using a measure such as the LRI.
- Overall Economic Benefit to Manitoba – at this stage, perhaps using a measure such as the Total Resource Cost test.
- Environmental Impacts – using a measure such as GHG reductions.

- Equity Impacts – considering availability to all customer segments, particularly “hard to reach” segments.

PUB/COALITION - 23 Reference: Harper Evidence Updated, p. 25-26

Preamble:

"Rather than ignoring these other considerations during the decision making process and simply reporting on them afterwards, it is important that all relevant considerations be included in the decision making analysis. There may well be certain criteria such as the savings targets or cost-effectiveness that must be met. However, the fact that there are a range of options available means there is likely more than one way of meeting the "mandatory" objectives. The principles of integrated resource planning require that the choices involved be clearly set out and assessed against an appropriate set of evaluation criteria in a transparent and objective manner."

Request:

In Mr. Harper's view, is it sufficient that "the choices involved be clearly set out and assessed against an appropriate set of evaluation criteria in a transparent and objective manner" for the next Efficiency Plan (i.e., 2023-2026) or should Efficiency Manitoba be required to refile the 2020-2023 Plan after completing the additional analysis.

Response:

The Act (Section 12 (4)) states that: "Efficiency Manitoba must implement an efficiency plan as approved by the minister." Given that the commencement date for the 2020-2023 Plan is April 1, 2020 and that the PUB's recommendations precede the minister's approval Mr. Harper does not consider requiring Efficiency Manitoba to refile the 2020-2023 Plan to be a practical alternative. As a consequence, it is Mr. Harper view that one of the PUB's recommendations should be that this issue be addressed in preparation of the next Efficiency Plan.

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PUB INFORMATION REQUESTS OF CONSUMERS COALITION

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PUB/COALITION - 24 Reference: Harper Evidence Updated, p. 27

Preamble:

"The lack of documentation and a central repository raises concerns regarding both the transparency and consistency in respect to how the options will be considered. In Efficiency Manitoba's case these concerns are compounded by the fact that the assessment of the options and development of programs was undertaken by more than one program design team which makes the need for information on potential options to be collected/recorded on a consistent basis even more critical."

Request:

In Mr. Harper's view, is it sufficient that a central repository be established for the next Efficiency Plan (i.e., 2023-2026) or should Efficiency Manitoba be required to refile the 2020-2023 Plan after completing the additional analysis?

Response:

Please see the response to PUB/Coalition 23.

PUB/COALITION - 25 Reference: Harper Evidence Updated, p. 49, 50

Preamble:

"Overall, there is lack of clarity and transparency in terms of how the target savings values have been determined and whether they have been determined appropriately.

The criteria used should extend beyond the level of budget and the mandatory considerations related to the energy savings targets and cost-effectiveness."

Request:

a) Explain why Efficiency Manitoba should not simply adopt the targets as set out in section 7 of the Efficiency Manitoba Act.

b) Is it Mr. Harper's view that the targets (Efficiency Manitoba Act s. 7) and cost effectiveness criteria as defined in the Regulation (Efficiency Manitoba Regulation, s. 12) should be viewed as minimum criteria and if so, what considerations would be relevant to the PUB determining whether higher targets or additional cost effectiveness criteria should be considered?

Response:

a) There are practical reasons why Efficiency Manitoba cannot simply adopt the targets as set out in section 7 of the Efficiency Manitoba Act. These include:
   - The fact that neither the consumption of electrical energy nor the consumption of natural gas in the relevant preceding years is known at the time the Energy Plan is being prepared.
   - Some of the consumption information required is commercially sensitive and not publically available.

b) It is Mr. Harper's understanding that the only criteria that can be viewed as "minimum criteria" are the savings targets. While the Regulation states that the PUB must "consider" cost effectiveness it does not state that the portfolio must be cost effective. This being said, clearly cost effectiveness is an important consideration. See the response to PUB/Coalition 22 b). In Mr. Harper's view cost-effectiveness (as defined by the Regulation) would be the primary consideration relevant to the PUB determining whether higher targets should be established – consistent with Section 4 (1) (b) of the *Act*.

It is unclear to Mr. Harper what is meant by "additional cost effectiveness criteria" as per the Efficiency Manitoba Regulation "cost effectiveness" is defined per the PACT. As noted in Daymark/EM 26, other jurisdictions use other definitions of cost effectiveness and in response to PUB/EM 11 a) Efficiency Manitoba has characterized the Participant Cost Test, the Total Resource Cost Test and Rate Impact Measure as measures of "cost effectiveness". In Mr. Harper's view, for any of these "additional cost effectiveness criteria" to be considered in PUB's review of Efficiency Manitoba's Plan they would have to align with one of the other evaluation criteria (e.g., those set out in response to PUB/Coalition 22 b)) established as being relevant to the review.