

VERSION NOTES FROM ADVISORY GROUP FEEDBACK

- Changes to the version presented September 21, 2017 based on Advisory Group feedback are described below
- All slide changes are marked with **CHANGES TO SLIDE**

| Slide # | Advisory Group Feedback | Action |
|---------------------|--|---|
| 10, 12 | Break out central services budget on charts. Add a note that acquisition costs may change due recent changes to the framework, that final results will not be known until after the end of the framework and that forecasts have a higher level of uncertainty near the end of the framework. Change charts to read “total” spending. Update charts with an adjustment factor to reflect uncertainty of forecasts. | Slides updated to reflect Advisory Group comments |
| 12 | Separate BMG from retrofit in charts. Provide net-to-gross conversion methodology. | Slide updated to reflect Advisory Group comments |
| 15, 16 | Add a description of what cost and savings are included in the acquisition cost analysis. Refer to acquisition costs as “resource acquisition costs” | Slides updated to reflect Advisory Group comments |
| 18 | Improve the clarity of the first bullet point | Slide updated to reflect Advisory Group comments |
| 19 | Add a note that all LDCs achieved a PAC of equal or greater than 1 | Slide updated to reflect Advisory Group comments |
| 19, 42 – 44, 56, 57 | IESO updates to cost effectiveness values, where available | Slides updated with updated IESO data |

VERSION NOTES FROM ADVISORY GROUP FEEDBACK

- Changes to the version presented September 21, 2017 based on Advisory Group feedback are described below
- All new slides are marked with **NEW SLIDE**

| Slide # | Advisory Group Feedback | Action |
|---------|---|---|
| 11 | Extrapolate LDC forecasts to include all LDCs | A new slide was added with an extrapolated forecast |
| 17 | Add forecasted acquisition costs based on the LDC forecast data and IESO pipeline data | A new slide was added with an acquisition cost forecast and qualitative description of factors that could influence acquisition costs |
| | Discussion on factors that influence acquisition costs | |
| 54 | Would be helpful to see how net-to-gross ratios have changed over time | A new slide was added with the net-to-gross ratios by program for 2015 and 2016 |
| 55 | Include a detailed description of cost effectiveness for those unfamiliar with the metrics used for CDM | A new slide was added with a description of TRC and PAC |
| 72, 73 | Add a description of what is included in “pipeline” and “potential pipeline” forecasts | New slides were added to the appendix with descriptions |



CONSERVATION FRAMEWORK MID-TERM REVIEW

BUDGETS, TARGETS, COST
EFFECTIVENESS – PHASE 2


SEPTEMBER 21, 2017

DISCLAIMER

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TABLE OF CONTENTS

| | |
|---|----|
| 1. Discussion Slides..... | 6 |
| 2. Introduction..... | 29 |
| I. Policy Context | |
| II. Introduction and Methodology | |
| III. Scorecard and Snapshot | |
| 3. Current State | 48 |
| I. Conservation First Framework | |
| II. Industrial Accelerator Program | |
| III. Alternate Approaches | |
| 4. Summary Observations and Next Steps..... | 65 |
| Appendix A: Retrofit and BMG application mapping..... | 70 |
| Appendix B: Glossary..... | 72 |



SECTION 1:
DISCUSSION
SLIDES

PHASED APPROACH TO BUDGETS, TARGETS, COST EFFECTIVENESS

This current state summary for the **Budgets, Targets, and Cost Effectiveness** topic is segmented into two phases. The table below outlines a description of the information presented during each phase. **The current state summary reflects verified and unverified results available as of early August, 2017 and CDM Plans as of June, 2017.** All results presented are net and expressed at the end-user level.

| Phase | Information Presented |
|----------------------|---|
| Phase I (August) | <ul style="list-style-type: none"> • Focus on Conservation First Framework, including a review of: <ul style="list-style-type: none"> • Current Province-wide progress (budgets and targets) • Guidelines and documentation supporting budget and target setting methodologies, target exchange, and performance incentives • Discussion of potential options for target and budget reallocation and target metrics |
| Phase II (September) | <ul style="list-style-type: none"> • Refresh of province-wide progress • Review: <ul style="list-style-type: none"> • Detailed/Granular Conservation First Framework results • Industrial Accelerator Program results • Cost effectiveness results • Industry benchmarking against verified results • Scorecard for budgets, targets, cost effectiveness • Discussion of the impact of alternate approaches on cost-effectiveness • Discussion of methodologies to move away from traditional incentives to customers |

FOCUS AREAS AND KEY QUESTIONS

This current state summary will analyze available information and begin to explore the issues and opportunities of the key questions and focus areas listed below pertaining to the **Budgets, Targets, and Cost Effectiveness** topic.

Key Questions

Phase I

- Are the **metrics that measure success aligned** with goals and policy objectives?
- Should **targets** be adjusted given framework goals and policy objectives? If so, how? What about beyond 2020?
- Should **budgets** be adjusted given framework goals and policy objectives? If so, how? What about beyond 2020?

Phase II

- Do the detailed results provide any **additional insights** that might change how to **adjust targets or budgets**?
- What are some alternate approaches and what could be the impact on **cost effectiveness**? Are these approaches appropriate for the second half of the framework? Beyond 2020?
- What are some methodologies to **reduce reliance on incentives**? Are these methodologies appropriate for the second half of the framework? Beyond 2020?

Focus Areas

I. Conservation First Framework:

- Mechanism to support reallocation
- Options to enable target exchange amongst LDCs
- Funding mechanism review
- Pay-for-Performance (P4P) obstacles
- Budget/target allocation across segments
- Options for competitive procurement

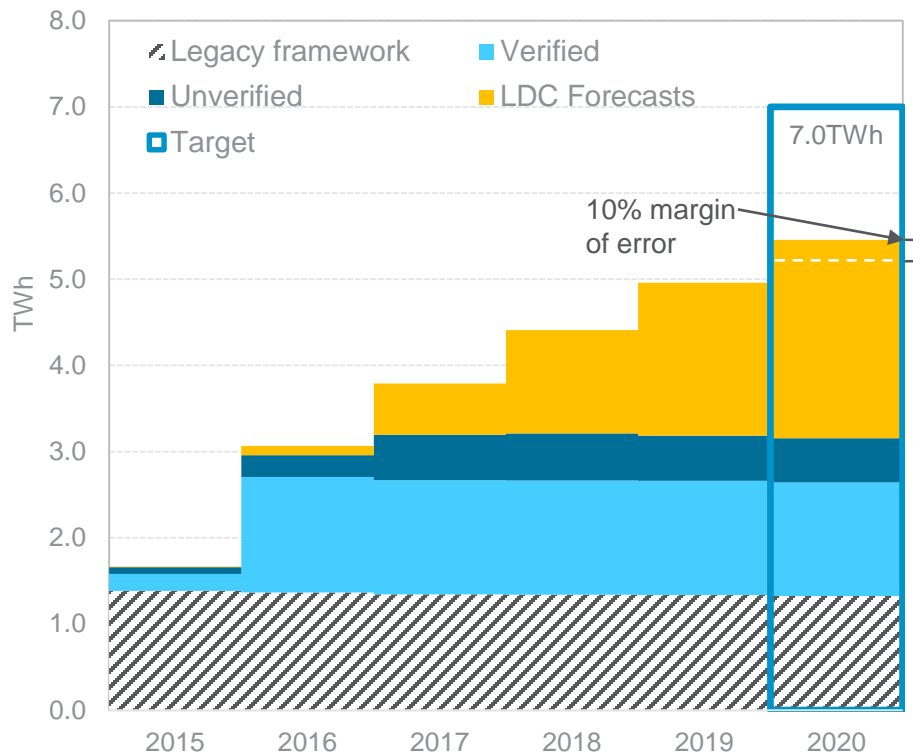
II. Industrial Accelerator Program:

- Provincial adjustments, options for adjustment

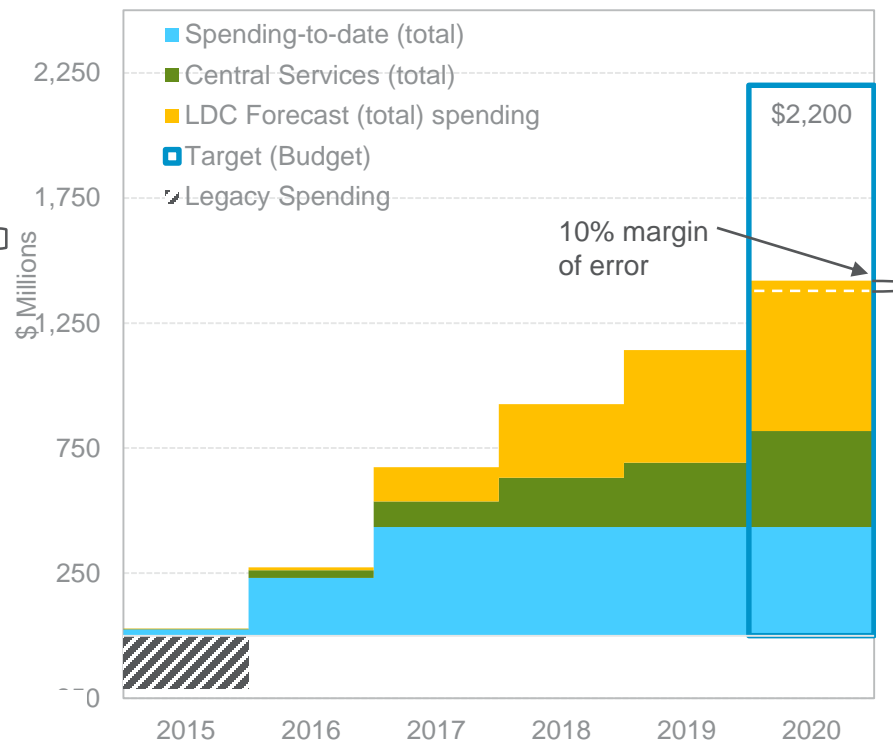
REFRESH OF **PROVINCE- WIDE PROGRESS**

LDC FORECASTS FROM 5 LDCS REPRESENTING 48 PERCENT OF THE CFF TARGET ANTICIPATE STRONG PROGRESS TOWARDS TARGETS

Net Annual Energy Savings (TWh)

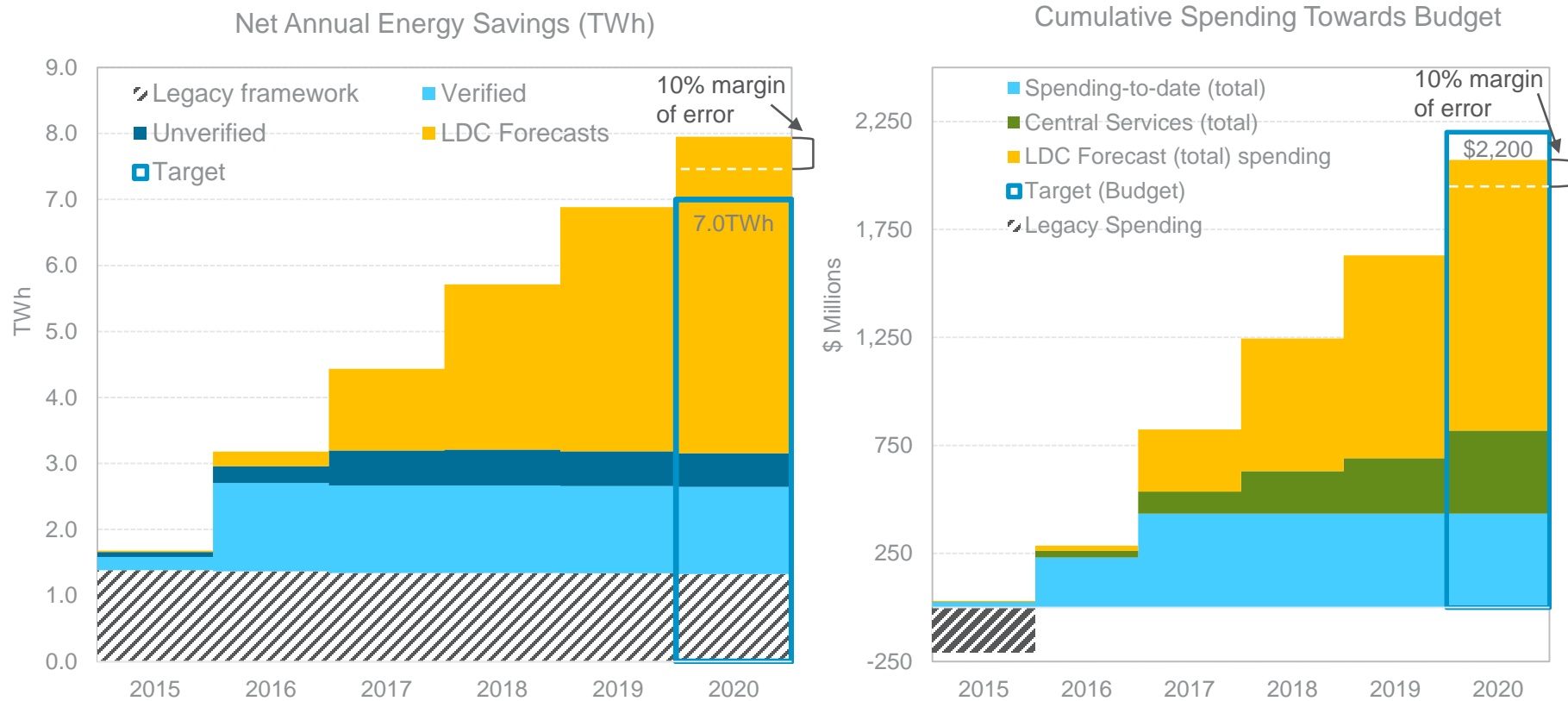


Cumulative Spending Towards Budget



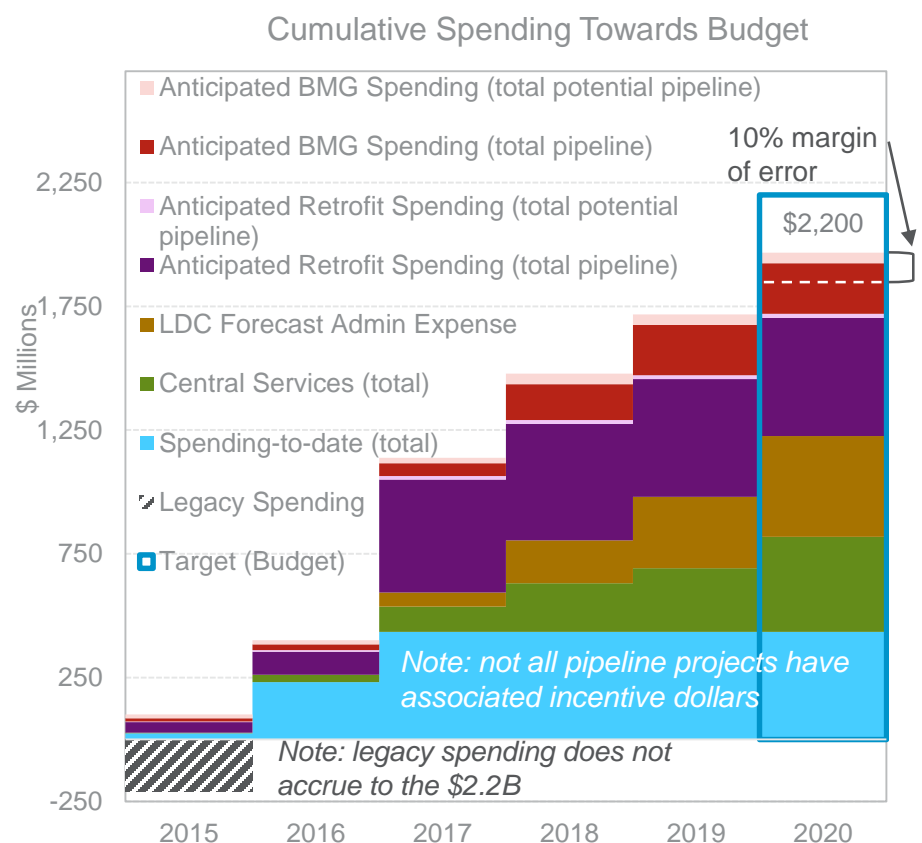
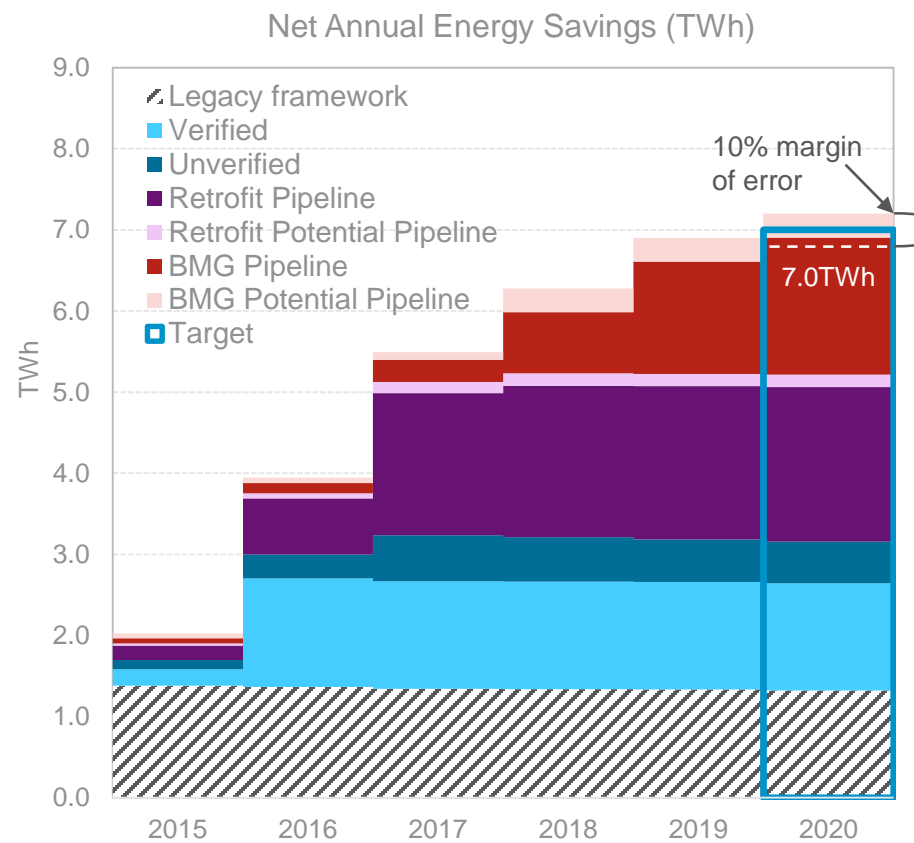
Note: Legacy framework includes savings achieved in 2015 from the 2011 to 2014 Framework towards CFF targets, but does not consider funding associated with those savings; Unverified results are typically lagged at least 6 months; 2017 unverified progress only represents 6 months of data. LDC forecasts include data from 5 LDCs that make up approximately 48% of the CFF target. Legacy spending does not accrue towards CFF budget. Forecasts have a higher level of uncertainty near the end of the framework. Final spending and savings results will not be known until well after the conclusion of the framework. Recent changes to the framework may increase acquisition cost forecasts.

LDC FORECASTS EXTRAPOLATED TO REPRESENT ALL LDCS ANTICIPATE EXCEEDING TARGET UNDER BUDGET



Note: Legacy framework includes savings achieved in 2015 from the 2011 to 2014 Framework towards CFF targets, but does not consider funding associated with those savings; Unverified results are typically lagged at least 6 months; 2017 unverified progress only represents 6 months of data LDC forecasts include data from 5 LDCs that make up approximately 48% of the CFF target, which has been extrapolated to represent all LDCs. Legacy spending does not accrue towards CFF budget. Forecasts have a higher level of uncertainty near the end of the framework. Final spending and savings results will not be known until well after the conclusion of the framework. Recent changes to the framework may increase acquisition cost forecasts

RETROFIT AND BEHIND THE METER GENERATION PIPELINE DATA ANTICIPATES STRONG PROGRESS TOWARDS TARGETS

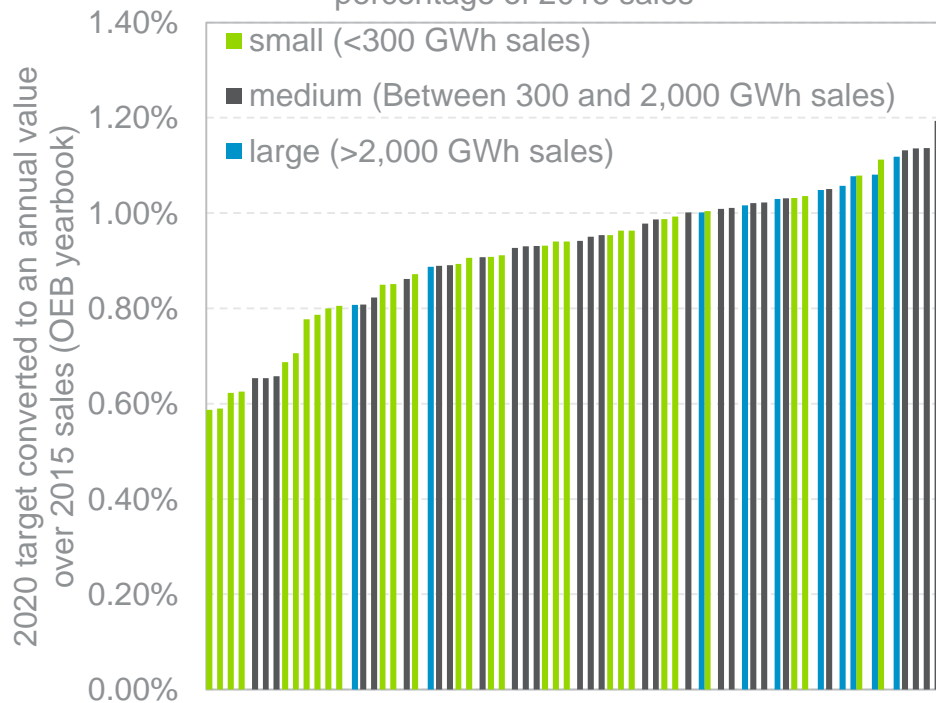


Note: Legacy framework includes savings achieved in 2015 from the 2011 to 2014 Framework towards CFF targets, but does not consider funding associated with those savings; Unverified results are typically lagged at least 6 months; 2017 unverified progress only represents 6 months of data Legacy spending does not accrue towards CFF budget. Forecasts have a higher level of uncertainty near the end of the framework. Final spending and savings results will not be known until well after the conclusion of the framework. Mapping of retrofit and BMG application status is provided in the appendix. Net to gross values are taken from 2016 verified results by program. Verified NTG was used for 2015 and 2016, and forecasted NTG ratios were used for all other years. Recent changes to the framework may increase acquisition cost forecasts

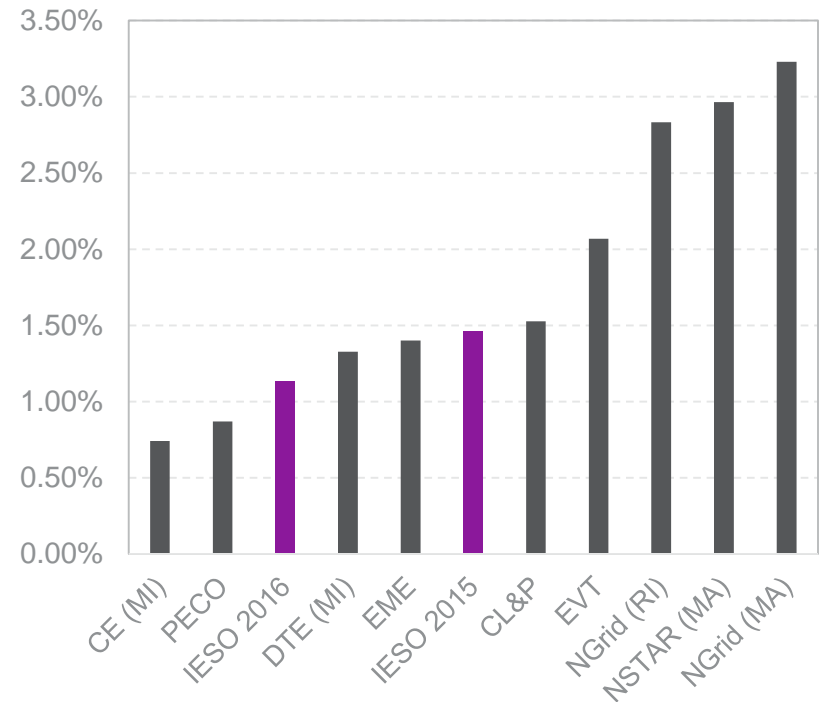
TARGETS AS A PERCENT OF SALES VARY FROM 0.6 TO 1.2 PERCENT

- Each LDCs' 2020 target was divided by six to develop an annual value, the annual value was divided by the 2015 sales from the OEB yearbook
- Other jurisdictions investigated range from 0.7 percent of sales to over 3 percent of sales
- Provincially, 1.5 and 1.1 percent of sales was achieved in 2015 and 2016, respectively

Average annual LDC targets expressed as a percentage of 2015 sales



Energy Savings as a % of Sales

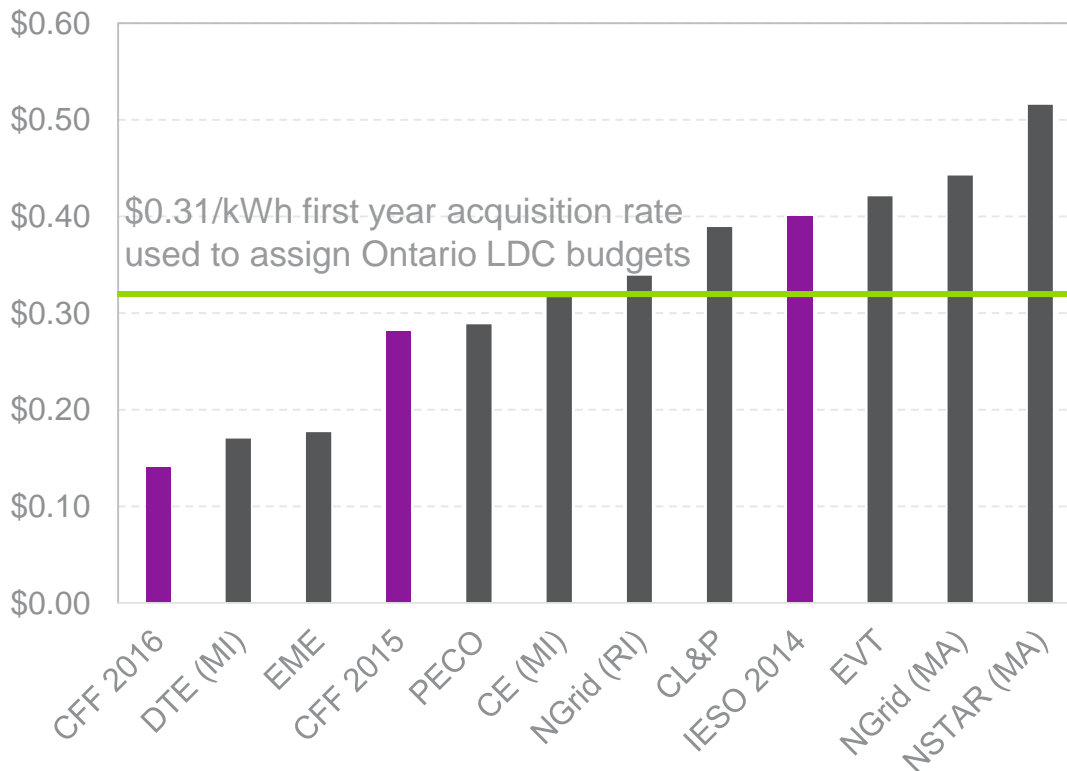


DO THE **DETAILED RESULTS**
PROVIDE ANY ADDITIONAL
INSIGHTS THAT MIGHT
CHANGE HOW TO ADJUST
TARGETS OR BUDGETS?

2016 LDC FIRST YEAR ACQUISITION COSTS ARE THE LOWEST ACROSS THE JURISDICTIONS ASSESSED FOR THE RESIDENTIAL SECTOR

- First year acquisition costs for the portfolio of residential programs is lower than many of the other jurisdictions assessed as part of a benchmarking assessment
- Average 2011 to 2014 framework first year acquisition costs for residential programs were between \$0.19/kWh and \$0.53/kWh

LDC First Year Resource Acquisition Costs (\$/kWh)



LDC first year resource acquisition costs by major residential program (\$/kWh)

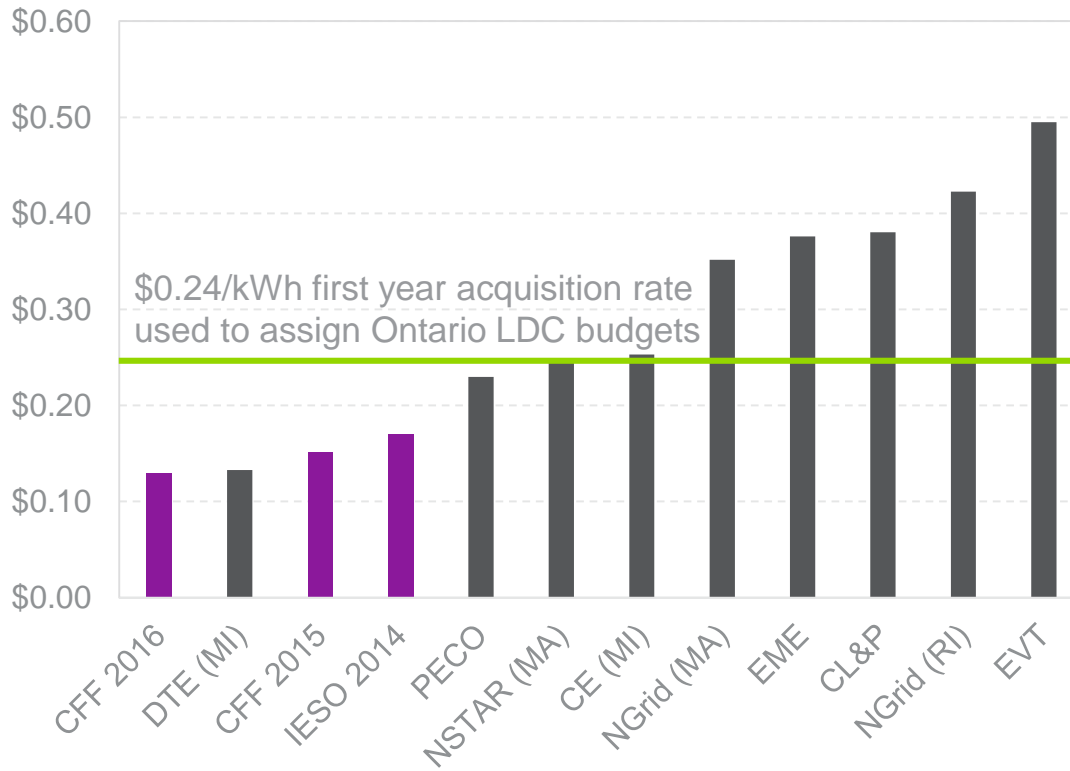
| Program | 2011-14 | 2015 | 2016 |
|----------------------------|---------|--------|--------|
| Portfolio (LDC costs only) | \$0.40 | \$0.28 | \$0.14 |
| Heating & Cooling | \$0.73 | \$0.61 | \$0.47 |
| Coupons | \$0.15 | \$0.06 | \$0.08 |
| Other Residential | \$0.42 | \$0.18 | \$0.83 |

Other Residential: Residential New Construction (2016: 0.72), Home Assistance Program (2016: 0.87). 2015 acquisition costs include legacy and verified savings and costs. 2016 acquisition costs include verified and unverified savings and costs.

2016 LDC FIRST YEAR ACQUISITION COSTS ARE THE LOWEST ACROSS THE JURISDICTIONS ASSESSED FOR THE C&I SECTOR

- First year acquisition costs for the portfolio of commercial and industrial programs is lower than many of the other jurisdictions assessed as part of a benchmarking assessment
- Average 2011 to 2014 first year framework acquisition costs for C&I programs were between \$0.09/kWh and \$0.22/kWh

LDC First Year Resource Acquisition Costs (\$/kWh)



LDC first year resource acquisition costs by major C&I program (\$/kWh)

| Program | 2011-14 | 2015 | 2016 |
|----------------------------|---------|--------|--------|
| Portfolio (LDC costs only) | \$0.17 | \$0.15 | \$0.13 |
| Retrofit | \$0.12 | \$0.08 | \$0.14 |
| Small Business Lighting | \$0.41 | \$0.57 | \$0.49 |
| Other Business | \$0.15 | \$0.02 | \$0.28 |

Other Business: High Performance New Construction, Process & Systems, Monitoring & Targeting, Energy Managers.

Note that SBL has a smaller budget than retrofit, so it has a smaller impact on business program acquisition cost. 2015 acquisition costs include legacy and verified savings and costs. 2016 acquisition costs include verified and unverified savings and costs.

FORECASTED ACQUISITION COST TRENDS DIFFER BETWEEN IESO PIPELINE FORECASTS AND LDC FORECASTS

- LDC forecasts show a slow increase in portfolio-wide acquisition costs
- Retrofit pipeline forecasts show a large decrease in acquisition cost between 2017 and 2020
- BMG pipeline acquisition costs also show a major decline, but later year acquisition costs are largely influenced by the high proportion of “detailed studies,” which have low incentives and high savings relative to other projects
- Acquisition costs can vary based on, for example, customer saturation (i.e., moving beyond “low hanging fruit” at customers’ facilities), program saturation (i.e., customer acquisition becomes more difficult and some may never be interested in participating), experience (e.g., staff become more familiar with required administrative processes and a lower amount of time and resources are required), efficiency of processes and systems (e.g., the ability to move an application through with fewer time and resources)

LDC first year resource acquisition by forecast (\$/kWh)

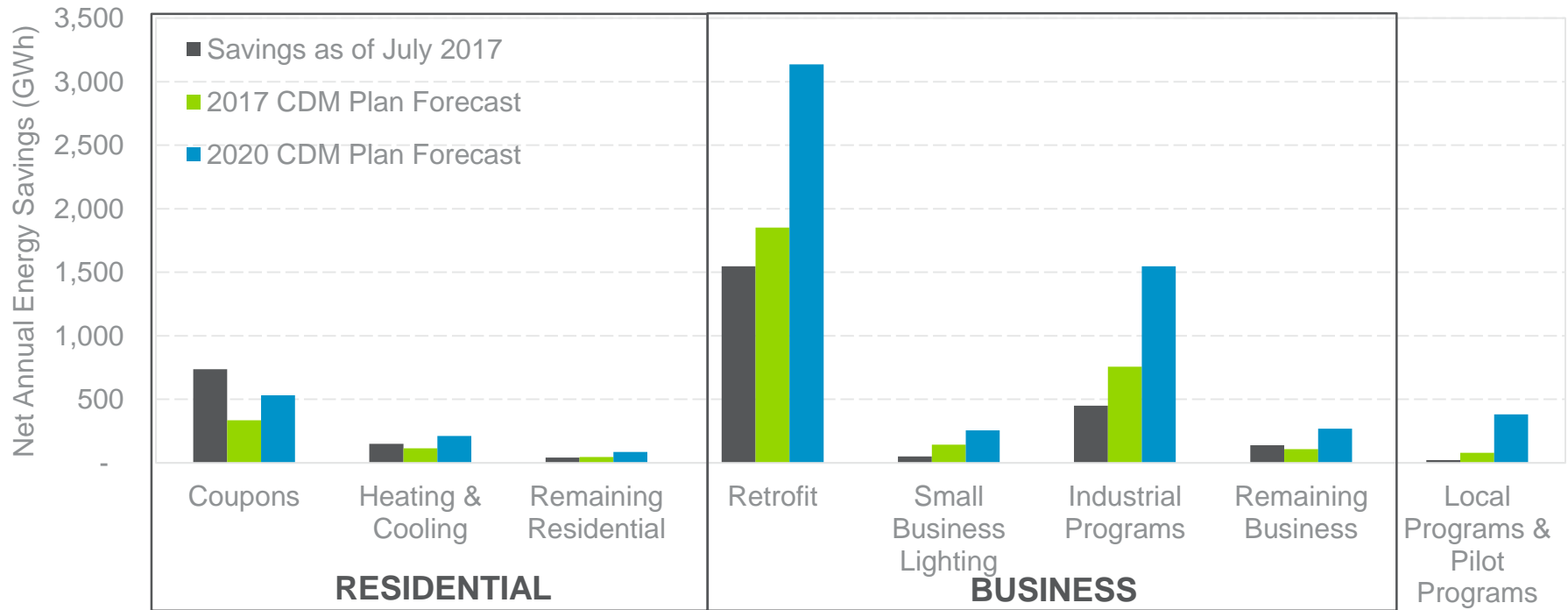
| Forecast | 2017 | 2018 | 2019 | 2020 |
|---------------------------------|--------|--------|--------|---------|
| LDC Forecasts | \$0.26 | \$0.26 | \$0.27 | \$0.29 |
| Retrofit Pipeline and Potential | \$0.33 | \$0.12 | \$0.22 | \$0.14 |
| BMG Pipeline Potential Pipeline | \$0.19 | \$0.17 | \$0.09 | \$0.005 |

*LDC Forecasts acquisition costs represent the full portfolio (i.e. residential and business programs). Retrofit and BMG pipeline and potential pipeline acquisition costs include IESO forecasts for savings and incentives, administrative costs are not considered. *Note that BMG Acquisition costs fall in 2019 and 2020 because “Detailed Studies” make up the majority of projects.*

RESIDENTIAL PROGRAMS ARE TYPICALLY MEETING OR EXCEEDING LDC CDM PLAN FORECASTS

- Several programs show progress exceeding 2017 CDM Plan forecasts (Coupons, Heating and Cooling, Remaining Business), however, most programs' progress are under their 2017 target (2017 CDM Plan Forecast)
- Note: Unverified results are typically lagged at least 6 months, 2017 unverified progress only represents 6 months of data

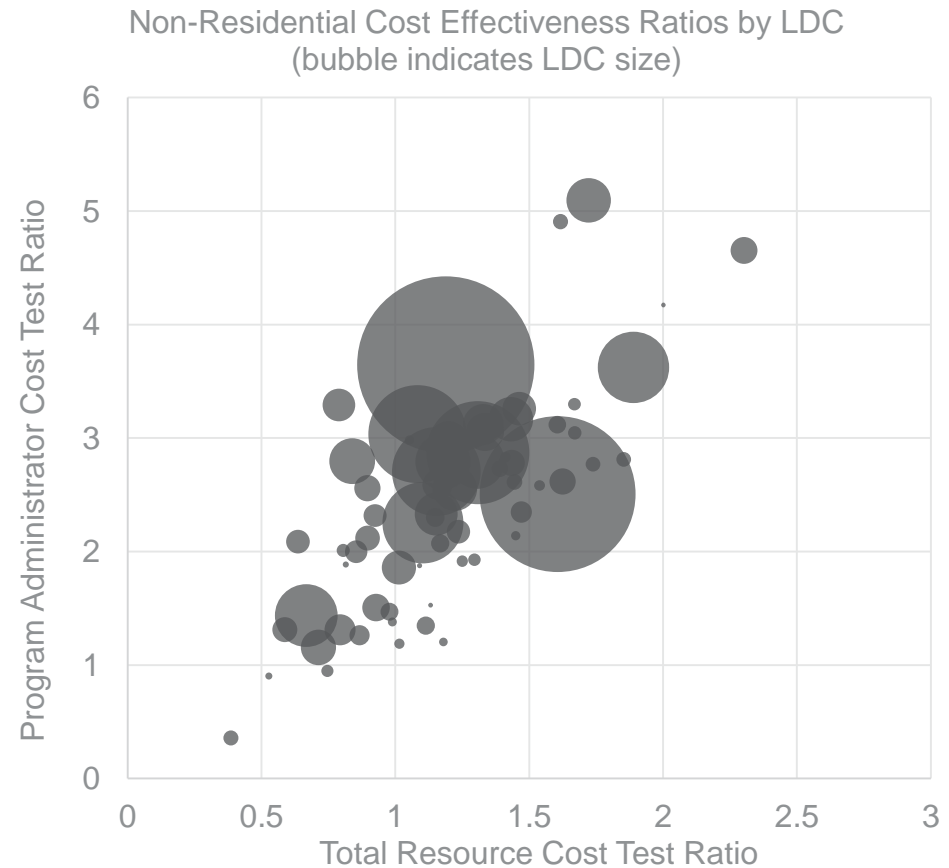
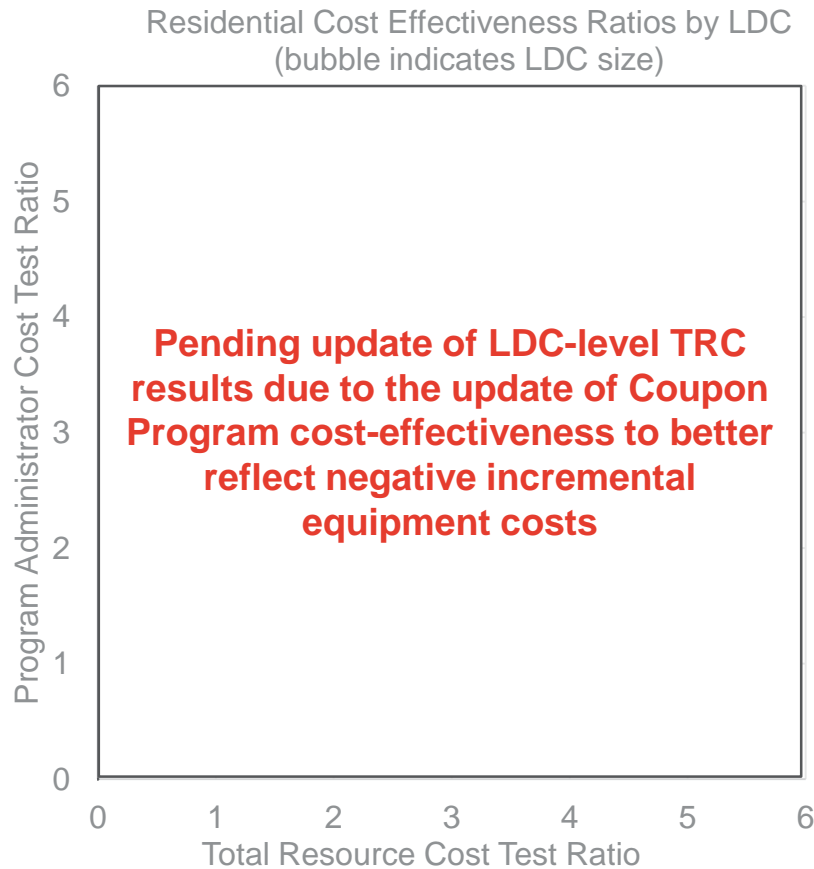
Savings by Program Against CDM Plan (GWh)



Note 1: Remaining residential includes the New Construction and Home Assistance programs. The remaining business bar includes High Performance New Construction, Existing Building Commissioning, Business Refrigeration Incentive and the Audit Funding programs

THERE IS A HIGH DEGREE OF VARIABILITY IN LDC LEVEL COST EFFECTIVENESS FOR BOTH COST EFFECTIVENESS TESTS AND SECTORS

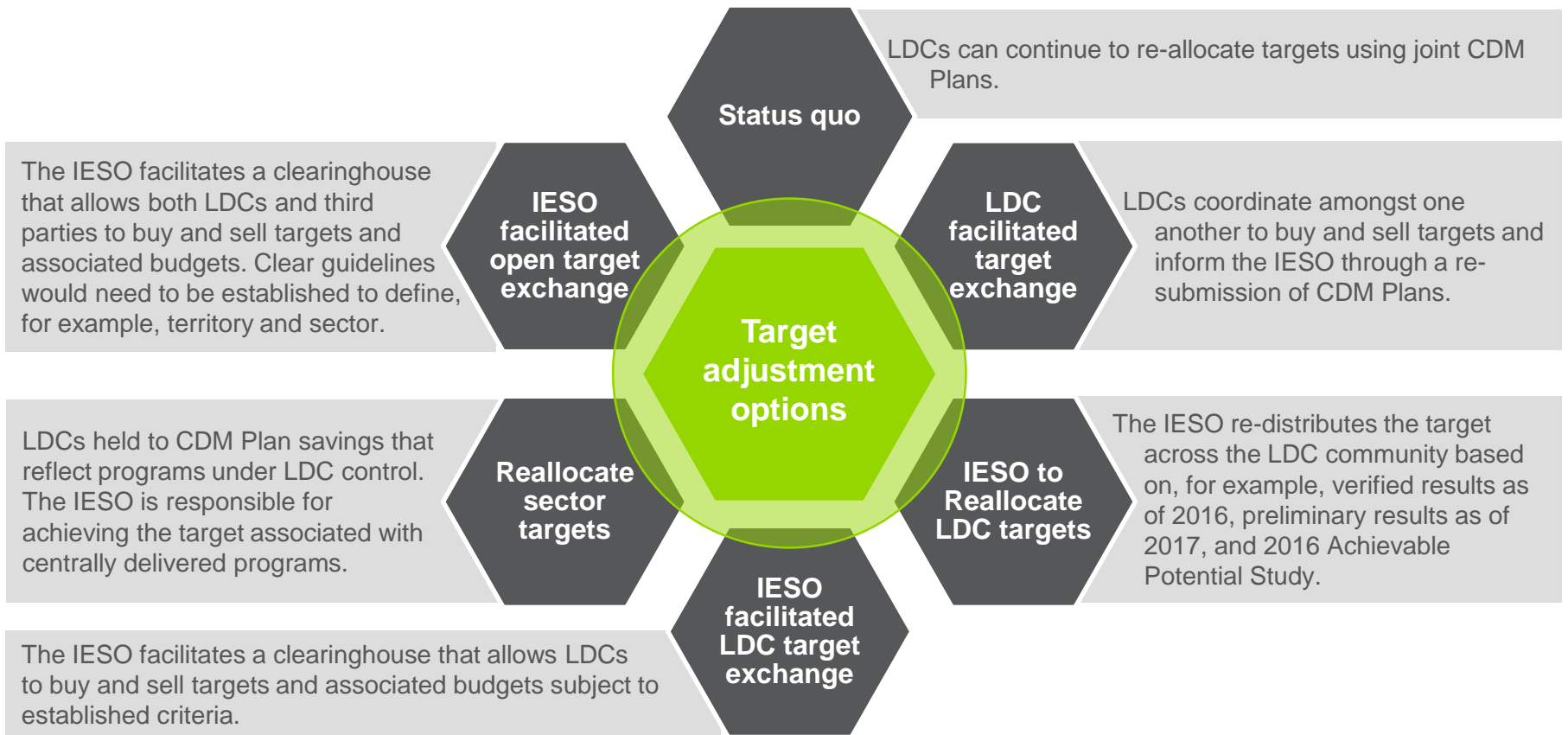
- All LDCs achieved a Program Administrator Cost Test ratio above 1



SHOULD **TARGETS** BE
ADJUSTED GIVEN
FRAMEWORK GOALS AND
POLICY OBJECTIVES? IF
SO, HOW? WHAT ABOUT
BEYOND 2020?

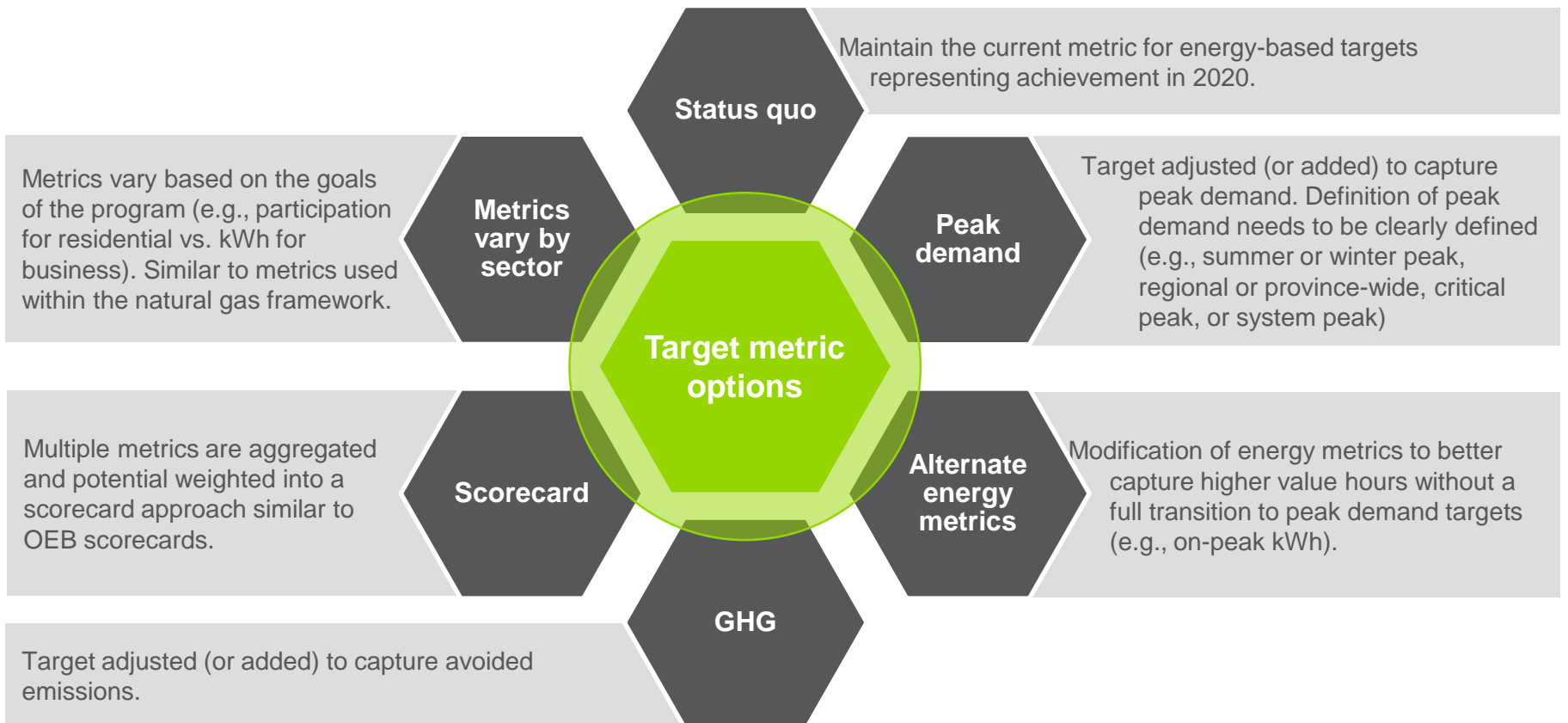
TARGET REALLOCATION OPTIONS

- The following slide provides a description of some potential target reallocation options
- Combinations of options may also assist in solving the challenges identified



TARGET METRIC OPTIONS

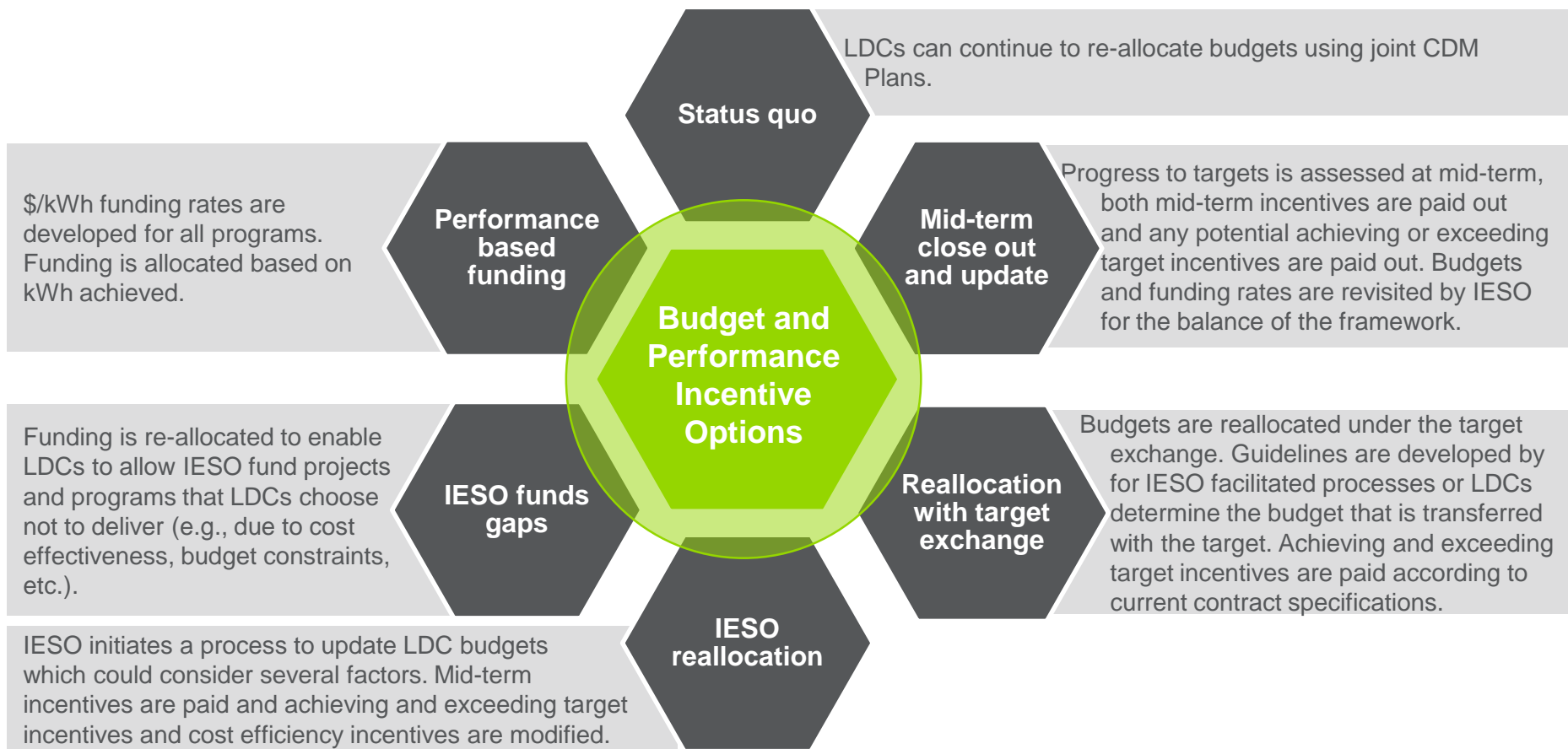
- The following slide provides a description of some potential target metric options
- Combinations of options may also assist in solving the challenges identified



SHOULD **BUDGETS** BE
ADJUSTED GIVEN
FRAMEWORK GOALS AND
POLICY OBJECTIVES? IF
SO, HOW? WHAT ABOUT
BEYOND 2020?

BUDGET AND PERFORMANCE INCENTIVE MODIFICATION OPTIONS

- The following slide provides a description of some potential budget and performance incentive modification options
- Combinations of options may also assist in solving the challenges identified



WHAT ARE SOME
ALTERNATE APPROACHES
AND WHAT COULD BE THE
IMPACT ON COST
EFFECTIVENESS?

ARE THESE APPROACHES
APPROPRIATE FOR THE
SECOND HALF OF THE
FRAMEWORK?
BEYOND 2020?

TARGET METHODOLOGIES VARY; THERE ARE MANY FACTORS THAT CAN RESULT IN HIGHER COST EFFECTIVENESS

Target Setting

- **Typically two approaches:**
 1. Select a “reasonable” target based on other jurisdictions, past performance, etc.
 - Pros: simple
 - Cons: risk in assuming targets similar to other jurisdictions can be achieved
 2. Use an achievable potential study
 - Pros: considers many factors, technologies, etc.
 - Cons: assumptions and results can vary widely
- **Other considerations:**
 - Regulatory involvement (intervenors, rigidity, etc.)
 - Timeframe
 - Guiding policy (all cost effective conservation, cost cap, energy efficiency as a resource, economic development)
 - Target method (static vs. dynamic, gross vs. net, end-user vs. generator level, etc.)

Cost Effectiveness

- **Benchmarking found the highest cost effectiveness in six of the jurisdictions reviewed:**
 - NGRID (MA), NSTAR (now Eversource) (MA), CE Power (MI), MN Power, AEP Ohio, Xcel Energy (MN)
 - Most utilities have been in market with energy efficiency programs since the early 2000s
 - NGRID, NSTAR, and Xcel Energy deliver their own programs
 - MN Power uses a third party energy consulting firm (Energy Insight) to manage its Conservation Improvement Program
 - AEP Ohio plans to hire program implementation contractors with the goal of minimizing risk
- **It is difficult to pinpoint a driver to higher or lower cost effectiveness across jurisdictions given the many factors involved (e.g., avoided costs, all cost effective EE, etc.)**

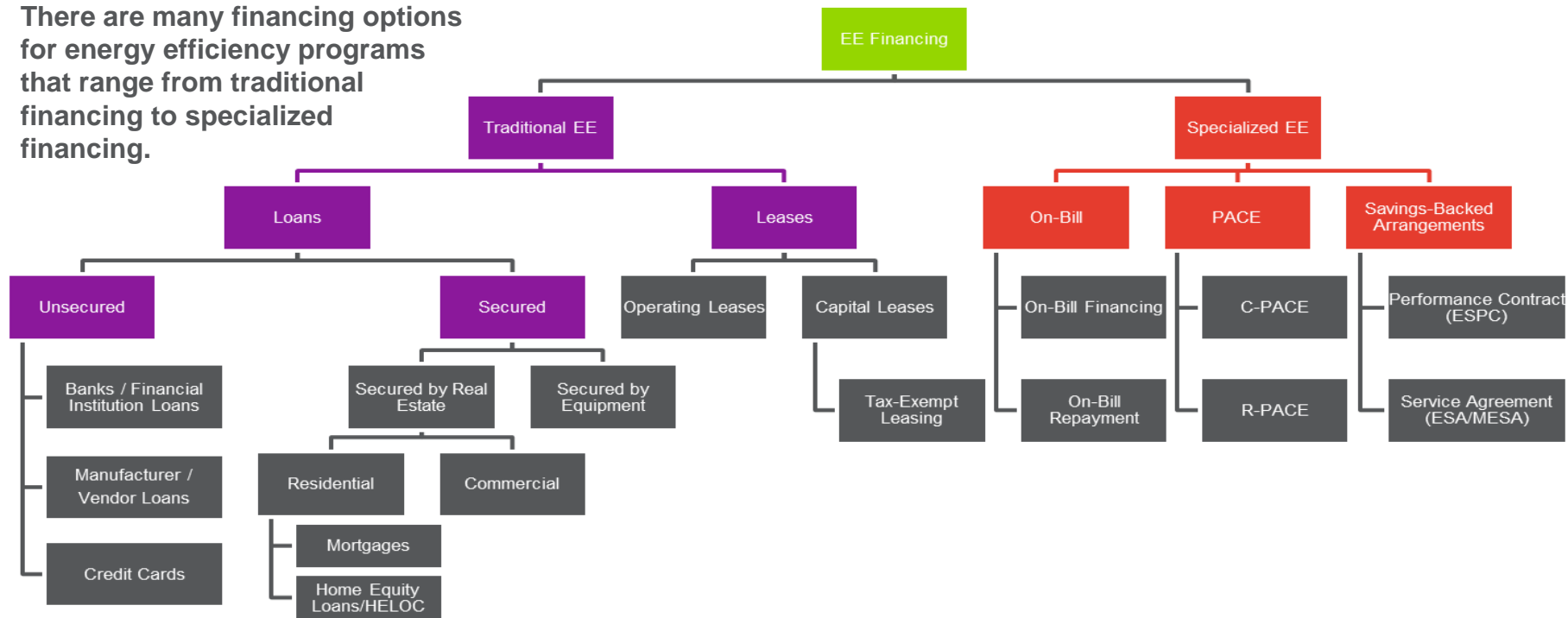
WHAT ARE SOME
METHODOLOGIES TO
**REDUCE RELIANCE ON
INCENTIVES?**

ARE THESE
METHODOLOGIES
APPROPRIATE FOR THE
**SECOND HALF OF THE
FRAMEWORK?**
BEYOND 2020?

JURISDICTIONAL SCAN OF INCENTIVE MECHANISMS

- Utilities are moving away from direct cost recovery for funding CDM programs, and moving towards more cost effective solutions, as well as reducing reliance on incentives and shifting to more financing instead
- In the U.S., new non-incentive based mechanisms include: on-bill financing, property tax and local government fees, PACE financing, and Energy Service Performance Contracts
- Many **EE financing programs** are run by utilities or state/local governments, who partner with small banks, credit unions, and other players which lessens the financial burden on the utility

There are many financing options for energy efficiency programs that range from traditional financing to specialized financing.





SECTION 2: INTRODUCTION

- I. Policy Context
- II. Introduction and Methodology
- III. Scorecard and Snapshot

TOPIC 8: BUDGETS, TARGETS AND COST EFFECTIVENESS

Policy Context – 2013 Long-Term Energy Plan & Conservation First Framework/Industrial Accelerator Program Ministerial Directions

LTEP 2013 provides context around the long-term conservation target to 2032 as well as cost-effectiveness testing:

- “The province expects to offset most of the growth in electricity demand to 2032 using programs and improved codes and standards. This will lessen the need for new supply. Our long-term conservation target of 30 TWh in 2032 represents a 16% reduction in forecast gross demand for electricity — the equivalent to more than all the power used by the City of Toronto in 2012 — an improvement over the 2010 LTEP.”
- “Our agencies and partners will achieve this goal with a combination of tools, including the Total Resource Cost Test, the Program Administrator Cost Test and a hurdle rate, to screen program proposals. A hurdle rate would consider the cost of delivering a conservation program against the avoided cost of procuring supply.”

The OPA’s role to develop Target and Budget Allocation was defined in the March 2014 Conservation First Framework Direction:

- “[...]I hereby direct the OPA to coordinate, support and fund the delivery of CDM programs through Distributors to achieve a total of 7 TWh of reductions in electricity consumption between January 1, 2015 and December 31, 2020 [...]”
- “The OPA, in consultation with Distributors, shall develop an allocation methodology to allocate the full 7 TWh among Distributors. The allocation methodology may take into consideration Distributor CDM potential at a local and/or regional level as identified in the OPA’s 2014 energy efficiency achievable potential study, and other factors, as appropriate.”
- “The OPA shall establish a budget allocation for each Distributor in consideration of the Distributor CDM Target and CDM Plan [...]”

TOPIC 8: BUDGETS, TARGETS AND COST EFFECTIVENESS (CONT)

Policy Context – 2013 Long-Term Energy Plan & Conservation First Framework/Industrial Accelerator Program Ministerial Directions

March 2014 Conservation First Framework Direction addresses cost effectiveness testing and exceptions:

- “The OPA shall ensure there is a positive benefit-cost analysis of each CDM Plan and each Province-Wide CDM Program and Local Distributor CDM Program utilizing the OPA’s Total Resource Cost Test and the Program Administrator Cost Test found in the OPA’s Cost-Effectiveness Guide [...] The OPA will establish hurdle rates to consider the cost of delivering Province-Wide Distributor CDM Programs against the avoided cost of procuring supply.”
- “The OPA shall [despite previous section] allow Distributors to apply to the OPA for approval of Province-Wide Distributor CDM Programs and Local Distributor CDM Programs where cost effectiveness is not demonstrated if the program is: a) targeted to on-reserve First Nation customers, b) designed for educational purposes, c) a low-income CDM program”

The July 2014 Industrial Accelerator Program Direction addresses budget, target and cost-effectiveness:

- “The OPA shall establish a budget to achieve a target of 1.7 TWh of savings through the Industrial Accelerator Program to be met through projects approved on or before December 31, 2020.”
- “The OPA shall evaluate achievement of electricity savings achieved through the Industrial Accelerator Program on an annual incremental basis, based on the OPA’s standard [EM&V protocols]...”
- “The OPA shall ensure that there is a positive cost-benefit analysis for the Industrial Accelerator Program utilizing the OPA’s Total Resource Cost (TRC) Test and the Program Administrator Cost (PAC) Test found in the OPA’s Cost Effectiveness Guide [...]”

TOPIC 8: BUDGETS, TARGETS AND COST EFFECTIVENESS (CONT)

Policy Context – 2013 Long-Term Energy Plan & Conservation First Framework/Industrial Accelerator Program Ministerial Directions

This topic area will also explore funding mechanisms, delivery models, financing and resource acquisition

LTEP 2013 outlines a need for financing mechanisms for conservation:

- “The government will work to make new financing tools available to consumers starting in 2015. These tools will include on-bill financing to help them with the upfront cost of making energy efficiency retrofits to conserve electricity and natural gas. The government has already enabled municipal governments to offer Local Improvement Charges to recover energy efficiency and renewable energy investments with repayment through property taxes. This allows consumers to save money on their energy bill and pay off conservation investments over time as they receive the benefits of conservation.”

The July 2014 Industrial Accelerator Program Direction also includes a mention of flexible financing:

- “The OPA shall facilitate flexibility in financing for Industrial Accelerator Program projects”
- (Mid-term Review) “review of the Industrial Accelerator Program in regards to [...] lessons learned with respect to financing mechanisms.”

The March 2014 Conservation First Framework Direction outlines options for funding mechanisms and encourages innovation:

- “The OPA shall, in consultation with Distributors, develop a cost recovery and performance incentive mechanism for Distributors for making Province-Wide Distributor CDM Programs and/or Local Distributor CDM Programs available to customers in their service areas.”
- [Full cost recovery (with tiered performance incentive mechanism) and pay for performance (paid based on a pre-specified value for each verified kilowatt hour of electricity savings achieved) are described in further detail following this section]
- “Innovation and adoption of new technologies will be encouraged.”

TOPIC 8: BUDGETS, TARGETS AND COST EFFECTIVENESS (CONT)

Policy Context – 2013 Long-Term Energy Plan & Conservation First Framework/Industrial Accelerator Program Ministerial Directions

This topic area will also explore funding mechanisms, delivery models, financing and resource acquisition

The June and December 2016 Directions focus on delivering pay-for-performance based programs to non-residential customers:

- “The IESO shall, in consultation with Distributors, centrally design, fund and deliver two CDM programs (“Centrally-Delivered Programs”): a. A province-wide pay-for-performance CDM program for Multi-Distributor Consumers (“Multi-Distributor Program”) [...]”

Amendment to July 2014 Industrial Accelerator Program Direction:

- “The IESO shall undertake a pay-for-performance pilot program for customers that are eligible for the Industrial Accelerator Program that is consistent with the Centrally-Delivered Pay-for-Performance Multi-Distributor CDM Program.”

December 2016 Directive to IESO to fund distribution-connected sites as part of Industrial Accelerator Program:

- “The IESO shall allow transmission-connected customer with distribution-connected sites to elect to have their transmission-connected and distribution-connected sites administered through the Industrial Accelerator Program...Any associated electricity savings...shall count toward Distribution CDM Targets under the Conservation First Framework Directive”

August 2017 Directive for IESO delivery of low income programs:






- “...The IESO shall centrally design, fund and deliver across all Distributors’ licensed service areas a Provincewide CDM Program(s) targeted to the low-income customer segment..., beginning January 1, 2018, within the budget established under section 1.4 of the CFF Direction.”
- “...reductions achieved through IESO-delivered Provincewide Low-Income CDM Program(s) shall not count towards a Distributor’s CDM Target.”
- “...IESO may continue to allow a Distributor to deliver, funded through their allocated CDM budget...”

MID-TERM REVIEW

Navigant was engaged by the IESO to complete the mid-term review for the Conservation First Framework and Industrial Accelerator Program. Issues were identified by the IESO and grouped into eight major topics that will guide the Framework Review through four key activities outlined below. This report is the current state summary for the **budgets, targets, cost-effectiveness** topic.







| Current State Summaries | | Market Research | Opportunities | Final Study Report |
|---|---------------------------|--|--|--|
| Topics | Report Date | Current State Summaries: | Objectives: | Research, analysis, market research inform potential modifications |
| Customer and market engagement and satisfaction | March 16 | Summarize the current state of each theme (e.g., existing operations, policies, progress, decisions, etc.) and are used as a basis for market research | <ul style="list-style-type: none"> To confirm and enhance content of the topic reports To gather insights into future framework improvements, design, and delivery | Cost-benefit and gap analysis to scope opportunities |
| Definition of CDM | April 20 | | | Consolidated list of medium-term (before 2020), and long-term (post 2020) opportunities for prioritization by the IESO |
| Collaboration | April 20 | | | Out of Scope: <ul style="list-style-type: none"> New mass market research 2011-14 framework in-depth analysis New program design LDC Mid-term incentive Evaluation Measurement & Verification protocols Codes and Standards |
| Governance & operations | May 18 | | | |
| Planning integration | June 15 | | | |
| Climate change | July 13 | | | |
| Budgets, targets, cost effectiveness | August 17 September 14 | | | |
| Non-energy impacts | October 12 | | | |
| | | May to October | September/October | November to February |

CONSERVATION FIRST FRAMEWORK SCORECARD







| METRIC | DESCRIPTION | RESULT | TREND | GOAL | INSIGHT |
|---------------------------|---|---|---|-----------|---|
| Energy savings-to-date | <ul style="list-style-type: none"> Metric: Net incremental first year energy savings, separated by year Goal: CDM Plan forecasts for each individual year | <u>2015:</u> 1,699 GWh  |  | 1,212 GWh | <ul style="list-style-type: none"> LDCs exceeded forecasted savings in 2015, but slightly underperformed in 2016 according to verified results (unverified results indicate LDCs exceeded savings in 2016) The majority of 2015 savings came from Legacy Extension Programs Another factor influencing higher 2015 results relative to 2016 is the fact that there has been more time to allow for true-ups of 2015 data |
| | | <u>2016:</u> 1,321 GWh  | | 1,264 GWh | |
| | | <u>2017</u> 261 GWh | | 1,406 GWh | |
| Energy savings vs. target | <ul style="list-style-type: none"> Metric: 2015 through 2017 energy savings persisting to 2020 Goal: 7 TWh CFF target | 3,156 GWh  |  | 7,000 GWh | <ul style="list-style-type: none"> Persisting savings have declined over 19% from 2015 to 2016 Trend and indicator are representative of 2015 and 2016 only |

*2017 values reflect only 6 months of unverified progress with significant data lags, therefore results and trend indicators are reflective of 2015 and 2016 only

LEGEND







| | | | | | | |
|---------------|---|---|---|--|---|---|
| TREND |  | Minimal (less than 5 percentage points year over year) change in the metric relative to prior years |  | Increase in the metric relative to prior years |  | Decrease in the metric relative to prior years |
| RESULT |  | Meeting/exceeding goal |  | Progress towards goal/monitor for concerns |  | Low progress relative to goal/potential action required |

CONSERVATION FIRST FRAMEWORK SCORECARD



| METRIC | DESCRIPTION | RESULT | TREND | GOAL | INSIGHT |
|--------------------------------------|---|--|--|-----------|---|
| Energy savings vs. plan : business | <ul style="list-style-type: none"> Metric: Persisting savings from 2015 through 2017 from business programs Goal: Forecasted savings for business programs from LDC CDM Plans (2015-2017) | 2,186 GWh  |  | 2,889 GWh | <ul style="list-style-type: none"> The majority of business savings came in 2015 The majority (90%) of 2015 savings came from Legacy Extension Programs Significant data lag, more savings likely as more data becomes available |
| Energy savings vs. plan: residential | <ul style="list-style-type: none"> Metric: Persisting savings from 2015 through 2017 from residential programs Goal: Forecasted savings for residential programs from LDC CDM Plans (2015-2017) | 933 GWh  |  | 496 GWh | <ul style="list-style-type: none"> The residential savings in 2015 through 2017 were almost double the CDM plan target driven by performance in Coupons The majority of these savings came in 2016 The 2016 Coupon program savings (460 GWh) was equivalent to almost the entire residential forecast for 2016 |
| Persisting energy savings | <ul style="list-style-type: none"> Metric: Savings from 2015 through 2017 CFF projects persisting to the end of the framework, 2020 Goal: Forecasted persisting savings for all CFF programs from LDC CDM Plans | 3,156 GWh  |  | 3,561 GWh | <ul style="list-style-type: none"> Verified 2020 persisting savings from 2015 and 2016 exceeded CDM plan forecasts A slightly higher proportion of persisting savings came from 2015 results (56%) than 2016 results (44%) |

*2017 values reflect only 6 months of unverified progress with significant data lags, therefore results and trend indicators are reflective of 2015 and 2016 only

LEGEND







| | | | | | | |
|---------------|---|---|---|--|---|---|
| TREND |  | Minimal (less than 5 percentage points year over year) change in the metric relative to prior years |  | Increase in the metric relative to prior years |  | Decrease in the metric relative to prior years |
| RESULT |  | Meeting/exceeding goal |  | Progress towards goal/monitor for concerns |  | Low progress relative to goal/potential action required |

CONSERVATION FIRST FRAMEWORK SCORECARD

| METRIC | DESCRIPTION | RESULT | TREND | GOAL | INSIGHT |
|----------------------------------|--|---|---|------|--|
| LDCs % of energy target achieved | <ul style="list-style-type: none"> Metric: The percentage of CFF target achieved in 2015 and 2016, average weighted by LDCs' allocation of total CFF target Goal: Forecasted energy savings from LDC CDM Plans | 38%  |  | 33% | <ul style="list-style-type: none"> LDCs exceeded their forecast in 2015 and 2016 by 5% Overperformance of select LDCs, including two that have met or exceeded their target, contribute to this result |

**2017 values reflect only 6 months of unverified progress with significant data lags, therefore results and trend indicators are reflective of 2015 and 2016 only*

LEGEND

| | | | | | | |
|---------------|---|---|---|--|---|---|
| TREND |  | Minimal (less than 5 percentage points year over year) change in the metric relative to prior years |  | Increase in the metric relative to prior years |  | Decrease in the metric relative to prior years |
| RESULT |  | Meeting/exceeding goal |  | Progress towards goal/monitor for concerns |  | Low progress relative to goal/potential action required |

CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | INSIGHT |
|---|-----------------------------------|--|------------------------|--|
| Energy savings by program (vs. CDM Plans) | Coupons | | 738 / 335 (220%) | <ul style="list-style-type: none"> • Most programs over-performed forecasted amounts from CDM Plans • The “Industrial Programs” category consists of the following programs: <ul style="list-style-type: none"> • Process & Systems Upgrades • Energy Manager • Monitoring & Targeting • Legacy extension industrial programs • The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> • Energy Audit Funding Program • Existing Building Commissioning • Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) |
| | Heating & Cooling | | 150 / 115 (131%) | |
| | Home Assistance | | 28 / 28 (99%) | |
| | Residential New Construction | Verified and reported results for 2015 | 14 / 18 (79%) | |
| | Retrofit | through 2017 divided by CDM | 1,547 / 1,852 (83%) | |
| | Small Business Lighting | Plan forecasted results for 2015 | 51 / 144 (36%) | |
| | High Performance New Construction | through 2017 (all values in net 2020) | 70 / 65 (108%) | |
| | Industrial Programs | Annual gigawatt-hours) | 450 / 757 (59%) | |
| | Local Programs | | 6 / 58 (10%) | |
| | Pilot Programs | | 15 / 21 (72%) | |
| Other | | 88 / 167 (53%) | | |

CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | INSIGHT |
|--------------------------------|-----------------------------------|---|---------|---|
| Peak demand savings by program | Coupons | | 39 MW | <ul style="list-style-type: none"> The majority (61%) of verified peak demand savings were achieved in 2015 Verified peak demand savings are 101% of forecasted CDM Plan savings High Performance New Construction has the lowest cost per MW of savings (\$245K/MW), whereas Local Programs have the highest (\$4M/MW) The portfolio cost per MW was \$617K/MW The “Industrial Programs” category consists of the following programs: <ul style="list-style-type: none"> Process & Systems Upgrades Energy Manager Monitoring & Targeting Legacy extension industrial programs The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> Energy Audit Funding Program Existing Building Commissioning Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) |
| | Heating & Cooling | | 53 MW | |
| | Home Assistance | | 4 MW | |
| | Residential New Construction | | 1.7 MW | |
| | Retrofit | Verified net incremental annual peak demand savings by program for 2015 and 2016 (sum of 2015 and 2016) | 193 MW | |
| | Small Business Lighting | | 14.5 MW | |
| | High Performance New Construction | <i>(note: MW are not available for unverified results)</i> | 18 MW | |
| | Industrial Programs | | 32 MW | |
| | Local Programs | | 0.2 MW | |
| | Pilot Programs | | 5 MW | |
| Other | | 14 MW | | |

CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | INSIGHT |
|---------------------|-----------------------------------|--|----------------------|--|
| Spending by program | Coupons | | \$97 / \$56 172% | <ul style="list-style-type: none"> The Retrofit Program has the highest overall spending, but also the highest overall peak demand impact, and highest energy savings (previous two slides) of all programs The “Industrial Programs” category consists of the following programs: <ul style="list-style-type: none"> Process & Systems Upgrades Energy Manager Monitoring & Targeting Legacy extension industrial programs The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> Energy Audit Funding Program Existing Building Commissioning Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) Central services are not included (however, Value Added Services are included) |
| | Heating & Cooling | | \$65 / \$71 92% | |
| | Home Assistance | | \$14 / \$22 62% | |
| | Residential New Construction | | \$ 4 / \$7 64% | |
| | Retrofit | Total spending by program (incentive and administrative) for 2015 through 2017 vs CDM Plan forecasts for 2015 through 2017 (values in \$ millions) | \$179 / \$277 65% | |
| | Small Business Lighting | | \$12 / \$49 24% | |
| | High Performance New Construction | | \$10 / \$23 43% | |
| | Industrial Programs | | \$22 / \$125 18% | |
| | Local Programs | | \$21 / \$47 42% | |
| | Pilot Programs | | \$0.9/\$7 % | |
| Other | | \$8 / \$44 19% | | |

CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | INSIGHT |
|--|------------------------------------|---|---------------|--|
| Other spending metrics | Central services (\$) | The amount the central services budget spent in 2015 and the first half of 2016 plus forecasted spending from July through December, 2016 | \$31 Million | <ul style="list-style-type: none"> CFF spending in 2015 and 2016, both for the framework and central services, is significantly lower than one-third of total budget A contributing factor to this is relatively low first year spending for both the central services budget and CFF framework, \$3 million and \$25 million respectively There is an upward trend in spending |
| | Central services (%) | The proportion of the total central services budget spent in 2015 and 2016 | 12% | |
| | CFF framework to date (\$) | The amount (in millions) that has been spent in the CFF framework in 2015 through 2017 (excluding central services) | \$434 Million | |
| | CFF framework to date (%) | The proportion of the 1.8 Billion dollar allocated CFF budget that has been spent over 2015 through 2017 | 24% | |
| LDC Progress towards mid-term energy targets | # LDCs on track to mid-term target | The number of LDCs that achieved at least 50 percent of their target as per the 2017 unverified results (as of June 2017) | 18 | <ul style="list-style-type: none"> The 18 LDCs that have achieved at least 50 percent of their target represent 25 percent of the 7TWh target 21 additional LDCs are within 10 percent of the mid-term target (represents an additional 58 percent of the 7TWh target) |

*2017 values reflect 6 months of unverified data

CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | | INSIGHT |
|--|-----------------------------------|--|--------|------|--|
| | | | 2015 | 2016 | |
| Cost effectiveness by program (total resource cost, TRC) | Portfolio | Measures the net cost or benefit based on costs incurred societally (non-incentive and participant costs) and the avoided costs to the electricity system and avoided costs, includes non-energy benefits and costs and benefits associated with other fuels (i.e., natural gas) | 1.3 | 2.1 | <ul style="list-style-type: none"> Negative TRCs indicate negative incremental costs which are considered benefits Most programs remain cost effective at the total resource cost level Monitoring and targeting, had costs in both 2015 and 2016, but no benefits. This is reflected in the “Industrial Programs” category The “Industrial Programs” category consists of the following programs: <ul style="list-style-type: none"> Process & Systems Upgrades Energy Manager Monitoring & Targeting Legacy extension industrial programs The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> Energy Audit Funding Program Existing Building Commissioning Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) |
| | Residential | | 3.4 | 5.0 | |
| | Business | | 1.0 | 1.2 | |
| | Coupons | | 10.5 | 17.2 | |
| | Heating & Cooling | | 2.0 | 1.4 | |
| | Residential New Construction | | 1.2 | 0.3 | |
| | Retrofit | | 1.0 | 1.1 | |
| | Small Business Lighting | | 0.8 | 1.5 | |
| | High Performance New Construction | | 1.9 | 2.4 | |
| | Industrial Programs | | 0.8 | 1.2 | |
| | Local Programs | | n/a | 2.3 | |
| Other | 0.9 | 1.7 | | | |






CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | | INSIGHT |
|---|-----------------------------------|---|--------|------|---|
| | | | 2015 | 2016 | |
| Cost effectiveness by program (Program Administrator Cost, PAC) | Portfolio | Measures the net cost or benefit based on costs incurred by the program administrator (incentive and non-incentive costs) and the avoided costs to the electricity system | 2.0 | 3.1 | <ul style="list-style-type: none"> • Most program remain cost effective at the Program Administrator Cost level • Monitoring and targeting, had costs in both 2015 and 2016, but no benefits. This is reflected in the “industrial programs” category • The “industrial programs” category consists of the following programs: <ul style="list-style-type: none"> • Process & Systems Upgrades • Energy Manager • Monitoring & Targeting • Legacy extension industrial programs • The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> • Energy Audit Funding Program • Existing Building Commissioning • Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) |
| | Residential | | 2.3 | 3.4 | |
| | Business | | 2.3 | 2.9 | |
| | Coupons | | 2.5 | 4.6 | |
| | Heating & Cooling | | 2.2 | 2.0 | |
| | Residential New Construction | | 1.9 | 0.6 | |
| | Retrofit | | 2.7 | 3.0 | |
| | Small Business Lighting | | 0.7 | 1.6 | |
| | High Performance New Construction | | 2.2 | 3.5 | |
| | Industrial Programs | | 1.3 | 2.6 | |
| Local Programs | n/a | 1.76 | | | |
| Other | 2.0 | 0.9 | | | |







CONSERVATION FIRST FRAMEWORK SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | | INSIGHT |
|--|-----------------------------------|--|--------|------|---|
| | | | 2015 | 2016 | |
| Cost effectiveness by program (Levelized Unit Energy Cost) | Portfolio | | 3.3 | 2.1 | <ul style="list-style-type: none"> Most programs saw a decrease in Levelized Unit Energy Cost from 2015 to 2016 Monitoring and targeting, had costs in both 2015 and 2016, but no benefits. This is reflected in the “industrial programs” category The “industrial programs” category consists of the following programs: <ul style="list-style-type: none"> Process & Systems Upgrades Energy Manager Monitoring & Targeting Legacy extension industrial programs The “Other” category consists of all remaining programs not listed in the table including <ul style="list-style-type: none"> Energy Audit Funding Program Existing Building Commissioning Certain legacy extension programs - (Aboriginal Conservation program, Program enabled savings) |
| | Residential | | 3.4 | 2.0 | |
| | Business | | 2.8 | 2.4 | |
| | Coupons | A test that normalizes the costs incurred by the program administrator per unit of energy or demand reduced (incentive and non incentive costs divided by the net present value of the energy savings using a societal discount rate) – All values in ¢/kWh | 2.3 | 1.2 | |
| | Heating & Cooling | | 5.2 | 5.1 | |
| | Residential New Construction | | 3.7 | 14.0 | |
| | Retrofit | | 2.4 | 2.3 | |
| | Small Business Lighting | | 10.7 | 4.9 | |
| | High Performance New Construction | | 3.7 | 3.2 | |
| | Industrial Programs | | 5.1 | 2.5 | |
| | Local Programs | | n/a | 2.8 | |
| | Other | | 3.3 | 8.0 | |

INDUSTRIAL ACCELERATOR PROGRAM (IAP) SCORECARD

| METRIC | DESCRIPTION | RESULT | TREND | GOAL | INSIGHT |
|---------------------------|---|--|---|------------------------------|--|
| Energy savings-to-date | <ul style="list-style-type: none"> Metric: Net verified incremental first year energy savings. Separated by year. Goal: IAP forecast | <u>2015</u> 49 GWh  |  | <u>2015</u> 114 GWh <hr/> | <ul style="list-style-type: none"> IAP underperformed in both 2015 and 2016, but significantly improved over those two years Results represent projects that are verified and in-service and do not include projects that are under contract, but not yet implemented Performance below forecast is driven by long project lead times and influenced by other initiatives (e.g., Industrial Conservation Initiative, Industrial Electricity Incentive Program, Cap & Trade) |
| | | <u>2016</u> 125 GWh  | | <u>2016</u> 416 GWh <hr/> | |
| Persisting energy savings | <ul style="list-style-type: none"> Metric: Savings from 2015 and 2016 CFF projects persisting to the end of the framework, 2020. Goal: IAP target | 174 GWh  |  | 1,700 GWh | <ul style="list-style-type: none"> Persisting savings are approximately 10% of the IAP target |

LEGEND

| | | | |
|---------------|---|--|---|
| TREND |  Minimal (less than 5 percentage points year over year) change in the metric relative to prior years |  Increase in the metric relative to prior years |  Decrease in the metric relative to prior years |
| RESULT |  Meeting/exceeding goal |  Progress towards goal/monitor for concerns |  Low progress relative to goal/potential action required |

INDUSTRIAL ACCELERATOR PROGRAM (IAP) SCORECARD

| METRIC | DESCRIPTION | RESULT | TREND | GOAL | INSIGHT |
|--|--|---------------------|-------|------|--|
| Cost effectiveness | <ul style="list-style-type: none"> Total Resource Cost Metric: A test that measures the net cost of CDM based on the total costs of the program including both participants' and utility's costs. Goal: IAP forecast | <u>2015</u> 0.80 | ↑ | 1.4 | <ul style="list-style-type: none"> The TRC indicator shows that the program is not cost-effective; however, this indicator provides a skewed perspective because the calculation includes all the program costs, but do not fully account for the benefits that result from the program |
| | <ul style="list-style-type: none"> Goal: IAP forecast | <u>2016</u> 4.45 | | | |
| | <ul style="list-style-type: none"> Program Administrator Cost Metric: measures the net cost of CDM based on costs incurred by the program administrator, including incentive costs and excluding net costs incurred by the participant. Goal: IAP forecast | <u>2015</u> 3.77 | ↑ | | |
| <ul style="list-style-type: none"> Goal: IAP forecast | <u>2016</u> 6.98 | | | | |
| | <ul style="list-style-type: none"> Levelized Unit Energy Cost Metric: a test that normalizes the costs incurred by the program administrator per unit of energy or demand reduced. Represented in ¢/kWh Goal: IAP forecast | <u>2015</u> 4.7 | ↑ | 4.0 | <ul style="list-style-type: none"> The LUEC benefit/cost ratio has improved from 2015 to 2016 |
| | <ul style="list-style-type: none"> Goal: IAP forecast | <u>2016</u> 2.0 | | | |

LEGEND

| | | | | | | |
|---------------|--|---|--|--|--|---|
| TREND | | Minimal (less than 5 percentage points year over year) change in the metric relative to prior years | | Increase in the metric relative to prior years | | Decrease in the metric relative to prior years |
| RESULT | | Meeting/exceeding goal | | Progress towards goal/monitor for concerns | | Low progress relative to goal/potential action required |

INDUSTRIAL ACCELERATOR PROGRAM (IAP) SNAPSHOT

| AREA | METRIC | DESCRIPTION | RESULT | INSIGHT |
|----------------|---------------------|---|-----------------------|---|
| Demand savings | Peak demand savings | Verified peak demand savings resulting from IAP programs | <u>2015</u> 0.6 MW | <ul style="list-style-type: none"> Peak demand savings increased significantly from 2015 to 2016 |
| | | | <u>2016</u> 74 MW | |
| Spending | Spent as % of total | The proportion of the \$500 million IAP budget that was spent in 2015 and 2016 | 1% | <ul style="list-style-type: none"> A very small amount of IAP budget has been reported spent to date Spending includes studies that enable projects, but do not deliver savings |
| | Allocated to date | The total amount of incentive and non-incentive spending on IAP programs in 2015 and 2016 | \$4.1 Million | |



SECTION 3: CURRENT STATE

- I. Conservation First Framework
- II. Industrial Accelerator Program
- III. Alternate Approaches



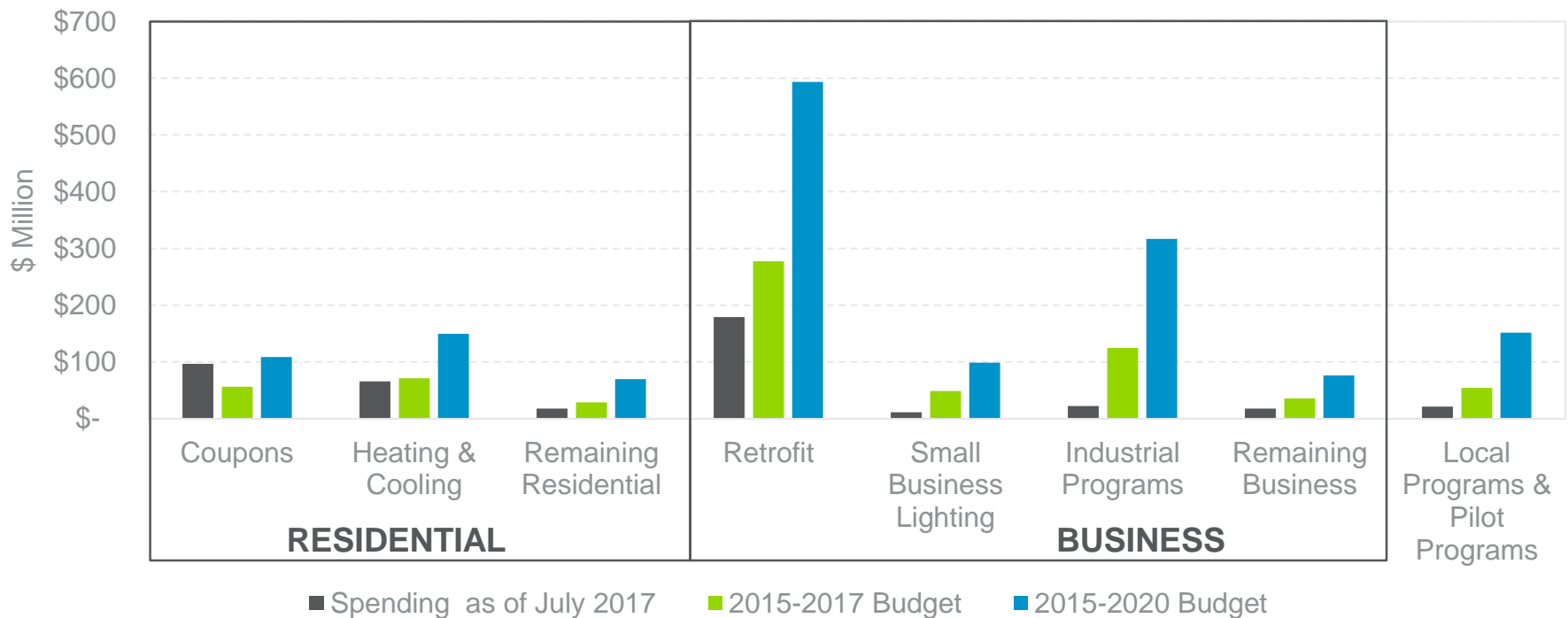
I. CONSERVATION FIRST FRAMEWORK

- i. Budgets
- ii. Targets
- iii. Cost effectiveness

SPENDING FOR MOST PROGRAMS ARE BELOW 2015 TO 2017 BUDGETS, COUPONS IS NEAR ITS 2020 BUDGET

- Spending relative to budgets is high for most residential programs, however business programs have relatively low spending versus forecast

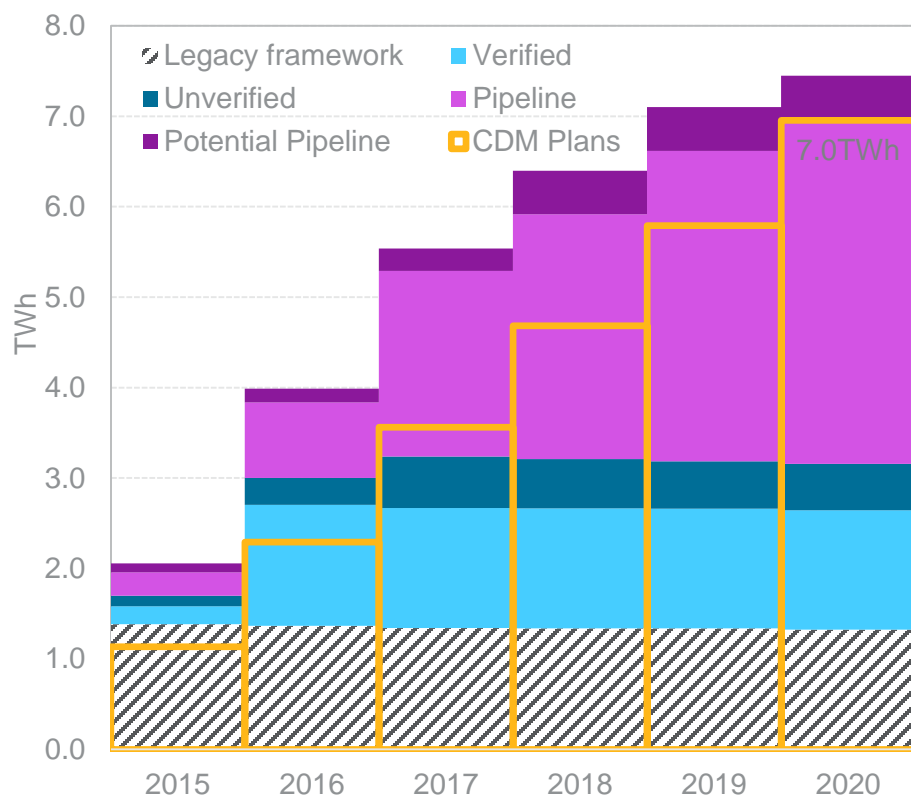
Spending by Program Against 2015-2017 and 2020 Budgets (\$ Millions)



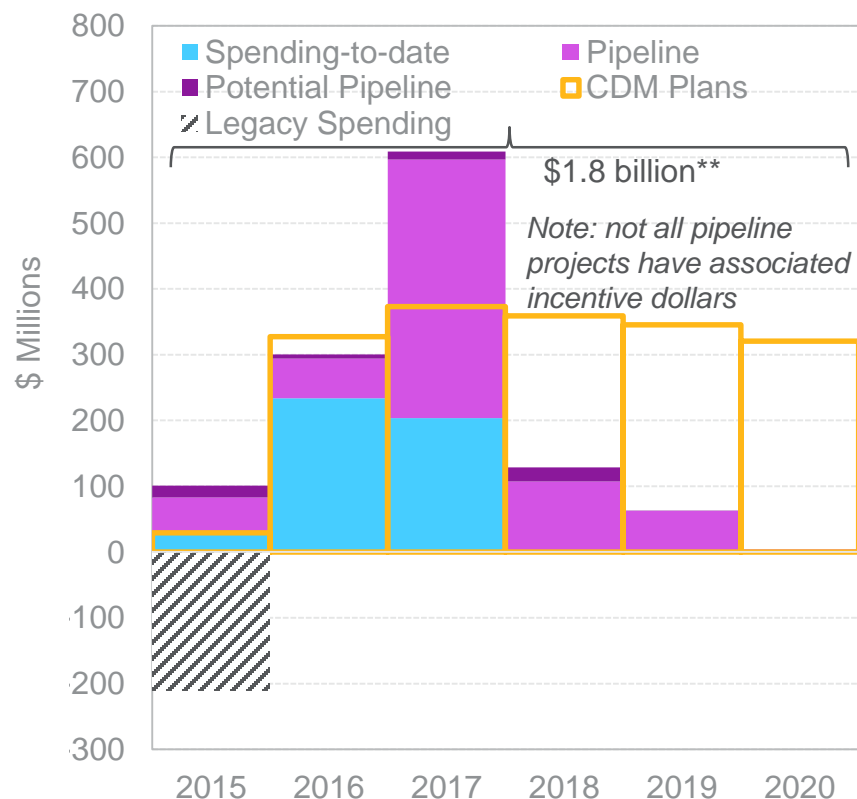
Note 1: Remaining residential includes the New Construction and Home Assistance programs. The remaining business bar includes High Performance New Construction, Existing Building Commissioning, Business Refrigeration Incentive and the Audit Funding programs

RETROFIT PIPELINE ANTICIPATES STRONG PROGRESS AGAINST CDM PLANS

Net Annual Energy Savings (TWh)



Year-over-Year Spending Against CDM Plans*



Note: Legacy framework includes savings achieved in 2015 from the 2011 to 2014 Framework towards CFF targets, but does not consider funding associated with those savings; Unverified results are typically lagged at least 6 months; 2017 unverified progress only represents 6 months of data, the CDM Plans the anticipated full year of savings; spending on a cash flow basis is typically lagged considerably from results

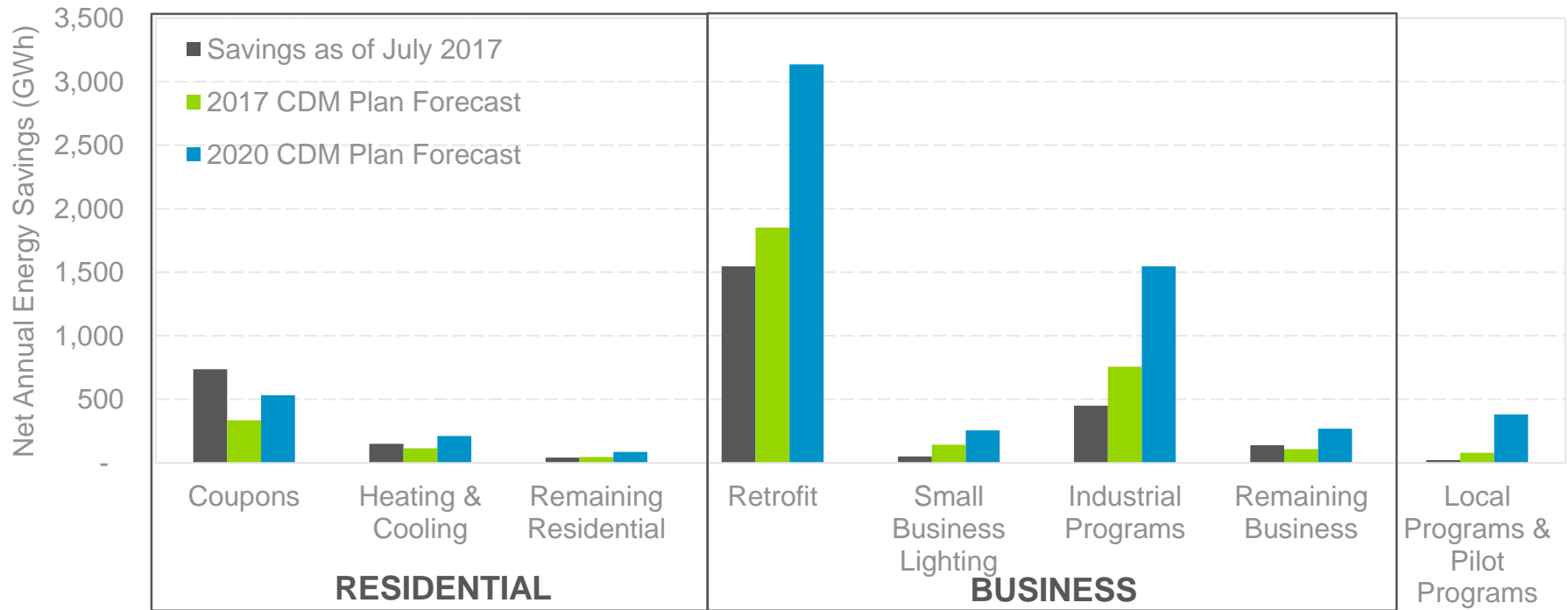
*Does not include Central Services, legacy spending does not count towards CFF budget **The full \$1.8 billion is not yet allocated within CDM Plans

I. CONSERVATION FIRST FRAMEWORK » TARGETS

RESIDENTIAL PROGRAMS ARE TYPICALLY MEETING OR EXCEEDING LDC
CDM PLAN FORECASTS

- Several programs show progress exceeding 2017 CDM Plan forecasts (Coupons, Heating and Cooling, Remaining Business), however, most programs' progress are under their 2017 target (2017 CDM Plan Forecast)
- Note: Unverified results are typically lagged at least 6 months, 2017 unverified progress only represents 6 months of data

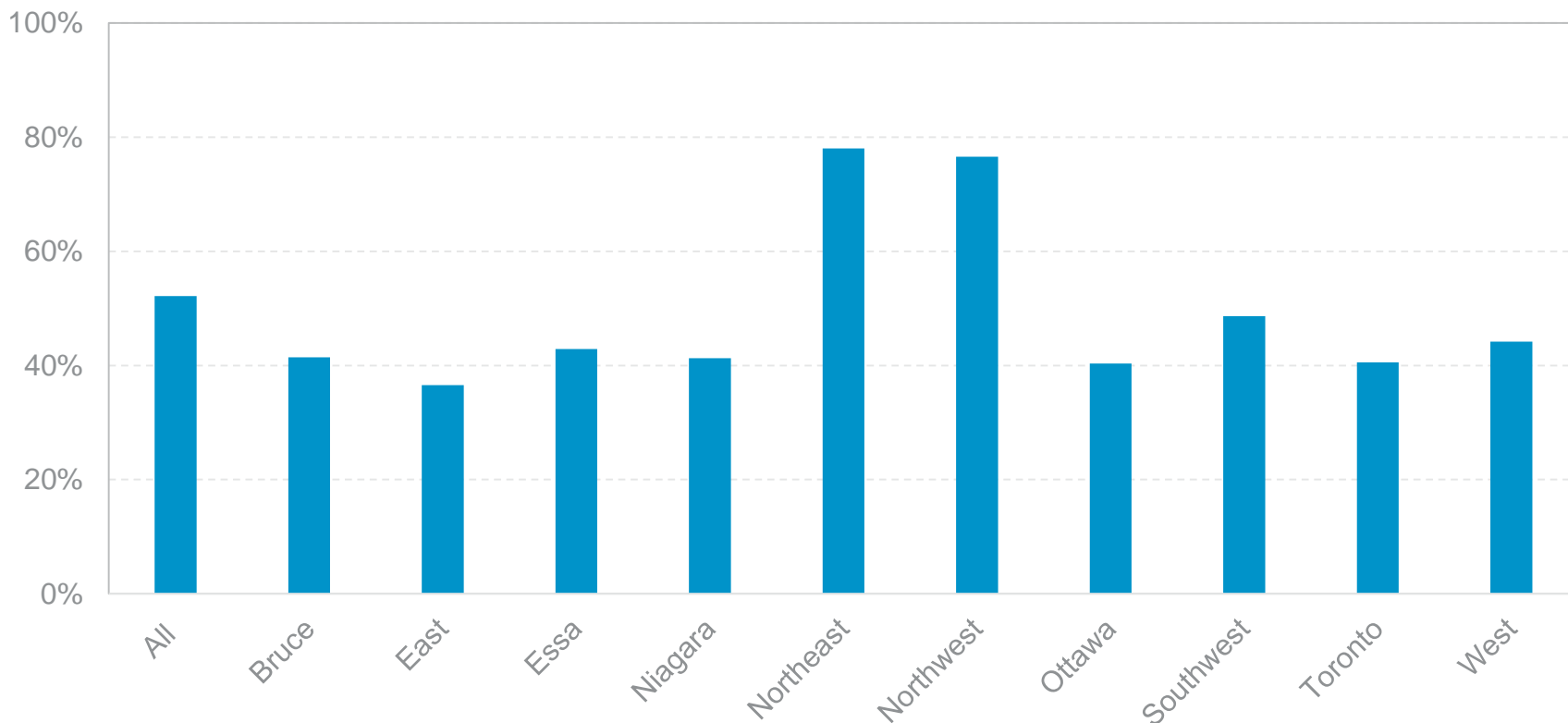
Savings by Program Against CDM Plan (GWh)



Note 1: Remaining residential includes the New Construction and Home Assistance programs. The remaining business bar includes High Performance New Construction, Existing Building Commissioning, Business Refrigeration Incentive and the Audit Funding programs

REGIONAL PROGRESS TOWARDS TARGETS VARIES; NORTHEAST AND NORTHWEST HAVE HIGHER PROGRESS COMPARED TO OTHER REGIONS

Percent of 2020 Target Achieved as of June 2017 (Unverified)



Note 1: many LDCs cross regions, in these cases for simplicity, targets and progress were equally distributed across the applicable regions (All is Hydro One)

Note 2: Unverified results are typically lagged at least 6 months; 2017 unverified progress only represents 6 months of data, the CDM Plans and APS 2016 represent the anticipated full year of savings

I. CONSERVATION FIRST FRAMEWORK » TARGETS

NET-TO-GROSS RATIOS VARY BY PROGRAM AND CAN VARY YEAR OVER YEAR

Conservation First Framework Programs

| Program | 2015 | 2016 |
|---|------|------|
| SOE Coupon Program | 162% | 140% |
| SOE Heating & Cooling Program | 56% | 70% |
| SOE New Construction Program | 85% | 81% |
| SOE Home Assistance Program | 100% | 100% |
| SOE Audit Funding Program | 90% | 69% |
| SOE Retrofit Program | 77% | 82% |
| SOE Small Business Lighting Program | | 93% |
| SOE High Performance New Construction Program | 53% | 64% |
| SOE Process & Systems Upgrades Program | | 87% |
| SOE Energy Manager Program | | 86% |
| SOE Retrofit Program - P4P | 75% | 71% |
| SOE Process & Systems Upgrades Program - P4P | | 81% |

Legacy (2011-2014) Framework Programs

| Program | 2015 | 2016 |
|--|------|------|
| Appliance Retirement Initiative | 47% | |
| Coupon Initiative and Bi-Annual Retailer Event Initiative | 164% | |
| HVAC Incentives Initiative | 50% | |
| Residential New Construction and Major Renovation Initiative | 50% | |
| Energy Audit Initiative | 89% | |
| Efficiency: Equipment Replacement Incentive Initiative | 76% | |
| Direct Install Lighting and Water Heating Initiative | 89% | |
| New Construction and Major Renovation Initiative | 55% | |
| Existing Building Commissioning Incentive Initiative | 95% | |
| Process and Systems Upgrades Initiatives - Project Incentive Initiative | 80% | |
| Process and Systems Upgrades Initiatives - Energy Manager Initiative | 75% | |
| Process and Systems Upgrades Initiatives - Monitoring and Targeting Initiative | 100% | |
| Low Income Initiative | 100% | |
| Aboriginal Conservation Program | 100% | |
| Program Enabled Savings | 75% | |

CFF IS ASSESSED USING TWO COST-EFFECTIVENESS TESTS

- Programs and portfolios are assessed using two industry cost-effectiveness tests outlined in the table below
- The IESO posts a more detailed document communicating cost-effectiveness guidance on their website

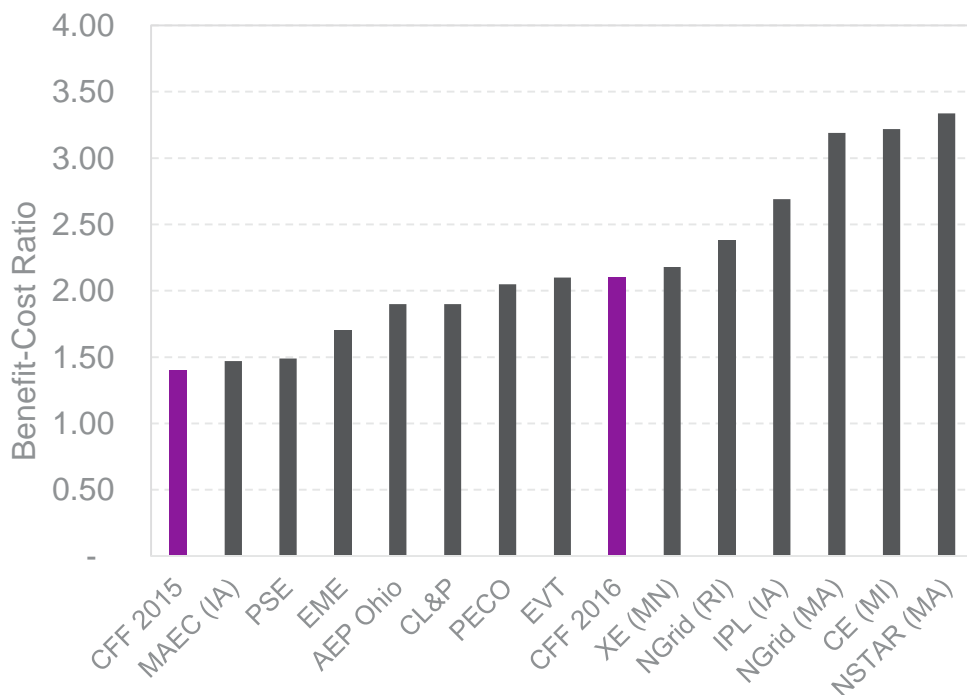
| Metric | Total Resource Cost (TRC) test | Program Administrator Cost (PAC) Test |
|-----------------------|--|---|
| Key Question Answered | How will the total costs of energy and demand in the utility service territory be affected? | How will utility costs be affected? |
| Summary Approach | Compares the costs incurred to design and deliver programs and customers' costs with avoided electricity and other supply-side resource costs (e.g., generation, transmission, natural gas, etc.) | Compares the costs incurred to design and deliver programs by the program administrator with avoided electricity supply-side resource costs. |
| Costs | <ul style="list-style-type: none"> • The expenses incurred by a program administrator to design and deliver CDM. • The incremental expenses incurred by participants to implement the conservation action. | <ul style="list-style-type: none"> • Total expenses incurred by a program administrator to design and deliver CDM. • The cost of providing incentives provided to participants to entice participation in the program. |
| Benefits | <ul style="list-style-type: none"> • The electricity system related costs no longer required as a result of the savings achieved by CDM, including: <ul style="list-style-type: none"> • Generation costs; • Transmission and distribution (T&D) costs; • Fuel costs; and, • Operations and maintenance (O&M) costs. • Other avoided supply-side resource costs | <ul style="list-style-type: none"> • The electricity system related costs that are no longer required as a result of the savings achieved by CDM, including: <ul style="list-style-type: none"> • Generation costs; • Transmission and distribution (T&D) costs; • Fuel costs; and, • Operations and maintenance (O&M) costs. |

I. CONSERVATION FIRST FRAMEWORK » COST EFFECTIVENESS

CFF PORTFOLIO TRC IN 2015 IS AT THE LOWER END AND IN 2016 IS AT THE HIGHER END OF THE OTHER JURISDICTIONS COLLECTED

- Total Resource Cost (TRC) test ratios for the provincial portfolio of programs is lower than many of the other jurisdictions assessed as part of a benchmarking assessment, but these improved from 2015 to 2016
- Overall, residential sector TRC test ratios are higher than business sector, and the Coupon program had the highest ratio in 2016

Total Resource Cost Test Ratio



CFF Total Resource Cost test by program and sector (\$benefits / \$costs)

| Program | 2015 | 2016 |
|-----------------------------------|------------|------------|
| Total Portfolio (CFF only) | 1.3 | 2.1 |
| Coupons | 10.5 | 17.2 |
| HVAC | 2.0 | 1.4 |
| Total Residential | 3.4 | 5.0 |
| Retrofit | 1.0 | 1.1 |
| SBL | 0.8 | 1.5 |
| Total Business | 1.0 | 1.2 |

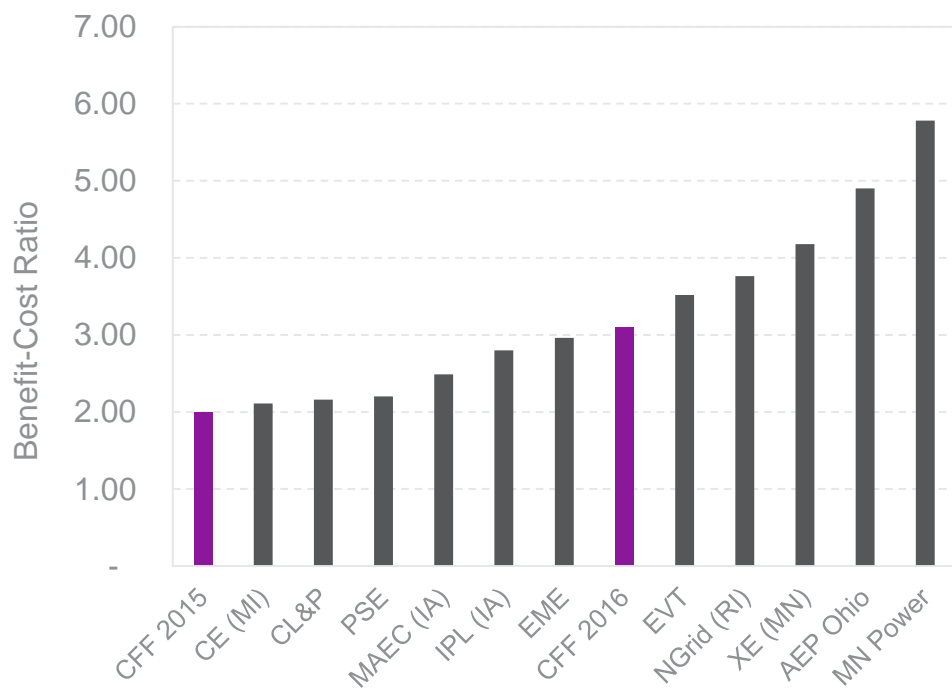
Total residential and Total Business aggregate all residential and business programs respectively

I. CONSERVATION FIRST FRAMEWORK » COST EFFECTIVENESS

CFF 2015 PORTFOLIO PAC IS AT THE LOWER END OF THE OTHER JURISDICTIONS COLLECTED, CFF IN 2016 IS MID-RANGE

- Program Administrator Cost (PAC) test ratios for the provincial portfolio of programs improved from 2015 to 2016
- In 2016, the provincial portfolio has a higher ratio than many other jurisdictions
- In 2016, business sector program administrator cost test ratios are higher than residential sector, however the coupon program had the highest ratio in 2016

Program Administrator Cost Test Ratio



CFF Program Administrator Cost test by program and sector (\$benefits / \$costs)

| Program | 2015 | 2016 |
|-----------------------------------|------|------|
| Total Portfolio (CFF only) | 2.0 | 3.1 |
| Coupons | 2.5 | 4.6 |
| HVAC | 2.2 | 2.0 |
| Total Residential | 2.3 | 3.4 |
| Retrofit | 2.7 | 3.0 |
| SBL | 0.7 | 1.6 |
| Total Business | 2.3 | 2.9 |

Total Residential and Total Business aggregate all residential and business programs respectively



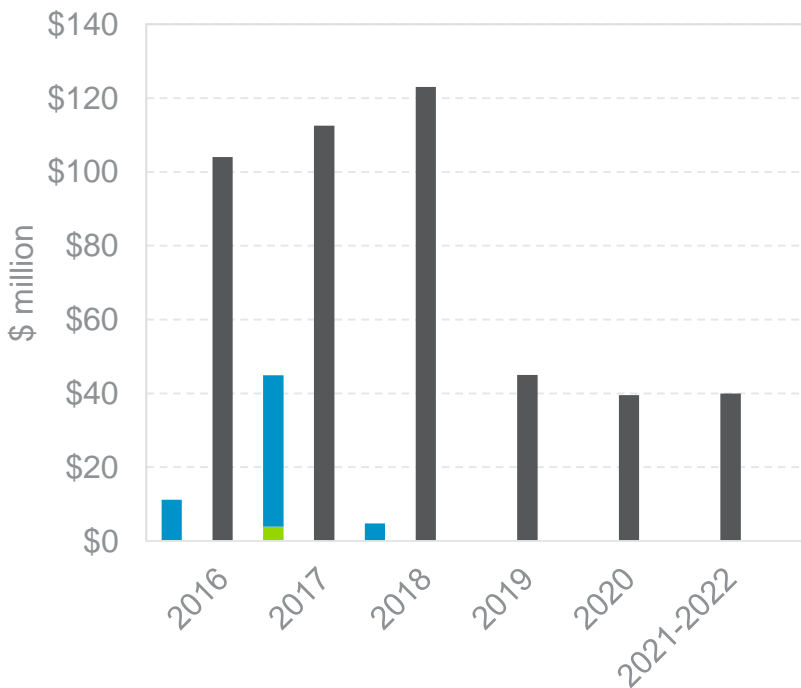
II. INDUSTRIAL ACCELERATOR PROGRAM

- i. Budget
- ii. Target
- iii. Cost effectiveness

SPENDING FOR THE INDUSTRIAL ACCELERATOR PROGRAM IS WELL BELOW BUDGET

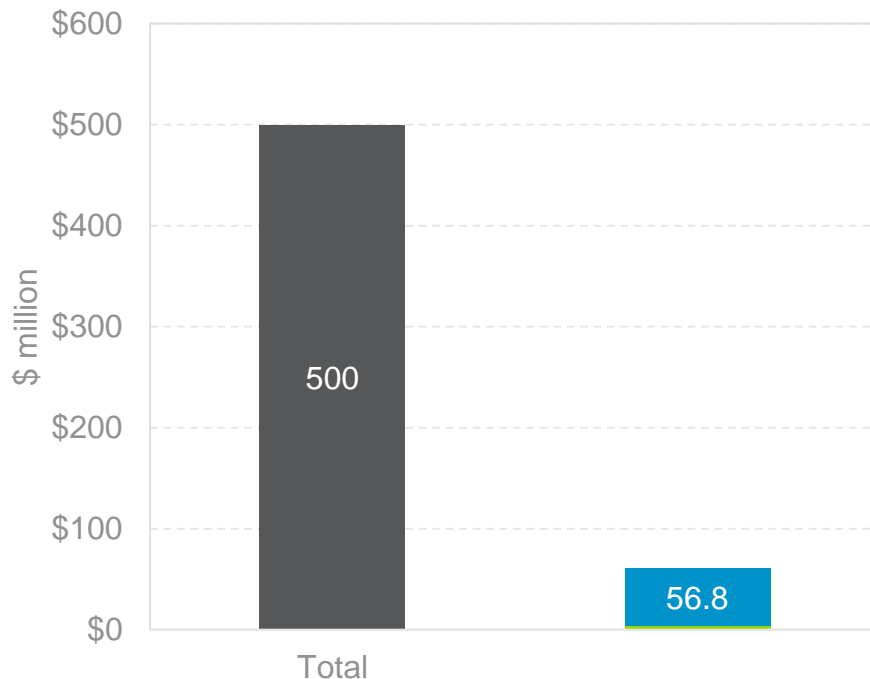
- The IAP budget was set based on the IAP energy target and assumptions on cost per kWh

Spending Against Annual Budgets (\$ million)



- Contracted and Committed Budget (\$ million)
- Verified Spending (\$ million)
- Budget (\$ million)

Spending Against Total Budget (\$ million)



- Contracted and Committed Budget (\$ million)
- Verified Spending (\$ million)
- Budget (\$ million)

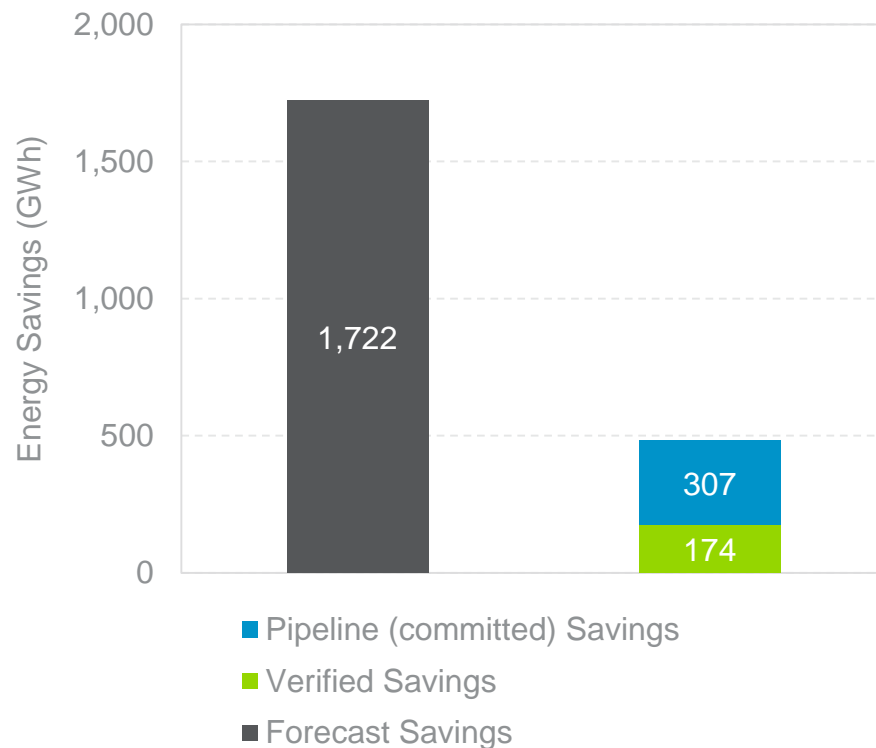
SAVINGS FOR THE INDUSTRIAL ACCELERATOR PROGRAM ARE WELL BELOW FORECAST HOWEVER SHOULD RECOVER WITH ANTICIPATED PIPELINE

- The IAP target was set based on the percentage of Ontario load that comes from transmission-connected customers and a similar metric was developed that was comparable to the Conservation First Framework target
- Performance below forecast is driven by long project lead times and influenced by other initiatives (e.g., Industrial Conservation Initiative, Industrial Electricity Incentive Program, Cap & Trade)

First Year Savings Against Forecast (GWh)



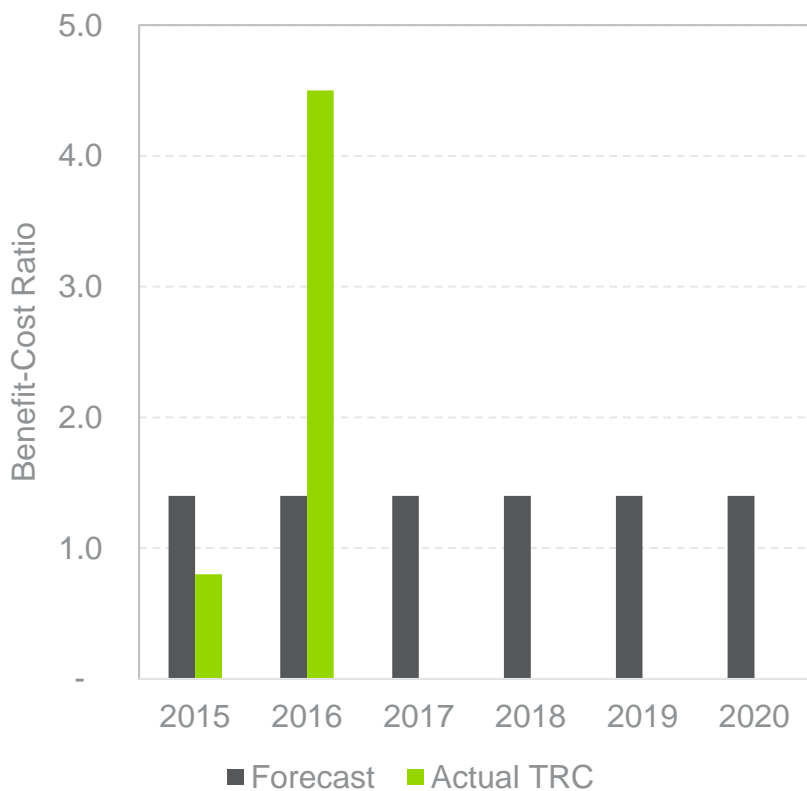
2020 Annual Savings Against Target (GWh)



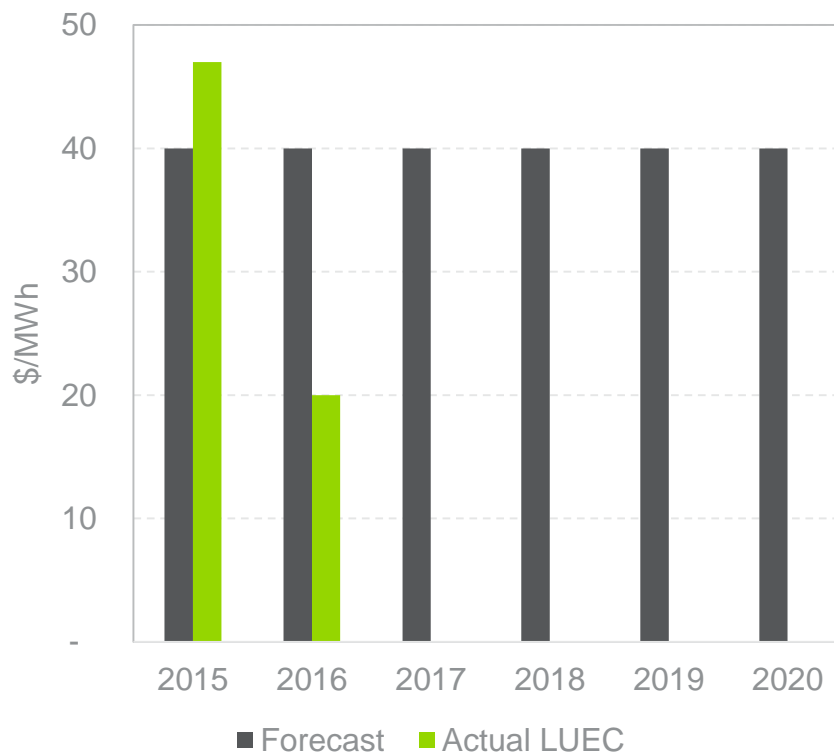
COST EFFECTIVENESS FOR THE INDUSTRIAL ACCELERATOR PROGRAM WAS ABOVE FORECAST IN 2016

- Total resource cost (TRC) test ratio improved from 2015 to 2016, but leveled unit energy cost (LUEC) declined over the same period

Total Resource Cost Ratio Against Forecast



Levelized Unit Energy Cost (\$/MWh) Against Forecast





III. ALTERNATE APPROACHES

- i. Budgets
- ii. Targets & Cost effectiveness

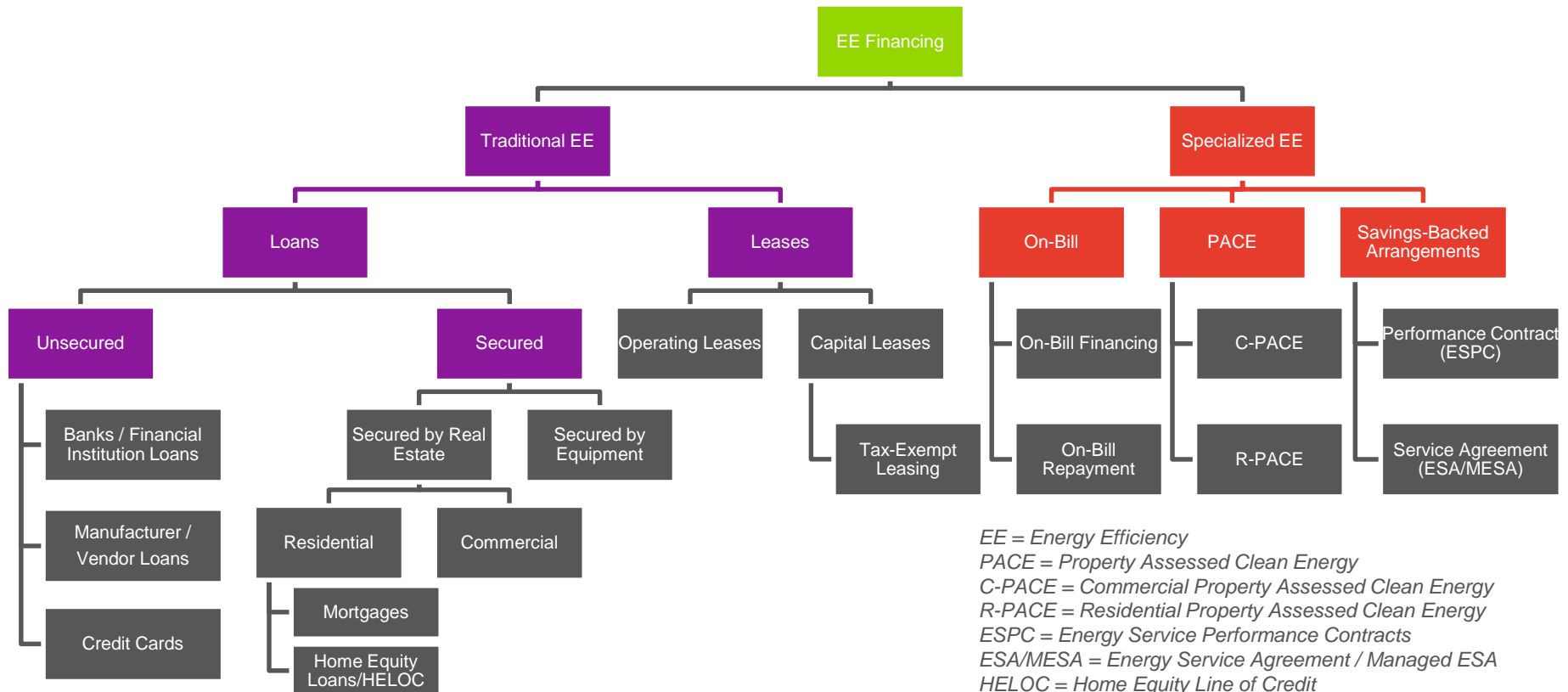
OTHER JURISDICTIONS: CDM FUNDING MECHANISMS

- One of the more common funding mechanisms for CDM in the U.S. is direct cost recovery through the rate case or a surcharge on the utility bill
- Other types of CDM financing is also emerging, including on-bill financing, property tax and local government fees, PACE financing, and Energy Service Performance Contracts

| Funding Mechanism | Description | Example Jurisdictions |
|---|---|--|
| Direct Cost Recovery | <ul style="list-style-type: none"> • Utilities can either recover costs through the general rate case, or through a public service surcharge (utility changes the electricity rate or adds a surcharge to the bill to pay for CDM) | Arizona, Massachusetts, Colorado, District of Columbia, Iowa, Pennsylvania, Texas, Utah, Washington, and Wisconsin |
| Third Party Loans | <ul style="list-style-type: none"> • Personal or business loan given and serviced by a lender who is neither a utility or government (the incentive is provided to the customer by a third party) | Pennsylvania |
| On-Bill Loans and Financing | <ul style="list-style-type: none"> • Personal or business loans given and serviced by the utility (loan provided by the utility for customer CDM, customer repays utility on their bill) | Manitoba, Alabama, Arkansas, California, Connecticut, Massachusetts, Rhode Island |
| Property Tax / Local Government Fees | <ul style="list-style-type: none"> • Loans or financing given and serviced by the government (loan repaid by the customer to the government) | Berkeley, California and Boulder, Colorado |
| Property Assessed Clean Energy (PACE) Financing | <ul style="list-style-type: none"> • PACE is paid through a voluntary assessment on their property tax bill (PACE financing attached to the property, not the customer) | Over 30 states in the U.S. |
| Energy Service Performance Contracts (ESPCs) | <ul style="list-style-type: none"> • Performance-based contracts between Energy Service Companies and building owners to finance projects (utility does not have to pay, just receives the energy savings) | United States |

OTHER JURISDICTIONS: ENERGY EFFICIENCY FUNDING MECHANISMS

- There is significant overlap between companies and the types of products they offer (PACE and loans, for example)
- On-bill financing is provided by the utility
- Many EE financing programs are run by utilities or state/local governments, who partner with small banks, credit unions, and other players
- MESA arrangements give the financier control of the utility bill whereas the customer maintains control under an ESA.



OTHER JURISDICTIONS: REDUCING RELIANCE ON INCENTIVES

- Utilities, regulators, and policymakers seek new approaches to achieve increasing savings targets at lower costs. One of the solutions to this is to move away from incentive-only programs, and incorporate more financing and market-based models
- There are currently a number of financing options for energy efficiency programs that range from traditional financing to specialized financing
- The previous slide outlines all of the possible EE funding mechanisms, while this table highlights the mechanisms utilities are using to reduce reliance on incentives.

| Financing Product | Description |
|---|---|
| Energy Service Performance Contracts (ESPCs) | ESPCs are performance-based contracts between Energy Service Companies (ESCOs) and building owners— most often customers in the institutional market. The ESCO typically guarantees the building owner that the project will deliver certain level of energy or dollar savings – generally, a level sufficient to pay for financed project costs via those savings. |
| Property Assessed Clean Energy (PACE) Financing | PACE is a financing mechanism that enables funding for energy efficiency, renewable energy and water conservation projects. PACE loans are repaid as an assessment on the property's regular tax bill |
| On-bill Financing (OBF) / On-bill Repayment (OBR) | On-bill lending is a method of financing energy efficiency improvements that uses the utility bill as the repayment vehicle. The utility is the lender in an OBF program. In OBR, the capital provider is a third party, and the utility operates as a repayment conduit for that third-party capital provider. |
| Unsecured Loan Products | A loan that is issued and supported by the borrower's creditworthiness, rather than by any type of collateral. |
| Energy Efficient Mortgages (EEM) | Conventional EEMs increase the purchasing power of buying an energy efficient home by allowing the lender to increase the borrower's income by a dollar amount equal to the estimated energy savings (Source: energystar.gov) |


TARGET METHODOLOGIES VARY; THERE ARE MANY FACTORS THAT CAN RESULT IN HIGHER COST EFFECTIVENESS

Target Setting

- **Typically two approaches:**
 1. Select a “reasonable” target based on other jurisdictions, past performance, etc.
 - Pros: simple
 - Cons: risk in assuming targets similar to other jurisdictions can be achieved
 2. Use an achievable potential study
 - Pros: considers many factors, technologies, etc.
 - Cons: assumptions and results can vary widely
- **Other considerations:**
 - Regulatory involvement (intervenors, rigidity, etc.)
 - Timeframe
 - Guiding policy (all cost effective conservation, cost cap, energy efficiency as a resource, economic development)
 - Target method (static vs. dynamic, gross vs. net, end-user vs. generator level, etc.)

Cost Effectiveness

- **Benchmarking found the highest cost effectiveness in six of the jurisdictions reviewed:**
 - NGRID (MA), NSTAR (now Eversource) (MA), CE Power (MI), MN Power, AEP Ohio, Xcel Energy (MN)
 - Most utilities have been in market with energy efficiency programs since the early 2000s
 - NGRID, NSTAR, and Xcel Energy deliver their own programs
 - MN Power uses a third party energy consulting firm (Energy Insight) to manage its Conservation Improvement Program
 - AEP Ohio plans to hire program implementation contractors with the goal of minimizing risk
- **It is difficult to pinpoint a driver to higher or lower cost effectiveness across jurisdictions given the many factors involved (e.g., avoided costs, all cost effective EE, etc.)**



SECTION 4:
SUMMARY
OBSERVATIONS
AND NEXT STEPS

PRELIMINARY OBSERVATIONS

Do the detailed results provide any **additional insights** that might change how to **adjust targets or budgets**?

Observations:

- Spending continues to appear to lag behind savings
- The 7TWh target appears to be achievable based on both LDC forecasts and pipeline data for the Retrofit program

Next Steps:

- Obtain feedback on target and funding options given the additional insights into potential progress

What are some alternate approaches and what could be the impact on **cost effectiveness**? Are these approaches appropriate for the second half of the framework? Beyond 2020?

Observations:

- Ontario cost effectiveness is lower than many other jurisdictions which could be driven by many factors beyond simply delivery costs or incentive levels (e.g., incremental equipment costs in Canada versus United States, avoided energy and capacity costs)

Next Steps:

- Further investigation in the LDC-level cost effectiveness to understand if local drivers or best practices that impacts cost effectiveness exist

PRELIMINARY OBSERVATIONS

What are some methodologies to **reduce reliance on incentives**? Are these methodologies appropriate for the second half of the framework? Beyond 2020?

Observations:

- Methodologies used outside of Ontario shift from simple incentives to customers to alternate methods of financing projects
- There are many forms of financing used across North America

Next Steps:

- Understand how project financing and capital budgeting for energy efficiency projects is currently working with customers and identify some options that align with Ontario customer needs
- Better understand some of the barriers to implementation of alternate funding mechanisms

NEXT STEPS

Based on the preliminary assessment of the current state of budgets, targets, and cost effectiveness, the following areas will be considered in the market research phase:

- Obtain feedback on target and funding options given the additional insights into potential progress
- Understand how project financing and capital budgeting for energy efficiency projects is currently working with customers and identify some options that align with Ontario customer needs
- Better understand some of the barriers to implementation of alternate funding mechanisms



APPENDICES

- A. Retrofit and BMG Mapping
- B. Glossary

RETROFIT AND BMG APPLICATION STATUS MAPPING

| Classification | Retrofit or BMG | Description |
|----------------|-----------------|---|
| Pipeline | Retrofit | Pre-Project Review - Approved to Proceed by LDC |
| | | Pre-Project Review - Approved by LDC |
| | | Pre-Project Review - Approve by LDC |
| | | Pre-Project Review - Application Pre-Approve by LDC |
| | | Pre-Project Review - Application Pre-Approved by LDC |
| | | Pre-Project Review - Returned by LDC for Applicant Edit(s) |
| | | Pre-Project Review - Return by LDC for Applicant Edit(s) |
| | | Pre-Project Review - Rejected by LDC for Applicant Adjustment |
| | | Pre-Project Review - Inspection and/or Evaluation Recommendations Submitted |
| | | Pre-Project Review - Inspection and/or Evaluation Assigned by LDC |
| | | Pre-Project Review - Inspection and/or Evaluation Assign by LDC |
| | | Pre-Project Review - Edit(s) Submitted to LDC |
| | | Pre-Project Review - Edit(s) Submit to LDC |
| | | Pre-Project Review - Edit(s) Sent to Applicant for Review |
| | | Pre-Project Review - Edit(s) Send to Applicant for Review |
| | | Pre-Project Review - Edit(s) Return by Applicant |
| | | Pre-Project Review - Edit(s) Returned by Applicant |
| | | Pre-Project Review - Adjustments Submitted to LDC |

RETROFIT AND BMG APPLICATION STATUS MAPPING

| Classification | Retrofit or BMG | Description |
|--------------------|-----------------|--|
| Pipeline | Retrofit | Pre-Project Review - Adjustments Sent to Applicant for Review |
| | | Pre-Project Review - Adjustments Rejected by Applicant |
| | | Pre-Project Application - Under LDC Review |
| | | Pre-Project Application - Submitted to LDC for Pre-Approval |
| | | Pre-Project Review - System Processing Pre-Approval |
| | | Pre-Project Application - Submit to LDC for Pre-Approval |
| | | Pre-Project Application - Submitted to LDC |
| | | Pre-Project Application - Submit to LDC |
| | | Pre-Project Application - Submission Returned for Edit(s) by Applicant |
| | | Pre-Project Application - Submission Return for Edit(s) by Applicant |
| Potential Pipeline | Retrofit | Pre-Project Application - Send to Applicant for Review |
| | | Pre-Project Application - Sent to Applicant for Review |
| | | Pre-Project Application - Saved as Draft |
| | | Post-Project Submission - Returned for Edit(s) by Participant |
| Pipeline | BMG | Active |
| Potential Pipeline | | Potentially Inactive |

GLOSSARY

| Term | Description |
|-------------------|---|
| CFF | Conservation First Framework. Programs in market from 2015-2020 resulting from the March 31, 2014 CFF Ministerial Directive and funded separately from 2011-2014+2015 Extension Legacy Framework Programs. |
| Adjustment | Verified results that were achieved in previous years but were not provided in a previous years' Annual Verified Results Report. |
| Allocated Budget | Each LDC's assigned portion of the Province's \$ 1.835 billion CDM Plan Budget of the 2015-2020 Conservation First Framework. |
| Allocated Target | Each LDC's assigned portion of the Province's 7 TWh Net 2020 Annual Energy Savings Target of the 2015-2020 Conservation First Framework. |
| Annual Savings | The energy or peak demand savings that occur in a given year (includes resource savings from new program activity and resource savings persisting from previous years). |
| APS | Achievable Potential Study completed in 2016 stating the amount of energy efficiency that is possible within a given timeframe and a given budget. |
| CCAP | Climate Change Action Plan. Document setting forth the policy for climate change in Ontario. |
| CDM Plan | Document developed by LDCs communicating anticipated energy savings and budgets for the 2015 to 2020 period. |
| Central services | Services supporting CFF administered by the IESO under a funding envelope (\$400 million). |
| CHP | Combined Heat and Power. Also called co-generation is behind-the-meter generation that involves the production of both electricity and useful thermal energy in an integrated system. |
| Conservation Fund | A source of funding external to the 2015-2020 CFF that provides financial support for innovative electricity conservation technologies, practices, research, and pilot programs. Savings from Conservation Fund pilot programs contribute to the LDCs savings targets based on the LDC service territory the pilot program is delivered in. |

GLOSSARY

| Term | Description |
|---------------------|--|
| DR | Demand Response - Technology or approaches that enable energy shifting or reduction during certain times. |
| DSM | Demand Side Management – an umbrella term that typically refers to energy efficiency and demand response |
| Dx | Distribution |
| EE | Energy efficiency - Technology or approaches that result in less energy to perform the same function. |
| EM&V | Evaluation, measurement and verification; the collection of methods and processes used to assess the performance of energy efficiency activities so that planned results can be achieved with greater certainty and future activities can be more effective |
| ECA | Energy conservation agreement. Contractual document guiding LDC and IESO responsibilities within the Conservation First Framework. |
| Energy Savings | Energy savings attributable to conservation and demand management activities. |
| ESCs | Energy Savings Certificates. Certificates that utilities can trade to represent one megawatt-hour of energy efficiency savings. |
| FCR | Full Cost Recovery. CFF funding mechanism whereby LDCs are paid for the amount spent to administer CDM programs. |
| Forecast | An LDCs' forecast of program activity, savings, net-to-gross adjustments, expenditures and cost effectiveness as indicated in each LDC's submitted CDM Plan Cost Effectiveness Tools. Forecasts at the province wide level are the sum of all LDCs' forecasts. |
| GHG | Greenhouse gas. Gases that trap heat in the atmosphere such as CO ₂ and N ₂ O. Reduction in GHGs are typically the goals of climate change policies. |
| Incremental Savings | The energy or peak demand savings newly attributable to activity procured in a particular reporting period based on when the savings are considered to 'start'. Savings attributed to activity performed or completed in 2016 are presented as 2016 savings. |

GLOSSARY

| Term | Description |
|-----------------------|---|
| LDC Innovation Fund | A source of funding under the 2015-2020 Conservation First Framework separate from LDC CDM Plan Budgets that the IESO maintains to support LDC led program design and market testing of new initiatives. Savings from LDC Innovation Fund pilot programs contribute to the LDCs savings targets based on the LDC service territory the pilot program is delivered in. |
| Legacy Framework | Programs in market from 2011-2015 resulting from the April 23, 2010 GEA CDM Ministerial Directive and funded separately from 2015-2020 Conservation First Framework Programs but whose savings in 2015 are attributed towards the 2015-2020 Conservation First Framework target. |
| Local Program | Programs designed by LDCs to serve their communities and approved by the IESO. |
| LTEP 2013 | Ontario's Long-Term Energy Plan; a strategic plan developed by the Ministry of Energy to set the policy for Ontario's electricity system. The previous LTEP was released in 2013, with an update anticipated in 2017 |
| Ministerial Direction | Documents issued by the Ministry to agencies with specific instructions and/or goals which enable action and authorize spending. |
| MOE | The Ontario Ministry of Energy; tasked with developing the electricity generation, transmission and other energy-related facilities that power Ontario's economy |
| MOECC | The Ontario Ministry of Environment and Climate Change; tasked with protecting Ontario's land, air, and water and coordinating climate policy |
| MW | Megawatt; a unit to measure electricity demand or supply |
| Net Savings | The energy or peak demand savings attributable to conservation and demand management activities, net of free-riders, spill over, etc. |
| OEB | The Ontario Energy Board; Ontario's independent energy regulator, tasked with overseeing how energy companies operate to ensure the public interest is served |

GLOSSARY

| Term | Description |
|------------------------|--|
| P4P | Pay for performance. CFF funding mechanism whereby LDCs are paid a \$/kWh rate for a particular program. |
| Peak Demand Savings | Peak Demand savings attributable to conservation and demand management activities, as determined by the IESO's EM&V Protocols. |
| Pilot Program | A program pilot that may achieve energy or demand savings and is funded separately from an LDC's CDM Plan Budget. |
| Policy | Government document that sets forth goals for a particular sector, for example, the energy sector's Long Term Energy Plan. |
| Program | A Conservation & Demand Management offering focusing on a particular opportunity or customer end-use (e.g. Coupon; or Retrofit;) from the 2015-2020 Conservation First Framework. |
| Progress or Comparison | An assessment of actual results versus verified and unverified results. |
| Province-Wide Program | Programs available to all LDCs to deliver and that are consistent across the province. |
| Regional Program | Programs designed by LDCs to serve their region and approved by the IESO. |
| Tx | Transmission |
| Unverified | Program activity savings and expenditures as determined by the LDC. For savings: 1) for prescriptive projects/programs: calculating quantity x prescriptive savings assumptions; and 2) for engineered or custom program projects/programs: calculated using prescribed methodologies. |
| Verified | The IESO's annually EM&V assessed program activity, savings, net-to-gross, expenditures and cost effectiveness. |