

# Mid-Term Review: 2015-2020 Conservation Framework

2<sup>nd</sup> Mid-term Review Public Webinar:  
Definition of Conservation and Demand  
Management (CDM) in Ontario

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July 6<sup>th</sup>, 2017

# Today's Agenda

- Conservation Mid-term Review overview and plan update
- 2<sup>nd</sup> current state summary: definition of conservation and demand management (CDM) in Ontario
- Key questions related to the review of the definition of CDM:
  1. Is the list of possible CDM technologies and services (outlined in this document) to be assessed for alignment against policy objectives in Ontario complete?
    - What other technologies or services should be considered? Why?
  2. What technologies and services should be eligible under the definition of CDM in the second half of the framework in order to support the policy objectives of the Government of Ontario? Why?
    - Are there any technologies or services that are currently eligible that should not be eligible in the second half of the framework? Why?
  3. What factors or parameters should be established/considered for any eligible technologies or services? (e.g. other available sources of funding, impact on peak demand, and etc.)
- Next steps (including how to submit written feedback and comments)

# Section 1:

## Mid-term Review Overview & Plan Update

- I. Mid-term Review Overview and Outcomes
- II. Project Plan Update

# Overview: Conservation Framework Mid-term Review

- The IESO has initiated the mid-term review of CFF and IAP, including a formal engagement process with the establishment of the Conservation Mid-Term Review Advisory Group
  - Multiple opportunities for all interested parties to provide input to review
  - Completion required by June 1, 2018 per Direction; IESO planning to complete Q1 '18
  - Advisory Group membership includes LDCs, customers, service providers and manufacturers
- IESO is implementing a Mid-Term Review Work Plan that includes an in-depth analysis of seven elements:
  - 1) Customer and market engagement; 2) definition of CDM; 3) collaboration; 4) governance and operations; 5) planning integration; 6) climate change; 7) budgets, targets and cost-effectiveness (including non-energy benefits)
- Review will assess CFF and IAP implementation against any stated policy goals within directions from the Minister of Energy and LTEP
- As an outcome of the review, IESO will provide recommendations to the Minister of Energy to address any identified challenges or opportunities

# Anticipated outcomes of Mid-term review

- Allocated LDC targets/budgets that are achievable
- Plan for addressing any LDC target gaps
- Plan/solutions to address outstanding needs identified by customers
  - E.g. multi-site customers; low-income customers
- Plan for establishing a target exchange mechanism should one be needed
  - Options presented/assessed for structure of target exchange: LDC only, open market, others
- Tools to ensure Conservation delivers system value when/where needed
  - Programs to address peak demand/local planning needs
- Conservation programs to support Ontario's climate change objectives
- Government direction (if needed) to achieve the above
- Options for delivering energy efficiency beyond 2020

# MID-TERM REVIEW STUDY PLAN

Issues were identified by the IESO and grouped into seven major topics that will guide the Framework Review through four key activities outlined below. The non-energy benefits topic will **now** be explored as part of the final report pending inputs external to this study.

Current State Summaries		Market Research	Opportunities	Final Study Report
Topics	Report Date	Objectives:		
Customer and market engagement and satisfaction	March 16	<b>Objectives:</b> <ul style="list-style-type: none"> <li>To confirm and enhance content of the topic reports</li> <li>To gather insights into future framework improvements, design, and delivery</li> </ul>	Research, analysis, market research inform potential modifications  Cost-benefit and gap analysis to scope opportunities  Consolidated list of short-term (within 1 year), medium-term (before 2020), and long-term (post 2020) opportunities for prioritization by the IESO	Consolidation of findings, feedback, and identification of issues and opportunities  Methodologies and approach clearly discussed  <b>Out of Scope:</b> <ul style="list-style-type: none"> <li>New mass market research</li> <li>2011-14 framework in-depth analysis</li> <li>New program design</li> <li>LDC Mid-term incentive</li> <li>Evaluation Measurement &amp; Verification protocols</li> <li>Codes and Standards</li> </ul>
Definition of CDM	April 20			
Collaboration	April 20			
Governance & operations	May 18			
Planning integration	June 15			
Climate change	July 13			
Budgets, targets, cost effectiveness	August 17			
		May to August	September/October	November to February

# Section 2:

## Topic 2 Current State Summary – Definition of Conservation and Demand Management (CDM)

- I. Segmentation and Definitions
- II. CDM in Ontario
- III. Jurisdictional Scan



# CONSERVATION FRAMEWORK MID-TERM REVIEW

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SECTION 2: CURRENT STATE SUMMARY -  
DEFINITION OF CDM



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## FOCUS AREAS AND KEY QUESTIONS ABOUT THE CURRENT STATE

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 **Definition of CDM** topic.

### Key Questions

- How has the definition of CDM changed over time in Ontario?
- Is the current definition appropriate to achieve the policy objectives of the framework and to align with Ontario’s broader GHG reduction goals?
- How does the definition of CDM in Ontario align with the definition of CDM/DSM in other jurisdictions?

### Focus Areas

- I. Conservation First Framework:
  - Defining CDM
  
- II. Industrial Accelerator Program:
  - Defining CDM

Note: the definition of CDM topic crosses other topics. Some examples include:

Topic 1: Customer and market engagement and satisfaction	How does the inclusion or exclusion of certain technologies impact customer engagement with the framework?
Topic 5: Planning integration	How does the definition of CDM interact with system planning? How are planning and CDM goals impacted by technologies that are included or excluded?
Topic 7: Climate change	Do the technologies included support climate change goals?
Topic 8: Budgets, targets, cost effectiveness	What is the impact of adding or removing technologies on the ability to cost-effectively reach targets?

## TOPIC 2 CURRENT STATE SUMMARY

This current state summary is organized by the sections outlined in the table below. The sections are designed to address one or more of the focus areas identified.

Section	Description	Focus Area
I. Segmentation and Definitions	Review the segmentation of the technologies investigated and define each technology and the benefits it typically brings to customers and system operators.	<ul style="list-style-type: none"> <li>Defining CDM</li> </ul>
II. CDM in Ontario	Description of the technologies currently included in the definition of CDM and those that are excluded. Review of the evolution of the definition of CDM in Ontario and policies that impact the definition and adoption of CDM.	<ul style="list-style-type: none"> <li>Defining CDM</li> </ul>
III. Jurisdictional Scan	Description and justification of the jurisdictions considered in the review. High-level review of the selected jurisdictions from a broader policy perspective. Matrix of technologies and methods by jurisdiction followed by observations and key findings.	<ul style="list-style-type: none"> <li>Defining CDM</li> </ul>

## SECTION 2: TOPIC 2 CURRENT STATE SUMMARY – DEFINITION OF (CDM)

### I. SEGMENTATION AND DEFINITIONS

## TECHNOLOGIES AND APPROACHES ASSESSED

- Demand side management (DSM) is an umbrella term that typically refers to energy efficiency and demand response
- This review will investigate all major DSM activities and also includes distributed energy resources (DER) given the increasing importance of distributed energy resources and the fact that much of this activity happens behind the meter
- For the purpose of this report, each technology and approach assessed was mapped to a category for ease of review

Category	Category Description	Technology/Approach	
<b>Energy Efficiency</b>	Technology or approaches that result in less energy to perform the same function.	<ul style="list-style-type: none"><li>• Resource acquisition</li><li>• Market transformation</li><li>• Behavioural</li></ul>	<ul style="list-style-type: none"><li>• Performance-based funding</li><li>• Voltage reduction</li><li>• Pilots/Research &amp; Development</li></ul>
<b>Demand Response</b>	Technology or approaches that enable energy shifting or reduction during certain times.	<ul style="list-style-type: none"><li>• Direct load control</li><li>• Demand Response capacity</li></ul>	<ul style="list-style-type: none"><li>• Time-of-use pricing</li><li>• Critical peak pricing</li></ul>
<b>Distributed Energy Resources</b>	Behind-the-meter or distribution-connected generation or storage resources that supply all or part of a customer's electricity use.	<ul style="list-style-type: none"><li>• Solar Photovoltaic (PV)</li><li>• Solar PV-storage</li><li>• Storage</li><li>• Combined Heat &amp; Power</li></ul>	<ul style="list-style-type: none"><li>• Electric Vehicles</li><li>• Microgrids</li><li>• Pilots/Research &amp; Development</li></ul>

## ENERGY EFFICIENCY DEFINITIONS

- The following table outlines the definition of each energy efficiency technology and approach investigated including some examples of each

Technology/Approach	Description	Examples
Resource acquisition	Programs that promote products and practices used by energy consumers that drive investments in the short-term; includes fuel switching actions such as electricity to solar/geothermal heating	Retrofit program, small business lighting program, coupon program
Market transformation	Programs that create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of energy efficiency measures	Voluntary standards, new approaches to building management
Behavioural	Programs focused on behavioral transformation of energy use of end consumers	Social benchmarking, home energy reports
Performance-based funding	Performance-based incentive payment calculated via use of whole-building advanced metering infrastructure (AMI) and associated analytics	ESCO model whereby project is financed and developed by the ESCO and payment is per unit of saving
EE Pilots/Research & Development	Trial initiatives to test new approaches and strategies for delivering energy efficiency to customers	IESO Pay for Performance for multi-site customers, building optimization
Voltage reduction	Reduction of energy consumption resulting from a reduction of feeder voltage/voltage optimization (applied to distribution system infrastructure – in front of the meter)	Voltage optimization through reactive power compensation, ground wire loss reduction

## DEMAND RESPONSE DEFINITIONS

- The following table outlines the definition of each demand response technology and approach investigated including some examples of each

Technology/Approach	Description	Examples
Direct load control	Programs focused on automatically shifting customer load in response to signals from the system operator or aggregator	Ontario's <i>peaksaver</i> PLUS program
Demand Response Capacity	Programs focused on customers shifting load in response to signals from the system operator or aggregator	Ontario's former Demand Response programs (DR1, DR2)
Time-of-use pricing	Programs that modify customer-facing pricing into pricing tiers based on the time of day (and/or season)	Ontario's time-of-use pricing regime
Critical peak pricing	Programs that align the highest system peaks with customer-facing pricing	Critical peak pricing, critical peak rebates

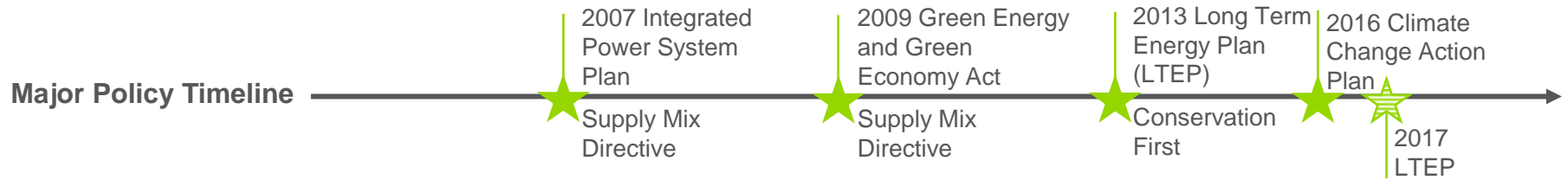
## CUSTOMER DISTRIBUTED ENERGY RESOURCE DEFINITIONS

- The following table outlines the definition of each distributed energy resource technology and approach investigated for the customer type including some examples of each

Technology/Approach	Description	Examples
Solar PV	Solar PV cited on customer premise, delivered via a utility or 3 <sup>rd</sup> party partner	Micro feed-in-tariff programs
Solar PV-storage	Combination of solar PV and storage technologies into a customer-sited nanogrid	Alectra's (formerly PowerStream) POWER.HOUSE
Storage	Utility incentives designed to accelerate adoption of storage technology. Programs may enable the utility to utilize stored power during peak events	TESLA Powerwall
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 <sup>1</sup>	Natural gas powered CHP for hospitals, waste energy recovery for pulp and paper facilities
Electric Vehicles	Plug-in electric vehicles as they relate to the ability to shift and manage customer load or use as storage	Electric vehicle charging rates, direct load control devices on charging
Microgrids	Programs or pilots that promote microgrids (combination of storage technology and generation resources). Can consider resiliency/islanding in response to physical or economic conditions	Customer-sited microgrids (solar PV, storage, combined heat and power)
Pilots/Research & Development	Trial initiatives to test new approaches and strategies for delivering distributed energy resources to the grid	Smart grid fund intelligent electric vehicle charging stations

# EVOLUTION OF THE DEFINITION OF CDM IN ONTARIO – LONG TERM VIEW

- The definition of CDM is set by guiding policies which specify overarching, long-term CDM goals/targets at the provincial level, these goals/targets have historically included a broad range of CDM activities



	2005-2007	2008-2010	2011-2014	2015-2020			
Guiding policy	<ul style="list-style-type: none"> <li>15 specific directives</li> </ul>	<ul style="list-style-type: none"> <li>Integrated Power System Plan</li> <li>Supply Mix Directive</li> </ul>	<ul style="list-style-type: none"> <li>Green Energy and Green Economy Act</li> <li>Supply Mix Directive</li> </ul>	<ul style="list-style-type: none"> <li>Long Term Energy Plan</li> <li>Conservation First</li> </ul>			
Long term goals/targets	N/A	3,600 <b>MW</b> by 2025	7,100 <b>MW</b> and 28 <b>TWh</b> by 2030	30 <b>TWh</b> by 2032			
Definition of CDM	2005-2007	2008-2010	2011-2014	2015-2020			
Energy Efficiency							
Behavioural Conservation							
Fuel Switching*							
Self/Co Generation					< 10 MW	< 10 MW	< 10 MW Excl. FIT and mFIT
Demand Management							
Natural Conservation							

\* When established, Fuel Switching referred to a transition from electricity to natural gas resulting in a reduction in electricity use



## SECTION 2: TOPIC 2 CURRENT STATE SUMMARY – DEFINITION OF (CDM)

### II. CDM IN ONTARIO

# EVOLUTION OF THE DEFINITION OF CDM IN ONTARIO – SHORT TERM VIEW (DX)

- The definition of CDM for the purposes of short-term targets is set by specific directives, these targets have historically included a subset of CDM activities that are included in long term goals/targets
- The table below outlines the targets for distribution connected (Dx) customers programs over time and the activities both included in the definition of CDM and supported through programs

	2005-2007	2008-2010	2011-2014	2015-2020
Primary target responsibility	Former OPA (IESO)	Former OPA (IESO)	LDCs	LDCs
Short term goals/targets	1,350 MW	Additional 1,350 MW	1,330 MW and 6,000 GWh between 2011 and 2014	7 TWh by 2020

Definition of CDM		2005-2007	2008-2010	2011-2014	2015-2020
Energy Efficiency	Other programs				
	LDC programs*				
	IESO programs				
Behavioural Conservation					
Fuel Switching					
Self/Co Generation	Renewables	<500 kW			<10 MW
	CHP**	<10 MW			<10 MW
Demand Management					
Natural Conservation					

## SECTION 2: TOPIC 2 CURRENT STATE SUMMARY – DEFINITION OF (CDM)

### II. CDM IN ONTARIO

# EVOLUTION OF THE DEFINITION OF CDM IN ONTARIO – SHORT TERM VIEW (TX)

- The definition of CDM for the purposes of short-term targets is set by specific directives, these targets have historically included a subset of CDM activities that are included in long term goals/targets
- The table below outlines the targets for transmission connected (Tx) customers programs over time and the activities both included in the definition of CDM and supported through programs

	2005-2007	2008-2010	2011-2014	2015-2020
Primary target responsibility	N/A	N/A	Former OPA (IESO)	IESO
Short term goals/targets	N/A**	N/A**	300 MW by June 2015	1.7 TWh by 2020

Definition of CDM	2005-2007	2008-2010	2011-2014	2015-2020
Energy	Other programs			
Efficiency	LDC programs			
	IESO programs			
Behavioural Conservation				
Fuel Switching				
Self/Co Generation	Renewables			<20 MW
	CHP*			<20 MW
Demand Management				
Natural Conservation				

## ELIGIBILITY AND ALIGNMENT WITH POLICY OBJECTIVES

• The following table outlines whether a particular technology or approach is currently eligible to be considered CDM within Conservation First Framework and Industrial Accelerator Program per Directions and which policy objectives the technology or approach aligns with; note: pilots/research and development are not included

Technology/ Approach	Eligible as CDM?	Policy Objectives						
		Initial					Evolving	
		Integration with Regional Planning	Customer Choice	Peak Reduction	Innovation	Market Transformation	Greenhouse gas reductions	Energy Affordability
Resource acquisition	Y	○	●	◐			●	●
Market transformation*	Y	○	●	○		●	●	●
Behavioural	Y	○	●	◐	●	●	●	●
Performance- based funding	Y	○	●	◐	●	●	●	●

Alignment:      ● High      ◐ Moderate      ○ Low

\* Recall: Market Transformation refers to programs that create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of energy efficiency measures

## ELIGIBILITY AND ALIGNMENT WITH POLICY OBJECTIVES

- The following table outlines whether a particular technology or approach is currently eligible to be considered CDM within Conservation First Framework and Industrial Accelerator Program per Directions and which policy objectives the technology or approach aligns with; note: pilots/research and development are not included

Technology/ Approach	Eligible as CDM?	Policy Objectives						
		Initial					Evolving	
		Integration with Regional Planning	Customer Choice	Peak Reduction	Innovation	Market Transformation	Greenhouse gas reductions	Energy Affordability
Direct load control	N	○	○	●			●	○
Demand Response Capacity	N	●	◐	●			●	◐
Time-of-use pricing	N		◐	●		●	●	◐
Critical peak pricing	N	●	◐	●			●	◐

Alignment:      ● High      ◐ Moderate      ○ Low

## ELIGIBILITY AND ALIGNMENT WITH POLICY OBJECTIVES

- The following table outlines whether a particular technology or approach is currently eligible to be considered CDM within Conservation First Framework and Industrial Accelerator Program per Directions and which policy objectives the technology or approach aligns with; note: pilots/research and development are not included

Technology/ Approach	Eligible as CDM?	Policy Objectives						
		Initial					Evolving	
		Integration with Regional Planning	Customer Choice	Peak Reduction	Innovation	Market Transformation	Greenhouse gas reductions	Energy Affordability
Voltage reduction	N	●		◐	●			
Solar PV	Y <sup>1</sup>	●	●	●	●		●	●
Solar PV-storage	N	●	●	●	●		●	●
Storage	N	●	●	●	●		●	●
Combined Heat and Power	Y	●	●	●			○	●
Electric Vehicles	N	●	●		●		●	
Microgrids	N	●	●	●	●		◐	●

Alignment: ● High      ◐ Moderate      ○ Low

## PRELIMINARY OBSERVATIONS

### How has the definition of CDM changed over time in Ontario?

- Targets have shifted from province-wide peak demand to LDC-level energy targets driven by larger policy goals which, in turn, lead to government directives
- In the past (pre-2008), progress included savings funded outside of IESO (then OPA) CDM programs (Renewable Energy Standard Offer Programs, Enwave, third tranche funding for LDCs)
- Combined Heat and Power was formally added to be considered as progress to targets
- Savings from time-of-use was previously included
- The context of fuel switching has changed over time as the needs of the bulk electricity system have changed – in 2006 fuel switching was moving from, for example, electricity to natural gas which reduces peak electric capacity; more recently, fuel switching can mean switching to electricity from natural gas to reduce greenhouse gas emissions
- The definition of CDM that is counted towards targets has changed over time and targets have shifted from broad, province-wide energy and demand reduction targets to localized, LDC energy targets

### Is the current definition appropriate to achieve the policy objectives of the framework and to align with Ontario's broader GHG reduction goals?

- There are several technologies and approaches currently not included in the definition of CDM that have both customer and system benefits and align with one or more of the Government's policy objectives
- Interactions with other policies must also be taking into consideration (e.g., net metering, industrial conservation initiative)
- All technologies and approaches align with some policy objectives, but not all align with GHG reduction goals
- Interaction with other policies should be considered
- Fuel switching must be considered in the context of broader climate objectives, for example, electrification implies an increase in electricity use, however, could there be a role for CDM to ensure electrification is as efficient as possible

## JURISDICTIONS REVIEWED

- IESO is unique among system operators in its role with CDM programs that go beyond energy efficiency activities (e.g., long-term system planning, demand response, regional planning, procurement)
- As it pertains specifically to CDM activities, six jurisdictions were selected that are among the most mature and progressive worldwide

<b>Canada</b>	<p>Nova Scotia British Columbia</p>	<ul style="list-style-type: none"> <li>• Nova Scotia and BC Hydro have historically had the highest DSM spending per customer in Canada</li> </ul>
<b>USA</b>	<p>California Massachusetts Vermont New York</p>	<ul style="list-style-type: none"> <li>• California, Massachusetts, and Vermont placed 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> respectively in the ACEEE (American Council for an Energy-Efficient Economy) <i>2016 Energy Efficiency Scorecard</i></li> <li>• New York placed 5<sup>th</sup> on the scorecard, but is a meaningful addition as it is one of the most progressive jurisdictions with respect to expanding investment in DER</li> <li>• All of these jurisdictions have diverse and mature program portfolios and a high level of energy savings achievement (as a % of sales)</li> </ul>
<b>Not Selected</b>	<p>Europe PJM Australia</p>	<ul style="list-style-type: none"> <li>• Certain jurisdictions in Europe, such as Germany, are leaders in CDM activities, however they are generally poor comparables to North American jurisdictions                             <ul style="list-style-type: none"> <li>• EE in Europe is generally defined more broadly as inclusive of transportation and all fuel types. In addition, the lead delivery and reporting agents are typically governmental bodies, with a priority focus on building codes and appliance standards, as opposed to measure level incentives</li> </ul> </li> <li>• PJM Interconnection does not <u>oversee</u> DSM or DER programming or investment.</li> <li>• Australia did not rank highly on the ACEEE international scorecard</li> </ul>

## TYPICAL FUNDING SCHEMES - CONTEXT

- Each technology and approach was assessed against three funding categories listed below. In addition, the assessment specified whether the technology or approach is fully funded or if the funding is uncertain (e.g., pilot programs, changing funding mechanisms, or retiring funding mechanisms)

Funding Category	Description	
<b>DSM</b>	Funding is primarily sourced from an energy efficiency/demand-side management plan that is typically regulator approved. Plans generally cover 1-3 years. Costs are typically recovered as an operating expense included in tariffs, but may also be recovered via a special charge (e.g., Vermont). Funding relates to electricity DSM only.	<b>DSM</b>
<b>Other Ratepayer</b>	“Other ratepayer” is used to represent funding that is not approved as part of a DSM budget, but rather is separately approved as part of a different filing request or operating budget. ‘Separate filings’ may include e.g. required smart grid plans or grid modernization plans. Costs are typically recovered as an operating expense included in tariffs, but may also be recovered via a special charge (e.g., California).	<b>OR</b>
<b>Other Funding (Including typically a mix of public/taxpayer, non-utility, and ratepayer)</b>	Particularly for new Distributed Energy Resource (DER) investments, there may be special public funding used by a utility partner that is leading the investment. For instance, BC Hydro’s Field, BC grid storage project was developed with support from the Canada Clean Energy Fund, or cap and trade revenues in California. This category indicates that funding for existing or newly planned activities has been sourced from what may be a combination of ‘other public’ and varying levels of ratepayer funds. Funding support may also be derived from non-utility revenue streams that are linked to specific DER initiatives (e.g. digital platform advertising).	<b>OF</b>



## ENERGY EFFICIENCY – TYPICAL FUNDING SCHEMES

- Customer EE programs are typically funded as part of DSM regulatory plans
- Voltage reduction is funded outside of DSM budgets, and is generally viewed by utility commissions as a prudent operational enhancement and not a DSM activity

## Predominant Funding Source

DSM

Other Ratepayer

Other (e.g., taxpayer)

## Indicator

DSM

OR

OF

EE Activity	Ontario	British Columbia	Nova Scotia	Massachusetts	California	Vermont	New York
Resource acquisition	DSM	DSM	DSM	DSM	DSM	DSM	DSM
Market transformation	DSM	DSM	DSM	DSM	DSM	DSM	DSM
Behavioural	DSM	DSM	DSM	DSM	DSM	DSM	DSM
Performance-based funding	DSM	-	-	DSM	DSM	-	DSM
Voltage reduction	OF, OR	OR	OR	OR	OR	OR	OR

## DEMAND RESPONSE – TYPICAL FUNDING SCHEMES

- Direct Load Control is typically a DSM activity, bundled as part of e.g. a ‘Smart A/C’ program, however it can also separately be introduced as a smart grid initiative outside of DSM plans and proceedings
- Most jurisdictions offer Time-of-use and Critical Peak Pricing tariffs (Yes indicates that a pricing program is available to customers either on a mandatory or voluntary basis)

Predominant Funding Source	Indicator
DSM	<b>DSM</b>
Other Ratepayer	<b>OR</b>
Other (e.g., taxpayer)	<b>OF</b>

DR Activity	Ontario	British Columbia	Nova Scotia	Massachusetts	California	Vermont	New York
Direct load control	OR	DSM ^	DSM *	DSM	DSM	-	DSM
Demand Response Capacity	OR	DSM	-	OR, DSM	OR, DSM	OR, DSM	OR, DSM
Time of Use Rates	YES	NO	YES	YES	YES	YES	YES
Critical Peak Pricing	YES <sup>T</sup>	NO	YES**	YES	YES	YES	YES

<sup>^</sup> New pilot activity in 2015 using 103 homes and 4 businesses focused on residential hot water.

<sup>\*</sup> This has been piloted in collaboration with Nova Scotia Power and New Brunswick Power, and is also offered by the Berwick Electric Commission in Berwick, NS. (<http://www.nrcan.gc.ca/energy/funding/current-funding-programs/cef/4975>)

<sup>\*\*</sup> Nova Scotia Power offers ‘one-part real time pricing’ and interruptible tariffs for very large customers that are categorically similar to CPP.

<sup>T</sup> Ontario has a program allowing large customers with certain NAICS codes and peak demand greater than 500 kW to offset peak during the top 5 hours of the year and pay lower rates. In addition, there are CPP pricing pilots underway for residential customers.

## DISTRIBUTED ENERGY RESOURCES – TYPICAL FUNDING SCHEMES

- Combined Heat and Power may fall under either DSM or as part of broader initiatives that include state or provincial funding
- Electric Vehicle incentives directly to customers are uncommon, these incentives are more generally captured in the form of purchase rebates and charging infrastructure initiatives

Predominant Funding Source	Indicator
DSM	DSM
Other Ratepayer	OR
Other (e.g., taxpayer)	OF

DER Activity	Ontario	British Columbia	Nova Scotia	Massachusetts	California	Vermont	New York
Solar PV	OR	-	-	OF	OR, OF	-	OF
Solar PV-storage	^	-	-	OF	OR	OF	OF
Storage	OR	-	%	#	OR	OR	OR
Combined Heat and Power	DSM	OR	OF *	DSM	OF	DSM	OF
Electric Vehicles (EVs)	OF	-	-	-	OF **	-	-
Microgrids	OF	-	-	-	OF	-	OF

^ Alectra (former PowerStream) Ontario is running a solar PV storage pilot.

\* As part of the Nova Scotia Community Feed in Tariff Program (COMFIT), administered by the Nova Scotia DOE but no longer accepting applications. <https://energy.novascotia.ca/renewables/programs-and-projects/comfit>

\*\* Southern California Edison, for example, offers a special metered EV rates.

# Massachusetts is currently developing an energy storage target, 2020 mandates expected to be set in July 2017.

% Very small pilot project <http://www.nspower.ca/en/home/newsroom/news-releases/clean-energy-project.aspx>

## PRELIMINARY OBSERVATIONS

### How does the definition of CDM in Ontario align with the definition of CDM/DSM in other jurisdictions?

- IESO is unique among system operators given the unique structure of Ontario’s electricity system (e.g. IESO and ~70 LDCs)
- In other jurisdictions (not Ontario), DSM plans and the funding allocated to them, focus primarily on energy efficiency and demand response programs, although CHP may be included as well as pilot/R&D budgets
- In other jurisdictions (not Ontario), DR investments are typically part of DSM plans, including e.g. direct load control programs, smart appliance programs, and behavioural programs
- DER investments are supported most commonly by a combination of ratepayer (operating expense, specific/required funding request\*, or surcharge) and public (e.g. provincial/state/federal) clean energy grants and funds, as well as non-utility revenue streams and operational cost savings. \*E.g. requirements to develop and submit ‘smart grid’ or ‘grid modernization’
- In most other jurisdictions, Voltage reduction (VR) is funded outside of DSM budgets, and is generally viewed by regulators as a prudent operational enhancement and not a DSM activity. In Massachusetts VR has been funded as part of ‘grid modernization’, and in California, where many utilities have been actively pursuing voltage reduction for decades, voltage reduction studies to find additional incremental savings have been part of smart grid pilot initiatives. Navigant is aware, however, of certain jurisdictions/utilities that have included CVR in DSM budgets (e.g. PECO in Pennsylvania)
- Generally, DSM includes the technologies included under “customer energy efficiency” and “dispatchable demand response” (as defined in this report)
- DER and smart grid investments are typically funded outside of DSM
- The treatment of both combined heat and power and voltage reduction varies across jurisdiction; voltage reduction is generally not funded out of DSM budgets

## NEXT STEPS

**Based on the preliminary assessment of the current state of definition of CDM, the following areas will be considered in the market research phase:**

- Understand the interactions between this report and other current state summaries (e.g., collaboration, climate change, planning integration, budgets and targets)
- Consider policy interactions during market research phase (e.g., net metering and Industrial Conservation Initiative) and the impact on adoption of different technologies and approaches
- Where a technology/approach should be funded is not a simple policy question and there are many considerations, for example:
  - Scale (cross with topic 3 - collaboration):
    - DERs are promoted in many jurisdictions through both government and private funding which may require scale to successfully promote adoption
    - Demand response can be funded both locally and through the IESO with different objectives. The structure of the jurisdiction and local vs. system needs have a large impact on how the funding/program administration is structured
    - Cost/benefit equity (alignment between those who fund a resource and those benefit from a resource on a time and geographic scale)
  - Market/System (cross with topic 5 - planning integration):
    - The degree to which (1) the resource is needed (e.g., renewable integration and the need for balancing resources); and (2) the market can support the ability to earn revenues (e.g., capacity costs and reserve margins, ancillary services markets, technology to provide automated demand response, dynamic pricing (rate structures)
  - Policy goals (cross with climate change + planning integration):
    - Is grid modernization a goal and/or promoted elsewhere?
    - What is the role of the regulator?

# Section 4: Key Questions and Next Steps for Engagement Participants

# Key questions for engagement participants

IESO invites your written input on the following key questions (and any other aspect of the definition of CDM):

1. Is the list of possible CDM technologies and services (outlined in this document) to be assessed for alignment against policy objectives in Ontario complete?
  - What other technologies or services should be considered? Why?
2. What technologies and services should be eligible under the definition of CDM in the second half of the framework in order to support the policy objectives of the Government of Ontario? Why?
  - Are there any technologies or services that are currently eligible that should not be eligible in the second half of the framework? Why?
3. What factors or parameters should be established/considered for any eligible technologies or services? (e.g. other available sources of funding, impact on peak demand, and etc.)

# Next steps

- Please send written comments to [engagement@ieso.ca](mailto:engagement@ieso.ca) by July 20, 2017
- IESO will post responses to questions in August 2017
- Next Mid-term Review webinar to be held in summer of 2017 on the climate change topic
- Access full versions of study plan/1<sup>st</sup> topic report on the Mid-term Advisory Group website and remain engaged via:

<http://www.ieso.ca/sector-participants/engagement-initiatives/engagements/conservation-framework-mid-term-review>





APPENDIX A:  
POLICY CONTEXT

## POLICY CONTEXT

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

**LTEP refers simply to “Conservation” as a broad term. The current landscape of demand response (DR) initiatives was laid out in the 2013 LTEP which charged the former-IESO with evolving current programs and integrating DR into the grid:**

- “Ontario is aiming to use DR to meet 10% of peak demand by 2025, equivalent to approximately 2,400 MW under forecast conditions. To encourage further development of DR in Ontario, the IESO will evolve existing programs and introduce new initiatives. [...] The IESO, as the system operator, is in the best position to enable these large consumers to provide DR to the grid in a manner that puts DR on par with comparable generation options.”

**2014 Ministerial Directions to OPA (now IESO) for Conservation First Framework and Industrial Accelerator Program provide the following definition of CDM:**

- *Conservation First Framework*
  - “The OPA shall consider CDM to be inclusive of activities aimed at reducing electricity consumption and reducing the draw from the electricity grid, such as geothermal heating and cooling, solar heating and small scale (i.e. <10MW) behind the meter customer generation. However, CDM should be considered to exclude those activities and programs related to a Distributor’s investment in new infrastructure or replacement of existing infrastructure, any measures a Distributor uses to maximize the efficiency of its new or existing infrastructure, activities promoted through a different program or initiative undertaken by the Government of Ontario or the OPA, such as the OPA Feed-in Tariff (FIT) Program and micro-FIT Program and activities related to the price of electricity or general economic activity.”
- *Industrial Accelerator Program*
  - “The OPA shall consider CDM to be inclusive of activities aimed at reducing electricity consumption and reducing draw from the electricity grid, including behind the meter customer generation.”

**Dec. 2016 Ministerial Direction to IESO**

- “The final FIT application period will be held in 2016. The IESO shall cease accepting applications under the FIT program by December 31, 2016 and any unallocated procurement target at the end of the procurement process will remain unallocated.”



APPENDIX B:  
GLOSSARY

## GLOSSARY

Term	Description
DSM	Demand Side Management – an umbrella term that typically refers to energy efficiency and demand response
EE	Energy efficiency - Technology or approaches that result in less energy to perform the same function.
DR	Demand Response - Technology or approaches that enable energy shifting or reduction during certain times.
DER	Distributed Energy Resources - Behind-the-meter or distribution-connected generation or storage resources that supply all or part of a customer's electricity use
Dx	Distribution connected (connected to the distribution system)
Tx	Transmission connected (connected to the transmission system)
Resource acquisition	Programs that promote products and practices used by energy consumers that drive investments in the short-term.
Market transformation	Programs that create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of energy efficiency measures.
Behavioural	Programs focused on behavioral transformation of energy use of end consumers.
Performance-based funding	Performance-based incentive payment calculated via use of whole-building advanced metering infrastructure (AMI) and associated analytics.
R&D, pilots	Research and development, trial initiatives to test new approaches and strategies.

## GLOSSARY

Term	Description
Voltage reduction	Reduction of energy consumption resulting from a reduction of feeder voltage/voltage optimization.
Direct load control	Programs focused on automatically shifting customer load in response to signals from the system operator or aggregator.
Demand Response Capacity	Programs focused on customers shifting load in response to signals from the system operator or aggregator.
TOU	Time-of-use pricing, Programs that modify customer-facing pricing into pricing tiers based on the time of day (and/or season).
Critical peak pricing	Programs that align the highest system peaks with customer-facing pricing.
Solar PV	Solar photovoltaic (PV) cited on customer premise, delivered via a utility or 3 <sup>rd</sup> party partner
Solar PV-storage	Combination of solar PV and storage technologies into a customer-sited nanogrid.
Storage	Utility incentives designed to accelerate adoption of storage technology. Programs may enable the utility to utilize stored power during peak events.
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.
Electric Vehicles	Plug-in electric vehicles as they relate to the ability to shift and manage customer load or use as storage.
Microgrids	Programs or pilots that promote microgrids (combination of storage technology and generation resources). Can consider resiliency/islanding in response to physical or economic conditions.