



Ontario Energy Board

Staff Discussion Paper

on a Cap and Trade Regulatory Framework for the Natural Gas Utilities

EB-2015-0363

May 25, 2016

Table of Contents

1	Introduction.....	1
1.1	Organization of this Paper	2
2	Cap and Trade Markets	3
2.1	Cap and Trade Fundamentals	3
2.2	Ontario’s Cap and Trade Program.....	5
3	Guiding Principles of Framework	8
4	Compliance Plans.....	9
4.1	Issues and Options	11
4.1.1	Regulatory Approach to Compliance Plans	12
4.1.2	Duration of Compliance Plans	12
4.1.3	Forecasting	13
4.1.4	Compliance Plan Assessment	16
4.1.5	Treatment of longer term investments	24
4.2	California and Québec Markets	25
5	Cost Recovery	28
5.1	Issues and Options	29
5.1.1	Cost Causation.....	29
5.1.2	Cost Allocation	30
5.1.3	Rate Design and Bill Presentment.....	30
5.1.4	Rate Setting Approaches	32
5.2	California and Québec Markets	35
6	Monitoring and Reporting.....	37
6.1	Issues and Options	37
6.2	California and Québec Markets	38
7	Customer Outreach and Education	39
7.1	Issues and Options	39
7.2	California and Québec Markets	40
8	Confidentiality of Cap and Trade Information.....	42
9	Other Issues.....	49
	Appendix A: Glossary.....	I
	Appendix B: Marginal Abatement Cost Curve (MAAC).....	VII

1 Introduction

The OEB is developing a framework to support the successful implementation of the provincial government's Cap and Trade program by the rate-regulated natural gas utilities: Enbridge Gas Distribution Inc. (Enbridge), Natural Resource Gas Limited (NRG), and Union Gas Limited (Union) ("the natural gas utilities"). The framework will outline the OEB's approach for assessing the cost consequences of the natural gas utilities' plans for complying with the Cap and Trade program and establishing a mechanism for recovery of these costs in rates.

On May 18, 2016, the *Climate Change and Low-Carbon Economy Act, 2016* ("*Climate Change Act*") received Royal Assent. On May 19, 2016, *Ontario Regulation 144/16, The Cap and Trade Program* ("*Cap and Trade Regulation*"), was issued, which provides details about the Cap and Trade program. The *Climate Change Act* and the *Cap and Trade Regulation* establish the details of a Cap and Trade program for the purposes of reducing greenhouse gas ("GHG") emissions in Ontario.

Under the *Climate Change Act*, the OEB rate-regulated natural gas utilities will have the following compliance obligations:

- Facility-related obligations for their owned or operated facilities
- Customer-related obligations for natural gas-fired generators and residential, commercial and industrial customers who are not Large Final Emitters (LFEs) or voluntary participants¹

As a result, the natural gas utilities will need to develop Compliance Plans to describe how they will meet their customer- related and facility-related compliance obligations. It is expected that the natural gas utilities' Compliance Plans will support the government's effort to reduce GHG emissions in Ontario.

According to the *Climate Change Act*, the Cap and Trade program will begin on January 1, 2017. The first compliance period will run from January 1, 2017 until December 31, 2020, with subsequent three-year compliance periods.

¹ Large Final Emitters are defined as mandatory participants that emit >25,000 tonnes of CO₂e per year. Voluntary participants are defined as customers who have chosen to participate in the Cap and Trade program ("opt in"). These customers emit between 10,000 and 25,000 tonnes of CO₂e per year

This Discussion Paper sets out OEB staff's initial thoughts on the key elements, issues and options for the development of a cap and trade regulatory framework for the natural gas utilities. In preparing the Discussion Paper, OEB staff (or staff) was informed by:

- The provisions of the *Climate Change Act* and *Cap and Trade Regulation*
- Cap and trade programs in Québec and California
- Research on cap and trade systems
- Information gathered during a series of stakeholder meetings (notes and other meeting material have been posted on OEB's website)

1.1 Organization of this Paper

The Discussion Paper (the Paper) begins with an overview of Cap and Trade programs and how they work. It also provides a high level summary of Ontario's proposed Cap and Trade program and how it compares to Québec and California. Following the overview, the Paper sets out staff's proposed guiding principles for the regulatory framework. These guiding principles informed staff's development of the options and proposals outlined in the Paper.

Finally, the Paper sets out five key elements that should be included in the regulatory framework:

- Compliance Plans
- Cost Recovery
- Monitoring and Reporting
- Customer Outreach and Education
- Confidentiality of Cap and Trade Information

Each of the key elements and the associated issues and options, as well as staff's proposal for addressing the issues, are discussed. The Paper also includes a review of how issues identified by staff have been addressed in California and Québec.

While recognizing that the Ontario Cap and Trade program will evolve and there will be a need to evolve the framework, in staff's view, a framework built around these key elements will be robust and flexible.

The Ontario government has indicated that it intends to link Ontario's Cap and Trade program with the existing cap and trade programs in Québec and California.

2 Cap and Trade Markets

As governments decide on how to address climate change, putting a price on carbon has emerged as a popular instrument to help drive greenhouse gas (GHG) emissions reductions. There are two main types of carbon pricing: carbon taxes and emissions trading systems (ETS) such as cap and trade. Cap and trade is being used around the globe to address GHG emissions, with almost 20 cap and trade systems operating or under development.

In North America, existing emissions trading systems and associated carbon markets include the Regional Greenhouse Gas Initiative (RGGI), which covers emissions from power plants in 8 Northeastern US states, and the Western Climate Initiative. The Western Climate Initiative was established in 2007 as a political collaboration on emissions trading policies. Ontario was an active WCI member from 2008-2011 and remained an observer afterwards. In 2012, a new organization, the Western Climate Initiative, Inc. (WCI), was established to provide administrative and technical services to support California and Quebec's Cap and Trade programs (the only jurisdictions that have implemented cap and trade). Although the WCI framework served as guidance, each jurisdiction developed its own program. Currently, joint allowance auctions are held between California and Québec, and emissions units are fully tradeable for use towards compliance in California and Québec.

2.1 Cap and Trade Fundamentals

Under a cap and trade system, the government establishes a provincial emissions cap that limits the total amount of GHG emissions allowed in a given time period (e.g., each year). This cap is then translated into allowances. These allowances serve as a carbon 'budget' for the compliance period, are either given to cap and trade participants or auctioned off. Participants are required to surrender one emissions unit (allowances or offset credits²) for each metric tonne of GHG emissions. Participants in the Cap and Trade program have options – they can reduce emissions or they can buy allowances. Allowances can be traded in a carbon market between cap and trade participants.

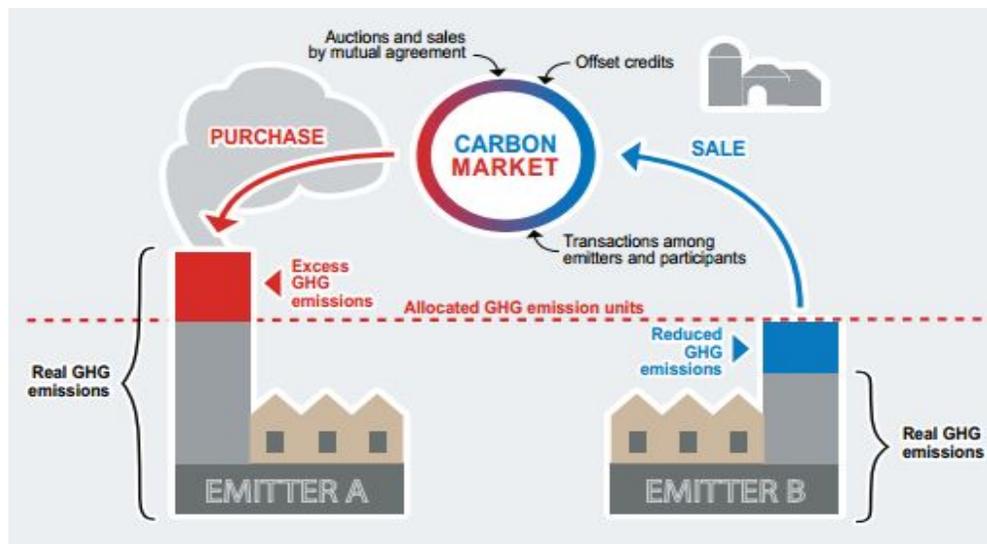
² An offset is a credit for a verified emission reduction from a source outside the cap and trade program. Offsets can be used by covered entities to meet their cap-and-trade obligations instead of using emission allowances or reducing on-site emissions.

Under Cap and Trade programs, participants have a certain amount of time in which to acquire all the allowances they need to meet their emissions. This period of time is called a compliance period. At the end of a compliance period, any participant covered by the program has to submit to government enough emissions units to cover all of its emissions for the given period (i.e., usually 1 unit = 1 tonne of emissions (CO₂e)).

Because of the ability to trade, a cap and trade system creates a secondary market where emission units can be sold between market participants. It also creates a tertiary market, where financial institutions may create swaps and derivatives to be sold in the marketplace.

Figure 1 below outlines a cap and trade system and its concepts.

Figure 1: Cap and Trade Concept



In a Cap and Trade program, participants typically have a number of options (sometimes referred to as flexibility mechanisms) available to comply with cap and trade, including:

- Receive free allowances from government
- Purchase allowances from government auctions
- Purchase offset credits
- Receive early reduction credits, if available
- Achieve internal GHG emissions reductions (i.e., abatement of GHG emissions)
- Trade between other market participant

2.2 Ontario's Cap and Trade Program

Ontario's Cap and Trade legislation is based on the WCI program. Ontario's program is economy-wide and covers both process and combustion emissions. The program will start in 2017, and the first government allowance auction will be held in March 2017.

In Ontario's Cap and Trade program there are three types of participants:

- Mandatory participants: LFEs, fuel suppliers/distributors (natural gas and gasoline), and electricity importers
- Voluntary participants: commercial and/or industrial customers who emit between 10,000 and 25,000 tonnes of CO₂e per year and who have chosen to participate in the program ("opt in")
- Market participants: participants who choose to trade in the carbon market but have no compliance obligation

Many of Ontario's market rules align with the California-Québec market, including:

- Offset credits will be limited to 8% of the participant's compliance obligation. A separate offsets regulation is expected to be put forward by the government later in 2016
- Auction floor price to align with Québec-California market; price to increase annually at 5% plus inflation
- Purchase limit to be set at 25% (maximum number of allowances a single covered participant can purchase at any one auction)
- Holding limit (number of available allowances that covered participant can hold in its account at any one time) to be set by formula
- Strategic reserve (allowances to be set aside in a reserve account) set at 5% of available allowances; sales to be held by province at set times to mitigate price spikes
- Allowance banking (number of allowances that covered participant can hold between compliance periods) set by formula related to participant's total proportion of the overall cap

All covered participants (mandatory and voluntary participants) will be required to verify and report their emissions to the provincial government. The natural gas-fired generators are also required to verify and report their emissions. Emitters that are not voluntary participants, but who emit 10,000 – 25,000 tonnes CO₂e per year, will be required to report their emissions only.

On November 1 of the year following the end of a compliance period, all covered participants (mandatory and voluntary participants) must surrender their emission units

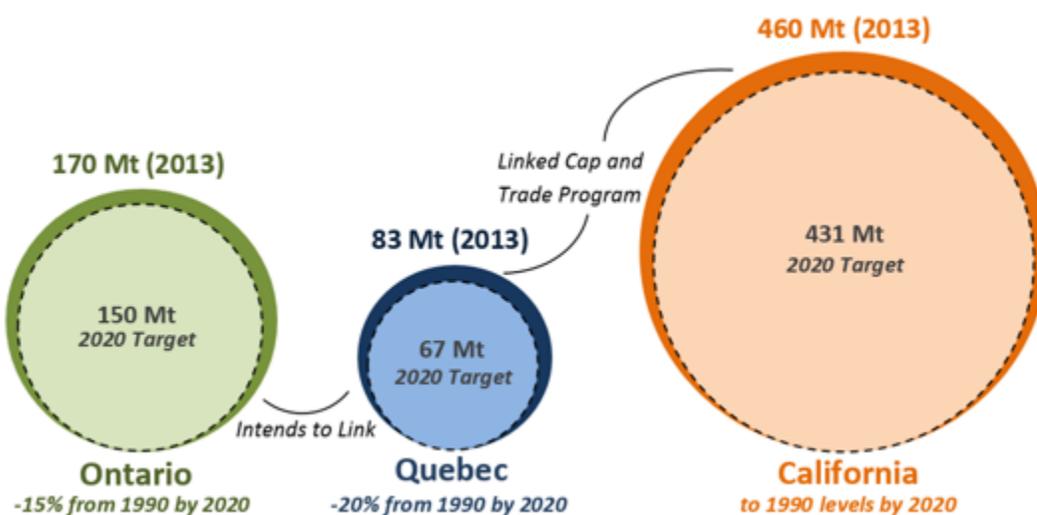
(allowances and offset credits) to the government. As discussed, these emission units must equal their total GHG emissions. All covered participants that fail to submit their required emission units may be subject to the following consequences:

- Minister may remove emission allowances and credits held in participant's accounts
- Participant with excess emissions not covered by emissions units is subject to a three-to-one penalty
- Participant's holding account may be restricted
- Continued shortfalls will have additional consequences

Linking to California and Québec

The government has signalled its intention to “link” with California and Québec's cap and trade market in 2018. The linking of Ontario to these other markets will allow market participants to meet their GHG emissions obligations through the acquisition of emission units from any of the three jurisdictions, increasing their market opportunities. Therefore the size of California and Québec in relation to their emissions and caps, as well as their approaches to implementing cap and trade are important. The total market size and the total emissions cap in each jurisdiction of the WCI market is outlined below in figure 2. The outer circle represents 2013 emissions levels and the inner circle represents 2020 emissions levels if each jurisdiction meets its individual 2020 reduction targets (also noted below).

Figure 2: Relative Market Size



Source: EcoRessources

Table 1 below shows the natural gas usage by region and how Ontario compares to Québec and California. Natural gas is consumed in Ontario in higher volumes and for longer periods for heating, water heating and other applications necessary for the residential sector and small businesses relative to California and Québec. Overall natural gas usage in Ontario's residential and commercial sectors is comparable to California, despite California's population and Gross Domestic Product (GDP) being over three times that of Ontario.

Table 1: Natural Gas Use by Region

Jurisdiction	Source	Natural Gas Use (PJ)	Population (million)	GDP (\$ Billion)
Ontario	Residential	352	12.9	695
	Commercial	219		
	Industrial	235		
	Electric Gen	235		
Quebec	Residential	25	7.9	363
	Commercial	66		
	Industrial	151		
California	Residential	519	39.1	2,203
	Commercial	215		
	Industrial	618		
	Electric Gen	1,105		

Sources: Natural Resources Canada: Office of Energy Efficiency, U.S. Energy Information Administration, Statistics Canada, U.S. Bureau of Economic Analysis

3 Guiding Principles of Framework

OEB staff suggests that the framework be guided by OEB's statutory objectives as well as the following principles to ensure consumer protection:

- **Cost-effectiveness:** Compliance Plans are optimized for economic efficiency and risk management
- **Rate predictability:** consumers should have just and reasonable, and predictable rates regarding the impact of the utilities' cap and trade activities
- **Cost Recovery:** prudently incurred costs related to cap and trade would be recoverable as a cost pass-through (similar to natural gas supply procurement)
- **Transparency:** investment/buying strategies and optimization processes are transparent and well documented to facilitate the OEB's assessment of the plans and costs, while ensuring market integrity
- **Flexibility:** plans are flexible and can adapt to changing market conditions and utility-specific characteristics; potential for framework to evolve as market matures and experience is gained
- **Continuous Improvement:** plans demonstrate continuous improvement of processes and practices, including the use of existing systems

Staff believes that a framework underpinned by these principles will ensure that the utility develops Compliance Plans that support the government's policy in a cost-effective manner. Staff has used these principles to assess the issues relating to cap and trade compliance, identify options and develop proposals.

The framework should encourage utility optimal decision making when developing a portfolio of cap and trade compliance activities. It is also expected that the utility's plan optimization will continuously improve over time as experience is gained. Staff is proposing on-going monitoring to promote superior performance.

In staff's view a principle-based framework will provide guidance to the utility in developing its plans and will manage expectations held by the utility and its ratepayers by ensuring a consistent approach to assessment, ratemaking and monitoring across utilities.

4 Compliance Plans

Under Ontario's Cap and Trade program, the "point of regulation" for natural gas is the OEB rate-regulated natural gas utility – Enbridge, NRG and Union. This means that the utility will be responsible for the greenhouse gas (GHG) emissions from facilities that it owns or operates as well as the emissions from most of its customers, including:

- All low-volume residential and small business customers
- Commercial and industrial customers who are not LFEs or voluntary participants
- Natural gas-fired generators

The utility will be required to verify and report GHG emissions to the provincial government and match its total GHG emissions (including customer-related and facility-related emissions) in each compliance period with an equivalent amount of emissions units (emissions allowances, offset credits and/or early reduction credits, if applicable).

Purpose of Compliance Plans

To meet its obligations under Cap and Trade, the utility will need to develop Compliance Plans to be filed with the OEB for approval. The overall purpose of a Compliance Plan is to describe the utility's strategy for meeting its Cap and Trade obligations. The OEB will review the plans to determine whether to approve the associated cap and trade costs for recovery from ratepayers. Cost recovery is discussed in section 5.

The Compliance Plans should meet the government-defined legislative and regulatory obligations for the natural gas utilities, and support the government's effort to reduce GHG emissions in Ontario.

Compliance Options

The utility will have a number of options available with which to comply with its Cap and Trade obligations. It is expected that the portfolio of cap and trade activities may include purchasing emission units (i.e., allowances and offset credits), engaging in GHG abatement programs for natural gas customers, and investing in strategies to mitigate and reduce GHG emissions from the utility's own facilities and operations.

A description of Cap and Trade emissions units is provided in Table 2, below, and possible GHG abatement measures are described in Table 3.

Table 2: Cap and Trade Emissions Units

Instrument	Market	Definition
Auction Allowances	Primary	Available through government administered auctions. Clearing price risk in competitive auction with some predictability.
Allowance Bi-laterals	Secondary	Negotiated price for government sourced allowances between counter-parties, improves price certainty, higher availability risk
Allowance Futures	Primary	Standardized futures contract traded on an exchange by a broker with delivery dates, volume and terms and margin call requirements
Allowance Forwards	Secondary	Customized contract traded over the counter (OTC) that includes both market and credit risk
Offsets	Secondary	Compliance-grade instrument generated by emission reduction activities outside of regulated scope. Must be verified.
Offsets Futures	Secondary/ Tertiary	Exchange traded futures contracts for offsets
Allowance Derivatives	Tertiary	Allowance derivative products offering the right to buy or sell an allowance for a set price during a future period (options) and swaps

The two main emissions units included in the *Cap and Trade Regulation* are allowances and offset credits.

One emission allowance is equivalent to one tonne of CO₂e. Allowances will be sold: a) in the primary market directly by government in quarterly auctions and b) in the secondary and tertiary markets by market participants, brokers, etc. Offset credits are credits for GHG reductions achieved by activities outside of sectors directly covered by Cap and Trade. They must meet specific protocols that are expected to be available through government approved (or government run) offset registries as well as through secondary and tertiary markets.

For the first compliance period, the government has indicated its intention to create early reduction credits as well as allowances and offsets. It is not yet clear how many early reduction credits will be created, who will be able to apply for them or what the criteria will be for acquiring these credits.

To reflect the government’s overall objective of reducing GHG emissions in the province, staff suggests that the portfolio of cap and trade activities include not only allowances and offset credits, but also GHG abatement strategies.

Table 3: GHG Abatement Measures

Instrument	Applicability
Customer abatement activities	Customer emissions
Renewable energy and fuel switching	Facility and customer emissions
New technologies	Facility and customer emissions
Building retrofits	Facility and customer emissions
Measures to mitigate and reduce fugitive emissions	Facility emissions
Biogas, RNG	Facility and customer emissions

The utility’s Compliance Plans must comply with the rules and restrictions established by the government’s Cap and Trade Program. This includes the limits on the use of offset credits (set at a maximum of 8% of compliance) and rules that deal with holding limits and purchase limits, as well as any other market or program rules described in the *Climate Change Mitigation and Low-Carbon Economy Act, 2016* or the *Cap and Trade Regulation*.

4.1 Issues and Options

With respect to the Compliance Plans that will be prepared by the natural gas utility and filed with the OEB for approval, staff has identified the following five issues to be addressed in the framework:

1. Level of OEB Guidance
2. Duration of Compliance Plans
3. Forecasting
4. Assessment of Compliance Plans
5. Treatment of Longer-term Investments

Each of these issues is discussed below.

4.1.1 Regulatory Approach to Compliance Plans

This issue addresses the appropriate level of guidance that the OEB should give with respect to the natural gas utility's Compliance Plans.

Staff is proposing that the OEB follow a light-handed approach that would require the utility to have a cost-effective portfolio of Cap and Trade instruments. The OEB would set out the basic parameters, including the approach it would take to assess the utility's plans and information that it would expect to see in a plan. The utility would be responsible for deciding on the exact makeup of their portfolio (subject to OEB approval), including how to prioritize and pace investments in Cap and Trade compliance options, and how and when to participate in the market. The OEB would assess the plans to ensure cost-effectiveness and reasonableness for the purpose of cost recovery.

Staff suggests that the benefits of this approach are that it allows the utility the flexibility to respond to changing market conditions and to use its understanding of its load to determine the best approach to compliance. In the early stages of Cap and Trade implementation in Ontario, the market will be nascent and there could be considerable market uncertainty.

4.1.2 Duration of Compliance Plans

The second issue deals with the duration of the utility's Compliance Plans. The government's Cap and Trade program lays out an initial four-year compliance period to be followed by three-year compliance periods.

Staff has considered the following options for Compliance Plan term:

1. Annual plans: Utility files annual Compliance Plans in addition to a longer-term three-year Reference Strategy, to be filed in the first year of each compliance period
2. Full compliance period plans: Utility files Compliance Plans that span the duration of the compliance periods as prescribed by the *Cap and Trade Regulation*. The utility would update its plans annually

Staff has identified a number of difficulties with an annual plan approach. Although annual plans may increase the forecasting accuracy of load and carbon price, they do

not facilitate the multi-year flexibility of longer term plans. Moreover, annual plans may be less likely to encourage the utility to plan strategically for the longer term, including planning for GHG abatement.

Staff's preferred approach is that Compliance Plans span the entire compliance period.

Staff proposes that if this approach is used, an exception should be made for the first year of Cap and Trade. For that year (2017), the utility would submit a one-year Compliance Plan. This modified approach recognizes the January 2017 timeline for Cap and Trade implementation and allows the utility enough time to gain experience before developing a more comprehensive, longer term plan. This approach also recognizes that in 2017 there will be an unlinked, Ontario-only cap and trade market. This may reduce the flexibility of the utility and limit its compliance options in that year.

Staff proposes that after the first year, the utility would file three-year Compliance Plans to align with the compliance periods set out by government. This would allow more long-term, strategic thinking and increased flexibility for the utility. A three-year OEB approved Compliance Plan would reduce the utility's regulatory risk with respect to plan implementation and recovery of prudently incurred costs. It would also support a longer term and more strategic approach to meeting the compliance obligations under Cap and Trade and would meet the OEB's principles of rate predictability and transparency.

This approach would involve an initial, detailed review and assessment at the start of every compliance period. In addition, staff suggests that annual updates to plans be required. The annual review process would focus on any updates to the plan based on new forecasts and market developments. The intent is to provide the gas utility with the flexibility to meet its GHG obligations and respond to market changes, subject to the OEB's regulatory oversight.

4.1.3 Forecasting

The utility forecasts are key inputs into the Compliance Plans. These forecasts include:

- Load forecasts
- Greenhouse gas (GHG) emissions forecasts
- Carbon price forecasts

The load forecasting is an activity the utility undertakes today. The other two forecasts – GHG emissions and the price of carbon – will be new forecasts that the utility will need to prepare in order to develop its proposed Compliance Plan. These forecasts are discussed below.

Forecasting Period

The forecasting period must align with the duration of the Compliance Plans. Therefore, staff proposes that the utility should prepare an annual forecast (of load, GHG emissions and carbon prices) for the first year (2017) of Cap and Trade, followed by three-year forecasts that would span the length of the following compliance periods (e.g., 2018-2020, 2021-2023, etc.).

Staff recognizes that longer term forecasts could increase the risks involved in forecasting accuracy.

Load Forecasts

As mentioned, under the *Climate Change Act* the utility is responsible for the GHG emissions of its customers as well as for its own facilities and operations. The load forecasts are key inputs for forecasting GHG emissions. Customer-related GHG obligations will be based on customer load forecasts, excluding LFEs and voluntary participants as the utility does not have the compliance obligation for these customers. Facility-related GHG obligations will be based on, amongst other matters, the utility's own natural gas consumption forecasts related to its operations (including unaccounted for gas losses, etc.) and other facilities. This is discussed in the section below. Therefore, the utility will have to prepare two separate forecasts to calculate its GHG emissions from natural gas consumption.

These forecasts will be used both to inform the development of its Compliance Plans and for the purposes of cost allocation and rate-setting (as outlined in section 5).

Staff notes that the utilities already prepare load forecasts for the purpose of rate-setting. Staff proposes that the utility use its existing OEB approved methodology when preparing these forecasts for the purpose of Compliance Plans. As discussed above, it is expected that the utility would prepare load forecasts for the first year (2017) of the Compliance Plan, followed by three-year load forecasts (2018-2020 and beyond).

GHG Emissions Forecasts

The GHG emissions forecasts will include forecasts of the following emissions:

- Emissions related to the utility's customers' natural gas usage (i.e., customer-related GHG obligations)
- Emissions related to the distribution of natural gas, including process emissions, emissions from fugitive and leaked gas, and emissions from the utility's facilities and operations (i.e., facility-related GHG obligations)

GHG emissions forecasts will have to account for three greenhouse gases: carbon dioxide (CO₂), methane (CH₄) to account for fugitives, and nitrous oxide (N₂O) to account for transportation fleets. The government has outlined methodologies for calculating GHG emissions in its emissions reporting regulation (Ontario Regulation 398/15 and Ontario's Guideline for Greenhouse Gas Emissions Reporting, issued May 19, 2016). Staff is of the view that these methodologies (i.e., formulae to calculate GHG emissions) should be used to forecast GHG emissions.

It is expected that the utility would prepare GHG emissions forecasts for its initial one-year (2017) Compliance Plan, followed by three-year GHG emissions forecasts (for 2018-2020 and beyond).

As with the load forecast, the utility will need to exclude GHG emissions of LFEs and voluntary participants to calculate its customer-related GHG obligations.

Carbon Price Forecasts

Staff suggests that two carbon forecasts be prepared: an annual carbon price forecast and a long term (10-year forecast). These forecasts will be needed for the utility to calculate the costs of its Compliance Plan.

For the annual carbon price forecast, staff recommends that the forecast be based on a large, liquid and public market exchange. Staff notes that these are the reasons that the California regulator relies on the Intercontinental Exchange (or ICE) for its annual

proxy price of carbon³. Staff proposes that the utility also use ICE for its annual carbon price forecast. ICE provides a one-year forward carbon price forecast (i.e., the exchange price is the trading price of a one-year forward contract). The OEB would also use this annual carbon price forecast as a benchmark.

As the utility is preparing its multi-year plans, a longer term carbon price forecast will be needed. The utility would use this long term benchmark price of carbon to help guide its strategic, long term planning.

To forecast the longer term price of carbon, staff has identified four options. The first option would be for each utility to develop its own methodology to forecast longer term carbon prices. Staff notes that this option may lead to divergent price forecasts and a consistent carbon price forecast for all utilities is essential.

The following options would ensure a consistent price forecast amongst the utilities:

- Together the utilities procure a longer term price forecast from a single reputable source
- Together the utilities procure a number of longer term price forecasts to calculate a consensus forecast
- The OEB procures a longer term carbon price forecast

The OEB currently purchases forecasts for the cost of capital and short-term debt rates to produce a consensus forecast. Staff sees merit in the OEB procuring forecasts from a number of different sources to develop a consensus forecast of long-term carbon prices that would be used by the natural gas utilities. Staff recommends that the OEB issue a 10-year carbon price forecast and that it should be updated annually.

4.1.4 Compliance Plan Assessment

As mentioned, the utility will file its Compliance Plans with the OEB for approval and recovery of costs. The Compliance Plans will include all relevant information

³ CPUC Decision 15-10-032 "Decision adopting procedures necessary for natural gas corporations to comply with the California cap and Greenhouse Gas emissions and market-based compliance mechanisms (Cap and Trade program)" October 22, 2015; p. 10 <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M155/K330/155330024.PDF>

regarding the procurement and investment strategies that the utility will undertake to comply with Cap and Trade.

4.1.4.1 Objectives of Compliance Plan Assessment

The principles discussed in section 3 should underpin the utility's Compliance Plans, while ensuring that the utility meets its Cap and Trade obligations.

Consistent with the six principles, Compliance Plans should be optimized, integrated and adaptable:

1. Optimized – An optimized Compliance Plan is characterized by strategic decision-making and risk management, resulting in a portfolio of compliance options that is cost-effective
 - A portfolio approach lends itself to optimization, as the utility makes use of more than just one compliance option
 - Risk management includes the identification of risks, scenario analysis, identification of risk mitigation strategies and governance practices.
2. Integrated – Procurement and investments in GHG abatement activities should be approached “holistically” to extract maximum value from long-term commitments that integrate multiple benefits as this should be more cost-effective than a narrow, short-term planning approach
3. Adaptable – Compliance Plans must be flexible enough to adapt to changes in market conditions and changes in load, as well as other sources of risk

Staff recognizes that in 2017 the utilities may only procure allowances at auction, if that is the most cost-effective approach.

4.1.4.2 Optimized Portfolio

Staff expects that the utility will demonstrate optimization by providing the following information:

1. Overview of Compliance Plan portfolio
2. Explanation of inputs into the plan
 - a. Forecasts
 - b. Marginal Abatement Cost Curve (MACC)
 - c. Other

3. Options analysis and description of optimization of decision-making
 - a. Selection of compliance options
 - b. Prioritization and pacing of compliance options
 - c. Using inputs above, explain how utility achieved optimal decision making to manage costs and risks
 - d. Explanation of how approach meets guiding principles and assessment objectives
 - e. Explanation of how approach considers long-term strategies
4. Performance metrics
 - a. Outline of the necessary cost information
 - b. Description of metrics

These are discussed below.

1. Overview of Compliance Plan

Staff expects that the utility's approach to cap and trade activities could include procurement of allowances (current year and future year vintages), procurement of offset credits (when possible), GHG abatement programs for natural gas customers, and GHG abatement activities for the utility's own facilities and operations.

2. Inputs

Staff suggests that in order to assess the utility's Compliance Plans, the OEB should rely on the following inputs: a Marginal Abatement Cost Curve (MACC), the forecasts outlined in Section 4.1.3, and any other inputs that the utility and/or the OEB deems appropriate.

Marginal Abatement Cost Curve (MACC)

Staff proposes that the OEB use a MACC to determine optimization and prioritization. A MACC would include all potential options that could be used for compliance. Staff also proposes that the timeframe for the MACC be 10 years to align with the long-term carbon price forecast. Please see Appendix B to the Paper for an example of a MACC.

A MACC will have to be prepared by either the utility or the OEB. Staff recognizes that for facility-related abatement activities, there may be differences between the natural gas utilities. However, in staff's view it is important to have one single consistent MACC that outlines all general, non-utility-specific abatement activities that are broadly available in the market. Staff recommends this approach, as it would ensure a standard description of costs of Cap and Trade and GHG abatement activities for the purpose of assessment. Staff recognizes that in addition to this general MACC, the utility may choose to develop its own, company-specific MACCs to inform the development of its Compliance Plans.

There are two options for the development of the single general MACC – the utilities could develop one together, or the OEB could develop it.

For both of the options above, it may not be possible to develop a MACC for the year 2017. As discussed, staff recognizes that in 2017 the utilities may only be procuring allowances at auction, and a MACC would not be needed for this year. MACCs would be prepared for the remainder of the first Compliance Plan term (2018-2020) and for subsequent three-year Compliance Plan terms.

Staff invites comments regarding the MACC approach and the development of the single general MACC.

3. Options analysis and description of optimization of decision-making

Staff recommends that the OEB assess how the utility used the MACC and selected the compliance options in its portfolio. To demonstrate this, the utility should provide the following:

- a. An explanation of how the utility's approach meets the guiding principles of the framework and whether the plans have been optimized, integrated and adaptable
- b. A description of how the instruments selected reflect prioritization and pacing resulting in cost-effectiveness
- c. A qualitative and quantitative explanation of how the instruments selected achieved optimal decision making to manage costs and risks
- d. An explanation of how the utility's approach complies with requirements and rules set out in the *Cap and Trade Regulation* (e.g.,

with respect to holding limits, procurement limits and limits on the use of offset credits).

- e. Explanation of how the utility's approach considers long-term strategies

It is expected that utility will consider longer term compliance options in its optimized portfolio. Staff recognizes that although some longer term investments in GHG abatement may be more expensive than the price of allowances or offset credits in any given year, there may be strategic value in investments that decrease emissions over the longer term. Therefore, staff expects that the utility will include a range of compliance options in its Compliance Plans, including those that are more expensive per tonne of CO₂ compared to the price of allowances. For compliance options that are more costly than the annual carbon forecast price, the utility should provide a qualitative explanation of why they are pursuing this, including the strategic value of these instruments in the long term (e.g., long-term considerations related to GHG mitigation and the increasing price of emission units in the longer term).

Staff invites comments on the approach described above as well as suggestions for any other approaches, documentation, descriptions, criteria or analyses, if any the OEB needs to assess the cost-effectiveness of utility's Compliance Plans.

4. Performance metrics

- a. The OEB will be assessing whether Compliance Plan portfolios are optimized for cost-effectiveness. Therefore, staff recommends that the utility provide the following cost information:
 - i. A quantitative and qualitative description of the total costs of the compliance portfolio, outlined by year and over the compliance period, including: Cost of total compliance plan; Costs by year; Cost by year per compliance instrument/activity
 - ii. For procurement of allowances at auction, the following details: Total quantity of allowances to be purchased at auction over the compliance period; Quantity of allowances to be purchased per year, and at each auction within a year; Expected cost of these

- purchases (based on carbon price forecasts); and Rationale for procuring these credits
- iii. For GHG abatement costs⁴, the following details: Abatement costs and GHG split by customer-related and facility-related activities. Customer-related costs and GHG split by residential, commercial and industrial customer and by program type for each year; Facility-related costs and GHG split by program type and year
 - iv. Administrative Costs, including a detailed account of administrative costs of running Cap and Trade by year and by compliance period
 - v. Financing costs, including carrying costs related to the acquisition of emission units for future compliance
 - vi. Cost of instrument per tonne of GHG

Staff recognizes that the information above includes market and commercially sensitive information that will be subject to confidentiality. Please see section 8 For a description of how staff proposes the framework should address confidentiality.

- b. To assess the Compliance Plans, staff recommends that the OEB use the following metrics:
 - i. Costs per tonne (\$/tonne) of each compliance instrument or activity
 - ii. A comparison of costs of investing in GHG abatement activities versus procuring emission units over the short-term and long-term
 - iii. Cost per customer

Staff suggests that to benchmark utility costs, the OEB use the Intercontinental Exchange (ICE) for the annual price forecast and the OEB's 10-year carbon price forecast.

As mentioned, staff recognizes that although some longer term investments in GHG abatement may be more expensive than the price of emissions units in any given year, there is strategic value in investments that decrease emissions over the longer

⁴ The GHG abatement costs must be incremental to the utility's 2015-2020 multi-year DSM plans (EB-2015-0029/EB-2015-0049)

term, particularly as the price of emission units will increase over the medium and long term.

4.1.4.3 Risk Management

While staff recognizes that the OEB has decided that costs related to risk management with respect to gas supply will not be allowed for recovery in rates (EB-2007-0606), staff's research into cap and trade markets indicates there are reasons for the utility to participate in risk management. Trading of emission units in the secondary and tertiary markets is a key component of a Cap and Trade program. These markets provide participants with the necessary flexibility to meet their GHG obligations. As such, trading and hedging strategies could result in more cost effective compliance for gas utilities, and thus reduce costs for customers.

To assess risk management, staff suggests that the OEB review the utility's governance systems and its approach to risk identification, scenario analysis and risk mitigation. As such, staff suggests that the OEB assess the following:

a. Governance Systems

Staff suggests that part of risk management includes the utility having robust governance systems in place to ensure that its strategic objectives reflect its obligations under the Cap and Trade program. Staff suggests that the OEB consider the following:

1. Approvals and accountabilities:
 - i. Has the utility established clear governance and accountability with respect to the development and implementation of the Compliance Plans?
 - ii. Do appropriate accountabilities exist at several organizational levels from management to senior executives?
 - iii. Do policies and processes exist that describe the checks and balances in place to ensure effective risk management and compliance monitoring?
2. Market readiness:
 - iv. Does the utility have the resources and capabilities to participate in the primary and secondary cap and trade markets (e.g., registration in Compliance Instrument Tracking System Service (CITSS), appropriate trading personnel, awareness of market tools, brokerages and exchanges)?

- v. Has the utility undertaken an analysis of counter-parties and financial intermediaries, including creditworthiness of those entities that the utility may deal with?

b. Risk Identification

Staff proposes that the utility identification of key risks should include, at a minimum:

1. Identification of hedging strategies the utility intends to pursue (e.g., procurement of future year allowance vintages) and the risks associated with those activities
2. Identification of trading strategies and risks associated with those activities
3. Identification of risks associated with load uncertainty/changeability and associated GHG emissions
4. Risks associated with carbon price annually and within a compliance period, including foreign exchange risks. Note that for the purposes of assessing carbon price risk, the long term carbon price forecast prepared by the OEB should be considered the medium-risk scenario
5. Risks associated with the carbon price in the longer term. This should be linked with the long term carbon price forecast outlined in section 4.1.3. As for the above, for the purposes of assessing carbon price risks in the longer term, the carbon price forecast prepared by the OEB should be considered the medium-risk scenario.
6. Market risks associated with various financial instruments in the secondary and tertiary market (e.g., futures, forwards, derivatives) and any procurement of these instruments that the utility intends to undertake
 - a. Risks to the utility and ratepayers associated with GHG emissions continuing to increase in the next 5, 10 and 15 years
 - b. Any other risks identified by the utility
7. Demonstration of carbon assets risk management that is aligned with other corporate risk management policies, processes and accountabilities
8. Demonstration of the utility's methodology for evaluating financial risk for emissions units trading

c. Risk Mitigation

For the OEB to assess the utility's risk mitigation plans, staff suggests that the utility describe how its Compliance Plans are robust and flexible, and able to respond to

changes in market conditions and carbon prices (with reference to the scenario analysis below). For example, the utility, in its plan, should outline how it would scale up and/or down due to unexpected changes in load and associated GHG emissions.

Staff suggests that in order to assess the robustness of the utility's Compliance Plan, the utility develop high, medium and low risk scenarios as follows:

1. High, medium and low risk forecasts associated with forecasting
2. High, medium and low risk forecasts associated with carbon price in the short and long term, including exchange rate risk
3. High, medium and low risk forecasts that combine both forecasting risk and carbon price risk

Staff invites comments on strategies for the OEB to assess risk mitigation as well as input on different approaches to risk management, including the potential use of risk management strategies such as Value at Risk.

4.1.5 Treatment of longer term investments

The final issue deals with how longer term capital investments should be addressed by the utility. For the purposes of this issue, longer-term investments refer to investments and activities that relate to GHG mitigation that could span three years or longer. This type of investment might include, for example, new technologies and new infrastructure.

The utility's Compliance Plans should reflect long-term thinking and planning for GHG abatement beyond a single year or a single compliance period. For the purposes of the Compliance Plan, the utility should provide the OEB with the following qualitative description of a long term strategy:

1. Description of the utility's expectations regarding load and associated GHG emissions
2. Description of long term strategies to reduce facility-related GHG emissions
3. Description of long term strategies to reduce customer-related GHG emissions

As mentioned, the utility will have obligations for both its customers (non-LFEs) and for its own facilities and operations. For long term strategies that deal with facility-related emissions, OEB staff proposes that a qualitative and quantitative description of the strategies/activities be included in the Compliance Plans and reviewed by the OEB (as described in section 4.1.4, this will include describing long-term compliance options and corresponding costs in a Marginal Abatement Cost Curve).

While descriptions of these long term investments would be included in the Compliance Plans, forecast capital expenditures would be dealt with in rates applications. This way the approval of costs and cost recovery would be dealt with like any other type of investment. Staff suggests that this approach is most appropriate as the rationale behind capital expenditures and operating costs will be underpinned by a range of factors, only one of which is Cap and Trade.

Staff recognizes that there might be a disconnect in the timing between the Compliance Plans approval process and the five-year incentive regulation rate setting cycle. However, it is possible to link the review and approval of the long-term investments in Compliance Plans with cost recovery in rate cases. As mentioned, this would mean that expected investments would be described in Compliance Plans. The OEB may approve long-term measures that have been included in the compliance plan and cost consequences would be considered in a subsequent rates application.

For the purposes of long term planning and descriptions of long term strategies that are outlined in the Compliance Plans, the utility should use the long-term carbon price forecast provided by the OEB (as described in section 4.1.3).

OEB staff expects that in the future, all planning and investment decisions should intrinsically consider GHG abatement as a part of capital investment decision-making, and should be built in as part of the utility's regular capital planning processes.

4.2 California and Québec Markets

Level of Guidance

California:

The content of the Plans is relatively prescriptive from an informational standpoint. Plans are required to include: forecast revenue requirement, monthly recorded GHG costs, GHG allowance proceeds, GHG outreach and administrative expenses, and the compliance obligations over time (i.e., to 2020). CPUC set forth a specific format that is intended to be consistent across utilities.

With respect to procurement of compliance instruments, utilities are approved to:

- procure and sell allowances through CPUC-approved exchanges, brokers and via the quarterly auctions

- purchase offset credits bilaterally, through brokers and through a competitive RFO process
- enter into forward contracts for future purchases up to a limit predefined by the CPUC

Utilities are not permitted to procure options, swaps, or other derivatives of compliance instruments (as noted in D. 14-12-040). Furthermore, the CPUC holds the right to limit the use of any additional compliance instrument, including the percentage of offsets available for compliance.

Québec:

As mentioned, Compliance Plans in Quebec are discussed and developed with substantial input from the Régie. The first strategy for Gazifère, for example, was debated before the Panel with intervenors and the final plan was directed by the Régie. The Régie has been active in debating the individual utility compliance strategy and has intervened with adjustments to the plan through the first compliance period.

Compliance Period

California:

Compliance Plans are developed and reviewed by the CPUC on an annual basis, through the existing rate making and cost of service review procedures.

Québec:

Compliance cost estimates and compliance strategies are based on the three-year forecast that underpins the utilities' rate cases. The plans include key components such as a three year forecast of emissions based on the pre-existing three year gas supply plan and forecasted prices for compliance instruments, as well as a narrative of purchasing volumes and rationale.

Treatment of Longer-term Investments

California:

Longer term elements of Cap and Trade procurement and compliance planning have been incorporated into the CPUC's long-term (10-year) planning process (currently only for electric Investor Owned Utilities), but there is no formal link to rate design/cost recovery (as this is set annually). The long-term plans are updated every two years to align with the comprehensive and collaborative state planning process. Longer term

plan elements are used by CPUC for reference and informational purposes and to align compliance planning with annual cost recovery mechanisms.

Québec:

Compliance period plans can include strategies for longer-term investment. Where capital requirements are necessary, the planning links to rates proceedings as part of the capital needs filing. There is no evidence that a process for discrete long-term cap and trade compliance plans has been contemplated to date.

Assessment of Compliance Plans

California:

Compliance Plans in California are intended to ensure that a utility's forecasting methodologies are reasonable and consistent with mandated procurement rules and limits, while enabling compliance with California's Cap and Trade program. Plans must include the forecast revenue requirement, monthly recorded GHG costs, GHG allowance proceeds received (from consignment of free allowances), GHG outreach and administrative expenses, and the compliance obligations over the compliance period.

Québec:

In Québec, the Régie has been actively involved in developing the individual utility compliance strategies. Natural gas utilities present a compliance period strategy before the Régie de l'énergie during a rate case procedure, and the Régie discusses and helps to develop the strategy and approves or amends the strategy accordingly. The first strategy for Gazifère, for example, was debated before the Panel with intervenors and the final plan was directed by the Régie. The Régie has not yet adjudicated on a formal set of guidelines or procedures for compliance plans and approves each utility's plan on a case by case basis. Compliance plans include key components such as a three year forecast of emissions based on the pre-existing three year gas supply plan, forecasted prices for compliance instruments, and a narrative of purchasing volumes and rationale.

5 Cost Recovery

As discussed in section 4, the Compliance Plans will include procurement and investment strategies that the utility will use to meet its GHG compliance obligations. These compliance obligations will have costs associated with them. These costs will include:

- Facility-related obligations for facilities owned or operated by the utility
- Customer-related obligations for natural gas-fired generators and residential, commercial and industrial customers who are not Large Final Emitters (LFEs) or voluntary participants
- Administrative costs to meet its compliance obligations

Customer-related and facility-related obligation costs will be incurred for abatement programs and for emission units procurement.

For abatement programs, the utility will likely develop targeted programs for its residential, commercial and industrial customers. It will also develop programs for its own facilities. Consequently, separate customer-related and facility-related abatement program costs will be known by the utility (similar to Demand Side Management programs).

For emission units procurement, the utility will be indifferent to whether it is purchasing emission units for its customers, its facilities or both. Consequently, the emission units procurement costs will be a total cost that includes both customer-related and facility-related obligations.

This section addresses the mechanism for recovery of the costs that a utility incurs in implementing its Compliance Plans and specifically: cost causation, cost allocation, rate design and bill presentment, and the rates setting approaches (including re-calibration and the true up process).

5.1 Issues and Options

5.1.1 Cost Causation

Table 4 summarizes OEB staff’s proposal on how Cap and Trade program related costs should be apportioned across customers.

Table 4: Cost Causation

Customer	Costs for Customer-related Obligations	Costs for Facility-related Obligations	Administrative Costs
Residential	√	√	√
Commercial	√	√	√
Industrial	√	√	√
Gas-fired Generator	√	√	√
Large Final Emitter and Voluntary Participant		√	√

As previously mentioned, the utility has a compliance obligation for its customers. Staff proposes that the customer-related obligation costs incurred on behalf of these customers should be borne by all customers except LFEs and voluntary participants, who are responsible for managing their own compliance obligation.

The utility also has a compliance obligation for its owned or operated facilities. Staff proposes that these costs will be a cost of doing business and as a result, should be borne by all customers. Staff notes that, as per the discussion in section 4.1.4, GHG abatement programs to mitigate and reduce facility-related GHG emissions would be considered in the utility’s capital planning process.

To meet its compliance obligations discussed above, the utility will incur administrative costs for monitoring, reporting and verification of emissions (MRV), purchasing/trading emissions units to manage its portfolio, and IT/CIS/billing systems. Staff recognizes that the LFEs and voluntary participants are responsible for managing their own GHG compliance obligation, and as such, they would be incurring their own administrative costs to comply with the Cap and Trade program. As a result, these stakeholders may suggest that they should not be responsible for the utility’s administrative costs.

However, administrative costs will be incurred to support both facility- and customer-related obligations and these costs will be a cost of doing business. Staff notes that administrative costs are not expected to be material. In California, the 2015 administrative and outreach costs were approximately \$4 Million (ranging across utilities from 0.1% to 2.7% of total compliance costs)⁵. Therefore, staff is proposing that administrative costs should be borne by all customers including LFEs and voluntary participants. This approach is consistent with how these costs are dealt with in California and Québec.

5.1.2 Cost Allocation

OEB staff suggests that from a cost causality standpoint, customer-related and facility-related obligation costs should be allocated on a volumetric basis to each rate class because the cost driver is load (and associated GHG emissions). This approach is consistent with California and Québec.

Since administrative costs will form part of the utility's on-going business, staff suggests they be allocated in the same manner as similar existing administrative costs. For example, incremental billing costs should be allocated consistent with the OEB approved cost allocation methodology for billing costs. Furthermore, separation of CIS system costs between cap and trade activities and other types of activities may raise accounting concerns. OEB staff sees no reasons to track these costs separately from similar costs.

5.1.3 Rate Design and Bill Presentment

Rate Design

OEB staff is proposing annual volumetric charges for the recovery of both customer-related and facility-related obligations costs. This means that costs would be recovered on an equal (m³) basis for each of these costs. This will link GHG emission costs with a

⁵ PG&E: Advice 3647-G-A (November 30, 2015)
SoCalGas & SDG&E: Decision 15-10-032 (October 22, 2015)

customer's natural gas consumption. Staff notes that this approach is consistent with California and Québec.

To provide transparency, staff suggests that both of these rates should be included on the utility's OEB approved tariff sheets. The separate rates on the tariff sheets will make it easier to track the amounts collected and facilitate the annual update. Also, providing a separate customer-related rate on the tariff sheet will assist the gas-fired generators and large gas users in their decision making purposes. In particular, the gas-fired generators require the ability to identify the customer-related obligations costs for bidding strategy purposes and large users (non-LFEs) for the purpose of deciding whether to become a voluntary participant in the Cap and Trade program.

The facility-related rate would be applied to all customers based on their natural gas consumption. The customer-related rate would be applied to the appropriate customers⁶ based on the customer's natural gas consumption. This rate would appear on the utility's tariff sheet "as applicable".

Bill Presentment

Facility-related Obligation Costs and Administrative Costs

Staff is of the view that the per-cubic meter charge for facility-related obligation costs should be included in the delivery charge on the customer's bill. Staff also sees the merit of including the administrative costs in the delivery charge as both of these costs will be a cost of doing business.

Customer-related Obligation Costs

For the customer-related obligation costs, staff proposes that the per-cubic-meter charge should have the same bill presentment for all consumers, regardless of the utility (i.e., included in the delivery charge, commodity charge or as a separate charge on the bill). This will mitigate customer confusion.

⁶ The utility's customers for the purposes of customer-related charges are gas-fired generators, and residential, commercial and industrial customers who are not LFEs or voluntary participants

Staff notes that all customers are billed by the utility for their delivery charge. This is not the case for the commodity charge. For example, large gas users that purchase their gas directly from a wholesaler or producer are not billed by the utility for their commodity costs; either are low-volume consumers that purchase natural gas from gas marketers. As a result, if the customer-related obligation costs were included in the commodity charge, these customers would require a separate charge on their bill.

In terms of whether these costs should be recovered as a separate line item on the bill, consumer research indicates that low-volume customers are concerned with the overall bill impacts⁷. Staff is also concerned that an additional line item on the bill could increase customer confusion and utility call centre activity.

Staff recommends that the per-cubic-meter charge for customer-related obligation costs should also be included in the delivery charge. This will ensure uniform bill presentment for all consumers, regardless of the utility. The LFEs and voluntary participants will not be required to pay the customer-related charge, therefore, this charge will need to be differentiated between LFEs (and voluntary participants) and all other customers. Applying the customer-related charge on a customer-specific, “as applicable” basis will provide the necessary flexibility to accommodate LFEs and voluntary participants that may be in several utility rate classes. Enbridge and Union have indicated that they plan to update their billing systems to accommodate cap and trade costs over a six-month period. Staff believes that establishing charges that make use of the current billing format will likely facilitate implementation and that this billing change can be accommodated in that time.

5.1.4 Rate Setting Approaches

To set the annual rates for both the customer-related and facilitated-rated charges, staff has identified two options: that the annual rates be based on the utility’s annual forecast or based on its forecast for the entire compliance period.

⁷ http://www.ontarioenergyboard.ca/oeb/Documents/EB-2004-0205/BEworks_TOU_Report.pdf

For the first option, the annual rates could be set based on:

- the annual weighted average price of the utility's proposed compliance options (as outlined in Tables 2 and 3 in section 4) or
- an annual carbon price forecast such as the Intercontinental Exchange (ICE)

In the first approach, the annual rates could be set based on the annual forecasted weighted average price of each of the utility's compliance options (customer- and facility-related) for each year of the compliance plan weighted by the annual volume forecast. With this approach, the utility's emission units may include a blend of allowances purchased in the year of the auction and allowances purchased for future years (i.e., future vintage allowances). For example, in a 2017 auction, the utility could buy future vintage allowances for years 2018, 2019, etc. In the second approach, the annual rates could be set based on an annual carbon price forecast such as ICE and the annual volume forecast. This will link the customer's annual consumption with its GHG emissions, regardless of the utility's procurement and investment strategies. This approach is consistent with California.

Alternatively, the annual rates could be set based on the forecasted weighted average price of the utility's compliance options (customer-related and facility-related) for the entire compliance plan weighted by the total volume forecast. This approach would act to smooth rates over the compliance period.

Staff acknowledges that the utility may need to gain some experience in the marketplace before it can develop comprehensive and longer term Compliance Plans. Further, 2017 will be the first year that the utility has to report GHG emissions for its customers and as such it may need to better understand the implications of these forecasts. As a result, staff believes that it would be premature at this time to adopt an approach where the rates are set based on the forecasted weighted average price of the utility's customer-related/facility-related compliance options for the entire compliance plan weighted by the total volume forecast.

Staff therefore suggests that rates be set based on:

- the annual weighted average price of the utility's proposed compliance options or
- an annual carbon price forecast based on ICE

Staff recognizes that rates based on the utility's annual compliance options may create intergenerational issues because the utility may purchase future vintage allowances during the compliance period (i.e., multi-year costs recovered in the annual rates). Staff also notes that any approach to address this issue would not mitigate the need to adjust rates in subsequent years in the multi-year plan.

Re-Calibration Process

Staff notes that the settlement prices from the quarterly auctions have been relatively stable in the WCI market. Also, the utility's Compliance Plans are not expected to significantly change on a quarterly basis as the plans should have a longer term focus. Staff is of a view that a quarterly examination of the customer- and facility-related obligation costs, and other matters, would be overly burdensome. Therefore, staff is proposing that the re-calibration be done annually. This approach would strike a balance between the carbon price reflected in the market and price stability. It also aligns with the annual monitoring and reporting process (outlined in section 6)

True Up Process

Staff also proposes that true ups be done on an annual basis. The annual true ups for the customer- and facility-related obligation costs would be based on the difference between the amount the utility actually paid for in terms of compliance instruments (such as purchasing allowances, including any future vintage allowances, offset credits, and secondary market transactions) and what it actually recovered in rates. Staff notes that the deferral account balances would have to be apportioned between customer- and facility- related obligations.

Staff is concerned that there may be a potential for large deferral account balances in relation to the customer-related obligation costs. To mitigate deferral account balances, staff proposes that the OEB set a threshold level that would trigger a review of the balances and potential customer impacts (e.g., electricity customers may be impacted if gas-fired generators are exposed to large variances after they have supplied power into the market). Staff invites comments on how the OEB should set the threshold level (e.g., should it be based on a dollar amount, a percentage) including any necessary criteria.

OEB staff recommends that annual re-calibration and true ups be filed as a separate rate application given the expected greater focus on this new activity by the natural gas utility.

5.2 California and Québec Markets

California:

Cost Causation and Cost Allocation

All customers pay the facility-related obligation costs and administrative costs. Covered entities (equivalent to Ontario's Large Final Emitters) that are subject to direct cap and trade regulation under California Air Resource Board's (CARB) rule are exempt from the portion of GHG compliance costs associated with customer-related obligations.

The natural gas utilities allocate facility-related obligation costs and customer-related obligation costs on a volumetric basis.

Rate Design

Annual uniform cents per therm (volumetric) charge for customer-related and facility-related obligations costs. These costs are recovered in transportation rates.

For incremental administrative costs, these costs are currently tracked in a deferral account but this practice will be phased out. The recovery of these costs will be reviewed in an upcoming rates proceeding.

Cost Recovery and True Up Process

The natural gas utilities recover their annual cap and trade program compliance costs for the following year on an annual forecast basis through an existing process. This process can be formal or streamlined depending on the utility requests and expected controversy.

The CPUC established a symmetrical variance account to capture the differences between forecast and actual compliance costs. The variance accounts are disposed annually and intervenors can challenge the costs that are inconsistent with the utility's procurement authority.

Québec:

Cost Recovery and True Up Process

The compliance costs are based on an annual forecast of GHG emissions and forecasted price of carbon subject to true ups. A symmetrical variance account captures the differences between the forecast and actual costs. True ups are completed quarterly, aligning with allowance auctions and are meant to revise forward rates. However, in practice, rates have only been changed annually with the variance being tracked. The gas utility files an annual compliance buying strategy in its annual rate application.

Cost Allocation

Facility obligations are allocated to all customers on a volumetric basis, while customer related obligations are allocated to only non-large final emitter customers on volumetric basis as well.

Administrative costs associated with compliance with the cap and trade program (including staff costs, compliance reporting, administrative procurement, etc.) are allocated on a volumetric basis to all customers as part of general administrative costs.

Rate Design

The rate is an equal cents per cubic meter (m³) for facility-related and customer-related obligations costs.

Costs, including the administrative costs, are recovered as a separate line item on the customer`s bill entitled the “Cap and Trade Emissions Allowance”.

6 Monitoring and Reporting

On-going monitoring of the utility's costs and performance is essential as it will:

- Support the review of costs for the purpose of rate recovery
- Provide useful and transparent feedback
- Encourage continuous improvement

On-going monitoring also meets staff's suggested guiding principles outlined in section 3 as it will ensure that the Compliance Plans are cost-effective and that the utility has adhered to its plans.

6.1 Issues and Options

Performance Metrics

Monitoring would include the usual tests of prudence (e.g., whether the utility followed its compliance strategies). Staff suggests that the performance metrics used to monitor the utility's Compliance Plans should be the same as the performance metrics used to assess these plans. Therefore, the OEB would use the following metrics to examine utility performance:

- Costs per tonne (\$/tonne) of each compliance instrument or activity
- A comparison of costs of investing in GHG abatement activities versus procuring emission units over the short-term and long-term
- Comparison of actuals with forecasts
- Cost per customer

The OEB would also use the latest settlement price from the quarterly auctions to benchmark utility costs.

Staff believes that it is important that the metrics used to monitor the plans should be consistent for all utilities as this will allow the OEB, ratepayer groups and other stakeholders to compare plans between the utilities and over time

Frequency and timing

Staff is proposing that the utility file annual monitoring reports to align with utility's cap and trade annual rate application (as discussed in section 5.1.4). The OEB expects the utility to provide supporting documentation (including auction reports, summaries of

offsets and secondary market transactions, etc.) to allow the OEB to review the execution and performance of the Compliance Plans with regards to cost recovery. This is similar to Québec and California.

6.2 California and Québec Markets

California:

The annual compliance cost forecast and rate adjustment processes provides a continuous monitoring opportunity for the CPUC.

The utilities file reconciliation reports, auction reports and supporting documentation with the CPUC. These reports allow the CPUC to review the execution and performance of the compliance plans on an on-going basis. This review process informs the CPUC when approving subsequent annual compliance plans on an on-going basis.

Québec:

The monitoring process has evolved in a relatively ad-hoc manner; as such, there is no discrete or additional monitoring process or metrics. Monitoring is included in the annual compliance strategy review filed along with the subsequent period's compliance plan.

Also, the Régie requires the utilities to file quarterly auction reports (aligned with allowances auctions) and annually (aligned with rate case filings) reports. This allows the Régie to monitor the utilities' adherence to their purchasing plans.

Monitoring includes the same tests of prudence and reasonableness that are applied to all other rate change considerations.

7 Customer Outreach and Education

Customer outreach and education is essential as customers need to fully understand the provincial government's cap and trade program and the impact of the program on their bills. Also, customers need to be educated on how to manage their GHG emissions to reduce bill impacts.

7.1 Issues and Options

Role of the Utility

Staff is of the view that the utility has the direct relationship with the customer and therefore, it should leverage its existing customer relationship to deliver targeted messaging. As part of the utility's customer outreach program it should:

- Include information on its website
- Respond to queries through its call centre
- Provide bill inserts
- Hold targeted meetings with commercial and industrial customers, and gas-fired generators

The utility's outreach program should address the following objectives:

- Improve customer understanding of the Cap and Trade program
- Ensure customers understand how to manage their GHG emissions to reduce their bills
- Maintain a consistent and professional message

This approach is similar to California and Québec.

Role of the OEB

Staff has identified two possible roles for the OEB to ensure a consistent message for customers of Enbridge, NRG and Union. The OEB could provide messaging to the utility, or the OEB could review messaging proposed by the utility.

Based on the objectives listed above, it is expected that the utility would develop a communication strategy/plan, including proposed messaging. Staff recommends that the OEB review the utility's messaging in its proposed communication plan/strategy. This approach provides the utility the flexibility to develop a communication plan that

bests responds to its customers, while ensuring consistent messaging to all natural gas consumers within Ontario. This is consistent with California.

7.2 California and Québec Markets

California:

In California, state-wide customer outreach programs educate ratepayers about the Cap and Trade program and are administered by the utilities. In addition to these state-wide efforts, the CPUC directed the utilities to develop customer outreach plans. Customer outreach and education programs are intended to address the following objectives:

- Ensure customers understand the costs and benefits of the Cap and Trade program
- Maximize the amount of GHG allowance revenues returned to customers
- Maintain competitive neutrality of messaging

Utilities can leverage existing customer relationships to deliver targeted messaging such as bill inserts, e-mail notices, newsletters, and information on the utilities' websites. Activities are not to conflict with state-wide outreach efforts.

Three of the state's largest utilities (SDG&E, PG&E and SCE) have proposed to pool funding to hire a third-party agency to meet the objectives outlined above. This collaborative effort will better manage costs, ensure competitive neutrality, and be consistent for statewide use. The proposed approach will begin with "low-cost" and "no-cost" cost measures and gradually progress through various (more aggressive) channels of outreach.

The recovery of Cap and Trade costs are through the transportation rates and this rate is already present on a customer's bill. This is intended to reduce customer confusion.

Québec:

The utility does the majority of direct outreach and education with respect to Cap and Trade. The utility's website includes Cap and Trade information content and explanations of the Cap and Trade approach, costs and impacts on rates in conjunction with the standard "explanation of rates" landing page.

Also, there is a clear line item on all customer bills and this augmented by inserts and information releases to ensure customers are well-informed of activities and rationale for rate changes related to Cap and Trade compliance.

The proceeds of the Cap and Trade program put in the Green Fund and are earmarked for the financing of the different initiatives contained in the 2013-2020 Climate Change Action Plan. These initiatives aim at reducing GHG emissions and helping Quebec society adapt to the impacts of climate change.

8 Confidentiality of Cap and Trade Information

Introduction

As part of the cap and trade framework for natural gas utilities, staff expects that a utility will be filing cap and trade information (Cap and Trade Information) in the following types of OEB processes:

- Proceedings to review and approve a utility's Compliance Plans and approve associated costs;
- Monitoring reports filed annually by the utility;
- Recalibration and true-up process for OEB approval of recovery of Cap and Trade costs; and
- Other OEB proceedings in which Cap and Trade Information may be disclosed to the OEB, including the utility's Cost of Service applications.

In these proceedings, staff believes the OEB will require access to information necessary for it to carry out its statutory obligation to set just and reasonable rates, including information relating to cap and trade costs that utility expects to recover from ratepayers. Some of the Cap and Trade Information that staff expects the OEB will receive will be confidential for various reasons.

In order to ensure transparency and the appropriate level of disclosure in OEB proceedings, while also ensuring compliance with the *Climate Change Act* and associated regulations, preserving market integrity and protecting confidential information, staff proposes adopting Confidentiality Protocols relating to Cap and Trade Information in OEB proceedings (Protocols).

Staff has identified two (2) categories of confidential Cap and Trade Information that it expects will be filed in OEB proceedings and therefore should be given special consideration. OEB staff is proposing confidentiality protocols that would supplement the existing OEB *Rules of Practice and Procedure* and *Practice Direction on Confidential Filings*.⁸

⁸ OEB *Rules of Practice and Procedure*, section 10 and OEB *Practice Direction on Confidential Filings*, section 5

Accordingly, staff proposes the following classification and confidential treatment of certain Cap and Trade Information:

Classification of Confidential Information	Specifics and Examples of Confidential Protocols for Disclosure	Protocols for Confidential Treatment and Disclosure
Auction Confidential	Information related to participation at auctions for emissions allowances that is prohibited from disclosure by s. 31 of <i>Climate Change Act</i> (except to ‘prescribed persons’), i.e., information relating to a person’s participation in an auction, including the person’s identity, bidding strategy, the amount of the bids for a specified quantity of emission allowances and the financial information provided to the (MOECC) Director in connection with the auction.	<p>Auction Confidential Information should be filed by an applicant utility according to the <i>Rules</i> and request confidential treatment for the information.</p> <p>Auction Confidential Info should only be reviewed by OEB staff and panel members.</p> <p>The applicant utility should file redacted versions of such documents for the public record.</p>
Market Sensitive	<p>Information relating to transactions of emission units on secondary or tertiary markets or offset credits.</p> <p>Information relating to compliance instruments used by a utility to meet its GHG obligations.</p>	<p>Market Sensitive Information should be filed by an applicant utility according to the <i>Rules</i> and request confidential treatment for the information.</p> <p>Market Sensitive Info should only be reviewed by OEB staff and panel members.</p> <p>The applicant utility should file redacted versions of such documents for the public record.</p>

Auction Confidential Information

The *Climate Change Act* prohibits a person from disclosing whether or not the person is participating in an auction or “information relating to the person’s participation in an auction, including the person’s identity, bidding strategy, the amount of the person’s bids for a specified quantity of emission allowances and the financial information provided to the Director in connection with the auction”. Disclosure of information concerning a person’s participation in an auction for emissions allowances (Auction Confidential Information), may only be made as ‘prescribed’.⁹ Section 65 of the *Cap and Trade Regulation* specifies that the OEB is a ‘prescribed’ person to whom Auction Confidential Information may be disclosed.

Auction information cannot be disclosed to other parties in an OEB proceeding, absent specific authorization in the *Cap and Trade Regulation*. However, since Cap and Trade costs will be recovered by rate-regulated utilities through rates payable by consumers, the OEB must ensure that the costs are reasonable and prudently incurred.

Staff proposes that the OEB adopt a procedure where Auction Confidential Information is only reviewed by OEB staff and the panel in a proceeding, all of whom are subject to

⁹ The *Climate Change Act*, Section 32 states:

(6) No person shall disclose whether or not the person is participating in an auction.

Same

(7) No person shall disclose whether or not the person is taking part in an auction or any other information relating to the person’s participation in an auction, including the person’s identity, bidding strategy, the amount of the person’s bids and the quantity of emission allowances concerned, and the financial information provided to the Director in connection with the auction.

Same

(8) If a prospective purchaser retains the services of another person in connection with an auction, the other person shall not disclose any of the information described in subsection (7) relating to the prospective purchaser.

Exception

(9) Subsections (6), (7) and (8) do not apply with respect to a disclosure to such persons as may be prescribed.

Prohibition re: bidding strategy

(10) No person shall coordinate the bidding strategy of more than one prospective purchaser in connection with an auction.

a statutory duty of confidentiality, both during and after employment as Ontario public servants.¹⁰

Staff proposes a process for reviewing Auction Confidential Information which is akin to the OEB's inspection / audit process under Part VII of the *OEB Act* whereby confidential information is disclosed only to OEB staff and panel members.¹¹ However, unlike the potential exceptions to confidentiality provided for in the inspection / audit process, there would be no exceptions with respect to Auction Confidential Information unless provided for in the *Cap and Trade Regulation*.

¹⁰ Sections 5 and 17 of O. Reg. 381/07: CONFLICT OF INTEREST RULES FOR PUBLIC SERVANTS (MINISTRY) AND FORMER PUBLIC SERVANTS (MINISTRY) under Public Service of Ontario Act, 2006, S.O. 2006, c. 35, Sched. A state:

5. (1) A public servant shall not disclose confidential information obtained during the course of his or her employment by the Crown to a person or entity unless the public servant is authorized to do so by law or by the Crown. O. Reg. 381/07, s. 5 (1).

(2) A public servant shall not use confidential information in a business or undertaking outside his or her work for the Crown. O. Reg. 381/07, s. 5 (2).

(3) A public servant shall not accept a gift directly or indirectly in exchange for disclosing confidential information. O. Reg. 381/07, s. 5 (3).

17. (1) A former public servant shall not disclose confidential information obtained during the course of his or her employment by the Crown to a person or entity unless the former public servant is authorized to do so by law or by the Crown. O. Reg. 381/07, s. 17 (1).

(2) A former public servant shall not use confidential information in a business or undertaking. O. Reg. 381/07, s. 17 (2).

¹¹ Section 111 of the OEB Act states:

Confidentiality

111. (1) All documents and records obtained by an inspector under section 107 or 108, and information obtained by an inspector under section 107, are confidential and shall not be disclosed to any person other than a member of the Board or an employee of the Board except,

(a) as may be required in connection with the administration of this Act or any other Act that gives powers or duties to the Board or in any proceeding under this or any other Act that gives powers or duties to the Board;

(b) to counsel for the Board or an employee of the Board;

(c) with the consent of the owner of the document or record or the person who provided the information; or

(d) in accordance with an agreement described in subsection (3). 2003, c. 3, s. 74; 2015, c. 29, s. 17 (1).

In order to maintain confidentiality, OEB staff with the inspector designation would review the Auction Confidential Information and provide a non-confidential report as to the reasonableness and prudence of the cap and trade costs incurred by a utility which would be on the public record.

Staff notes that, following an auction or sale of emission allowances the Minister will make publicly available a summary of each auction or sale and set out information such as the lowest bid prices accepted in the auctions, the registered participants who submitted bids and some details regarding the emissions allowances sold.¹² Hence, staff is of the view that there will be sufficient publicly available information about auction results for consumers to be informed about utility's cap and trade costs and the restriction on disclosure of Auction Confidential information should not preclude transparency of OEB proceedings dealing with cap and trade costs.

Market Sensitive Information

Information may be filed with the OEB related to a utility's Compliance Plans which involves primary market activity, other than auctions, as well as secondary market activity (including bilateral agreements, other transactions and instruments) which will also need to be treated as confidential. Staff is concerned that such information could have an impact on cap and trade markets if disclosed (Market Sensitive Information) and such disclosure could be contrary to sections 28(5) and (6) of the *Climate Change Act* which prohibit trading and 'tipping' of generally non-disclosed information.¹³ Staff

¹² *Cap and Trade Regulation* s.42 states:

42. (1) The Minister shall make available to the public, in a manner that the Minister considers appropriate, a written summary of each auction or sale, setting out the following information: 1. In the case of an auction, i. the lowest bid price accepted for Auction Class 1 emission allowances, and ii. the lowest bid price accepted for Auction Class 2 emission allowances. 2. The registered participants who submitted bids in the auction or sale. 3. Details regarding the number of emission allowances sold, the number of each vintage year or category of emission allowances sold, and a description of how the emission allowances were distributed among the participants who submitted bids, without identifying which participants purchased the emission allowances. (2) The summary shall be made available within 45 days following the conclusion of the auction or sale.

¹³ The *Climate Change Act*, section 28(5) prohibits trading where there is an undisclosed change and Section 28(6) prohibits "tipping" information that is not generally disclosed. The sections state:

therefore proposes that Market Sensitive Information follow the same protocol as Auction Confidential Information, that is it will only be reviewed by staff and panels in proceedings relating to cap and trade costs.

Similarly, OEB staff with inspector designation would review the Market Sensitive Information and provide a non-confidential report on the reasonableness and prudence of the costs for the public record.

Public Information

Generally, the OEB should look to have as much information filed publicly as possible. This is the OEB's preferred approach and in keeping with the guiding principle of transparency. Therefore, with the exception of the Auction Confidential and Market Sensitive Information staff proposes that other information pertaining to a utility's cap and trade costs is provided in public filings including, for example, information pertaining to:

- Load forecasts for customer related obligations, LFEs and voluntary participants;
- Forecasts of GHG emissions;
- Forecasted costs per tonne of GHG;
- Total cost of the compliance portfolio over the compliance period and cost per year;
- Administrative costs over the compliance period and cost per year;
- Financing costs;
- Cost of abatement activities, per customer and / or per tonne of GHG;
- MACC (marginal abatement cost curves) indicating comparisons of emissions reductions costs and compliance costs;
- Proposed capital investments (as part of Leave to Construct and / or Cost of Service proceedings; and

Trading where undisclosed change

(5) No person shall purchase, sell, trade or otherwise deal with emission allowances or credits if the person has knowledge of information that has not been generally disclosed and that could reasonably be expected to have a significant effect on the price or value of an allowance or credit.

Tipping

(6) No person shall, other than in the necessary course of business, inform another person of information that has not generally been disclosed and that could reasonably be expected to have a significant effect on the price or value of an emission allowance or credit.

- Information that is otherwise publicly available and reported by utilities in a non-confidential context.

In addition to the above-noted information, OEB staff notes that a number of other key data will be publicly available, for example carbon price forecasts which will be derived from ICE for short-term pricing and the OEB will prepare and issue longer-term pricing.

The utility may wish to seek confidential treatment for commercially sensitive information, or information that could affect a utility's competitiveness, proprietary rights or privileged information, such as information regarding new business opportunities or new technologies. Staff is of the view that the existing *Rules of Practice and Procedure* and *Practice Direction* as well as the OEB's experience in dealing with confidentiality issues in past proceedings provide sufficient methods for dealing with requests for confidential treatment of commercially sensitive information.

Conclusion

OEB staff emphasizes that, as the Ontario cap and trade market is still nascent the protocols and procedures surrounding confidential information should be expected to evolve as the market matures. Hence, staff proposes that the confidentiality Protocols be reviewed and updated as necessary upon issuance of any revised Ontario legislation and regulations as well as OEB Rules, Codes, orders and decisions.

9 Other Issues

Customer Abatement Programs and OEB's Demand Side Management Framework

On December 22, 2014, the OEB issued its multi-year Demand Side Management (DSM) Framework (EB-2014-0134)¹⁴ that outlines its guiding principles and its expectations for the utilities for DSM. The DSM framework is designed to reduce natural gas consumption throughout Ontario, and includes the OEB's policies on all elements of the gas utilities' DSM activities.

Staff notes that the multi-year DSM Framework includes an evaluation, measurement and verification ("EM&V") process where the OEB has an active role. In addition, the DSM Framework has processes and mechanisms in place to ensure that the utility cannot apply for lost revenue adjustment mechanism (LRAM) amounts and/or the shareholder incentive amounts for customer abatement programs that are implemented under cap and trade.

The DSM framework also includes a mid-term review provision (June 1, 2018). In light of the government's Cap and Trade program, the OEB may assess the appropriateness of this framework at that time.

Treatment of New Business Activities

With respect to new business activities, staff notes that the OEB decides on a case-by-case basis whether the utility can undertake these activities (e.g., the OEB would decide whether a utility could enter into the business of developing renewable natural gas to sell in the marketplace). Also, staff proposes to use existing OEB accounting policies for non-utility activities and affiliate relationships as well as the natural gas undertakings.

¹⁴ http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/search/rec&sm_udf10=eb-2014-0134&sortd1=rs_dateregistered&rows=200

Appendix A: Glossary

Term	Definition	Source
Allocation	Under cap and trade regime, permits to emit can initially either be purchased by emitters or given to them for free.	Center for Climate Energy and Solutions (C2ES)
Allowance	A government-issued authorization to emit a certain amount. Commonly denominated as one tonne of CO ₂ e per year. Total number of allowances distributed to all entities in a cap-and-trade system is determined by the size of the overall cap on emissions.	C2ES
Allowance Bi-laterals	Negotiated price for government sourced allowances between counterparties, improves price certainty, higher availability risk.	Navigant/Delphi
Allowance Budget	Maximum number of allowances available in a given compliance period	Navigant/Delphi
Allowance Derivatives	Allowance derivative products offering the right to buy or sell an allowance for a set price during a future period (options) and swaps.	Navigant/Delphi
Allowance Forwards	Customized contract traded over the counter (OTC) that includes both market and credit risk.	Navigant/Delphi
Allowance Futures	Standardized futures contract traded on an exchange by a broker with delivery dates, volume and spec. terms and margin call requirements	Navigant/Delphi
Auction Allowances	Real and verifiable allowances available during government administered auctions. Clearing price determined by competitive auction with some predictability.	Navigant/Delphi
Auctioning	A method for distributing emission allowances in a cap-and-trade system whereby allowances are sold to the highest bidder. May be combined with other forms of allowance distribution.	C2ES

Term	Definition	Source
Auction platform	Online platform through which participants bid at quarterly auctions and special reserve auctions. In the case of a linked market, a auction platform is usually shared.	Navigant/Delphi
Banking	The carry-over of unused allowances or offset credits from one compliance period to the next. Program rules usually establish quantitative limits on banking to ensure market integrity and avoid manipulation.	C2ES
Border Carbon Adjustment	Measures taken at a border to compensate or adjust for added costs imposed by regulatory policies. In the context of cap and trade, importers could be required to buy allowances upon entering a cap and trade regime, or pay a fee levied as a carbon price equivalent.	Energy Research Center, University of Cape Town
Broker	Executes exchanges on behalf of compliance entities	C2ES
Cap	A mandated restraint in a scheduled timeframe that puts a “ceiling” on the total amount of anthropogenic greenhouse gas emissions that can be released into the atmosphere. This can be measured as gross emissions or as net emissions (emissions minus gases that are sequestered)	C2ES
Cap Adjustment Factor	The percentage by which the amount of available allowances decreases at the beginning of each compliance period	C2ES
Carbon dioxide equivalent (CO₂e)	Carbon dioxide equivalent is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential. For example, the global warming potential for methane over 100 years is 21. This means that emissions of one million metric tons of methane is equivalent to emissions of 21 million metric tons of carbon dioxide.	C2ES

Term	Definition	Source
Carbon price	A cost applied to carbon pollution to encourage polluters to reduce the amount of GHGs they emit into the atmosphere. Under a cap-and-trade regime the cost is influenced by market forces.	The Guardian
Compliance	The act, specific to cap-and-trade schemes, of surrendering the required amount of allowances, or some combination of allowances and offsets, to cover an entity's emissions. Also refers to achievement by an entity in meeting its quantified emission limitation and reduction commitments under the applicable law or treaty.	Point Carbon
Compliance period	The time frame for which regulated emitters surrender enough allowances to cover their actual emissions during that time frame	C2ES
Covered entity	Any organization directly subject to the cap and trade regulation and who would hold compliance liability.	Navigant/Delphi
Early reduction credits	Credits that may be issued for GHG emissions reduced during an eligibility period (typically preceding the compliance period) to an emitter that meets the requirements described in the regulation.	Quebec Ministry of Environment
EITE (emissions intensive, trade exposed)	A measure of a given sector (or emitters) sensitivity to carbon price or regulation on the basis of two distinct measures - emissions intensity (amount of GHGs per unit of production) and trade exposure. Various methodologies have emerged to measure these factors. These metrics can be used to determine the allocation of gratis allowances as a means of addressing competitiveness concerns.	Navigant/Delphi
Emissions threshold	The total amount of annual emissions that defines whether an entity is 'covered' under a cap and trade program or not. Emitters with aggregate emissions below the threshold are generally considered 'non-covered entities' while those above hold direct compliance liability. Typically set at 25,000 t/CO ₂ e per year.	Navigant/Delphi

Term	Definition	Source
Emissions unit	One metric ton of CO ₂ , tradable compliance unit.	Quebec Ministry of Environment
Exchange	Platforms through which program participants can buy, sell or trade units on secondary/spot markets.	Navigant/Delphi
ETS (Emissions Trading Scheme)	A policy instrument where by firms buy and sell carbon allowances in order to reduce greenhouse gas emissions, otherwise known as cap and trade.	Navigant/Delphi
Greenhouse Gases (GHGs)	Include a wide variety of gases that trap heat near the Earth's surface, slowing its escape into space. Include carbon dioxide, methane, nitrous oxide, water vapor and other gases. While GHGs occur naturally in the atmosphere, human activities also result in additional greenhouse gas emissions. Humans have also manufactured some greenhouse gases not found in nature (e.g., hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride).	C2ES
Holding limits	The maximum number of allowances that may be held by an entity or jointly held by a group of entities with a direct corporate association at any point in time. Program rules usually establish quantitative limits on carry-over between compliance periods to ensure market integrity and avoid manipulation.	EU ETS
Industry assistance factor	The percentage of free allowances an emitter is provided based on the industry's leakage risk or EITE measure.	Sustainable Prosperity

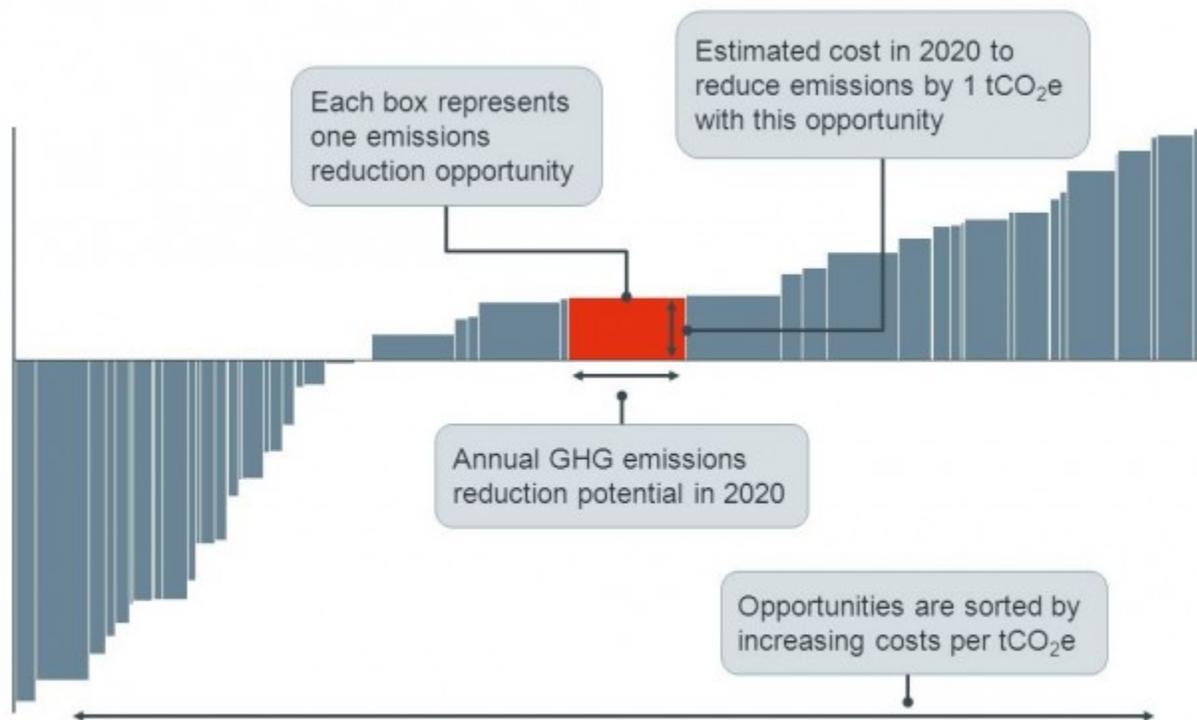
Term	Definition	Source
Leakage	A reduction in emissions of greenhouse gases within a jurisdiction that is offset by an increase in emissions of greenhouse gases outside the jurisdiction. For example, if a regulated facility moves across the border to continue operations unchanged rather than reducing its emissions.	C2ES
Linkage	Authorization by the regulator for entities covered under a cap-and-trade program to use allowances or offsets from a different jurisdiction's regulatory regime (such as another cap-and-trade program) for compliance purposes. Linking may expand opportunities for low-cost emission reductions, resulting in lower compliance costs.	C2ES
Offset	Compliance-grade instrument generated by emission reduction activities outside of covered emissions scope. Must be quantified and verified, leading to performance, credit and market risks.	C2ES
Offset Futures	Exchange traded futures contracts for verified offsets.	Navigant/Delphi
Offset limit	Portion of an entity's compliance obligation that can be attributed to the purchase of offsets. Generally intended to incent reductions within covered sectors and applied as a percentage of an entities' overall emissions.	Navigant/Delphi
Offset registries	Formal repository for offset credits that adhere to government-accepted protocols must be registered to be accepted as a compliance instrument and available for purchase.	Navigant/Delphi
Performance Benchmark	Standard set as a certain amount of emissions per unit produced. Performance benchmark are one means of translating an economy-wide cap to a facility or entity level, required to allocate gratis allowances.	Navigant/Delphi

Term	Definition	Source
Point of regulation	Entity or emission source and threshold at which cap and trade compliance liability is directly applied. For example, transportation is considered a 'covered sector' under cap and trade, but the point of regulation is fuel distributors.	Navigant/Delphi
Price floor	A guaranteed minimum price for a tonne of CO ₂ e sold at an allowance auction under a cap and trade regime	Navigant/Delphi
Purchase limits	The maximum quantity of allowances that one entity can purchase at auction	Navigant/Delphi
Strategic reserve	A number of allowances withheld from auction as a price containment mechanism.	Navigant/Delphi
Verified emissions	Emissions that are counted by a third-party verifier. These emissions are mentioned in a verification report and, where applicable, a notice of correction.	Quebec Ministry of Environment
Western Climate Initiative (WCI)	A collaboration launched in February 2007 to meet regional challenges raised by climate change. WCI is identifying, evaluating and implementing collective and cooperative ways to reduce greenhouse gases in the region. Membership in the WCI presently consists of California, British Columbia, Manitoba, Ontario, and Quebec.	C2ES

Appendix B: Marginal Abatement Cost Curve (MACC)

How to Read a MAC Curve

The marginal abatement cost curve (MACC) summarizes the estimates of the volume and costs of opportunities to reduce GHG emissions. Each box on the curve represents a different opportunity to reduce GHG emissions. The width of each box represents the emissions reduction potential that opportunity can deliver in any given year, and the height of each box represents the average cost of abating one tonne of CO₂e (carbon dioxide equivalent) through that activity. The graph is ordered left to right from the lowest cost to the highest cost opportunities.



Source: ClimateWorks Australia, <http://climateworks.com.au>

