

K.3.1

EB-2015-0029
Union Gas Limited
2015-2020 Demand Side Management Plan

VECC Compendium
Union Panel #2
August 20, 2015

1.0.7 Program Budget

The budget presented in Table 2 below does not include inflation.

Table 2
Residential Program Budget (\$000)

Program Cost	2016	2017	2018	2019	2020
Development and Start-up	\$1,850	\$0	\$0	\$0	\$0
Incentives/Promotion					
<i>Home Reno Rebate</i>	\$7,233	\$9,880	\$12,326	\$12,226	\$12,226
<i>Behavioural</i>	\$1,124	\$3,303	\$3,303	\$3,303	\$3,303
<i>ESK</i>	\$389	\$387	\$386	\$386	\$386
Total	\$8,745	\$13,569	\$15,916	\$15,916	\$15,916
Evaluation	\$559	\$709	\$859	\$859	\$859
Administrative Costs	\$991	\$1,071	\$1,071	\$1,071	\$1,071
Total	\$12,145	\$15,349	\$17,845	\$17,845	\$17,845

1.0.8 Program Participation and Simple Payback

Program Participation

As requested by the Board in the Framework, Table 3 below is a summary of forecasted participants in Union's Residential program per offering. The forecast was developed at the offering level and a customer may choose to participate in multiple offerings.

Table 3
Residential Program Participation

Offering	2016	2017	2018	2019	2020
Home Reno Rebate	3,000	4,000	5,000	5,000	5,000
Behavioural	300,000	300,000	300,000	300,000	300,000
ESK	15,000	15,000	15,000	15,000	15,000

Simple Payback

Simple payback is calculated using the incremental costs of the offering and dividing by the annual gas, electricity and water savings benefits to the customer. The simple payback after a DSM incentive would reduce the incremental cost and therefore, reduce the payback period for the customer. Table 4 provides the simple payback analysis by participant.

Home Reno Rebate is strongly aligned with the Board's guiding principles and key priorities, and Union's focus on the offering will correspondingly continue to grow, with increased planned participation over the term of the Plan.

As well, Union envisions the Home Reno Rebate offering, in tandem with the Behavioural offering, as a critical vehicle for increasing energy literacy amongst Residential customers. Completing an energy assessment is not only a precursor to installing measures that result in long-lived energy savings, but also a source of energy information that can help consumers make informed energy choices on a daily basis.

Description

- Participants of the Home Reno Rebate offering work with a partner Service Organization to complete an initial energy assessment (known as the "D Assessment") to establish the home's current energy use and identify energy saving opportunities in the home. A critical component of the D Assessment is a blower door test that measures air tightness.
- The Service Organization provides a report to the participant outlining energy saving opportunities, along with the home's EnerGuide rating and energy saving tips and information.
- Rebates are available for completing energy assessments and implementing opportunities recommended from the D Assessment:
 - Building envelope: air sealing and insulation (basement, attic, and exterior wall)
 - Products: furnace, boiler, water heater, window, door or skylight
- After the upgrades are made, participants complete a second energy assessment (known as the "E Assessment") to determine energy savings.

Target Market

- Home Reno Rebate offering targets residential customers in detached, semi-detached, townhouses and individually metered row townhouses. Participants must have a natural gas furnace/boiler.
- Home Reno Rebate participants typically exhibit higher than average natural gas consumption and live in homes built prior to 1977.
- Union intends to target customers across the Union's franchise area. In the 2012-2014 period, the offering was gradually expanded throughout central and southern Ontario.

Incentive Level

- Assessment rebates:
 - Union provides a rebate for the D and E Assessments (\$500), provided all of the eligibility criteria and program rules have been met.
- Measure rebates:

- 1 • Bonus Rebate
- 2 ○ Starting in 2016, Union intends to add a “bonus rebate” of \$250 for each measure
- 3 installed beyond the first two. This rebate is designed to encourage homeowners to
- 4 pursue all energy savings opportunities available to them.
- 5
- 6 • Maximum Rebate
- 7 ○ Starting in 2016, Union will increase the maximum rebate payment from \$2,500 to
- 8 \$5,000. The cost of the assessment, measure rebates, and bonus rebates will count
- 9 toward this cap.
- 10 ○ The higher rebate allowance will ensure homeowners are incented to pursue all
- 11 natural gas savings opportunities recommended to them, such as multiple insulation
- 12 measures.
- 13

14 *Market Delivery*

- 15
- 16 • Awareness and interest in the offering will be cultivated through a number of channels
- 17 including:
- 18
- 19 ○ Mass-media promotion
- 20 ▪ Radio, newspaper, and billboards/outdoor signs to build widespread
- 21 awareness, particularly in areas where Home Reno Rebate was not previously
- 22 available.
- 23
- 24 ○ Targeted promotion
- 25 ▪ Direct mail, door-hangers, etc., targeted to the homes most likely to benefit
- 26 from the offering, such as older homes (built prior to 1977) with higher than
- 27 average natural gas consumption and neighbours of Home Reno Rebate
- 28 participants that are likely to be of the same vintage.
- 29
- 30 ○ Behavioural offering
- 31 ▪ The Behavioural offering will act as a channel to reach the target group with
- 32 timely cross-promotions and adaptive messaging, and will also help Union
- 33 establish a more thorough profile of its customers and how they use energy in
- 34 the home, which can be used in support of campaigns.
- 35
- 36 ○ Contractor and Service Organization network
- 37
- 38 Union will continue to develop a network that can generate participant leads and provide
- 39 an effective and efficient customer experience start-to-finish. Developing and
- 40 maintaining this network involves:
- 41 ▪ Identifying, pursuing, and screening Service Organizations and contractors
- 42 (e.g. heating, insulation, window/skylight, and general contractors) for

- Rebates are available for building envelope and ENERGY STAR measures, as shown in Table 1 below. These rebate levels are consistent with 2015.

Table 1
Measure Rebates

Measure	Rebate	Description
Basement Insulation	\$1,000	For adding at least R23 to 100% of basement
	\$500	For adding at least R12 to 100% of basement
	\$800	For adding at least R23 to 100% of crawl space wall
	\$400	For adding at least R10 to 100% of crawl space wall
	\$450	For adding at least R24 to 100% of floor above crawl space
Exterior Wall Insulation	\$1,500	Add at least R9 for 100% of building to achieve a minimum of R12.
	\$1,000	Add at least R3.8 for 100% of building to achieve a minimum of R12.
Attic Insulation	\$500	For increasing attic insulation from R12 or less to at least R50 from R12 or less
	\$250	For increasing attic insulation from R13 to R25 to at least R50
	\$500	For increasing cathedral/flat roof insulation by at least R14
Air Sealing	\$150	Achieve 10% or more above base target
	\$100	Achieve base target
Furnace/Boiler	\$500	For replacing low or mid-efficiency heating system with 95% AFUE or higher condensing natural gas furnace or 90% AFUE or higher ENERGY STAR® condensing gas boiler
Water Heater	\$200	For replacing water heater with ENERGY STAR natural gas water heater with EF of 0.82 or higher
Window/Door/Skylight	\$40	For each window, door or skylight replaced with ENERGY STAR-qualified model.

- Rebates will continue to be structured in a prescriptive manner to ensure simplicity for participants. The predictable nature of the rebates enables participants to make fully informed decisions, and assists Service Organizations and channel partners in communicating accurate information.
- Rebate amounts are based on a balancing of the rebate in proportion to the incremental cost and m³ savings potential of the measure. Rebates are highest, for example, for measures that are both expensive and yield strong m³ savings, such as insulation.

to define eligibility criteria, determine appropriate incentive levels and to build an initial market delivery approach.

1.4.1 Customer class(es) targeted

- Residential, C/I General Service

1.4.2 Rate Classes Targeted

- Rate M1, Rate M2, Rate 01, Rate 10

1.4.3 Goals

Program goals for the Low Income Program are to:

- Reduce the energy burden of Union's low income customer base
- Provide offerings to Union's low income customer base that adhere to the guiding principles and key priorities outlined in Section 2.0 of the Guidelines
- Continue to develop the breadth and the depth of the low income offerings throughout the term of the multi-year plan
- Minimize the barriers that low income customers face in participating in energy conservation programs

1.4.4 Program Strategy

Program strategies to achieve Union's goals for the Low Income Program include:

- Addressing all measures and natural gas savings opportunities in dwellings while meeting the program cost-effectiveness requirements
- Growing the offering's infrastructure across Union's franchise area
- Providing customers with the education required to continue conservation in their home after measure installation has been performed
- Addressing universality by expanding the Program to new low income markets (i.e. Low Income Market Rate Multi Family, Aboriginal communities etc.)
- Fostering relationships with key influencers in the low income community (i.e. Municipal Service Manager Offices, social service agencies, associations)

1.4.5 Program Offerings

The offerings delivered in the Low Income Program are outlined below.

Home Weatherization ("HW") Offering

Description

The Home Weatherization offering provides:

- A free home energy audit ("Initial Audit") to qualified homeowners and tenants to determine the building envelope upgrade requirements. During the Initial Audit, an

assessment of the furnace will be made to determine if it's at end-of-life and if it qualifies for an incentive under the Furnace End-of-Life Upgrade Offering. If the furnace is not at end-of-life, the auditor will leave information regarding Union's Furnace End-of-Life Upgrade Offering for future reference.

- All qualifying building envelope upgrades are installed for free including: attic insulation, wall insulation, basement insulation and draft-proofing measures.
- One carbon monoxide detector per home will be left behind for self-installation.
- Health and safety upgrades - if health and safety issues are discovered during the Initial Audit that prevent measures from being installed, the issues will be assessed to determine whether they fall within Union's Health and Safety Protocols and, if qualified, these issues will be addressed to allow for installations. Union has worked with industry experts to define appropriate Health and Safety Protocols and these are outlined in Union's general Health & Safety Policy document that is provided to the contracted delivery agents. The most common Health & Safety issue addressed is a customer's inability to safely clear clutter from the required work space. This is due to age and mental or physical disabilities.
- A follow-up home energy audit ("Final Audit") that will evaluate the energy savings realized in the home by installation of the measures.
- One-on-one energy conservation education by the auditors and contractors.
- Free installation of up to two energy efficient showerheads, two metres of pipe wrap and a programmable thermostat. Kitchen and bathroom aerators are left behind for self-installation.

Target Market

Social and Assisted Housing Market

The Home Weatherization offering will be targeted at Social and Assisted Housing Providers with tenants that meet the following eligibility criteria:

- A household income at or below 135% of the most recent Statistics Canada Pre-Tax Low-Income Cut-Offs ("LICO") for communities of 500,000 or more, as updated from time to time (income eligibility to be confirmed by the housing provider).
- Occupant of either a:
 - Single family detached home, semi-detached home, row home or town home
 - OR
 - Part 9 building (as defined by Part 9 of the Ontario Building Code)

Private Market

Any private market customer who meets the following eligibility criteria will be targeted:

- Customer is an occupant (owner or renter) of either a:
 - Single family detached home; semi-detached home, row home or town home
 - OR
 - Part 9 building (as defined by Part 9 of the Ontario Building Code)
- Customer pays their own gas bill
- Customer has either:
 - A household Income at or below 135% of the most recent Statistics Canada Pre-Tax Low-Income Cut-Offs ("LICO") for communities of 500,000 or more, as updated from time to time
 - OR
 - Received one of the following social benefits within the last twelve months:
 - The National Child Benefit (NCB)
 - Allowance for the Survivor
 - Guaranteed Income Supplement (GIS)
 - Allowance for Seniors
 - Healthy Smiles Ontario Child Dental Program
 - Ontario Works
 - Ontario Disability Support Programs (ODSP)
 - LEAP Emergency Financial Assistant Grant
 - Participants of Union's End-of-Life Furnace Upgrade program, or
 - Participants of electric CDM Home Assistance Program

Incentive Level

- The Home Weatherization offering is delivered at no cost to the customer
- The health and safety incentive will vary by home, as the incentive level will be dependent upon cost-effectiveness. These levels are outlined in the Health & Safety Policy that is provided to the contracted Delivery Agent.

Market Delivery

To build awareness and take-up of the Home Weatherization offering, the following channels will be utilized by market:

Social and Assisted Housing Market Delivery

- *Direct Sales:* Union's Commercial Account Managers (CAMs) will target housing providers directly to bring the Home Weatherization offering to their tenant base. Housing providers will qualify tenants to ensure that they meet the eligibility criteria.

4. Enbridge should include in its survey plan non-participants or administrative staff as surveyees.
5. Enbridge should make sure that it conducts a review of program materials and tracking records in its proposed process evaluation study.

Union

1. Instead of waiting for the Aboriginal offering to start before beginning its process evaluation, Union should start its evaluation as early as possible in the first year of the low income weatherization offering.
2. Instead of the proposed energy modeling analysis, Union should propose a plan for the OEB to conduct a billing analysis as historical consumption data exist and expected energy savings are likely to be substantial.
3. Union should conduct a review of program materials and tracking records in its proposed process evaluation study.

5.5.4 Low Income Multi-Family: Recommendations

1. Enbridge and Union should consider adding early replacement measures, heating equipment repairs, furnaces, water heaters (including tankless and solar hot water), windows, programmable thermostats, duct sealing, duct insulation, boiler reset control measures and pipe wrap to their offerings.
2. Leverage the existing Low Income Multi-family Working Group to discuss providing a single point of contact for building owners, financing options to augment and/or reduce incentives over time, and a more flexible audit structure to improve program cost effectiveness. Improved cost effectiveness may free up some funds, enabling the working group to consider providing additional program oversight and support to building owners. This would in turn mitigate costs by improving project completion rates.
3. Enbridge and Union should provide reasonably consistent custom incentive offerings, unless differences are merited and explained in plans.

Enbridge

1. Enbridge should clarify whether it plans to offer high efficiency boilers as both a prescriptive and custom measure.
2. In order to find answers to its research issues in its evaluation plan, Enbridge should conduct a process evaluation and investigate the issues.

Union

1. Union should roll out as a full program, rather than as a pilot, its Low Income Multi-Family offering.
2. Union should offer an incentive for operational improvements, similar to Enbridge.



UNION GAS LIMITED

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition ("VECC")

Reference: Exhibit A, Tab 3, Appendix A, pp. 3-8, Home Reno Rebate (HRR) Offering

- a) Please describe more fully Union's current Service Organization and Contractor Network and discuss how many of each are available and the specific services they each provide.
 - b) Please provide cost details for a typical "D Assessment" to establish a homes current energy use and identify energy saving opportunities.
 - c) Please provide cost details for a typical "E Assessment" to determine energy savings.
 - d) Please provide the size of the Target Market (i.e. number of residential customers living in detached, semi-detached and individually metered row houses).
 - e) Please provide the number of customers in part (d) with a natural gas furnace/boiler.
-

Response:

- a) Service Organizations
 - Union partnered with nine Service Organizations in Central and Southwestern Ontario (Elora, REEP and Green Ventures are all part of Green Communities)
 - The Service Organizations that serve each district are provided in Table 1 below.
 - Customer can select any one of the partner Service Organizations serving their district to perform their energy assessments. The customer contacts the Service Organization directly to schedule the pre and post energy assessment.
 - The Service Organization recommends eligible upgrades to the customer based on the pre assessment. They also process all required paperwork with Union on behalf of the customer and provide Union all tracking information required.
-

Table 1: Service Organization By District

District	Service Organizations
London Region	Amerispec of Canada
	Barrier Sciences Group
	BuyWise Consulting
	Direct Energy
	Elora Centre
	The Energy
	Ridge Energy Consultants
Waterloo Region	The Energy
	REEP Green Solutions
	Ridge Energy Consultants
	BuyWise Consulting
	Direct Energy
	Barrier Sciences Group
	EnerTest Corporation
Waterloo North Region	Amerispec of Canada
	EnerTest Corporation
	Amerispec of Canada
	BuyWise Consulting
	The Energy
Windsor Region (including Chatham & Sarnia)	Ridge Energy Consultants
	The Energy
	Ridge Energy Consultants
	Barrier Sciences Group
	Eco Advantage Energy Advisors
Hamilton Region	BuyWise Consulting
	Amerispec of Canada
	The Energy
	Barrier Sciences Group
	Ridge Energy Consultants
	EnerTest Corporation
	Direct Energy
Halton Region	Amerispec of Canada
	Elora Centre
	Eco Advantage Energy Advisors
	BuyWise Consulting
	The Energy
	EnerTest Corporation
	Ridge Energy Consultants

Contractor network

- Union does not provide any recommendations on which contractor(s) the customer must work with to participate in the program. The customer may select any contractor which services their area. Union encourages participants to get at least three competitive quotes.
- Contractors perform a variety of services, and include the following:
 - i. HVAC Contractors – complete the furnace and water system upgrades
 - ii. Insulation Contractors – provide insulation services/installation
 - iii. Window Contractors – provide window, skylight and doors replacement services
 - iv. Renovators/General Contractors – Provide complete solution service to home owners by handling all upgrades and renovations in the house

b) The cost for a typical “D Assessment” is \$350.

c) The cost for a typical “E Assessment” is \$150.

d) The approximate number of residential customers living in detached, semi-detached and individually metered row houses is 1.150 million. Union estimates that 22% of these homes are Low Income.

e) The approximate number of residential single family customers with a natural gas furnace/boiler is 1.104 million¹.

UNION GAS LIMITED

Answer to Interrogatory from
Green Energy Coalition ("GEC")

Reference: Exhibit A, Tab 3, Appendix A, pp. 2-8

- a) How many homes are in what Union considers to be part of the "target market?"
- b) Regarding the proposed prescriptive rebate levels shown on p. 5:
- i) How were they developed?
 - ii) What fraction of incremental cost do they represent?
 - iii) How do they compare to Union's current rebate offerings? To its 2014 offerings (if different than current)?
 - iv) How was it determined that these levels of incentives would lead to the 2016 forecast target participation level of 3000?

Response:

- a) The Home Reno Rebate target market includes residential customers in single family homes (detached, semi-detached, townhouses and individually metered row townhouses) with a natural gas furnace or boiler. Union estimates a target market of approximately 860,000¹ homes.

Additional factors will impact the likelihood of customers to participate in the Home Reno Rebate offering within this target market, such as:

- Household characteristics, such as age of the home and natural gas consumption
- Percentage of customers who have previously retrofitted their homes, including those that participated in the federal *ecoEnergy Retrofit – Homes* program and the provincial *Home Energy Savings Program*

¹ Based on 1,303 previous participants, natural gas heating penetration of 96% and a Low-income rate of 22% amongst 1.150 million single family homes.

UNION GAS LIMITED

Answer to Interrogatory from
Consumers Council of Canada ("CCC")

Reference: Exhibit A, Tab 3, Appendix A, p. 6

With respect to the Home Reno Rebate Program please confirm the maximum incentive in 2016 will be \$5000. Has Union surveyed its residential customers regarding this program? If so, please provide the results of that research. The Council is concerned about the costs and benefits of this program for participants and non-participants. Participants in 2016 could obtain significant rebates, funded in part, by other customers who may have may have already undertaken energy efficiency initiatives at their own cost. Has Union assessed potential participant levels with lower incentives? How many customers have signed up to date in 2015? If they defer their decision for 6 months will they have access to potential rebates of \$5000, rather than \$2500 under the 2015 offering?

Response:

Confirmed, the maximum incentive in 2016 will be \$5,000.

Union has not surveyed customers regarding its offering proposal.

Union has not performed a robust assessment of potential participant levels with lower incentives.

Year-to-date as of May 31, 2015, 904 homes have participated in Home Reno Rebate.

If customers defer their decision until 2016, they will have a higher maximum rebate amount under Union's proposal however the rebate amount for individual measures will be consistent with 2015. Therefore if they are implementing a measure combination that exceeds the maximum in 2015 they would receive a higher rebate by deferring their implementation, however otherwise they would receive the same amount (with the exception of the bonus rebate Union intends to add in 2016 of \$250 for each measure installed beyond the first two, where applicable. This rebate is designed to encourage homeowners to pursue all energy savings opportunities identified for their home).

3. Enbridge should increase the offering incentive cap to be greater than \$2,000. For example, Enbridge could be consistent with Union's incentive cap of \$5,000.
4. Enbridge should reconsider its tiered incentive structure, and consider offering a sliding-scale incentive structure that should start at a lower savings level than the current 15 percent savings. This would accommodate some customers that could just install one measure at a time.
5. If Enbridge continues to offer a tiered incentive structure or offers a sliding-scale incentive, then it should lower the amount of savings required to achieve the various incentive levels or increase the level of incentives. As currently structured, a customer is required to achieve a significant reduction in usage in order to receive a relatively limited incentive amount.
6. Enbridge should consider providing incentives such that they are structured on a per-square-foot basis, or on a percentage-of-total-project-cost basis for insulation measures. In addition, it should provide prescriptive incentives for other measures similar to Union's incentive structures. Such a structure provides flexibility to the customer, thereby allowing households of different sizes, shapes, and energy consumption to participate.
7. Enbridge should provide the required home energy audits at no cost to the customer.
8. Enbridge should provide additional measures as part of this offering, such as faucet aerators, showerheads, programmable or adaptive thermostats, lighting measures, or smart strips. Such an offering ensures a holistic approach to program savings.
9. Enbridge should include in its impact evaluation plan a proposal to conduct a billing analysis for this offering.
10. Enbridge should adopt Union's survey approach for its process evaluation.
11. Enbridge should conduct any desk review of program records, data tracking systems, and materials such as marketing materials, training documents, and program manuals.

Union

1. Union should consider providing incentives such that they are structured on a per-square-foot basis, or on a percentage-of-total-project-cost basis. Such a structure provides flexibility to the customer, thereby allowing households of different sizes, shapes, and energy consumption to participate.
2. Union should provide the required home energy audits at no cost to the customer.
3. Union should provide additional measures as part of this offering, such as faucet aerators, showerheads, programmable or adaptive thermostats, lighting measures, or smart strips. Such an offering ensures a holistic approach to program savings.
4. Union should include in its impact evaluation plan a proposal to conduct a billing analysis for this offering.

UNION GAS LIMITED

Answer to Interrogatory from
Board Staff

Reference: Exhibit A, Tab 1, p. 12-13

Preamble: Union noted that it has proposed many new and innovative programs in its DSM Plan.

- a) Please identify any other programs (including pilot programs) that Union considered but chose not to include within its portfolio of programs.
- b) If applicable, please identify the reason(s) why Union chose not to further pursue these programs.

Response:

- a) and b) In the program design phase, Union considered multiple offerings for potential inclusion in the 2015-2020 DSM Plan. The following table lists the offerings that Union considered but did not include in its portfolio of programs:

Potential Offerings	Rationale
Home Labeling	<ul style="list-style-type: none"> Union believes that voluntary home labeling will not succeed in the marketplace since there are significant hurdles to overcome including: <ul style="list-style-type: none"> Limited potential in the market - disincentives exists to disclose information on inefficient homes in market Difficulties for homebuyers to compare homes and put a value on energy efficiency if home labelling is not widespread Slow Market Transformation as a result of the constant changes in the pool of homebuyers and home sellers Fragmented market—numerous real estate boards across the Union Gas franchise area.
Financing	<ul style="list-style-type: none"> Please see the response at Exhibit B:T1.Union.Staff.1 part d).
Commercial New Construction	<ul style="list-style-type: none"> Please see Exhibit A, Tab 3, Appendix A, p. 105. Union had the same concerns around the Commercial market.
Fuel Switching	<ul style="list-style-type: none"> Union experienced significant intervenor opposition to using its DSM budget to support fuel switching incentives
Simplified Custom	<ul style="list-style-type: none"> Union believes that customers are well served with the current C/I Custom and C/I Prescriptive program so a separate Simplified Custom offering was not seen as valuable, instead Union made changes to the current offerings

Holistic Low-Income	<ul style="list-style-type: none">• Holistic Low Income offering is a costly program as a result of high incentives necessary for the market to respond
Optimum Home	<ul style="list-style-type: none">• Please see Exhibit A, Tab 3, Appendix A, p. 105
Commercial Behavioural	<ul style="list-style-type: none">• Commercial Behavioural programs are still relatively new in the marketplace and uncertainties exist with regards to the actual impacts for Commercial customers

- Reluctance amongst channel partners to delay or complicate a sale by referring clients to Service Organizations.
 - Some contractors may be reluctant to refer customers to the Home Reno Rebate offering because they feel it will impact their ability to close the sale in a timely manner. They may also be reluctant to refer customers to Service Organizations if they do not have an established relationship due to concerns around how it may impact their reputation if the customer does not have a positive experience.
- Channel capacity
 - In order to offer Home Reno Rebate across the Union franchise area, new Service Organization partnerships and channel relationships will need to be established.
 - Union will address this barrier through numerous forms of channel engagement, as noted in the "Market Delivery" section above.

Behavioural Offering

Union will launch a Behavioural offering in late 2016. This offering seeks to achieve natural gas savings by encouraging customers to change energy use decisions and actions. As well, the offering will produce benefits for other offerings by acting as a channel to promote the adoption of energy efficient measures and drive participation in Home Reno Rebate and ESKs.

This offering provides natural gas usage comparisons that benchmark the customer's consumption against that of like peers as well as the customer's own performance from past months/years. To help customers action this information, the Behavioural offering provides customized energy saving tips, and uses goal setting, progress trackers, and other coaching mechanisms to motivate behavioural changes.

The Behavioural offering has two components:

- (1) Home Energy Reports ("HER") sent by mail and/or email to Residential customers with high natural gas use; and
- (2) An Online Portal available to all Residential customers.

Natural gas savings from the Behavioural offering are quantified by comparing the actual natural gas use of HER participants to that of a control group. The offering is therefore evidence based and relies on customer specific data.

Description

- Home Energy Reports
 - HERs will be sent to a group of 300,000 residential customers consuming greater than Union's Normalized Average Consumption ("NAC"). These are Union's highest consuming residential customers.
 - Reports will be mailed out during the heating season (Example: two reports during the October to December period, and two reports in the January to March period).
 - Union will complete a Request for Proposal ("RFP") process to select a vendor. The specific report contents may vary depending on the vendor, but HERs generally include:
 - Benchmarking information, comparing the customer's natural gas usage to peers living in a similar geographic area with similar dwelling characteristics;
 - Historical usage information, showing the customer how much gas they used in the most recent period compared to consumption from past periods/years;
 - Goal setting and coaching toward that goal; and,
 - Tips to save energy that involve both behavioural changes and the adoption of energy efficiency measures. Messages can also be used to cross-promote other offerings.
- Online Portal
 - Similar information to the HERs will be made available to every residential customer in a digital format through an Online Portal. Union will investigate integrating the content into MyAccount, Union's existing online account management tool.
 - Union will seek to include an "energy assessment questionnaire" where customers can enter household, dwelling, and equipment characteristics and receive customized energy saving tips. The information will also be used by Union to refine benchmarking information and adaptive messaging, and to ensure the information presented in the Online Portal and HERs is relevant and meaningful to the customer.

Target Market

- All Residential customers (both those enrolled in HERs and those not) will have access to the Online Portal.
- HERs will be sent to 300,000 of the highest consuming Residential customers. This group was selected for participation due to several factors, including:
 - The opportunity to save energy is greater amongst high usage customers and by targeting this group, Union will achieve greater cost-effectiveness;

UNION GAS LIMITED

Answer to Interrogatory from
Board Staff

Reference: Exhibit A, Tab 3, Appendix A, pp. 12-15

Preamble: The Energy Savings Kit (ESK) program has been offered since 2000. The payback period for ESKs is about 3 months and the payback period for programmable thermostats is about 1.57 years (before any incentive is provided).

Union's ESK contains a \$25 rebate coupon for a programmable thermostat. OEB staff notes that Enbridge offers a \$75 rebate coupon for an adaptive thermostat.

- a) Please explain the need to continue the ESK program from 2016 to 2020 in the context of the OEB's direction, in the DSM Framework, requiring utilities to move towards programs that are designed to achieve deeper savings.
- b) Please discuss the market saturation rates in Union's service territory for all of the individual items within the ESK.
- c) If Union were to discontinue the ESK program, please discuss how Union would reallocate the ESK budget.
- d) Please discuss whether Union is concerned that by offering incentives for programmable thermostats it may be undermining the adoption of more advanced adaptive and web-enabled thermostat technologies.
- e) Please discuss Union's position regarding offering a larger rebate coupon for an adaptive thermostat (instead of a programmable thermostat).

Response:

- a) The ESK offering is the most cost-effective offering in the Residential Program on both a TRC-Plus and cumulative m³/dollar spent basis. It also ensures broad participation with 15,000 residential customers projected to install a kit every year over the term of the Plan. As DSM costs are recovered from all customers Union believes it is important to ensure the Residential Program provides broad access and opportunities to participate. This includes customers in newer homes (i.e. built after the 1976 Ontario Building Code change) who may not have significant retrofit opportunities. ESKs assist in striking an appropriate balance

between the Board's guiding principles, and serve as a complement to the other offerings in Union's Residential Program.

- b) Union processed approximately 690,000 ESKs from 2000 to 2014, and approximately 84,500 Low Income single family homes received basic measure treatment. Union estimates there is a total of approximately 977,000 single family residential customers with natural gas water heating. Therefore, the ESK saturation rate is 79%. Union does not have this information at the individual measure level.
- c) Union would consider allocating the budget towards the Residential Behavioural offering and the Commercial/Industrial custom offering (general service and contract customers).
- d) Union believes that it is appropriate to continue offering a programmable thermostat rebate which is also eligible for adaptive and web-enabled models. These thermostat technologies have important differences from programmable thermostats that may result in uptake within a different set of residential customers in Union's franchise area. Generally speaking, the Union Gas customer tends to lag behind general trends with respect to technology and online behaviours. Union's research indicates that 43% of customers have a low level of comfort using computers¹, have privacy/trust issues related to the internet and generally have a low level of online activity.
- e) Union will consider the introduction of a separate offer for adaptive thermostats over the term of the Plan, and views this as a potential CDM collaboration opportunity. Union is currently engaged with Hydro One in a collaborative Bring Your Own Thermostat ("BYOT") pilot project that is designed to understand the gas and electric savings associated with various adaptive thermostat technologies over a 12 month period.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit A, Tab 3, Appendix C, p. 19

Please provide a detailed budget of the Residential Behavioural offering, including both capital and operating costs, as well as all startup costs and share of administration and overheads, for each year from 2015 to 2020.

Response:

Please see Table 1 below.

Table 1
Behavioural Offering Budget (\$000)

	2015 Proposed	2016 Proposed	2017 Proposed	2018 Proposed	2019 Proposed	2020 Proposed
Development & Start-up Costs	n/a	\$1,550	\$0	\$0	\$0	\$0
<i>Vendor Implementation</i>	n/a	\$350	\$0	\$0	\$0	\$0
<i>Integration of Online Portal</i>	n/a	\$450	\$0	\$0	\$0	\$0
<i>MPAC Data Purchase</i>	n/a	\$750	\$0	\$0	\$0	\$0
Incentives/Promotion	n/a	\$1,124	\$3,303	\$3,303	\$3,303	\$3,303
<i>Incentives</i>	n/a	\$0	\$0	\$0	\$0	\$0
<i>Promotion</i>	n/a	\$1,124	\$3,303	\$3,303	\$3,303	\$3,303
Evaluation	n/a	\$75	\$75	\$75	\$75	\$75
Administration	Tracked at Program Level					
Total	n/a	\$2,749	\$3,378	\$3,378	\$3,378	\$ 3,378

UNION GAS LIMITED

Answer to Interrogatory from
 School Energy Coalition ("SEC")

Reference: Exhibit A, Tab 3, Appendix A, pp. 14 and 15

Please confirm that the figures on the following spreadsheet are correct. The figures are all 2016-2020 totals, derived from Tables 2 through 6. If any of the figures are incorrect, please provide corrected information.

Residential Program Budget and Forecasts				
<i>'000 omitted</i>				
Category	Home Reno Rebate	Behavioural	ESK	Total
Direct Budget	\$53,791	\$14,336	\$1,934	\$70,061
Development, Startup, Evaluation and Admin	\$8,422	\$2,245	\$303	\$10,970
Total Program	\$62,213	\$16,581	\$2,237	\$81,031
Portfolio Costs - Share	\$7,914	\$2,109	\$285	\$10,307
Shareholder Incentive	\$4,455	\$43	\$120	\$4,618
Total Cost of Savings	\$74,582	\$18,732	\$2,641	\$95,956
Forecast CCM	571,637	21,267	60,379	653,283
Cost per CCM (cents)	13.047	88.082	4.375	14.688

Response:

Some figures are incorrect. Please see Table 1 below. Administration is tracked at the program level and cannot be shown by offering, therefore Development and Start-up, and Evaluation does not include Administration (total Administration is shown in the Total column). Shareholder Incentive is derived from each offering's cumulative m's attributed to the overall Resource Acquisition scorecard, as well as from the Home Reno Rebate's Participant metric.

Table 1

Residential Program Budget, 2016 to 2020 (000s)				
Category	Home Reno Rebate	Behavioural	ESK	Total
Direct Budget	\$53,791	\$14,336	\$1,935	\$70,062
Development and Start-up, Evaluation	\$3,600	\$1,925	\$168	\$5,693
Administration				\$5,275
Total Program	\$57,391	\$16,261	\$2,103	\$81,030
Share of portfolio costs	\$7,957	\$2,339	\$313	\$10,609
Shareholder Incentive	\$4,810	\$40	\$116	\$4,966
Total Cost of Savings	\$70,158	\$18,640	\$2,532	\$96,605
Forecast CCM (m3 000)	571,637	21,268	60,379	653,284
Cost per CCM (cents)	12.3	87.6	4.2	14.8

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit A, Tab 3, Appendix A, p. 15

Please explain how the Residential Behavioural Program is cost-effective, given the high cost per CCM.

Response:

The Residential Behavioural offering does not meet the TRC plus test in isolation but the overall residential program exceeds the 1.0 TRC threshold requirements as outlined in Exhibit A, Tab 3, Appendix A, p. 23.

The Guidelines outline that, "Program concepts such associal benchmarking....should be priorities in the first half of the new multi-year DSM term".

UNION GAS LIMITED

Answer to Interrogatory from
Board Staff

Reference: Exhibit A, Tab 3, Appendix A, pp. 12-15

Preamble: The Energy Savings Kit (ESK) program has been offered since 2000. The payback period for ESKs is about 3 months and the payback period for programmable thermostats is about 1.57 years (before any incentive is provided).

Union's ESK contains a \$25 rebate coupon for a programmable thermostat. OEB staff notes that Enbridge offers a \$75 rebate coupon for an adaptive thermostat.

- a) Please explain the need to continue the ESK program from 2016 to 2020 in the context of the OEB's direction, in the DSM Framework, requiring utilities to move towards programs that are designed to achieve deeper savings.
- b) Please discuss the market saturation rates in Union's service territory for all of the individual items within the ESK.
- c) If Union were to discontinue the ESK program, please discuss how Union would reallocate the ESK budget.
- d) Please discuss whether Union is concerned that by offering incentives for programmable thermostats it may be undermining the adoption of more advanced adaptive and web-enabled thermostat technologies.
- e) Please discuss Union's position regarding offering a larger rebate coupon for an adaptive thermostat (instead of a programmable thermostat).

Response:

- a) The ESK offering is the most cost-effective offering in the Residential Program on both a TRC-Plus and cumulative m³/dollar spent basis. It also ensures broad participation with 15,000 residential customers projected to install a kit every year over the term of the Plan. As DSM costs are recovered from all customers Union believes it is important to ensure the Residential Program provides broad access and opportunities to participate. This includes customers in newer homes (i.e. built after the 1976 Ontario Building Code change) who may not have significant retrofit opportunities. ESKs assist in striking an appropriate balance

between the Board's guiding principles, and serve as a complement to the other offerings in Union's Residential Program.

- b) Union processed approximately 690,000 ESKs from 2000 to 2014, and approximately 84,500 Low Income single family homes received basic measure treatment. Union estimates there is a total of approximately 977,000 single family residential customers with natural gas water heating. Therefore, the ESK saturation rate is 79%. Union does not have this information at the individual measure level.
- c) Union would consider allocating the budget towards the Residential Behavioural offering and the Commercial/Industrial custom offering (general service and contract customers).
- d) Union believes that it is appropriate to continue offering a programmable thermostat rebate which is also eligible for adaptive and web-enabled models. These thermostat technologies have important differences from programmable thermostats that may result in uptake within a different set of residential customers in Union's franchise area. Generally speaking, the Union Gas customer tends to lag behind general trends with respect to technology and online behaviours. Union's research indicates that 43% of customers have a low level of comfort using computers¹, have privacy/trust issues related to the internet and generally have a low level of online activity.
- e) Union will consider the introduction of a separate offer for adaptive thermostats over the term of the Plan, and views this as a potential CDM collaboration opportunity. Union is currently engaged with Hydro One in a collaborative Bring Your Own Thermostat ("BYOT") pilot project that is designed to understand the gas and electric savings associated with various adaptive thermostat technologies over a 12 month period.

Union may pursue to help make energy efficiency top of mind a part of daily routines.

Energy Savings Kit ("ESK") Offering

ESKs have been offered since 2000. As the focus of the Residential Program continues to shift towards Home Reno Rebate and Behavioural, the focus on the ESK offering will be significantly reduced relative to the 2012-2014 DSM Plan. However, as a mature offering with highly refined channels, there remains an opportunity to pursue cost effective energy savings and provide Residential customers with broad access to DSM. The ESK will also act as a complement to the Home Reno Rebate and Behavioural offerings.

Description

- ESKs are pre-packaged measures designed to reduce a customer's energy usage and water consumption.
- The Energy Saving Kit contains:
 - Energy efficient Showerhead [1.25 Gallons Per Minute (GPM) (4.73 LPM)]
 - Energy efficient kitchen aerator [1.50 GPM (5.68 LPM)]
 - Energy efficient bathroom aerator [1.00 GPM (3.79 LPM)]
 - Pipe wrap (two meters)
 - Teflon tape (1 roll for ease of showerhead installation)
 - \$25 Programmable Thermostat rebate coupon

Target Market

- The ESK offering is targeted to Union residential customers living in detached, semi-detached, townhouses and individually metered row townhouses who have a natural gas water heater and furnace. Each household is eligible to receive one kit.
- This offering is not available to Union customers living in high-rise buildings and multi-family buildings with more than five units.

Incentive Level

- The ESK is provided at no cost to the customer.
- A \$25 rebate coupon is provided towards the purchase of a programmable thermostat.

Market Delivery

- Online orders and door-to-door delivery will continue to be the main areas of focus.
 - Online orders will be supported through:

5.5 Low Income Programs

5.5.2 Low Income New Construction: Recommendations

Enbridge

1. Enbridge should roll out as a full offering, rather than as a pilot, the Low Income New Construction offering.

2. Without further substantiation of the usefulness of the street poster marketing approach, Enbridge should consider redirecting funds for these posters to other marketing opportunities.

3. Enbridge should clearly state how IDP documents are used to establish estimated savings, and how it intends to verify the claimed savings.

4. As this is a new pilot, it should conduct a process evaluation study and identify the effectiveness of the proposed incentives and delivery mechanisms and areas for improvements.

Union

1. A comprehensive suite of low income offerings should include Low Income New Construction, Low Income Single-Family and Low Income Multi-Family offerings, which are referred to as core offerings in this section. Union should provide a Low Income New Construction offering. This offering should be consistent with Enbridge's program, including the recommendations above.

5.5.3 Low Income Single Family: Recommendations

Enbridge and Union

1. If they do not do so already, Enbridge and Union should consider performing a blower door test, using infrared thermography, and conducting combustion analysis, draft testing, and combustion appliance zone tests in audits.

2. Enbridge and Union should consider adding early replacement measures, heating equipment repairs, boilers, water heaters (including tankless and solar hot water), windows, duct sealing, duct insulation, and boiler reset control measures to their offerings.

Enbridge

1. Enbridge should also consider adding pipe wrap to its offering.
2. Enbridge should consider offering incentives to address as many of the health and safety barriers to weatherization as possible.
3. If Enbridge plans to rely on the forthcoming TRM, it should clearly state so. However, as energy savings are expected to be significant (e.g., exceeding 10 percent), we recommend using an energy billing analysis on a sample of offering participants.

UNION GAS LIMITED

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition ("VECC")

Reference: Exhibit A, Tab 3, Appendix A, pp. 9-11, Behavioural Offering

- a) Please define Normalized Average Consumption (NAC).
- b) Please confirm the total number of highest consuming residential customers (i.e. consuming greater than Union's NAC).
- c) Please describe a typical vendor for this program.
- d) Please provide the party that would complete and deliver the energy assessment questionnaire.
- e) Please provide the geographical reach for this Program.
- f) Please discuss how Union's research of other jurisdictions informed its Behavioural Offering.

Response:

- a) The Normalized Average Consumption ("NAC") is an estimate of the average amount of natural gas a residential, commercial or industrial customer will consume, given normal weather conditions. NAC is estimated by determining what the actual average consumption is, and then restating that number to reflect normal weather. The NAC is applicable to the general service market only.
- b) Approximately 40% of residential customers consume greater than Union's residential NAC.
- c) Vendors that provide behavioural services such as the Home Energy Reports to the market typically operate through a Software-as-a-Service model and deliver their offerings to customers under the utility moniker that they are providing the service for. Companies operating in this space typically use a treatment and control methodology to measure the savings impact of their results. Given that they use customer information to create, craft, and deliver the behavioural program offering, companies in this space typically operate under the strictest of data security protocols. Opower is the most widely recognized vendor.

5. Union should conduct any desk review of program records, data tracking systems, and materials such as marketing materials, training documents, and program manuals.

5.3.3 Residential Products: Recommendations

Enbridge and Union

1. Both Enbridge and Union could conduct a pilot study to explore the reliability and cost-effectiveness of emerging measures suitable for the Energy Savings Kit offering that could replace any potentially obsolete efficiency technologies.
2. Both Enbridge and Union should investigate the reliability and cost-effectiveness of emerging showerheads, and consider incorporating such showerheads into their new pilot study or existing offerings.
3. Both Enbridge and Union should consider partnering with electric utilities that offer incentives for similar thermostat measures, and ensure that the incentive amounts provided to customers are consistent between fuel types.

Enbridge

1. Enbridge should consider increasing the Adaptive Thermostat incentive to the equivalent of at least \$100 while evaluating both customer adoption rates for this type of measure and customer payback rates.
2. If Enbridge intends to use the TRM for its savings estimate claim, we recommend that Enbridge clearly states its intention in the plan.
3. Enbridge's evaluation plan should include an Ontario-specific impact evaluation study on adaptive thermostats as existing impact evaluation studies are finding a significant level of natural gas savings ranging from 10 percent to 12 percent of annual heating consumption.
4. Enbridge should also conduct a survey of non-participants in its process evaluation in order to find out reasons for not participating in the offering. To the extent this offering requires Enbridge program staff or contractors to interact with customers to promote and/or install adaptive thermostats, Enbridge should also survey program staff and/or contractors.

Union

1. Union should provide an incentive for adaptive thermostats so that new technologies with higher savings potentials are available for customers looking to adopt them.
2. Union should consider providing incentives for measures other than thermostats and instant hot water saving measures to ensure that all customers are served by a range of DSM technologies and to increase participation.
3. Union should conduct a literature review of standard thermostats and consider whether to discontinue this offering, or include a plan for the OEB to conduct a full impact evaluation study on this measure if it still believes there might be some savings impacts.

Low income cut-offs

What are the LICOs?

The low income cut-offs (LICOs) are by far Statistics Canada's most established and widely recognized approach to estimating low income cut-offs. In short, a LICO is an income threshold below which a family will likely devote a larger share of its income on the necessities of food, shelter and clothing than the average family. The approach is essentially to estimate an income threshold at which families are expected to spend 20 percentage points more than the average family on food, shelter and clothing.² The first set of published LICOs used the 1959 Family Expenditure Survey to estimate five different cut-offs varying between families of size one to five. These thresholds were then compared to family income from Statistics Canada's major income survey, the Survey of Consumer Finances (SCF)³, to produce low income rates.

Today, Statistics Canada continues to use precisely this approach to construct LICOs, with the exception that cut-offs now vary by 7 family sizes and 5 different populations of the area of residence. This additional variability is intended to capture differences in the cost of living between rural and urban areas.⁴

How are LICOs calculated?

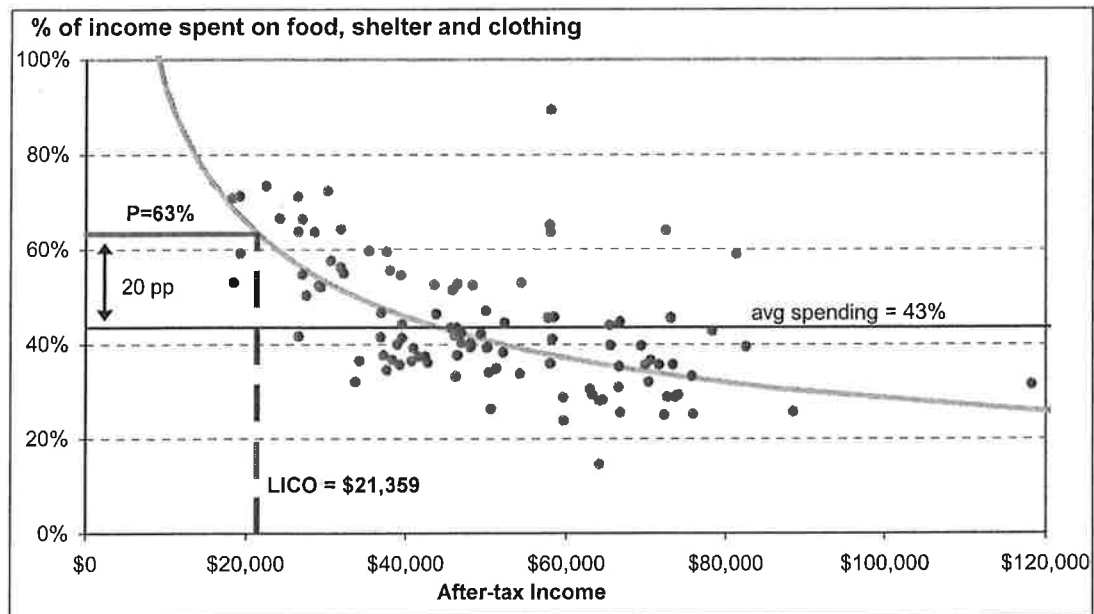
As mentioned previously, a LICO is an income threshold below which a family will likely devote a larger share of its income to the necessities of food, shelter and clothing than an average family would. According to the most recent base for LICOs, the 1992 Family Expenditures Survey, the average family spent 43% of its after-tax income on food, shelter and clothing. Figure 1 shows the calculation of a LICO using the example of a family of four living in an urban community with a population between 30,000 and 99,999. The 63% line represents the average proportion of after-tax income that all families (regardless of size) spent on food, shelter and clothing in 1992 (i.e. 43%) plus the 20 percentage point margin. The dots on the chart show the actual observed proportion of income spent by four-person families in medium-sized cities on necessities, according to the 1992 Family Expenditure Survey. A regression line is fitted to this distribution and the intersection of that curve and the 63% line gives the LICO—in this case, \$21,359.^{5 6 7}

This process is carried out for seven family sizes⁸ and five community sizes and results in a table of 35 cut-offs. This operation is done twice: once for before-tax cut-offs, once for after-tax cut-offs.

-
2. Twenty percentage points are used based on the rationale that a family spending 20 percentage points more than the average would be in "straitened circumstances".
 3. Starting with data for 1996, the Survey of Labour and Income Dynamics (SLID) replaces the Survey of Consumer Finances (SCF).
 4. The LICOs were revised in early 2005 to incorporate revised weights from the 1992 Family Expenditure Survey, which were part of the 2003 Survey of Household Spending historical revision.
 5. The model is the following: the logarithm of spending on food, shelter and clothing is a function of the logarithm of income, family size, population of the area of residence and region.
 6. It can clearly be seen that as income increases, the proportion spent on food, shelter and clothing decreases. In this case, points to the left of the intersection point between the regression curve and 63% line represent situations where more than 63% of after-tax income is spent on necessities
 7. All dollar values of LICOs and LIMs are expressed in current dollars.
 8. Note that in the calculation of LICOs, contrary to the LIMs, no distinction is made by age of family members.

Figure 1

Calculation of an after-tax LICO



Low income rate and low income gap

To determine whether a person (or family) is in low income, the appropriate LICO (given the family size and community size) is compared to the income of the person's economic family.⁹ If the economic family income is below the cut-off, all individuals in that family are considered to be in low income. In other words, "persons in low income" should be interpreted as persons who are part of low income families, including persons living alone whose income is below the cut-off. Similarly, "children in low income" means "children who are living in low income families". Overall, the low income rate for persons can then be calculated as the number of persons in low income divided by the total population. The same can be done for families and various sub-groups of the population; for example, low income rates by age, sex, province or family types.

After having determined that an individual/family is in low income, the depth of their low income can be analysed by using the amount that the family income falls short of the relevant low income cut-off. For example, a family with an income of \$15,000 and a low income cut-off of \$20,000 would have a low income gap of \$5,000. In percentage terms this gap would be 25%.¹⁰ The average gap for a given population, whether expressed in dollar or percentage terms, is the average of these values as calculated for each unit.

9. The family concept used is the economic family, that is, all persons living in the same dwelling and related by blood, marriage, common-law relationship or adoption.

10. For the calculation of this low income gap, negative incomes are treated as zero.