May 29, 2009

Ontario Energy Board
2300 Yonge Street, Suite 2700
Toronto, Ontario
M4P 1E4

Attention: Ms. Kirsten Walli, Board Secretary

RE: EB-2008-0346 - Union Gas Limited - 2010 Demand Side Management Plan

Dear Ms. Walli:

The current Demand Side Management ("DSM") Plan (3-year Plan 2007 - 2009) expires on December 31, 2009. Gas distributors and intervenors were participating in EB-2008-0346 to develop DSM Guidelines which would be used for the next multi-year DSM framework.

On April 14, 2009 the Board issued a letter to the EB-2008-0346 participants directing natural gas distributors to file a one-year DSM Plan for 2010 citing the uncertainty relating to the Green Energy Act. The letter notes that the Board expects the 2010 DSM Plan to be filed under the current DSM framework.

On April 29, the Board issued its decision with respect to the measures and input assumptions to be used for the 2010 DSM Plans.

On May 13, 2009 the Board issued a letter directing the distributors to remove programs related to low income energy consumers from the 2010 DSM Plans. Union understands that these issues will be addressed through the Low-Income Energy Assistance Program Conservation Working Group (EB-2008-0150).

This submission is Union's 2010 DSM Plan and follows the prescribed Board directions noted above.

Union's 2010 DSM Plan is consistent with the current DSM framework with the exception of removing the budgets and targets related to low income energy consumers.

Union's 2010 DSM Plan follows the submission made for the 2007 – 2009 Plan incorporating Navigant's approved 2010 measures and assumptions. With respect to free rider rates, which were not contained in the Navigant report, Union will plan using its previously submitted 2009 rates. Union will not pursue spillover for 2010 (just as it did not for 2008 and 2009). Like changing other portions of the DSM framework under which it functions, Union sees spillover as "out of scope" until Union's next multi-year framework discussions. In addition,

Union has added two measures that were not mentioned in the final Navigant report for which substantiation documents are available. The measures include the 1.0 GPM faucet aerator (bathroom and kitchen), and the 0.64 GPM pre-rinse spray nozzle. These two measures were included in Union's 2009 input assumption proposal (EB-2009-0102).

Union may file additions or changes to measures and inputs relative to the those found in the 2010 DSM Plan's Appendix B with the Board prior to 2010 as appropriate. Changes would result from new measures being brought forward or updates based on 2009 evaluation studies.

Other minor changes to the 2010 DSM Plan from the 2007-2009 DSM Plan include:

1. Change in name only of the "Evaluation Report" to "Annual Report". The change was made to distinguish between the annual results document that is filed with the Board and the evaluation priority research reports.

2. Removal of a separately listed Industrial General Service market, as it is included in the Commercial market program.

If you have any questions, please contact me at 519-436-5476.

Yours truly,

[original signed by]

Chris Ripley
Manager, Regulatory Applications

cc: Crawford Smith (Torys)
EB-2008-0346 Intervenors

Union Gas Limited

2010 DSM Plan

Table of Contents

1 Introduction

This document outlines Union's 2010 Demand Side Management (DSM) Plan. The Plan follows as an extension of the framework determined in the DSM Generic Proceeding Decision and builds on Union's DSM experience to date. Since 1997, Union Gas has consistently delivered cost effective DSM programs and over the past eleven years has delivered approximately 614 million m^3 of natural gas savings and TRC net benefits of over $1 billion[1]. The success of Union's Demand Side Management Programs has been driven by three primary factors that are tightly linked:

1. Superior customer relationships.
2. Employees with strong technical and business knowledge.
3. A fair incentive mechanism that focuses the utility on successfully delivering these programs. Based on Union's experience this is a proven formula for driving return.

Budget: The budget for 2010 will be $20.89 million. This budget represents the 2009 budget of $20.56 million increased by 10%, less the associated Low Income budget for 2010 of $1.73 million. Included in this budget increase is $1.33 million allocated for market transformation programs.

Target: For 2010, Union's TRC target will be based on the TRC formula accepted in the DSM Generic Proceeding EBO 2006-0021. The formula sets the annual target by averaging Union's actual audited TRC results over the previous three years and applying to this figure an escalation factor equal to 1.5 times the amount by which budget is increased, or 15%.

SSM: In 2010, Union will be eligible to earn an SSM incentive payment, determined using the methodology outlined in the DSM Generic Proceeding Decision EBO 2006-0021. At 100% of the TRC target Union will be eligible for an SSM incentive payment of $4.75 million. An additional incentive of $0.5 million will be available for market transformation activities.

LRAM: Union will continue to apply the rules of the Lost Revenue Adjustment Mechanism (LRAM) as outlined in the DSM Generic Proceeding Decision.

DSMVA: Union will continue to use the DSMVA to "true-up" the variance between the DSM spending estimate built into rates for the year and the actual spending in that year. If actual spending is less than the amount built into rates, ratepayers shall be reimbursed. Union will be reimbursed for overspending, up to a maximum of 15% of its DSM budget for the year, provided additional funding is utilized on incremental program expenses, including market transformation programs.

Programs: Union's 2010 Plan will be focused on programs in the following markets:

- Residential Markets;
    - New Home Construction

[1] The historical TRC number is based on the avoided costs in place at the time the results were achieved.

    - Existing Customers
- Commercial Markets; and
    - New Build Construction
    - Existing Buildings
- Distribution Contract Markets.

Additionally, Union will implement a Market Transformation program.

Research: In 2010 Union will place a significant focus on research directed at improving overall program design and the targeting of opportunities. This focus demonstrates Union's commitment to developing a sustainable portfolio of DSM programs.

Evaluation: Union is committed to completing evaluation work on a portion of the measures included in this 2010 Plan as prioritized by Union in collaboration with its EAC prior to the start of 2010. Union will also complete an Annual Report which will be subject to an independent third party audit.

Union seeks to continue its leadership in the emerging culture of energy efficiency and conservation and as such submits this 2010 DSM Plan for approval. Union's DSM activities will focus on delivering natural gas savings, but our market leadership will enable customers to also generate electricity and water savings through Union's programs. Union will also seek out partnerships with Government and other Utilities to leverage all program spending to maximize results for customers.

2 Regulatory Framework

This section outlines how the framework determined in the Decision on Phase 1 of the DSM Generic Proceeding will apply over the course of the 2010 DSM Plan.

2.1 Budget

The budget for 2010 will be $20.89 million. This budget represents the 2009 budget of $20.57 million increased by 10%, less the associated Low Income budget for 2010 of $1.73 million. The budget for 2010 includes $1.33 million for Market Transformation programs.

The budget for 2010 will be allocated to the market sectors based on historical results and Union's assessment of the potential in each sector. The program costs will be established based on Union's estimation of the cost of achieving the target. Research and evaluation costs are based on the amount needed to focus on creating sustainable DSM programs going forward. Finally the internal resources were reviewed in order to assess the overhead that would be required to achieve the target and complete the research and evaluation work identified.

Table 1 provides a summary of the 2010 DSM Plan budget. A detailed breakdown by market segment is not possible at this time. There are a number of unknown variables necessary for the TRC target calculation that are not available until finalization of the 2009 DSM results. However, the percentage spend per market segment will not vary materially from 2007 and 2008 spend.

Table 1

2010 DSM Planned Budget

	Year			
	2009^		2010 *	
	($000)	%	($000)	%
Program Allocation				
Residential				
Commercial				
Distribution Contract				
Market Transformation	1,210	5.9%	1,330	6.4%
Programs Sub-total	15,010	73%	15,255	73%
Research	910	4.4%	919	4.4%
Evaluation	515	2.5%	523	2.5%
Administration	165	0.8%	167	0.8%
Salaries and Overhead	3970	19.3%	4,033	19.3%
Total	**$20,570**		**$20,897**	

^ Based on 2009 Plan numbers taken from the 2007 – 2009 DSM Plan

* Low Income budget is removed from total 2010 budget [($20,570 * 1.1) – $1,730 = $20,897]

In 2010, Union will continue to spend a significant portion of the budget on high quality research and evaluation activity. In addition, Union intends to spend a relatively large portion of the budget increase towards program spending. This reflects Union's experience that program results are becoming more expensive to achieve over time and this trend is expected to continue. Allocation by market will be similar to past years.

2.2 Target

Union will continue to utilize the formula accepted in Phase 1 of the DSM Generic Proceeding, which sets the target by averaging Union's actual audited TRC results over the previous three years and applying to this figure an escalation factor equal to 1.5 times the amount by which budget is increased, or 15%. The OEB has provided direction to Union in regards to 2010 Low Income DSM programming in their letter dated May 13, 2009. The board has directed "Union Gas and Enbridge Gas Distribution should remove the parts of their DSM budgets, targets, shareholder incentives and programs related to low income energy consumers from their main portfolio". As such, Union will reflect the removal of the Low Income portion of our program, budget and target setting. In short, any Low Income activity is out of scope in this 2010 DSM Plan.

Union's DSM Target for 2007 was set at $188 million in Phase 1 of the DSM Generic Proceeding. For the 2010 Plan, Union's target will be established as follows:

- The simple average of the actual 2007, 2008, and 2009 audited TRC values as approved by the Board, excluding the actual TRC values attributed the Low Income programming for each year, increased by 1.5 times the budget escalation factor (i.e. 15%).

The formula for setting the 2010 DSM target is:

[2007 actual audited net TRC (less LI TRC results) + 2008 actual audited net TRC (less LI TRC results) + 2009 actual audited net TRC (less LI TRC results)] / 3 X 115% = 2010 net TRC target

As specified in the DSM Generic Proceeding Decision, the "actual audited TRC values" shall be the total TRC produced for the year in question as determined by the audit for the following year (i.e. 2008 audit completed and filed with the Board by June 30, 2009).

2.3 Shared Savings Mechanism (SSM)

In the 2010 DSM Plan, Union will be eligible to earn a SSM incentive payment which will be set by a formula, and at 100% of TRC target will be $4.75 million. The following formula applies for the determination of the SSM curve and resulting cumulative payout. The SSM incentive payout curve will be identical to the one agreed to in the Generic Decision [EB-2006-0021], and used for the 2007-2009 DSM Plan.

- For achievement of between 0 and up to 25.0% of the annual target, the SSM payout shall equal $900 for each 1/10 of 1% of target achieved.
- For achievement of greater than 25.0% up to 50% of the annual target, the SSM payout shall equal $225,000 plus $1,800 for each 1/10 of 1% of target achieved.
- For achievement of greater than 50.0% up to 75.0% of the annual target, the SSM payout shall equal $675,000 plus $6,300 for each 1/10 of 1% of target achieved above 50.0%, and
- For achievement of greater than 75.0% of the annual target, the SSM payout shall equal $2,250,000 plus $10,000 for each 1/10 of 1% of target achieved above 75.0% to a maximum of the SSM annual cap.

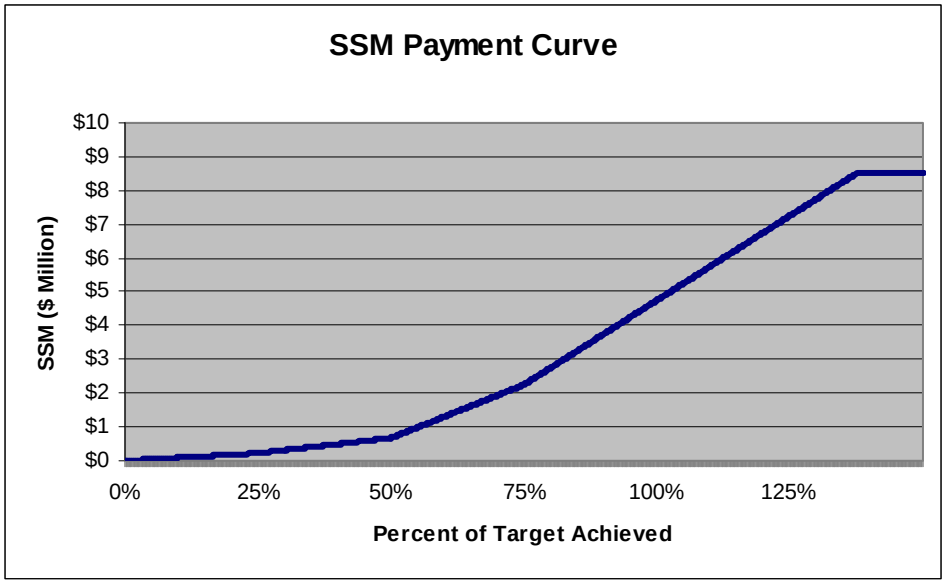
The SSM payout will be calculated based on the results as they apply along the curve and equates to the following:

- Up to 25% of the annual target, a total payout of $225,000,
- Up to 50% of the annual target, a total payout of $675,000,
- Up to 75% of the annual target, a total payout of $2,250,000,
- Up to 100% of the annual target, a total payout of $4,750,000,
- Up to 125% of the annual target, a total payout of $7,250,000, and
- In excess of 125% of the annual target, a total that is capped at no more than $8,500,000.

In 2010, as it was for 2008 and 2009, the annual SSM incentive cap of $8.5 million will increase by the Ontario CPI as determined in October 2009.

For illustrative purposes, the SSM curve is shown in Figure 1 below.

Figure 1



As outlined in the DSM Generic Proceeding Decision, for the purposes of determining whether Union has met its TRC target, the input assumptions for the calculation of SSM will not be changed retroactively. Changes to input assumptions, which are confirmed through the audit process, apply in the year immediately following the year being audited. The treatment of input assumptions for the purpose of calculating the SSM incentive and DSMVA is summarized in Table 2. The approved 2010 DSM Measures and Input Assumptions Report (EB-2008-0346) completed by Navigant has been used as the starting point for the 2010 SSM assumptions. Union has added in free rider rates based upon best available information at this time given Navigant did not include free riders in its submission. Also, Union has added two additional measures that were not present in the approved 2010 DSM measures and inputs list which were submitted in Union's proposed 2009 DSM Inputs, file number EB-2009-0102. Substantiation sheets for these measures are included in Appendix A. Union would file any changes to measures or inputs relative to those found in Appendix B with the Board prior to 2010 as appropriate. Changes may result from new measures being brought forward or updated evaluation work.

Table 2

Treatment of DSM Input Assumptions for the Purpose of Calculating SSM and DSMVA

ProgramType	Participants	Annual Unit Savings	Free Rider %	Measure Life	Unit Incremental Costs	Direct Program Costs
Prescriptive	Actual	Fixed	Fixed	Fixed	Fixed	Actual
Custom	Actual	Actual	Fixed	Actual	Actual	Actual

Detailed program input assumptions used in the calculation of TRC benefits are included in Appendix B.

The SSM Variance Account (SSMVA) shall be cleared in 2011.

2.4 Lost Revenue Adjustment Mechanism (LRAM)

To ensure that natural gas utilities are not penalized for implementing effective energy efficiency programs, the Board allows utilities to recover the lost distribution revenues that result from these programs. The mechanism used is the Lost Revenue Adjustment Mechanism (LRAM).

Union will continue to use the LRAM deferral account for 2010 in the same manner as in previous years. The variance between the actual volume savings achieved and the target savings included in the current rates will be recorded in the LRAM account.

For Union, the first year impact will be calculated as 50% of the annual volumetric impact multiplied by the distribution rate for each of the rate classes that the volumetric variance occurred in. Input assumptions used in the calculation of the LRAM amount will be best available at the time of the annual audit.

The LRAM account shall be cleared in 2011.

2.5 DSM Variance Account (DSMVA)

The DSM Generic Proceeding confirmed continuation of the DSMVA to "true-up" the variance between the spending estimate built into rates for the year and the actual spending in that year. If actual spending is less than the amount built into rates, ratepayers shall be reimbursed. If actual spending is more than was built into rates, Union shall be reimbursed up to a maximum of 15% of its DSM budget for the year. All additional funding must be utilized on incremental program expenses, including market transformation programs.

The DSMVA account shall be cleared in 2011.

2.6 DSM Screening

DSM programs are screened using the Total Resource Cost (TRC) test and must yield a benefit cost ratio of 1.0 or more to be included in the portfolio. The TRC test is a societal benefit/cost test that determines the net present value of a DSM measures/program/portfolio's savings. The benefits are the costs avoided by the reduction in resource consumption (natural gas, electricity, and water) and the costs are the participant (equipment) and program costs.

The TRC measure screening will be calculated using the input assumptions found in Appendix B, which are based on the Board approved 2010 Measures and Input Assumptions Report (EB-2008-0346).

The input assumptions used in this plan are summarized in Appendix B.

2.7 Avoided Costs

Avoided costs represent the benefits in the TRC calculation (i.e. the benefits to society of not having to supply natural gas, electricity and water) and are integral to the determination of TRC benefits for the purposes of determining overall program results.

In the 2007 - 2009 DSM Plan, Union adopted the methodology used by Enbridge for calculating avoided costs. In summary, the commodity portion of the avoided costs is updated annually. In the subsequent years the same avoided costs were to be used to calculate both the target (relative to 2007) and incentive amount, so that there is neither a gain nor a loss as a result of changes in the avoided costs.

For the 2010 DSM Plan, Union will continue the same approach for the calculation of avoided costs as used in the 2007 – 2009 DSM Plan.

2.8 Consultation Process

Union will continue to engage stakeholders and intervenors through a consultative process. This process will include formal and informal consultation as required. As agreed to in the DSM Generic Proceeding, Union will hold two formal consultative meetings annually. The purpose of the meetings will be to:

- Review annual results (the Annual Report will be sent to the Consultative annually for review) and select the Evaluation and Audit Committee ("EAC"). Three members will be selected using the current process used to select the Audit Sub-Committee; the fourth member will be the utility. In the current process, the members of the Consultative nominate individuals to stand on the committee. Then each member of the Consultative votes for the three members they would like on the committee. The three with the highest number of votes form the committee.

- Review the completed evaluation results.

- Share ideas around program design and effectiveness.

All intervenors in Union's most recent rate case shall be entitled to participate in the Consultative meeting.

2.9 Evaluation and Audit Process

Union shall file annually a clear and concise Annual Report (previously termed the "Evaluation Report") that summarizes the savings achieved, budget spent and the evaluations conducted in support of those numbers. The name of the report was changed from Evaluation Report to Annual Report to alleviate confusion between the annual results documentation and the evaluation research work. There are no changes to the content of the report. It is a change in name only. The purpose of the evaluation and audit process is to review all input assumptions related to the delivery of DSM for the 2010 Plan.

To assist with that purpose, in the DSM Generic Proceeding, all parties agreed to the establishment of an Evaluation and Audit Committee (EAC) to engage stakeholders in the development of an evaluation plan and budget and to engage stakeholders in a review of the evaluation results as they become available over the term of the Plan.

The EAC will continue to have an advisory role in the following evaluation activities:

- Consultation to set the evaluation priorities for 2010.
- Review and comment on evaluation study designs. Input on the research methodology used to determine the input assumptions.
- Selection of the independent auditor to audit the Annual Report and determine the scope of the audit. The EAC will ensure that all comments on the Annual Report from the Consultative are reviewed by the auditor.
- Following the audit, review of the Annual Report annually to confirm scope and priority of identified evaluation projects.
- The EAC will be responsible for meeting the reporting guidelines of the Board (found at Section 2.1.12 of the Natural Gas Reporting & Record Keeping Requirements Rule for Gas Utilities). The EAC will provide a final report within 10 weeks from the later of, the receipt of the Annual Report and supporting evaluation studies from the Utility, or the hiring of the auditor. Recommendations of the EAC with respect to DSMVA, LRAM and SSM clearances shall be included in the EAC's final report. The EAC shall not consider any further information subsequent to the Board's filing deadline each year.

A third party audit of the Annual Report will be completed annually. The auditor will be retained by Union who determines the scope of the audit. As determined in the DSM Generic Proceeding, it will be the role of the auditor to:

- Provide an opinion on the DSMVA, SSM and LRAM amounts proposed and any amendment thereto.
- Verify the financial results in the Annual Report to the extent necessary to give that opinion.
- Review the reasonableness of any input assumptions material to the provision of that opinion.
- Recommend any forward looking evaluation work to be considered.
- The auditor shall be expected to take such actions by way of investigation, verification or otherwise as are necessary for the auditor to form their opinion. The auditor, although hired by the utility, must be independent and must ultimately serve to protect the interests of stakeholders.

In addition to the audit, Union will also continue to complete a third party verification of custom projects annually. These verification studies are not intended to be duplicated by the auditor as they will based on a sampling methodology that has received EAC input and provides confidence in the savings numbers claimed by the third party verification engineering company. As outlined in the Generic Proceeding Decision, projects selected for assessment will consist of a random selection of 10% of the large custom projects representing at least 10% of the total volume savings for all custom projects and consist of a minimum number of five projects.

2.10 Electricity Conservation and Demand Management (CDM)

Union will focus on the delivery of energy efficiency and conservation efforts as they pertain to reductions in natural gas for our customers. Where those initiatives have other benefits, such as electricity, water or other resource savings benefits, Union will account for those through its TRC benefit calculations.

When appropriate, Union will work with other LDCs (both gas and electricity) in the delivery of DSM and CDM initiatives for the benefit of contributing to building a "Culture of Conservation" in Ontario. Where that cooperation requires the sharing of costs and/or benefits, Union will enter into upfront agreements as to the distribution of attributes of those activities.

As outlined in the DSM Generic Proceeding Decision, all costing of electric DSM activities will be done on a fully allocated cost basis and the net revenues will be split 50/50 between shareholders and ratepayers.

3 Programs / Activities

This section provides an outline of the planned programs as well as research and evaluation activities Union plans to focus on over the 2010 Plan period. As appropriate, Union may introduce new, positive TRC programs, drop planned programs or adjust the programs or incentive levels outlined in this section. Union will remain focused on continually improving its programs and approach to market as new information becomes available.

Programs for 2010 are organized into the following areas:

- Residential Markets;
  - New Home Construction
  - Existing Customers
- Commercial Markets;
  - New Build Construction
  - Existing Buildings
- Distribution Contract Markets; and
- Market Transformation.

Below are descriptions of the various markets and related programs.

3.1 Residential Market

The Residential Existing Customers program targets customers in the M1 and R01 rate classes and includes all single-family detached, attached row and individually-metered multi-family housing.

3.1.1 Residential New Home Construction

New homes represent an opportunity to incorporate energy efficiency options at the time of construction. In 2010, Union's initiatives in the new home construction market will target water-heating loads. Measures will be delivered which are more efficient than the standard currently installed as mandated by the Ontario Building Code of 2.5 GPM for showerheads and 2.2 GPM for aerators. The primary barrier to the adoption of energy efficiency by builders involves a lack of motivation to install conservation measures at the time of construction as the builders will not realize the energy savings.

Strategy
The Residential New Home Construction program targets the adoption of energy efficient measures in the new housing segment of the residential market. Union will build on the successful partnerships developed over several decades in working with home builders. Union will target builders directly, and will investigate promoting the program through local home builders associations (HBAs) and the Ontario Home Builders Association (OHBA).

The overall objectives for the 2010 Plan are:

1. Drive strong builder relationships to improve new home energy efficiency.
2. Influence builders to install water saving measures in their developments.

Initiatives

Union will deliver a suite of water conservation measures directly to residential home builders. This program will be supported directly through Union's Residential Account Managers, who have established relationships with builders and the organizations to which they belong.

The measures which will be delivered through this program include:

- Energy efficient showerhead (1.25 GPM – not currently commercially available),
- Energy efficient kitchen aerator (1.50 GPM), and
- Energy efficient bathroom aerator (1.50 GPM).

Union will continue to explore options to enhance efficiency in the new home construction market, such as additional measures or through the support of a new home labelling program, as opportunities arise.

3.1.2 Residential Existing Customers

Union actively targets energy efficiency to its 1.2 million existing residential customers. The primary barriers to the adoption of energy efficiency measures in this segment include a gap in consumer awareness and a lack of pro-activity in independently seeking out and purchasing energy efficient measures. The residential market also presents important opportunities. The current period of global economic uncertainty and higher levels of unemployment have affected Ontario and residential customers are looking for opportunities to reduce monthly energy expenses. Customers are in greater need of education and assistance with actionable steps they can take to reduce energy costs through conservation. With the Ontario Government's introduction of the Green Energy Act, Union will work with Government to understand what programming they intend to offer residential customers and seek out leverage opportunities.

Strategy

In 2010 the Residential Existing Customers energy efficiency program will continue to target the reduction of natural gas consumption for space-heating and water-heating by customers in existing single family and multi-family homes. The program is delivered through a combination of customer communication, education and incentives.

Union's communication and education vehicles deliver the message that the best method to control energy bills is through conservation. They provide specific and relevant advice on actions residential customers can take to achieve efficiency savings. Education and awareness initiatives are supported by promotions that assist customers in making wise energy choices. Union delivers conservation measures and incentives through retailer and contractor partnerships, as well directly to residential customers.

The overall objectives for the 2010 Plan are:

1. Increase customer awareness of energy efficiency, and energy efficient improvement options.
2. Provide education and incentives through multiple delivery channels.
3. Reassess program design to target customers who have not previously been reached by Union's conservation initiatives.
4. Implement improvement in program design to incorporate stakeholder input.

Union actively targets information and promotional materials to customers to increase the awareness and uptake of high efficiency measures. Union also works with the HVAC contractor channel and the retailer channel to deliver incentives to our customers, and provides incentives to the contractor to encourage the promotion of high efficiency.

Initiatives

Union will continue to drive the distribution of its Energy Saving Kit (ESK) in 2010. Through providing ESKs to residential customers Union is able to efficiently and cost-effectively delivery a group of pre-packaged measures which will reduce household consumption of energy and water. Each ESK contains:

- Energy efficient showerhead (1.25 GPM – not currently commercially available),
- Roll of Teflon tape for ease of showerhead installation,
- Energy efficient kitchen aerator (1.50 GPM),
- Energy efficient bathroom aerator (1.50 GPM),
- Pipe wrap (2m),
- ESK Installation Guide, and
- $15 Programmable Thermostat on-bill rebate coupon.

Programmable thermostat rebate coupons are offered both as a component in Union's ESKs and as an independent promotion. In addition to its inclusion in ESKs this on-bill rebate coupon is delivered via the following channels:

- Bill inserts distributed to the entire Union residential customer base,
- Banner retailers,
- Direct mail to targeted conversion customers, and
- Union Gas website.

In additional to the coupon, Union has partnered with HVAC contractors to drive the sale and installation of programmable thermostats. The installation component of the program will remain for 2010, and Union will continue to leverage its existing and developing business relationships to drive greater distribution of this measure.

Union has continually evaluated its delivery tactics and improved its initiatives to provide further benefits to our customers. In 2008 for its ESK initiative Union transitioned from a 1.50 GPM low flow showerhead to one with a lower 1.25 GPM flow rate. This unit maximizes energy and water savings for the customer. The 1.25 GPM units are not commercially available and are manufactured as a special order for Union. The aesthetics of the showerhead were also changed

from a white plastic casing to a model with a chrome casing to improve customer satisfaction with the product.

In 2010 Union Gas will continue to deliver ESKs directly to residential customers, and through established partnerships which target this market. In addition, Union has implemented an installation component to the ESK program through participating HVAC contractors. Through Union's HVAC partnership initiative customers are influenced while energy decisions are already top-of-mind. ESKs are not only provided to customers but components are also installed, further simplifying the implementation process for the customer. In addition to distributing ESKs, HVAC partners provide customers with conservation advice to help them save money on their energy bill. Union will continually strive to identify additional delivery opportunities for 2010. ESK delivery channels have employed the following tactics:

- Online order form,
- Retailer pick-up depots,
- Distribution events held at prominent banner retailers, home shows etc.,
- School board partnerships encouraging staff, students and their family to sign up to receive a free kit, and
- Energy clinics to distribute ESKs while empowering customers with further methods to manage their energy use, such as draft proofing and air sealing.

In addition to promoting measures included in ESKs, forums such as energy clinics provide customers with specific actionable advice they can implement to gain more control over their energy use. Energy efficiency education and awareness will continue to be a priority in 2010. Union will maintain its focus on informing residential customers through direct communication vehicles such as bill-inserts, Union's website and EnerSmart magazine. EnerSmart is Union's bi-annual publication which provides informative and practical articles that highlight ways customers can use energy more efficiently. On a monthly basis customers will continue to receive the InTouch customer information newsletter with their bill which highlights relevant topics throughout the year. These communication tools are used to complement Union's initiatives and to promote the value in energy efficiency.

The Union Gas website has been re-designed to shift its focus and messaging to promote environmental responsibility. The residential section (www.uniongas.com/energyefficiency) serves as another forum for educating our customers, and includes information on Union's programs and incentives available as well as links to additional conservation-related programs offered in Ontario. Union offers its Wise Energy Guide through the website and via ESK events to assist customers in understanding and executing conservation projects within their homes. Union's educational tools also support and explain the use of EnerGuide and ENERGY STAR appliance labels. Together, Union's mix of communication vehicles consistently delivers the message that the best method for residential customers to control their energy bills is through conservation.

In addition to educating residential customers, Union provides a dedicated HVAC partners section on its website (www.uniongas.com/hvac). Through education HVAC partners will have

the ability to drive the importance of conservation and communicate our programs to their customers.

As Union continues to drive energy efficiency in the residential market we will investigate new opportunities to ensure a sustainable portfolio of DSM initiatives is maintained.

3.2 Commercial Market

In 2010 Union will continue to create, market and promote energy efficiency programs targeted at commercial, institutional and industrial facilities. Programs will continue to target New Build Construction and Existing Buildings. Programs are designed based on the measures approved in the Navigant 2010 Measures and Input Assumptions Report (EB-2008-0346). Union has also included in this Plan two measures that are not outlined in the Navigant 2010 Report – 0.64 GPM pre-rinse spray nozzles and 1.0 GPM faucet aerators. These technologies are included in Union's 2010 Plan as prescriptive measures. As noted in Section 2.3, they have also been included in Union's proposed 2009 DSM Inputs, file number EB-2009-0102. Information sheets on the savings calculations for these measures are included in Appendix A. In addition, as has been the past practice, Union will continue to seek out new technologies that promote energy efficiency and will bring them forward for discussion and potential inclusion in the portfolio on an ongoing basis.

The overall objectives for the 2010 Plan are:

1. Deliver a comprehensive portfolio of cost effective programs across all segments and customer types.
2. Increase the long term value of Union's DSM efforts in commercial, institutional and industrial facilities.
3. Leverage Union's leadership position in energy conservation with Government and stakeholders to enhance the value of the DSM portfolio.

3.2.1 Commercial New Build Construction

In the New Build market, decisions about efficiency are made during the design stage. Higher capital cost, customer indifference to efficiency, economic conditions and lack of knowledge/awareness are all potential barriers to the adoption of energy efficient equipment measures. Union will engage the target community to design and construct new buildings that will operate at higher levels of energy and environmental performance than required in the Model National Energy Code for Buildings.

Initiatives in the New Build Program will target space heating, water heating and ventilation measures, as well as initiatives that target process related loads.

Strategy

The New Build program targets the reduction of natural gas consumption in commercial, institutional and industrial new construction. The energy efficiency initiatives are marketed

through trade allies such as designers, architects, consulting engineers, equipment distributors and HVAC contractors who are the key advisers and influencers for the end-use customer on all matters of construction. Their influence includes building design, HVAC system/equipment selection and the development of operating and maintenance procedures in the commercial/industrial markets.

Union will work with key allies during the design stage to influence projects to be built above the requirements of the building code. Union will assist in advising customers and allies on technology and energy efficiency options, helping them calculate their return on investment, determining eligibility and assisting with customer presentations.

The program assists channels and trade allies in developing new product and service offerings and will help them deliver added value to their customers through lower operating costs and longer equipment life. Union provides financial incentives directly to trade allies to facilitate their own business development efforts and/or the end-use customer to encourage the adoption of energy efficiency in their design and construction decisions.

The overall objectives for the 2010 Plan are:

1. Improve and expand the knowledge base of architects, designers and engineers on energy efficiency technologies and motivate them to take action and include in their design plans.
2. Identify and participate in relevant marketing opportunities that will influence the design community and promote energy efficiency messaging.
3. Increase the energy efficiency of new commercial, institutional and industrial buildings.

Initiatives

Union actively promotes the consideration of efficiency in the design stage through its Design Assistance Program which has successfully engaged the design community in energy efficiency initiatives.

This program will continue to provide assistance in the design planning stages through facilitating modeling simulations. The simulations explore the various alternatives to achieving energy efficiency, including realizing energy savings of 25% or greater above the Model National Energy Code for Buildings. There are no planned changes from the current program that has been in existence for several years. Union will continue to promote the Design Assistance Program and will offer energy efficiency advice to developers, architects and consulting engineers through Union's sales staff, brochures and website.

In addition, Union will continue to employ an integrated approach to the New Build market by delivering targeted equipment incentives to engineers, design build contractors, HVAC contractors and end-users. These incentives are provided through programs designed around approved measures in the Energy Savings Program ("ESP") and through the Custom Program.

Examples include but are not limited to:

- Condensing Boilers (heating load only),
- Energy Recovery Ventilators – up to 4,999 cfm,
- Heat Recovery Ventilators – up to 4,999 cfm,
- Rooftop Units – two stage unit under 5 ton,
- Infrared Heaters,
- De-stratification Fans, and
- Demand Control Kitchen Ventilation.

Union also uses a variety of marketing and account management tools to drive results in the new build market including direct selling efforts, working directly with corporate national account customers, advertising in targeted media, market support materials, educational seminars, "Lunch and Learn" meetings as well as through the sponsorship or partnership of forums hosted by other organizations that promote energy efficiency.

3.2.2 Commercial Existing Buildings

Union Gas encourages end-use customers and the many stakeholders and trade allies in this market to use best practices when operating or replacing equipment and retrofitting existing buildings. The result is improved energy and water efficiency within their facilities. Barriers to the adoption of energy efficiency measures include long project cycles, high capital cost, economic conditions and customer and trade allies' awareness.

Strategy

The Existing Buildings Program targets the adoption of energy efficient technology in the commercial, institutional and industrial market using a market segment focus. Union has identified market segments with like characteristics to which it will dedicate resources. For each segment, Union will gain a better understanding of key players and segment leaders, service providers, economic drivers and decision making criteria to help establish complete energy solutions.

Information on services and/or technologies will be tailored and marketed to the specific needs of each segment group. The energy efficiency programs will continue to be marketed through trade allies such as HVAC contractors, designers and engineers who recommend and install equipment. The programs will also be targeted directly to the end-use customer as they are today and supported by Union's Account Managers.

The overall objectives for the 2010 Plan are:

1. Improve and expand the knowledge base of trade allies on energy efficiency technologies and measures.
2. Improve the knowledge base of identified key customers.
3. Increase the energy efficiency of existing commercial, institutional and industrial buildings.

The following provides a brief description of the potential strategies by market segment.

Office Segment
Union will identify and target owner occupied buildings as owners are more open to considering energy efficiency improvements. Key energy efficiency improvements include space heating, domestic water heating through condensing boilers, hot water conservation measures, programmable thermostats, ventilation systems and controls. Service offerings include general energy efficiency assistance, HVAC audits and energy audits.

Retail Segment
Union will target various sub-segments within this segment such as household/furniture, appliance and do-it-yourself centres. A fundamental barrier in this segment in many cases is companies lease their space and may not have a capital interest in investing in space heating systems. The strategy in this segment will be to target companies that have long term leases and companies that own/occupy their own buildings.

Foodservice Segment
Union will promote energy efficiency opportunities within restaurants and commercial kitchens with a focus on higher efficiency ventilation through controls, and domestic hot water through cleaning and cooking equipment. Union will work with trade allies and internal Account Managers to target national accounts and decision makers within corporate head offices, as well as independent owners/operators.

Hotel/Motel Segment
Union will target corporate head offices in order to penetrate multiple hotel/motel chains (i.e. hotel brands such as Sheraton or Marriot) as well as regional independent owners/operators. Key efficiency improvements include space heating, water heating through condensing boilers, hot water conservation measures, ventilation systems, controls, commercial cooking and laundry.

Institutional Segment
Union will identify and target various sub-segments within the institutional segment, including education, hospitals and long term care. Key energy efficiency improvements include space heating, domestic water heating through condensing boilers, hot water conservation measures, ventilation systems and commercial cooking and cleaning. Service offerings include general energy efficiency assistance, HVAC audits and energy audits.

Multi-Family Segment
Union will target the private multi-residential segment, which includes rental and condominium buildings and multi-residential social housing. Union will continue to play a key role in making trade allies and end-use customers aware of the benefits of choosing high efficiency natural gas options leveraging strong relationships with business partners and multi-family decision makers. Key energy efficiency improvements include space heating, domestic water heating through condensing boilers, hot water conservation measures and ventilation systems.
The hot water conservation program has been successful in providing low flow showerheads and aerators to these customers at no charge. Union has seen excellent uptake on this program and will continue with this offering in 2010.

Warehouse Segment
Union will target this segment directly and through partnerships to promote energy efficiency. Key energy efficiency improvements include space heating opportunities primarily through infrared heaters, controls, programmable thermostats and de-stratification fans.

Industrial Segment
Union will target this segment directly and through partnerships. Key energy efficiency improvements within the industrial segment include process load efficiencies, space heating opportunities through infrared heaters, de-stratification fans, ventilation systems, controls, programmable thermostats and condensing boilers.

Recreation Segment
Through activities with recreational associations and municipalities Union will continue to educate the diverse array of sub-segments in the recreation segment to target their needs. Key efficiency improvements within this segment include space heating, domestic water heating through condensing boilers, programmable thermostats, controls and ventilation systems. Service offerings include general energy efficiency assistance, HVAC audits and energy audits.

Agriculture Segment
Union targets this segment directly and through partners to promote the energy conservation opportunities. Key energy efficiency improvements for this segment include space and water heating opportunities.

Initiatives
Both customers and trade allies recognize the value of the expertise and industry knowledge brought to the market by Union's Commercial and Industrial sales team.
These Account Managers are able to engage customers, equipment manufacturers and energy efficiency experts in forums that range from individual meetings to trade association seminars. Union's sales team will continue to promote and incent energy efficient technologies as based on the approved Navigant measures to increase the adoption of these technologies in the market.

Union will also continue to offer a custom program to support customers in adopting energy efficient technologies and processes that are specific to their needs and facilities.

Beyond a mix of prescriptive and custom incentive programs, education and communication vehicles are created and made available to trade allies and customers including case studies, technical newsletters, training videos and E-tools. Union is also in the process of refreshing the website to meet the distinct informational and communication needs of its commercial, institutional and industrial customer groups.

Union also offers educational and training opportunities to architectural, engineering, energy service companies (ESCO) and HVAC contractors on an ongoing basis. These include energy efficiency workshops and seminars, boiler audit seminars, marketing materials and case studies promoting energy efficiency.

3.3 Distribution Contract Market

The distribution contract energy efficiency program targets Union Gas' large volume customers in contract rate classes included in industrial, agricultural, and commercial market segments.

There are a number of barriers to energy efficiency in these segments. Energy costs are often a small fraction of total production costs while competition for capital within corporate structures is intense. Long paybacks and lack of information about available technologies are also major barriers. The past success of this program also means that many high return projects have already been completed.

The market conditions that will impact customers over the next year and therefore impact the availability of both capital and operating budgets in facilities are:

1. Global economic downturn,
2. Access to capital markets to fund energy efficiency investments,
3. Canadian/U.S. exchange rate,
4. Increased competition,
5. Increased consolidation (mergers/buyouts),
6. Downward trend on production outputs, and
7. Energy price volatility due to tight supply/demand (ie: Natural Gas, Electricity, Oil, Propane).

The goal of the 2010 Plan is to grow the DSM commercial and industrial capability and results including:

1. Deliver a comprehensive suite of cost effective initiatives across all sectors and customer types.
2. Increase the longer term value of Union's DSM efforts in commercial, institutional and industrial facilities.
3. Leverage Union's leadership position in energy conservation with Government and stakeholders to enhance the value of the DSM portfolio.

Strategy

The energy efficiency program for this market is marketed directly to the customer and through partnerships with key organizations. This collaboration is required to:

1. Build a solid foundation for long-term success, and
2. Build strategic partnerships.

The program takes advantage of the relationships our Account Managers and Technical Project Managers have with customers, equipment manufacturers, consultants, trade organizations and energy service companies. Customers recognize the value of Union's overall contributions, which gives the company the opportunity to learn the details of specific processes and identify opportunities to influence where energy efficiency investments are made. Identifying and prioritizing savings opportunities provides added value to our customers, and often gives them the means to take advantage of growth opportunities when they arise. The end result is a strong, viable industrial base that is capable of producing a better product more economically.

The program design for the distribution contract market in 2010 will remain consistent from the 2007-2009 DSM Plan. This is to provide continuity and consistency for customers who have projects underway and for customers that are becoming familiar with existing offerings. In some instances, program funding level changes are required to encourage more difficult upgrades of process equipment, and the implementation of projects with longer paybacks. There is the potential to influence projects by expanding communications with customers to drive efficiency as an integral component of new project design or retrofit.

Union's distribution contract market consists of larger hospitals, universities, institutions, and an extensive variety of industrial applications including process, parts manufacturing, assembly, cement, etc. The diversity of customer needs and requirements in this group represents a continuous opportunity to broaden the reach of the program. It takes incremental resources to inform and educate this customer segment and a greater number of projects are expected to be required to achieve a similar level of volume savings. An increased effort will be required to maximize alliances with industrial service providers, trade organizations, and other gas and electric utilities. This alliance approach will be applied alongside our direct to customer program in order to reach the maximum number of customers.

The overall objectives for the 2010 Plan are:

1. Advance customer energy efficiency and productivity.
2. Improve long term viability of our customers in a global marketplace.
3. Increase awareness that emission reductions are an integral part of efficiency improvement.
4. Maximize partnership opportunities to expand the reach of the program.

Technologies

There are numerous applicable energy efficient technologies within every industrial process sector. Therefore, when defining eligible program technologies Union uses broad definitions so that any new developments over the course of our DSM plan can be incorporated.

Eligible technologies include:

- Process improvement technologies specific to each sector,
- Steam system equipment and improvements,
- Heat recovery systems,
- Space-heating and water-heating technologies, and
- Application specific measurement and controls.

Initiatives

To maximize success both in the plan year and in the future, Union provides a mix of custom incentive programs to meet the distinct needs of different customers which include the following program elements:

- Communication and Education,
- Performance Testing and Steam Plant Audits,
- Steam Trap Surveys,
- Engineering Analysis and Energy Audits,
- Equipment Incentives, and
- Demonstration of New Technology.

Below is a summary of the program elements eligible for the Custom Incentive Program.

Communication and Education

Education is a very important element to facilitate informed ideas and actions. Newsletters, technology magazines, case studies, other publications and workshops are offered to our customers to promote the efficient use of natural gas and to increase the awareness of energy saving opportunities.

Union Gas will consider a targeted approach for our customer education program. Experience has allowed Union Gas to determine that not all customers have similar education requirements. The education program will be delivered in a manner that matches customer needs in the detail and the topics that are offered.

Based on customer feedback and interest, Union Gas will develop and sponsor specific education forums. When independent professional development groups, trade organizations, or government offices offer workshops on relevant energy efficiency topics, Union will promote and / or co-sponsor those that provide added value to our customers.

Union Gas holds several customer meetings at various locations in its service territory throughout the year. An effort is made to include one or more presentations based on an energy efficiency topic at each meeting.

The following proven methods of communication will continue to be utilized:

- Brochures,
- Website,
- Gasworks newsletter,
- Customer meetings,
- Training sessions, and
- Industry associations.

An opportunity exists to improve efficiency in many production environments by changing the perception that production and product quality play a far more important role. A two tiered communication and education plan is required to integrate a customized energy efficiency perspective into the mainstream of a facility's priorities. Once knowledge and experience demonstrate that efficiency is not a stand-alone idea, but rather an essential element that contributes to the continuous improvement philosophy of both production and product quality, then there is an opportunity to change organizational behaviour and influence action.

There is an increased interest by customers for Union to take a larger role in communicating efficiency measures and opportunities. Union is in the unique position of being able to amalgamate information and lessons learned on a larger basis than each individual company's experience.

Performance Testing and Steam Plant Audits
This program is designed for Union to work in conjunction with the customer and consultants to determine the equipment operating efficiency, identify and quantify energy and cost saving opportunities, and establish implementation costs and payback periods for:

- Steam generation systems,
- Furnaces,
- Thermal fluid heaters,
- Vaporizers,
- Process heaters, and
- Other combustion equipment.

An additional benefit from this program is that projects can improve the safety and reliability of combustion equipment. NO_x and CO_2 emissions are also reported as part of this analysis. At the completion of an audit, Union works with the customers to formulate the recommendations into a prioritized list of energy efficiency projects. This enables customers to work projects into their own site-specific energy plans and budgets.

Steam Trap Surveys
This program is designed to reduce losses from steam distribution systems. A qualified service provider identifies leaking traps, over-sized or under-sized traps, blocked or flooded traps, and the need for improvements in condensate return systems. Boiler efficiency has the most value when the steam distribution system is working effectively.

Engineering Analysis and Energy Audits
Customers work with their Union Gas Account Managers to identify processes in the plant that need improvement. This program supports engineering feasibility studies, engineering simulations, energy audits, onsite energy managers, and metering and targeting by supplying end-users with the information needed to invest in energy efficiency measures.

A customer can consider an engineering analysis for the design and justification of:

- Replacing old inefficient equipment,
- Making process changes, and
- Designing new facilities – includes utilizing simulation software in the case of LEED buildings.

Energy Audits may focus on all energy sources within a plant:

- Natural gas,
- Electricity,
- Compressed air,
- Water/wastewater, and
- HVAC/makeup air.

There is a need for practical engineering/technical experience in manufacturing facilities that is focused on the concepts of energy efficiency. In 2010 Union continues a partnership with the University of Windsor to develop energy efficiency professionals by providing eligible manufacturers with no-cost energy assessments. The lessons learned from the 2007-2009

program have positioned Union to expand the program going forward in cooperation with other universities or colleges and potentially with other utilities in Ontario.

The Metering and Targeting (Energy Monitoring and Targeting) program element has been enhanced to benefit customers beginning their M&T system, and encourage customers to expand existing systems. These include:

- Simple Systems, and
- Complex Systems.

The simple systems component for Metering and Targeting (Energy Monitoring and Targeting) is designed as a first step in the program. It is intended to encourage customers to identify and monitor large consumers of energy under the principle that you can't improve what you don't measure.

Eligibility requirements:

- Installation of one meter on a service loop of a natural gas appliance. Eligible meters include: steam, gas, or water meters, and
- Meter is tied into a control system for monitoring.

The complex systems component is designed to incorporate a systematic approach to Metering and Targeting system design, to encourage customers with an existing metering device to improve by incorporating the meter into an energy management process.

Eligibility requirements:

- Installation of two or more meter types (steam, gas, water), including temperature and electricity sensors, and / or
- Installation of hardware/software for monitoring, modelling, or predicting, and
- Entire system is tied into a control system that is monitored to determine "system health".

Equipment Incentives

Union provides incentives targeted at equipment installations that save natural gas. Equipment incentives are designed to promote the use of:

- New and retrofit high-efficiency equipment,
- Heat recovery devices, and
- Controls.

Incentives are available for installations identified with or without an audit. Under both circumstances, Union's role is as a knowledgeable third party that has cross-sector expertise in energy efficiency opportunities. The industrial trend over the past several years has been to reduce overhead costs, so customers have fewer and fewer in-house experts available to analyze potential projects. With shorter payback requirements due to limited capital budgets, new relationships will be developed in facilities to influence and direct customer operating budgets into energy savings versus other capital spending opportunities.

Demonstration of New Technology
Financial incentives for the demonstration of new technologies are an essential part of convincing a customer to take the risk of trying a product that is not yet standard convention. This initiative is designed to encourage the adoption of market-ready, new, repeatable, energy efficient gas-fired technologies. This initiative is not intended for research – it is for commercially available energy efficient products that don't have a foothold in Ontario. Union strives to have this funding option available to support customers willing to take on the additional risk to achieve innovative results.

3.4 Market Transformation Program

In 2010, Union will continue its market transformation program with a budget of $1.33 million.

Market transformation presents a formalized approach to encouraging the adoption of specific energy efficient technologies within a pre-determined customer segment. Market transformation programs, as opposed to traditional DSM programs which target the end user, focus on influencing a broad array of actors in the marketplace.

The fundamental principle which supports market transformation activities is that energy efficient technology adoption is frequently slowed by a variety of barriers found in the market place. Through utility intervention these obstacles can be removed and accelerated adoption of the energy efficient technology will occur.

3.4.1 Drain Water Heat Recovery (DWHR)

Starting in 2007, Union Gas has offered Drain Water Heat Recovery in New Home Construction as its market transformation program. As market transformation is a process that occurs over a prolonged period of time, Union will continue to focus on Drain Water Heat Recovery in 2010. The technology works by allowing cold incoming water in a home to be pre-heated by outgoing grey water before entering a gas water heater or storage device. Substantial energy savings can be achieved by reclaiming the heat from drain water generated from processes such as showering, laundry, and dish washing. The program's long term goals consist of:

- Increase market penetration,
- Succeeding in having DWHR added as a standard to the Ontario Building Code, and
- Assist in the development of a competitive marketplace for the technology.

The market transformation program will be delivered to the new build market in 2010. Union's new build program will focus on driving adoption in the marketplace. Union will continue to build awareness amongst builders and new home buyers through various builder training workshops, a presence at trade shows and through marketing efforts. It will also continue to be promoted through a rental program in partnership with Reliance and Direct Energy.

This technology currently has a low market share but with help can have significant penetration in the market place over time. DWHR has the potential to yield significant gas savings benefits to customers if barriers to market penetration are overcome.

3.4.2 Market Barriers

Market barriers, as defined by Eto et al[2], are "characteristics of the market for an energy-related product, service, or practice that help explain the gap between the actual level of adoption and an increased level that would appear to be cost beneficial".

Union has focused on addressing the barriers to adoption of DWHR in the new construction market, which include:

- High production costs.
- Lack of product knowledge in the marketplace.
- Hassle, information and incremental transaction costs.
- Performance and installation uncertainties.
- Organization practices or customs.

3.4.3 Market Effects

Market effects are changes in the market, including the behaviour of participants, which reflect the increased adoption of energy efficiency products. Through its program results to-date Union has increased awareness of DWHR with customers and within the builder community. The program has driven an increase in the percentage of housing starts that install DWHR units. Union will seek to build on its experience and will continue to engage customers, builders, and government agencies with focused program elements to influence transformation of the market.

The market effects Union seeks to encourage through its Residential Drain Water Heat Recovery for New Home Construction market transformation program are summarized in Table 3 below.

Table 3

Market Effects Attributable to Utility DSM Programs

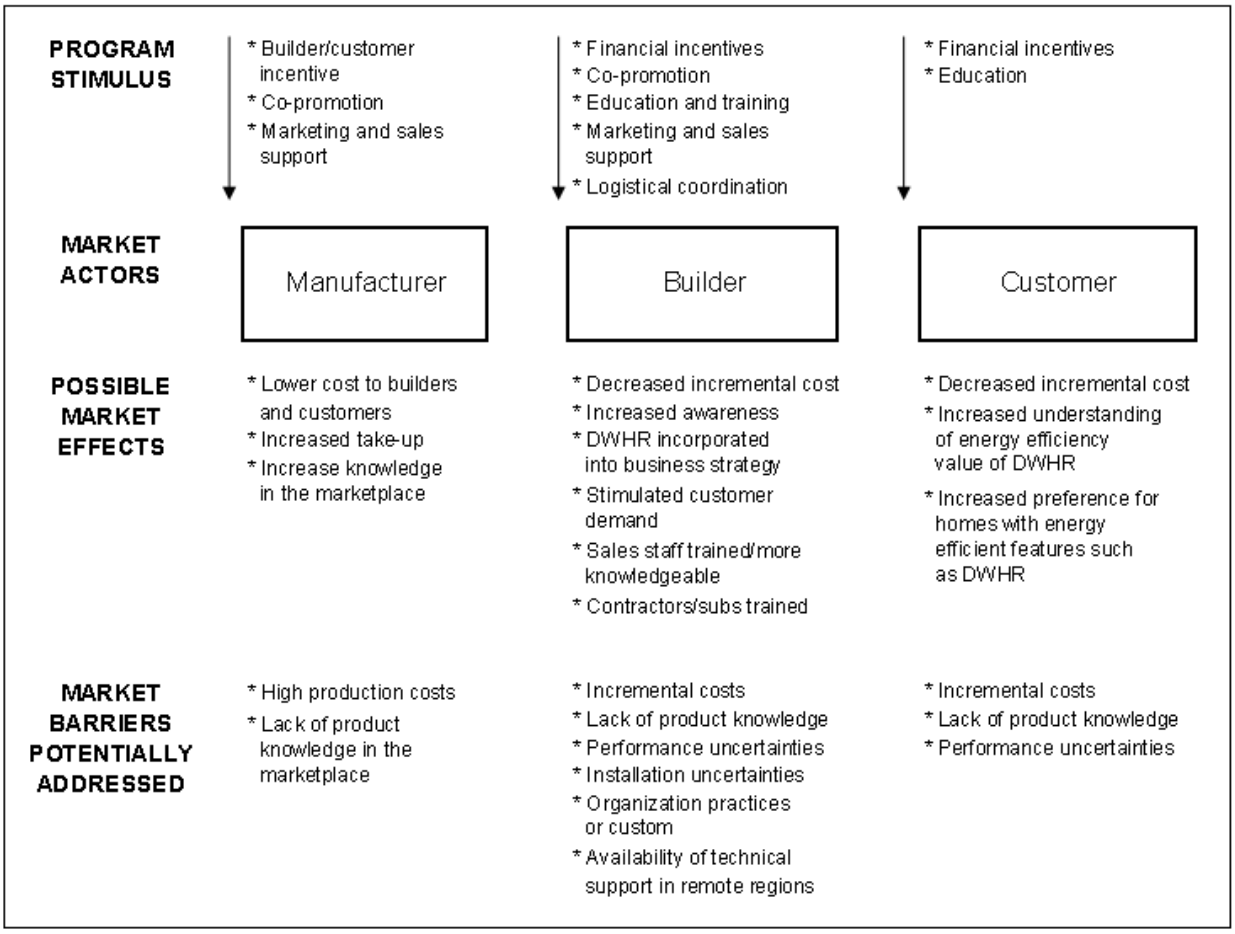
Market Actor	Market Effect
Customer	Change in purchasing behaviour due to changes in: ▪ Awareness ▪ Attitude ▪ Knowledge ▪ Decision-making processes
Builder	▪ Changes in promotion practice ▪ Changes in design practices ▪ Changes and standardization in installation practices ▪ Changes in service offerings ▪ Development of new skills

[2] Eto, Joseph, Ralph Prahl, and Jeff Schlegel; "A Scoping Study of Energy-Efficiency Market Transformation by California Utility DSM Programs"; Energy & Environment Division – Earnest Orlando Lawerence Berkeley National Laboratory; Berkeley, California, July 1996.

Manufacturers	▪ Changes in promotion ▪ Changes in business strategies ▪ Changes in price ▪ Changes in shipping and distribution practices ▪ Changes in production schedule and quantity produced
Government	▪ Changes in codes, standards, or regulations ▪ Changes in promotion

3.4.4 Market Influence Diagram

Union created a market influence diagram to illustrate its market transformation efforts.



3.4.5 DWHR Program Description

For 2010, the DWHR program will be offered solely in the new build market. Union will work to engage manufacturers, builders, and customers through efforts outlined in this section and depicted in the market influence diagram above. A description of each of the program stimulus is provided below.

Manufacturers

Union will continue to facilitate the sales process between the manufacturer(s) and home builders. Marketing and sales support will continue to be a priority in 2010. Union will work with the manufacturer(s) to identify opportunities to reduce per unit costs and encourage the development of a competitive marketplace for DWHR.

Builders

Union will conduct DWHR workshops to train builders and sales agents in effectively marketing the value of the DWHR technology to new home buyers. This training provides the market actors with the ability to effectively convey the benefits of the technology to potential home buyers.

Union will also facilitate training for builders' contractors/sub-contractors to educate them on the proper installation and benefits of DWHR.

Union will actively seek joint promotion opportunities with builders as well as seek to leverage rental programs from energy service companies to increase market adoption of the product.

To further build interest amongst new home builders, financial incentives will be provided to promote the inclusion of DWHR equipment as an option in their homes. In 2010 an incentive will be provided for the purchase and installation of each DWHR unit to increase builder interest and acceptance of the technology. In cases where rental programs are the preferred option, Union will provide a builder incentive to promote adoption in addition to an on-bill credit provided to the home buyer.

The educational components of the DWHR will remain a focus in 2010. Direct communication vehicles such as direct mail and builder brochures will be utilized to provide information and further support the program. Union will look to partner with service organizations such as EnerQuality to target builders to drive uptake of the program. Additional forums such as trade magazines, conferences and trade shows will be employed to ensure the message is received throughout the new build marketplace.

Customers

Union will seek to increase customer awareness of DWHR through education and awareness campaigns which target new home buyers. Initiatives may include:

- Direct-to-customer rental incentive on-bill credit.
- Marketing materials explaining the benefits of DWHR which are made available for distribution and for use by builders.

- The inclusion of DWHR units in model homes and sales centres to influence home buyers when they are selecting features for their home.
- Indirectly through training sales agents on the benefits of DWHR for their clients.

Union will also utilize various media channels and internal communication tools such as uniongas.com/dwhr to create further awareness of DWHR amongst potential home buyers.

3.4.6 Budget

The estimated budget for the 2010 DWHR program is outlined in Table 4 below.

Table 4

Market Transformation 2010 Budget

DWHR Incentive		
Estimate New Build Incentive	$400	
Total Units Installed	2492	
Total Cost (Incentives)		$996,800
Marketing Materials		$45,000
Training Sessions & Workshops		$42,860
Home Shows/Builder Events		$20,000
Communications		$20,000
Research & Evaluation		$20,000
Pilot - Monitor Only		$186,340
TOTAL BUDGET		**$1,331,000**

3.4.7 Research and Evaluation

Effective research and evaluation are necessary components of program planning and implementation and are crucial elements for gauging the effectiveness of specific market transformation strategies. Union will complete a third party evaluation of its market transformation program to verify its effectiveness in meeting the objectives outlined in the scorecard for that year. Results will be used to inform program design and re-align Union's delivery strategy to ensure future success.

3.4.8 Future Program Development

To ensure Union maintains a sustainable market transformation portfolio, Union will allocate a portion of the 2010 budget to launch a monitor-only pilot program. Union is considering residential tankless water heaters or commercial condensing gas water heaters as two potential measures under review for the pilot. The success of this measure will be assessed to evaluate its viability and to determine how it could be expanded moving forward. The pilot program will be delivered in addition to the DWHR program currently in the marketplace.

3.4.9 Incentive Scorecard

Union can earn an incentive of $0.5 million for market transformation activities. A market transformation program can use a number of metrics to determine an appropriate incentive for program execution and performance.

These metrics relate to:

- Ultimate outcomes (e.g. market penetration vs. baseline, product sales).
- Indicators of market effects (e.g. indicators of lasting market effects and/or reductions in market barriers).
- Effective and efficient performance of planned activities.
- A decline in the per unit cost of the equipment.

Union will use a scorecard approach to evaluate program effectiveness and eligibility for an incentive payment. A scorecard is provided for the DWHR market transformation program for 2010 as outlined in Table 5 below. The scorecard results will be applied to the eligible incentive amount to determine the actual incentive earned for the program. The pilot measure will be monitored in 2010 and will not be formally evaluated against scorecard metrics.

Table 5

2010 Market Transformation Incentive Scorecard

Element	Metrics (weighting)	Metric Value Levels			Score
		50%	100%	150%	
DRAIN WATER HEAT RECOVERY					
ULTIMATE OUTCOMES	a) Participating Builders	80	90	100	/15
	b) Units installed (new build) as a percentage of 2010 housing starts	13.0%	14.0%	15.0%	/55
MARKET EFFECTS	c) Customer Awareness Survey - baseline TBD%	2009 + 3%	2009 + 6%	2009 + 9%	/15
	d) Builder Knowledge Survey - baseline TBD%	2009 + 3%	2009 + 6%	2009 + 9%	/15

Explanation of Metrics:

a) Participating Builders are defined as the number of builders that install at least 1 unit in their new build homes between January 1st and December 1st, 2010.

b) DWHR units installed as a percentage of all 2010 new housing starts in Union's franchise area.

c) Customer Awareness Survey – The percent increase of customer awareness and knowledge of DWHR relative to the 2009 survey results. The target for this metric is a 6% increase in general customer awareness and knowledge of DWHR.

d) Builder Awareness Survey – The percent increase in builder awareness and knowledge of DWHR relative to the 2009 survey results. The target for this metric is a 6% increase in builder awareness and knowledge of DWHR.

Scorecard Example

Element	Metric Performance	Weighted Score	Score
Ultimate Outcomes	85 Participating Builders	75% x 15 = 11.25	66.25
	14% of new build has DWHR units installed	100% x 55 = 55	
Market Effects	+6% customer awareness	100% x 15 = 15	22.50
	+3% builder awareness	50% x 15 = 7.5	
		TOTAL	**88.75**

The incentive for Union's performance, in this example, would be $443,750 (0.8875 x $500,000).

Union will complete an evaluation of its market transformation program to verify its effectiveness in meeting the objectives outlined in the scorecard. The evaluation will also confirm the scorecard to be used for the next year of the market transformation program.

3.5 Research

Over the 2010 Plan period Union will have a significant focus on research to improve overall program design and targeting of opportunities. This focus demonstrates Union's commitment to developing a sustainable portfolio of DSM programs.

In 2010, Union intends to spend $882,000 on research. Identified research measures of potential interest for 2010 include the following:

Residential	
	Residential Market Segmentation
	Boiler Reset Controls
	Solar Hot Water Heating
Commercial	
	Commercial Dishwasher
	Ozone Laundry
	Building Recomissioning
	Drain Water Heat Recovery in Commercial Applications
	Commercial Building Envelope Upgrade
	Commercial Boiler Reset Controls
Industrial	
	Automated Energy Monitoring and Analysis
	Insulation Baseline for Piping and Storage Tanks
	Waste Fuel Potential
	Web Based Tool Development

A detailed research plan for 2010 is included in Appendix C.

Where appropriate, Union will look to partner with Enbridge on research work completed over the course of the Plan.

3.6 Evaluation Plan

To confirm evaluation priorities for 2010, Union will collaborate with the EAC. There will be strong emphasis on selecting evaluation priorities by the end of the first quarter of 2010. The evaluation priorities will have some flexibility to be adjusted upon completion of the 2009 audit and if programs change over the course of the year. In 2010, Union intends to spend $633,000 on evaluation which is slightly higher than the amount spent in 2008.

Union completed a market potential study in 2008 based on the initial expectation of a new multi-year Plan beginning in 2010. Union may choose to update this study with new information for submission in 2011 with the next DSM Plan filing.

Where appropriate, Union will look to partner with Enbridge on evaluation work completed over the course of the Plan.

Appendix A – New Input Assumptions

1. PRE-RINSE SPRAY NOZZLE (0.64 GPM)

Commercial, Existing

Efficient Technology & Equipment Description
Low-flow pre-rinse spray nozzle/valve (0.64 GPM)
Base Technology & Equipment Description
Standard pre-rinse spray nozzle/valve (3.0 GPM)

Resource Savings Assumptions

Natural Gas	**See below m^3**

Market Segment	Natural Gas (m^3/yr
Full Dining Establishments	1,286
Limited Service Establishments	339
Other Establishments	318

A field study was undertaken at 37 sites across 4 regions in Union Gas territory. Measurements of water pressure, incoming and leaving (at both burner On and Off setpoints) water temperature at the water heater and supplied to the pre-rinse spray valve, details of the make, model and type of water heater, and type of food service establishment, were collected at each site.

Flow rate vs. pressure curves for high-flow and nominal 0.64 USgpm pre-rinse spray valves (PRSV) were developed from the Veritec studies in Waterloo[3] and Calgary[4]. An average flow rate vs pressure curve for high-flow PRSVs was developed from the Veritec Waterloo study.

Water savings were evaluated for each region based on the difference between the flow rates of the high-flow and low-flow PRSV at the average measured water pressure, and the average usage of the PRSV for each of 3 food service establishment types from the Veritec studies in Waterloo and Calgary.

Natural gas savings were determined using the US-DOE WHAM[5] model to establish water heater efficiency. Inputs to the model from site measurements included the average cold water and hot water setpoint temperatures for each region. Additional inputs to the model included water heater energy factor and rated water heater input (both average for the region), ambient air temperature (assumed at 70°F), and average daily volume of hot water. This last item was determined from a combination of research undertaken by FSTC[6], and ASHRAE[7] recommendations, for each food service establishment type. The proportion of hot water delivered to the PRSV was determined from the average measured mixed water temperature for each region. Operating times are not
expected to be different between 1.24 & 0.64 (Bricor model B064) USgpm models based on cleanability times of 20-21 seconds according to the FTSC[8].

[3] "Region of Waterloo – Pre-Rinse Spray Valve Pilot Study – Final Report", Veritec Consulting Inc., January 2005

[4] "City of Calgary" – Pre-Rinse Spray Valve Pilot Study – Final Report", Veritec Consulting Inc., December 2005.

[5] Appendix D-2. Water Heater Analysis Model. Water Heater Rulemaking Technical Support Documents. http://www1.eere.energy.gov/buildings/appliance_standards/residential/waterheat_0300_r.html

[6] Charles Wallace and Don Fisher Energy Efficiency Potential of Gas-Fired Commercial Hot Water Heating Systems in Restaurants. FSTC April 2007

[7] ASHRAE Handbook 2007HVAC Applications. Chapter 49

[8] pg 32 & 37 "Deemed Savings for (Low Flow) Pre-Rinse Spray Nozzles" by Energy Profiles, January 30, 2009.

Electricity	**0 kWh**
Water	**See below L**

Market Segment	Water (L)[8]
Full Dining Establishments	252,000
Limited Service Establishments	66,400
Other Establishments	62,200

Assumptions and inputs:

- Water savings were evaluated for 3 food service establishment types: Full Service Restaurants, Limited Service Restaurants, and Other
- The PRSV water usage was based on the 2 Veritec studies, and incorporated the measured differences in usage time for the high-flow and low-flow PRSVs.

Other Input Assumptions

Equipment Life	**5 years**
This is consistent with other studies[9,10]	
Incremental Cost (Cust. / Contr. Install)	**$88**
$88 = ($50/pc* + $1/pc* shipping USD) x 1.28901** exchange rate + $22 installation*** *estimated by Bricor, March 2, 2009 **Exchange rate from March 2, 2009 - http://www.xe.com/ucc/convert.cgi ***estimated installation from Seattle Utilities ($21-23/pc), based on conversation with Bricor, March 2, 2009	
Free Ridership	**0 %**
Relatively new product; currently only aware one manufacturer. Propose 0% free ridership.	

[9] CEE Commercial Kitchens Initiative - Program Guidance on Pre-Rinse Spray Valves

[10] Enbridge market survey of average usage

2. 1.0 GAL/MIN FAUCET AERATOR (BATHROOM)

Commercial Building Retrofit (Installed) - Multi-Residential

Efficient Technology & Equipment Description
1.0 GPM Faucet Aerator
Base Technology & Equipment Description
Average existing stock / 2.2 GPM Faucet Aerator

3.6.1 Resource Savings Assumptions

Natural Gas (Updated)	**11 m^3**
Based on Navigant savings calculation adjusted for a 1.0 GPM unit.	
Electricity	**n/a kWh**
Water (Updated)	**2,371 L**
Based on Navigant savings calculation adjusted for a 1.0 GPM unit.	

3.6.2 Other Input Assumptions

Equipment Life	**10 years**
As recommended by Navigant.	
Incremental Cost (Contractor Install)	**$1.50**
As per utility program costs.	
Free Ridership (Updated)	**10 %**
Free ridership – EB 2008-0384 & 0385	

3. 1.0 GAL/MIN FAUCET AERATOR (KITCHEN)

Commercial Building Retrofit (Installed) – Multi-Residential

Efficient Technology & Equipment Description
1.0 GPM Faucet Aerator
Base Technology & Equipment Description
Average existing stock / 2.5 GPM Faucet Aerator

Resource Savings Assumptions

Natural Gas (Updated)	**39 m^3**
Based on Navigant savings calculation adjusted for a 1.0 GPM unit.	
Electricity	**n/a kWh**
Water (Updated)	**8,072 L**
Based on Navigant savings calculation adjusted for a 1.0 GPM unit.	

Other Input Assumptions

Equipment Life	**10 years**
As recommended by Navigant.	
Incremental Cost (Contractor Install)	**$2**
As per utility program costs.	
Free Ridership (Updated)	**10 %**
Free ridership – EB 2008-0384 & 0385	

Appendix B – 2010 Measures and Inputs List

	Target Market		Equipment Details				Annual Resource Savings			Other		
	Sector	New/Existing	Efficient Equipment	Details of efficient equipment	Base Equipment	Details of base equipment	Natural Gas (m3)	Electricity (kWh)	Water (L)	EUL	Incremental Cost ($)	Free Rider (%) [1]
	Residential Space Heating											
7	Residential	Existing	Reflector Panels		No reflector panels		143	0	0	18	$229	0%
9	Residential	Existing	Programmable Thermostat		Standard Thermostat		53	54	0	15	$25	43%
	Residential Water Heating											
11	Residential	New/Existing [2]	Faucet Aerator	Bathroom, 1.5 GPM	Average existing stock	2.2 GPM	6	0	2,004	10	$2	33%
12	Residential	New/Existing [2]	Faucet Aerator	Kitchen, 1.5 GPM	Average existing stock	2.5 GPM	23	0	7,797	10	$2	33%
13	Residential	Existing	Low flow showerhead (Union Gas ESK)	1.5 GPM	Average existing stock	2.2 GPM	46	0	6,334	10	$6	10%
14	Residential	New/Existing [2]	Low-flow showerhead (Union Gas ESK)	1.25 GPM	Average existing stock	2.2 GPM	63	0	10,570	10	$13	10%
15a	Residential	Existing	Low-flow showerhead (Endbridge TAPS)	1.25 GPM	Average existing stock	2.25 GPM	66	0	10,886	10	$13	10%
15b	Residential	Existing	Low-flow showerhead (Enbridge TAPS)	1.25 GPM	Average existing stock	3.0 GPM	116	0	17,168	10	$13	10%
16	Residential	Existing	Pipe Wrap (R-4)	Insulation for DWH outlet pipe	Uninsulated DHW outlet pipes	R-1	18	0	0	10	$2	4%
	Commercial Cooking											
27	Commercial	New/Existing	Energy Star Fryer	50% cooking efficiency	Standard fryer	35% cooking efficiency	913	0	0	12	$2,648	30%
	Commercial Space Heating											
29	Commercial	Existing	Air Curtains	Single door	Non-air curtain doors		667	172	0	15	$1,650	5%
30	Commercial	Existing	Air Curtains	Double door	Non-air curtain doors		1,529	1,023	0	15	$2,500	5%
31	Commercial	Existing	Condensing Boilers	88% seasonal efficiency (est.)	Non-condensing boiler	76% estimated seasonal efficiency	0.0104 / Btu/hr	0	0	25	$12/Kbtu/hr	5%
32	Commercial	New/Existing [2]	Demand Control Kitchen Ventilation	0 - 4,999 CFM	Kitchen ventilation without DCKV		4,801	13,521	0	15	$10,000	5%
33	Commercial	New/Existing [2]	Demand Control Kitchen Ventilation	5,000 - 9,999 CFM	Kitchen ventilation without DCKV		11,486	30,901	0	15	$15,000	5%
34	Commercial	New/Existing [2]	Demand Control Kitchen Ventilation	10,000 - 15,000 CFM	Kitchen ventilation without DCKV		18,924	49,102	0	15	$20,000	5%
35	Commercial	New/Existing	Destratification Fans		No destratification fans		0.5/ft^2	(-)0.0034 /ft^2	0	15	$7,021	10%
36	Commercial	Existing	Energy Recovery Ventilator		Ventilation without ERV		1.84 - 5.14/CFM**	0	0	20	$3/CFM	5%
37	Commercial	New	Energy Recovery Ventilator		Ventilation without ERV		1.75 - 4.89/CFM**	0	0	20	$3/CFM	5%
40	Commercial	Existing	Heat Recovery Ventilation	Ventilation with HRV	Ventilation without HRV		1.75 - 4.90/CFM**	0	0	20	$3.40	5%
41	Commercial	New	Heat Recovery Ventilation	Ventilation with HRV	Ventilation without HRV		1.62 - 4.55/CFM**	0	0	20	$3.40	5%
43a	Commercial	New/Existing	Infrared Heaters	0 - 75,999 BTUH	Regular Unit Heater		0.015 /Btu/hr	245	0	20	$0.02	33%
43b	Commercial	New/Existing	Infrared Heaters	76,000 - 150,999 BTUH	Regular Unit Heater		0.015 /Btu/hr	559	0	20	$0.02	33%
43c	Commercial	New/Existing	Infrared Heaters	151,000 - 300,000 BTUH	Regular Unit Heater		0.015 /Btu/hr	870	0	20	$0.02	33%
44	Commercial	New/Existing [2]	Rooftop Unit	Two-stage rooftop unit	Single stage rooftop unit		255	0	0	15	$375	5%
45	Commercial	Existing	Programmable Thermostat		Standard thermostat		82 - 538**	63 - 266**	0	15	$110	20%

	Target Market		Equipment Details				Annual Resource Savings			Other		
	Sector	New/Existing	Efficient Equipment	Details of efficient equipment	Base Equipment	Details of base equipment	Natural Gas (m3)	Electricity (kWh)	Water (L)	EUL	Incremental Cost ($)	Free Rider (%) [1]
46	Commercial	Existing	Prescriptive Schools - Elementary	hydronic boiler with 83%+	hydronic boiler with 80%-82% efficiency		10,830	0	0	25	$8,646	27%
47	Commercial	Existing	Prescriptive Schools - Secondary	hydronic boiler with 83%+	hydronic boiler with 80%-82% efficiency		43,859	0	0	25	$14,470	27%
	Commercial Water Heating											
48a	Commercial	New/Existing	Condensing Gas Water Heater (100gal/day)	95% thermal efficiency	Conventional water heater	80% efficiency, 91gal. tank.	332	0	0	13	$2,230	5%
48b	Commercial	New/Existing	Condensing Gas Water Heater (500gal/day)	95% thermal efficiency	Conventional water heater	80% efficiency, 91 gal. tank.	873	0	0	13	$2,230	5%
48c	Commercial	New/Existing	Condensing Gas Water Heater (1,000gal/day)	95% thermal efficiency	Conventional water heater	80% efficiency, 91 gal. tank.	1,551	0	0	13	$2,230	5%
50	Commercial	Existing	Pre-Rinse Spray Nozzle	1.24 GPM	Standard pre-rinse spray nozzle	3.0 GPM	190 - 886**	0	36,484 - 170,326**	5	$60	12.4%
	Commercial	Existing	Pre-Rinse Spray Nozzle (Full Service) [3]	0.64 GPM	Standard pre-rinse spray nozzle	3.0 GPM	1,286	0	252,000	5	$88	0%
	Commercial	Existing	Pre-Rinse Spray Nozzle (Limited) [3]	0.64 GPM	Standard pre-rinse spray nozzle	3.0 GPM	339	0	66,400	5	$88	0%
	Commercial	Existing	Pre-Rinse Spray Nozzle (Other) [3]	0.64 GPM	Standard pre-rinse spray nozzel	3.0 GPM	318	0	62,200	5	$88	0%
	Multi-Family Water Heating											
53	Multi-Family	New/Existing	CEE Tier 2 Front-Loading Clothes Washer	MEF=2.20, WF=5.1	Conventional top-loading, vertical axis clothes washer	MEF=1.26, WF=9.5	117	396	58,121	11	$600	10%
54	Multi-Family	Existing	Faucet Aerator	Bathroom, 1.5 GPM	Average existing stock	2.2 GPM	4	0	1,382	10	$2	10%
	Multi-Family	Existing	Faucet Aerator [3]	Bathroom, 1.0 GPM	Average existing stock	2.2 GPM	11	0	2,371	10	$1.50	10%
55	Multi-Family	Existing	Faucet Aerator	Kitchen, 1.5 GPM	Average existing stock	2.5 GPM	16	0	5,377	10	$2	10%
	Multi-Family	Existing	Faucet Aerator [3]	Kitchen, 1.0 GPM	Average existing stock	2.5 GPM	39	0	8,072	10	$2	10%
56	Multi-Family	Existing	Low-flow showerhead (Union Gas ESK)	1.5 GPM	Average existing stock	2.2 GPM	33	0	5,228	10	$6	10%
57	Multi-Family	Existing	Low-flow showerhead (Union Gas ESK)	1.25 GPM	Average existing stock	2.2 GPM	45	0	8,824	10	$13	10%
58a	Multi-Family	Existing	Low-flow showerhead (Enbridge TAPS)	1.25 GPM	Average stock	2.25 GPM	48	0	9,088	10	$13	10%
58b	Multi-Family	Existing	Low-flow showerhead (Enbridge TAPS)	1.25 GPM	Average stock	3.0 GPM	84	0	14,333	10	$13	10%

**Savings will vary for different segments. Please see substantiation sheet for segment specific savings.

1. Free Ridership has been added based on the 2009 DSM Input Assumptions application dated March 30 2009, file number EB-2009-0102.

2. The input assumptions for Faucet Aerator (Bathroom and Kitchen, 1.5 GPM), Low Flow Showerhead (1.25 GPM), Demand Control Kitchen Ventilation, and Rooftop Unit reflect both new and existing building applications.

3. Pre-Rinse Spray Nozzel (0.64 GPM), Faucet Aerator (Bathroom and Kitchen, 1.0 GPM) have been added based on the 2009 DSM Input Assumptions application dated March 30, 2009, file number EB-2009-0102. Substantiation documents are provided in Appendix A.

Union Gas Commercial/Industrial Custom Projects

Sector	Free Rider (%)*
Agriculture	0%
Industrial	56%
Commercial	59%
Multi-Residential	42%
New Construction	33%

*As per EB-2008-0385

Appendix C – 2010 Research Plan

RESIDENTIAL

Customer and Program Development Plan

Topic	Research Description
Residential Market Segmentation	Market segmentation work will allow Union to concentrate on improving savings by focusing on customers in specific load shapes. Some examples may be: ▪ Large homes/small homes, ▪ Demographics of residents (i.e. elderly, young families, etc.), and ▪ "Early adopter" types.

Technology Research Plan

Technology	Research Description
Residential Boiler Reset Controls	Residential boilers heat water to heat a home. The higher the boiler water output temperature, the higher the incoming water temperature will be. The higher the incoming water temperature is, the less heat will be able to be transferred from the burning combustion gasses to the incoming water. The less heat that is transferred from the combustion gasses to the boiler water, the higher the temperature of the flue gasses as they leave the boiler, and consequently the more heat from combustion will be lost to the outdoors. Outdoor boiler reset controls reduce the boiler water output temperature from the high design temperatures when they are not needed, thus reducing flue gas temperatures and reducing heat lost to the outdoors. They figure out what boiler output temperature is needed by sensing how cold it is outside. This project would look at the savings and costs of boiler reset controls on existing and new boilers.
Pan-Canadian Monitoring of Natural Gas/Solar Water Heaters	Solar Domestic Hot Water systems can be connected to natural gas HWH systems. The interaction between the two may affect the savings from the solar systems, however, the effects are not well studied. NGTC is planning to work in conjunction with Enbridge, Sask Energy, Gaz Metro and Union Gas, starting at some time during 2009 and running through 2010.
To Be Determined	Residential technology research opportunities manifest themselves periodically through the year. These are generally co-funded research opportunities with other utilities, government agencies, and/or manufacturers. Research may include: ▪ Technical/economic analysis of new technologies or new applications of existing technologies. ▪ Laboratory/field testing of new technologies.

COMMERCIAL

Customer and Program Development Plan

Technology	Research Description
Drain Water Heat Recovery in Commercial Applications	Technical and economic assessment of drain water heat recovery for commercial applications. ▪ Overview of current, available technologies, ▪ Identification of suitable commercial market segments / applications, ▪ Estimation of energy savings potential for typical applications (possibly as a function of water flows, and water temperatures), and ▪ Economic assessment which includes simple payback calculations. Field demonstrations may be undertaken for promising applications of this technology.

Technology Research Plan

Technology	Research Description
Commercial Dishwasher	There are numerous makes and models of commercial dishwashers on the market. This research is to determine the DSM opportunity using higher efficiency models.
Ozone Laundry	Commercial laundries can use ozone generators as a cleaning agent to reduce hot water & detergent use compared to conventional laundries. This research will determine the DSM potential from using ozone in commercial laundry markets.
Building Recomissioning	Building Recomissioning involves systematically going through an existing building and optimize controls and tune HVAC equipment to reduce gas usage. This project will provide a basis to create a DSM program.
Commercial Building Envelope Upgrade	Commercial buildings that are retrofitted with high efficiency windows and additional insulation likely use less energy than building that aren't retrofitted. However the energy savings & costs were unknown. This project will help determine savings on different insulation levels, normalized by area. It will also consider air sealing savings.
Commercial Boiler Reset Controls	Commercial boilers can heat water to provide space heating. The higher the boiler water output temperature, the higher the incoming water temperature will be. The higher the incoming water temperature is, the less heat will be able to be transferred from the burning combustion gasses to the incoming water. The less heat that is transferred from the combustion gasses to the boiler water, the higher the temperature of the flue gasses as they leave the boiler, and consequently the more heat from combustion will be lost to the outdoors. Outdoor boiler reset controls reduce the boiler water output temperature from the high design temperatures when they are not needed, thus reducing flue gas temperatures and reducing heat lost to the outdoors. They figure out what boiler output temperature is needed by sensing how cold it is outside. This project would look at the savings and costs of boiler reset controls on existing and new boilers.

To Be Determined	Commercial technology research opportunities manifest themselves periodically through the year. These are generally co-funded research opportunities with other utilities, government agencies, and/or manufacturers. Research may include: ▪ Technical/economic analysis of new technologies or new applications of existing technologies. ▪ Laboratory/field testing of new technologies.

INDUSTRIAL

Customer and Program Development Plan

Technology	Research Description
Energent Monitoring Trials	The Energent Energy Monitoring System is an internet-based energy management information system. This is a demonstration to show what savings can be accomplished through automated energy monitoring and analysis in an industrial plant. The system automatically identifies & monitors changes in energy use which are not obvious through the installation of traditional metering and data collection devices. This identifies out-of-the-ordinary energy use and flags it so personnel can address the issue. Energy savings can be shown when the plant personnel act on the recommendation and there is a marked decrease in energy use. This research to commence in 2009 and continue into 2010.

Technology Research Plan

Technology	Research Description
Insulation Baseline for Piping & Storage Tanks	Insulating industrial storage tanks & piping in high pressure steam systems can save natural gas. However, the "average" amount of insulation that would have normally been installed in a retrofit is unknown, so the reference or base case is unknown. This makes it challenging to substantiate the savings from adding insulation. This project will establish what the “average” level of steam tank and piping insulation is.
Waste Fuel Potential	Study to determine and quantify the industrial waste streams that have a useable heat value. Determine the technologies that can be utilized to recover the potential value back into the process while minimizing air emissions.
Web Based Tool Development	Develop a web based calculation tool for an industrial technology.
To Be Determined	Industrial technology research opportunities manifest themselves periodically through the year. These are generally co-funded research opportunities with other utilities, government agencies, and/or manufacturers. Research may include: ▪ Technical/economic analysis of new technologies or new applications of existing technologies. ▪ Laboratory/field testing of new technologies.