

DSM best practices



In
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with

B. Vernon & Associates

Canadian natural gas distribution utilities' best practices in demand side management



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B. Vernon & Associates

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Executive summary

Canadian natural gas local distribution companies (LDCs) have long been active proponents of energy conservation both in their own utility operations, and, since the early 1990's in many cases, through formal initiatives to encourage their customers to utilize natural gas wisely.

Over time LDCs have developed a sophisticated approach to DSM, utilizing market research, engineering analysis and statistical modelling to identify and evaluate conservation and efficiency opportunities. Customers have come to value the subject matter expertise that LDCs have developed and to trust the utility's recommendations of measures that should be adopted.

This study examines DSM practices among the CGA's Canadian natural gas utility members between 2000 and 2004 and, based on the research conducted and the advice from these LDC DSM practitioners, identifies those practices that should be considered 'best in class'. Best in class is the concept of 'Best Practice' that is defined in this study as "documented strategies and tactics employed by successful organizations and programs"¹.

Study approach

To complete this study a team was formed by the Canadian Gas Association (CGA) under the auspices of members of CGA's DSM Task Force:

- Atco Gas (Atco)
- Enbridge Gas Distribution (also representing Enbridge Gas New Brunswick) (Enbridge)
- Société en Commandite Gaz Métro (Gaz Métro)
- Manitoba Hydro

¹ The definition of best practice that was adopted for this study was taken from the U.S. National Energy Efficiency Best Practices Study. Source: www.eebestpractices.com

- SaskEnergy (also representing Heritage Gas)
- Union Gas Limited (Union)
- Terasen Gas Inc. (also representing Terasen Gas Vancouver Island) (Terasen)

Financial support for the study has been provided by CGA member companies and by CGA under a Letter of Cooperation with Natural Resources Canada. This study forms part of a broader federal-provincial-industry (includes gas and electricity energy industries) DSM initiative that includes: DSM potential, regulatory frameworks, and monitoring / reporting.

The study team also includes IndEco Strategic Consulting Inc. of Toronto (as lead consultant) and B. Vernon & Associates of Vancouver. Work on the study was conducted between March and June 2005.

This report has been organized around core DSM activities and processes that have been identified by the study team. These are:

- Organization and management
- Program planning
- Program delivery
- Monitoring, verification and reporting

Methodology

The data requirements for this study were addressed in two phases: a quantitative phase comprised of a written request for information from the participating LDCs and a qualitative phase comprised of a series of face to face and telephone participant interviews.

The study team used two main criteria to select the best practices:

- **Actionable.** To be included as a best practice, the practice has to be practical and achievable by other LDCs.
- **Results Oriented.** Such practices must materially contribute to the objective of reducing customer energy use.

On examination it became clear that the suggested best practices were of two types:

- **Industry wide** - those that have already been adopted by four or more Canadian gas LDCs.
- **Leading edge** – those practices that are not in widespread use, i.e. by fewer than four Canadian gas LDCs.

This distinction does not suggest that leading edge best practices are in some sense more important than those that are characterized as industry wide. It suggests only that some practices are more broadly adopted than others and therefore, that some may be more difficult to adopt (because of cost or other barriers), or that the lack of adoption more broadly of some practices may be a reflection of the maturity of the DSM industry.

Findings – DSM organization and management

Organization and management of DSM is an important determinant of DSM success. Integration of DSM as a core business practice is key. Five best practices in DSM organization and management were identified:

- BP1 Integrate DSM throughout the company as a part of routine business practice (leading edge)
- BP2 Create a defined process for external stakeholder involvement in DSM outside of the formal regulatory process (leading edge)
- BP 3 Develop appropriate, effective shareholder performance incentives to motivate DSM excellence (leading edge)
- BP4 Instil a corporate culture of innovation (leading edge)

The leading edge best practices in DSM organization and management reflect the maturity of the DSM programs of these organizations and the ability of the regulatory environments to support them. It is anticipated that other natural gas utilities in Canada will adopt these leading edge best practices as their programs mature. Regulators need to be encouraged to continue to support and foster innovation in DSM organization and management in the utilities they regulate.

The CGA can play a role in supporting DSM innovation across Canada. Research and development into innovative technologies and the development and piloting of new programs can be resource intensive,

potentially making it difficult for some of the smaller LDCs. There would be a benefit to having increased collaboration and information sharing among the Canadian natural gas companies with respect to R&D and program development. It would likely be more cost-effective and would avoid duplication of effort. The facilitation of such information sharing and collaboration is a potential role for the Canadian Gas Association.

Findings- DSM planning

Good planning is critical to successful DSM. The study team has identified five best practices in planning.

- BP5 Minimize planning uncertainty through multi-year approach (industry wide)
- BP6 Develop programs that minimize lost opportunities (industry wide)
- BP7 Design programs in collaboration with industry (leading edge)
- BP8 Assess market as part of program design (leading edge)
- BP9 Provide programs for 'hard to reach' customers (leading edge)
- BP10 Extend DSM efforts beyond natural gas conservation/ efficiency (leading edge)

While DSM planning has been one of the strengths within the industry, significant opportunities remain to achieve additional customer savings through new approaches to collaboration with industry, to composition of the DSM portfolio, and to understanding customer needs. Multi-year planning and budgeting of DSM increases the ability of LDCs to capture these significant opportunities.

The CGA could facilitate the sharing of information and best practices on DSM planning, among its members. Utilities should be encouraged by their regulators to cooperate with their electric utility counterparts on achieving net energy savings and efficient load building.

Findings – DSM program delivery

Canadian natural gas LDCs are experienced and effective deliverers of DSM programs. Program delivery is the only DSM activity directly seen by customers and prospective participants. The method of program delivery, how it is positioned and how it is branded helps determine the success of programs. Three existing best practices in program delivery were identified in this study.

- BP11 Deliver programs in partnership with other agencies and stakeholders (industry wide)
- BP12 Position LDC as a provider of unbiased energy solutions (industry wide)
- BP13 Brand DSM (leading edge)

Currently, LDCs approach the issue of partnerships on an independent basis, even though many of their potential partners are national in scope (e.g. retailers, appliance manufacturers). There is an opportunity for development of collaborative approaches to establish these types of partnerships. The CGA DSM taskforce could potentially act as a catalyst for this purpose.

Findings – DSM monitoring, evaluation and reporting

Monitoring and evaluating the results of DSM is essential to the continual improvement of these programs. DSM reporting has uses beyond regulatory compliance, including stakeholder buy-in and stimulating internal management support for DSM. The best practices identified with respect to monitoring, evaluation and reporting are:

- BP14 Ensure there is an effective feedback loop between monitoring & verification and program design (industry wide)
- BP15 Develop a formal methodology for verifying energy savings (industry wide)
- BP16 Create a concise annual report on DSM activities and results that is available and easily accessible to the public (leading edge)

While the cost-benefit tests used by various LDCs may be similar, the input assumptions often differ, making it hard to compare program results. The values used for input assumptions can also be a very

contentious issue with stakeholders, particularly where there is a utility incentive.

There is value in having a consistent industry wide approach for determining the value of input assumptions to cost-benefit tests. The CGA DSM task group may be able to facilitate the development of this approach.

1 Introduction

1.1 Background to the Study

Canadian natural gas local distribution companies (LDCs) have long been active proponents of energy conservation both in their own utility operations, and, since the early 1990's in many cases, through formal initiatives to encourage their customers to utilize natural gas wisely.

Under the characterization of DSM (Demand Side Management) customer programs were designed and launched². DSM was defined as any action that would affect customer demand, whether conservation and efficiency or load addition, although in general most LDCs and their regulators began to view DSM solely as a gas usage reduction exercise. Initial programs concentrated on consumer education and awareness with communication to customers about the types of measures that could be taken to reduce their consumption. Subsequent efforts looked at adding more direct ways of influencing customer actions, often with the provision of financial incentives. As DSM has matured, some utilities have added market transformation programs to their DSM program offerings.

Early success in helping to reduce customer demand for natural gas led to a view within LDCs that these demand side efforts could be an important offset to growing supply side requirements (and perhaps as a method of avoiding or delaying the need for certain utility distribution facility upgrades), and as a means of customer retention. More recently, DSM has found a following among customers as a way of reducing operating costs, dampening the effect of rising natural gas prices, improving competitiveness (in the case of commercial and industrial customers), and reducing emissions.

Over time LDCs have developed a sophisticated approach to DSM, utilizing market research, engineering analysis and statistical modelling to identify and evaluate conservation and efficiency opportunities. Customers have come to value the subject matter expertise that LDCs have developed and to trust the utility's recommendations of measures that should be adopted.

² Terasen's DSM activities are part of an Integrated Resource Planning framework. In Ontario, DSM was intended to be part of a similar IRP framework; however, the integration portion has yet to be determined by the Ontario Energy Board.

This has been a significant effort: since 2000, Canadian gas LDC customers have achieved 705 million m³ (27 million GJ) in first year natural gas reductions directly attributable to gas utility efforts, enough energy to provide heat and hot water to about 222,000 Canadian single family dwellings. To achieve this, utilities across the country between 2000 and 2004 have spent \$119 million on these efforts³. The total lifetime energy savings and benefits of these DSM initiatives are significantly greater.

In 2004, the CGA and NRCan signed a Letter of Cooperation on Energy Efficiency which provided a framework for enhanced collaboration and coordination with respect to conducting activities to further energy efficiency and renewable energy in Canada. The development and implementation of collaborative action under the LOC is executed through a federal-provincial-industry initiative which aims to create conditions favourable to accelerating EE/DSM activity in Canada. The identification of institutional barriers and information gaps and working towards their resolution is a key element of the federal-provincial-industry initiative, which also includes the electricity distribution sector. This report, consisting of primary research into the best practices in natural gas demand-side management, will augment the information on: EE/DSM potential in Canada; DSM regulatory frameworks; performance measurement and reporting; and best practices in EE/DSM, that is currently under development through the broader government-industry initiative.

This report presents the findings of a primary research project into DSM best practices among CGA's natural gas utility members across Canada.

1.2 Study Objectives

While LDC DSM efforts have increased each year since 2000 and significant progress has been made, there remains an imperative for additional customer energy reductions (to help meet the country's greenhouse gas reduction targets, for example, or specific utility regulated conservation targets). Toward this end, Canadian gas LDCs recognize the need to ensure their DSM practices are both current and optimized.

This study examines DSM practices among the CGA's Canadian natural gas utility members between 2000 and 2004 and, based on the research conducted and the advice from these LDC DSM practitioners, identifies

³ This expenditure refers to the aggregate of the LDCs' DSM budgets, and excludes government, customer and other partner expenditures.

those that should be considered 'best in class'. Best in class is the concept of 'Best Practice' that is defined in this study as "documented strategies and tactics employed by successful organizations and programs. The objective is not, however, to identify best organizations or best programs; only to identify best practices that exist within organizations and programs"⁴.

An ultimate objective of this work is to engage CGA member companies and other stakeholders in a discussion of how customer energy savings might be increased. The study terms of reference relate to energy efficiency and conservation and therefore, this work does not address in depth those activities of LDCs that might be described as fuel choice or fuel switching or load building, except to the extent that such activities may have an energy efficiency element.

1.3 Study Approach

This report is based on the results of Requests for Information (RFIs) to each of the Canadian gas LDCs actively pursuing DSM and a series of face to face and telephone interviews conducted with them, along with secondary research conducted by the study team. While DSM programs have been offered by several utilities over the last decade, most current programs have been in place for five years or less. To simplify the data collection and in recognition of the difficulty obtaining data for the entire program life, the focus of the data collection was on a five year period, from 2000 to 2004.

To complete this study a team was formed by the Canadian Gas Association (CGA) under the auspices of members of CGA's DSM Task Force:

- Atco Gas (Atco)
- Enbridge Gas Distribution (also representing Enbridge Gas New Brunswick) (Enbridge)
- Société en Commandite Gaz Métro (Gaz Métro)
- Manitoba Hydro

⁴ The definition of best practice that was adopted for this study was taken from the U.S. National Energy Efficiency Best Practices Study. Source: www.eebestpractices.com

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The study team also includes IndEco Strategic Consulting Inc. of Toronto (as lead consultant) and B. Vernon & Associates of Vancouver.

Work on the study, including preparation and response to the RFIs and the interviews, was conducted between March and June 2005.

1.4 Report Structure

This report has been organized around core DSM activities and processes that have been identified by the study team. Following a description of the historical perspective and current situation regarding natural gas DSM in Canada and a review of the methodology adopted by the study team for this work, this report examines these DSM core activities and processes:

- Organization and management
- Program planning
- Program delivery
- Monitoring, verification and reporting

In each case the report identifies and discusses those DSM practices that have been described as:

- Industry wide best practice (that have been adopted by four or more gas LDCs in Canada)

- Leading edge best practice (that have been less widely adopted in Canada)

An emphasis has been placed by the study team on those best practices (whether industry wide or leading edge) that are practical, useful, and suitable for adoption by others. The best practices are numbered, for easy reference only. The numbering is not indicative of either the relative priority or importance of each best practice.

2 State of natural gas DSM in Canada

This chapter presents a brief overview of the historical perspective and current state of demand side management (DSM) initiatives by natural gas utilities in Canada. It is important to set the context for the ensuing discussion of 'best practices' in DSM in chapters 4 through 7 by providing some background information on the companies, the environments in which they operate and their existing DSM efforts. This will help to provide a better understanding of the best practices that were selected and the rationale for the choices made.

2.1 *Comparing natural gas companies*

The companies included in this study are all unique organizations, with individual corporate structures, goals and policies. As seen below in Table 1, the companies vary with respect to their ownership, throughput and customer base. The majority of companies are investor-owned utilities, while Manitoba Hydro and SaskEnergy are crown corporations. The ownership structure may influence how a company implements and manages its DSM activities. For example, shareholder incentive mechanisms for DSM performance have not historically been made available to publicly owned natural gas utilities. However, vertically integrated LDCs, including crown corporations, may have the incentive of increased revenues where energy saved through DSM can be exported on the open market for a profit. Effective for 2005 in Ontario, however, a DSM incentive mechanism has been made available to all electric distribution companies, including those that are owned by municipalities or the province or the private sector.

Other important factors to consider when comparing DSM programs and results across utilities are the size of the utility (e.g. throughput of gas per year and number of customers) as well as the breakdown of customers by sector. For example, Gaz Métro has a significantly smaller proportion of residential customers in their total customer base, compared to the other utilities. This reflects the fact that electricity is the dominant residential heating fuel in Quebec. SaskEnergy's proportion of residential customers is also slightly lower than the other utilities, but not to the same extent as Gaz Métro. Having a smaller proportion of residential customers will 'skew' certain DSM performance metrics, such as 'DSM expenditures per customer' or 'energy savings per customer', when comparing companies.

Table 1 General characteristics of natural gas utilities in Canada (2004)

LDC	Owner	Annual throughput ¹		Customers	
		10 ⁶ m ³	10 ⁶ GJ	Total	Residential
Atco	Investor	4,937	187	906,550	92%
Enbridge	Investor	11,838	448	1,671,442	92%
Gaz Métro	Investor	5,312	201	158,527	66%
Manitoba Hydro	Crown	2,148	81	258,713	90%
SaskEnergy	Crown	3,827	145	326,985	82%
Terasen	Investor	6,035	229	885,200	90%
Union	Investor	14,135	535	1,223,584	91%

1. Based on RFI responses.

There are also significant differences among the provinces with respect to the provincial fuel mix available, the dominant residential heating fuel and the relative price of natural gas and electricity. The average residential tariffs for natural gas are quite similar across the companies, with the exception of SaskEnergy and Atco, which are somewhat lower due in part to low transportation and storage costs⁵.

All of the above factors – size, ownership, customer base and provincial fuel issues - influence the objectives the companies have for pursuing DSM and the strategies that they adopt. For example, SaskEnergy voluntarily developed its DSM program as a customer service and customer retention initiative when natural gas prices rose in Saskatchewan. These types of influences will be discussed throughout the report.

2.2 Overview of company approaches to DSM

With the exception of Enbridge and Union, every company in this study is located in a different province, meaning that nearly all companies face different energy regulations and energy efficiency policies (Table 2). Enbridge, Gaz Métro, Terasen and Union all operate in a ‘regulated-DSM’ environment, where DSM is expected by the regulator, DSM plans are approved by provincial regulators and DSM is funded through ratepayers. SaskEnergy’s expenditure on DSM program incentives is taken off of its dividend payment to the Provincial Government and is approved by the Crown Investment Corporation. While SaskEnergy’s

⁵ Residential average tariff rates range from 0.29 \$/m³ to 0.42 \$/m³.

DSM activities are not approved by an ‘arms-length’ regulator, as in Ontario, BC and Quebec, it is still considered ‘regulated DSM’ for the purposes of this study. Atco’s EnergySense program is the only example of non-regulated DSM in this study, as it is conducted as a quasi ‘non-utility’ program. Table 2 summarizes the DSM regulatory environment of these companies.

Table 2 Regulatory environment of natural gas companies conducting DSM in Canada

LDC	DSM approval agency	DSM since
Atco	n/a	2002
Enbridge	Ontario Energy Board	1995
Gaz Métro	Régie de l’énergie Québec	2001
Manitoba Hydro	Manitoba Public Utilities Board	n/a
SaskEnergy	Crown Investment Corporation	2001
Terasen	British Columbia Utilities Commission	1997
Union	Ontario Energy Board	1997

The DSM regulatory environment influences the primary drivers for DSM, the programs that are selected for implementation and the preferred outcome of DSM activities. In jurisdictions with DSM regulated by an arms-length agency, the primary driver for DSM tends to be achieving cost effective energy savings. The Total Resource Cost (TRC) test is used to screen programs and to calculate total societal benefits from the programs. At SaskEnergy, on the other hand, the primary driver for its DSM program is residential customer satisfaction and retention. As such, programs are screened based on the cost and benefits to individual program participants (i.e. the Participant Cost Test).

Overall, natural gas DSM in Canada is a maturing enterprise. As seen in the Table 2 above, some utilities have a decade of experience delivering DSM programs while others have only a few years of experience. Additionally, some companies have focused their efforts to a single program or to a single customer sector, while others have developed a broad range of programs covering all sectors over time (discussed in more detail in section 2.3).

A brief description of each LDC’s DSM program follows.

Atco

Atco's Energy Management Services department was formed in 2001, as a customer service and retention initiative in response to high energy prices. Soon after formation, Atco adopted the brand of EnergySense™ for its energy conservation and efficiency programs. Atco offers three areas of service within EnergySense: a customer toll free number for general energy efficiency advice; the residential EnerGuide for Houses program; and a commercial energy audit service. Apart from the toll free number, EnergySense's programs are delivered on a fee for service basis. EnergySense is funded jointly by Atco Gas and Atco Electric.

Enbridge

Enbridge has delivered DSM programs, regulated by the Ontario Energy Board, since 1995. Over the past decade, Enbridge's DSM programs have delivered approximately 1.8 billion m³ in natural gas savings and net energy savings for customers of approximately \$865 million⁶. Enbridge offers a comprehensive suite of cost effective programs to all sectors and customer types. The company is continuing to grow both the existing suite of programs and develop new program offerings to replace programs that have reached their sunset. Major new areas of focus include market transformation, lost opportunities and further enhancements around strategic partnerships.

Enbridge Gas New Brunswick provides natural gas distribution services in five areas of New Brunswick (Fredericton, Moncton, Oromocto, St. John and St. George). The company does not have a regulated DSM plan similar to other LDCs in the study, however it does offer rebates, in cooperation with NRCAN, to natural gas customers who upgrade their heating system to (or build a new home with) an ENERGY STAR® natural gas furnace or boiler. The company also provides additional incentives for the installation of both central heat and hot-water natural gas systems⁷.

Gaz Métro

Gaz Métro launched its DSM program in the spring of 2000. The company currently offers 20 DSM programs to its customers. More than 17,000 residential customers and more than 800 business customers have participated in Gaz Métro's programs to date. The company delivers three main types of DSM programs – awareness programs;

⁶ Enbridge Gas Distribution. 2006-2008 Demand Side Management Strategic Plan.

⁷ <http://www.amazingenergy.ca/rebates.php>

replacement and acquisition programs for energy efficiency equipment; and feasibility study & implementation programs. Since inception, Gaz Métro's DSM portfolio has saved more than 47 million m³ of natural gas.

Gaz Métro also supports energy conservation and efficiency through its Energy Efficiency Fund. Funded by a portion of the customers' share of the utility's productivity savings, the Energy Efficiency Fund's two priorities are low income programs and innovative technology programs.

Manitoba Hydro

Manitoba Hydro has been providing regulated DSM on the electric side since 1989. In 1999, Manitoba Hydro acquired Centra Gas. Since 2001, residential natural gas customers have received 'piggybacked natural gas savings' via customer service and cost recovery programs provided on the electric DSM side. Manitoba Hydro is currently in the conceptual stage of proposing a natural gas program to its local public utility board, but at the moment does not have any standalone natural gas DSM programs. The natural gas savings and DSM expenditures attributed to Manitoba Hydro in this report reflect the company's estimation of the portions of its existing electric DSM programs that are related to natural gas.

SaskEnergy

In July 2001, SaskEnergy, a crown corporation, began offering prime rate loans to encourage residential customers to use more energy efficient natural gas appliances. In 2002, Natural Resources Canada became a partner and the focus of the program was narrowed to ENERGY STAR® furnaces and boilers. Under the ENERGY STAR® loan program, customers are eligible for a prime rate loan from the TD Bank for the installation of an ENERGY STAR® high efficiency furnace. SaskEnergy, with funding support from NRCan, pays down the interest rate for the 5-year loan to prime rate. The program is delivered through the SaskEnergy Network of 135 natural gas retailers and contractors.

SaskEnergy also owns Heritage Gas, in Nova Scotia, along with Scotia Investments and AltaGas Services. Natural gas distribution has only been available very recently in the province. Heritage Gas has been providing natural gas distribution services since December 2003. The company does not have a regulated DSM plan similar to other LDCs in the study, however it is pursuing programs, in cooperation with NRCan and the Provincial Government, to encourage residential and commercial customers to convert to natural gas use and to install the highest efficiency equipment available when doing so. These programs have

only recently been started and as such were outside of the period of scope for this report (2000 -2004).

Terasen

Terasen has been conducting DSM programs as part of its integrated resource planning efforts since the mid-1990's. The company has offered a variety of programs to its residential, commercial and institutional customers, including initiatives to encourage the installation of high efficiency furnaces, boilers, fireplaces and water heaters. During the period 2000 – 2004, Terasen customers reduced their annual demand by a cumulative 750,000 GJ as a result of the company's DSM programs.

In 2002, Terasen completed the acquisition of Centra's gas distribution business on Vancouver Island. Recently Terasen Gas Vancouver Island initiated a program in partnership with BC Hydro and NRCan to offer an incentive for the purchase of high efficiency heating systems combined with an incentive to install natural gas in new residential construction.

Union

Union has undertaken DSM activities, regulated by the Ontario Energy Board, since 1997. The company achieved more than 322 million m³ of first-year energy savings from program inception through 2004, at an investment of more than \$33 million. Union delivers a wide range of programs types (education, equipment replacement, building retrofit, new construction, audit etc) across all sectors – residential, commercial, industrial, and distribution contract customers. Union operated under a 5-year DSM plan from 1999 through 2004. Currently the company is developing a three year strategic plan (2006-2008) that is consistent with emerging energy policy direction in Ontario.

2.3 DSM activities 2000-2004

From 2000 through 2004, there was a total of 119 million dollars invested in DSM by natural gas utilities in Canada (Figure 1). Annual DSM expenditures have increased steadily over this period, with the total expenditure in 2004 (\$30.9M) being nearly twice that of 2000 (\$16.6M). This growth is due to both an increase in the number of companies participating in DSM over the time period, as well as an increase in DSM budgets within individual companies over the period (namely, ATCO, Enbridge and Gaz Métro).

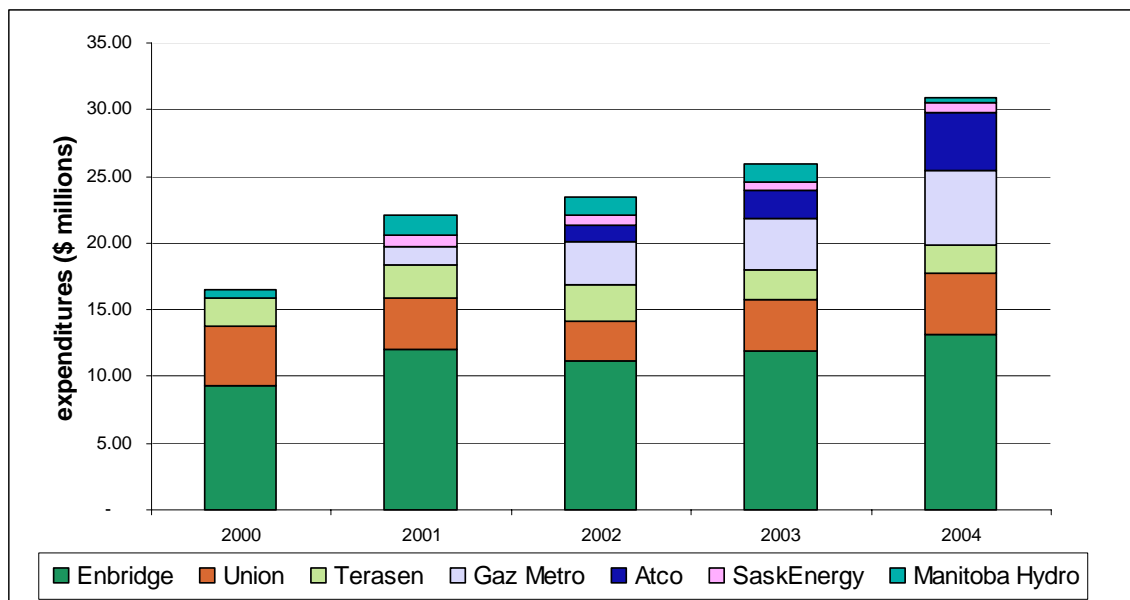


Figure 1 DSM expenditures by company (2000 - 2004)

The first-year annual energy savings from these DSM investments is summarized in Table 3. This table clearly illustrates that while annual DSM expenditures and energy savings have been increasing since 2000, the cost per cubic metre of natural gas savings has been very stable throughout the entire period.

Table 3 DSM expenditures and energy savings (2000-2004)

	2000	2001	2002	2003	2004
Number of utilities with DSM programs	4	6	7	7	7
LDC DSM expenditures (millions of \$)	\$ 16.6	\$ 22.1	\$ 23.4	\$ 26.0	\$ 30.9
Natural gas annual end-use savings from LDC DSM programs (millions of m ³ /yr)	91.8	138.2	150.2	153.4	170.9
Cost per m ³	\$ 0.18	\$ 0.16	\$ 0.16	\$ 0.17	\$ 0.18
Natural gas annual end-use savings from LDC DSM programs (millions of GJ/yr)	3.48	5.24	5.69	5.81	6.47
Cost per GJ	\$ 4.76	\$ 4.22	\$ 4.12	\$ 4.47	\$ 4.78

In 2004, the natural gas distribution companies invested a total of more than 30 million dollars in DSM. Table 4, below, shows the 2004 DSM expenditure of each company and the percent of the company's gas revenue it represents (both including and excluding commodity costs). While the largest DSM budget is more than 15 times that of the smallest DSM expenditure, the percent of revenue that DSM expenditures

represent is much more consistent across the companies, suggesting that much of the variance in DSM budgets is explained by variance in company size.

Table 4 2004 DSM expenditures, by company, as a proportion of revenue

LDC	DSM expenditure ¹ (\$ millions)	Total utility revenue (\$ millions)	% of total utility revenue	Utility revenue less cost of gas (\$ millions)	% of utility revenue less cost of gas
Atco	\$ 4.30	1,550 ²	0.28%	407 ²	1.06%
Enbridge	\$ 13.09	2,408 ¹	0.54%	987 ³	1.33%
Gaz Métro	\$ 5.55	1,783 ⁴	0.31%	555 ⁴	1.00%
Manitoba Hydro	\$ 0.46	494 ⁵	0.09%	119 ⁵	0.39%
SaskEnergy	\$ 0.73	317 ⁶	0.23%	167 ¹	0.43%
Terasen	\$ 2.20	1494 ⁷	0.15%	609 ⁷	0.36%
Union	\$ 4.60	1,791 ⁸	0.26%	885 ⁸	0.52%

1. Based on RFI responses.
2. www.atcogas.com/Regulatory/03-04_AG_GRA/APPL_UPDATED/SCH_REV.xls
3. www.cgc.enbridge.com 2004 Annual Report.
4. <http://www.gazmetro.com/english/surveiller/faits.htm>
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8. RP-2003-0063 Statement of utility income.
http://www.oebdocs.oeb.gov.on.ca/pdf/Schedules_19March2004.pdf

As mentioned in the previous section, the portfolio of programs offered by each LDC differs. Figure 2 provides an overview of the types of programs offered by natural gas utilities in 2004. The programs have been categorized according to customer sector (residential, commercial/institutional or industrial), as well as by the type of measure that is the basis of the program (e.g. equipment replacement, education). It should be noted that the total number of 'check marks' does not necessarily represent the total number of programs for each LDC, as there may be several programs within one category or one program may cover several categories. The purpose of this table is to provide a snapshot of the LDCs' DSM portfolios.

All seven companies offer residential programs, five of them offer commercial/institutional programs and only three offer industrial programs. Equipment replacement (e.g. upgrading to a high efficiency furnace) is the most common type of residential program, while energy audits and feasibility studies are among the most common commercial/institutional program. Industrial programs are predominantly 'custom projects', where the specific energy efficiency

measures installed are identified based on the individual needs of each customer.

	Atco	Enbridge*	Gaz Métro	Manitoba Hydro	SaskEn ergy	Terasen	Union**
Residential							
Audit/assessment	✓	✓	✓	✓			
Building retrofit		✓		✓		✓	✓
Equipment replacement		✓	✓		✓	✓	✓
New construction - envelope		✓		✓			✓
New construction - equipment		✓	✓			✓	✓
Education				✓	✓		✓
Commercial/Institutional							
Audit/assessment	✓	✓	✓			✓	✓
Building retrofit		✓					✓
Equipment replacement		✓	✓			✓	✓
New construction - envelope		✓	✓				
New construction - equipment		✓	✓				✓
Custom projects		✓	✓				✓
Education		✓				✓	✓
Industrial							
Equipment replacement		✓	✓				
New construction - equipment			✓				
Custom projects		✓	✓				✓
Education		✓					✓

Figure 2 Types of DSM programs offered in 2004, by company

*BASED ON 2002 M&E REPORT

** BASED ON 2003 M&E REPORT

3 Methodology

3.1 Definition of best practice

At the initiation of the study, the following definition of best practice was adopted by the study team:

"The term 'Best Practice' refers to the business practice that, when compared to other business practices that are used to address a similar business process, produces superior results.

Best practices are documented strategies and tactics employed by successful organizations and programs. Note, however, that rarely is an organization or program "best-in-class" in every area. Our focus is not on identifying best programs or best organizations but, rather, best practices that exist within and across programs."⁸

3.2 Data collection

The data requirements for this study were addressed in two phases:

1. **Quantitative.** This consisted of a written Request for Information (RFI) issued by the study consultants to the seven (7)⁹ participating LDCs. Additional materials provided by the participants (program summaries, reports) and identified by the consultants (information from other jurisdictions) was also collected in this phase.
2. **Qualitative.** This consisted of a series of face to face and telephone interviews conducted by the study consultants with the participating seven (7) LDCs. In addition to supplementing information included in the Phase 1 RFI responses, the interviews proved to be a useful mechanism to elicit candid views on which DSM practices have

⁸ Source: www.eebestpractices.com U.S. National Energy Efficiency Best Practices Study, December, 2004, Quantum Consulting Inc., for the California Best Practice Project Advisory Committee

⁹ While seven CGA member LDCs participated directly, the responses from SaskEnergy, Enbridge, and Terasen also reflected the activities of Heritage Gas (Nova Scotia), Enbridge New Brunswick, and Terasen Gas Vancouver Island, respectively. Collectively this group of distribution utilities represents the majority of gas distribution (by volume) in Canada. Organizations not participating include the network of rural natural gas co-operatives in Alberta, Pacific Northern Gas of British Columbia and a small number of municipally-owned utilities in other provinces.

worked well within interviewee organizations, which have not worked well and recommendations they suggest for improvement.

The period under study is between 2000 and 2004 (5 years). This was done to simplify data collection and in recognition that while most DSM programs have been offered by several utilities over the last decade, most current programs have been in place for five years or less. An emphasis has been placed on recent activity. Annual data for some utilities are based on calendar year reporting (January through December). For other utilities it is based on a fiscal year beginning in April or October. It was anticipated from the outset that the quantitative data collected (revenues, costs, numbers of customer participants, and so forth) would be approximate in any case because of differing allocations of customers between sectors, categorization of costs and methods of determining energy savings. In addition, rather than providing simply a historical perspective, the study team also identified existing trends and potential future developments.

The study team acknowledges all LDC participants for their active and enthusiastic assistance in both the completion of the RFI responses and in the interview phase. A total of seven responses to the RFI were received and seven interviews were completed (100% of participants in each instance).

The Request for Information

The RFI was in two parts: Section 1 requested general information about LDC DSM activities, and Section 2 requested specific data about DSM programs. Table 5 and Table 6 summarize the categories and type of information collected in Part 1 and Part 2 of the RFI, respectively.

Section 2 of the RFI was completed by each participant for each major program on offer between 2000 and 2004. A total of 33 individual program responses were received.

Table 5 Categories and examples of data collected in RFI part 1

RFI section	Category	Examples	Comparative assessment (rationale)
1.1	Company & market	Revenues, customers, rates	LDC size, tariff rate impact
1.2	Resources, planning & results	DSM expenditures, energy savings	Cost effectiveness
1.3	Channel resources	Types of channel partners, tools	Techniques utilized
1.4	General information for customers	Communications tools	Techniques utilized
1.5	Portfolio and program screening	Tests deployed, pass/fail criteria	Degree of adoption
1.6	Stakeholder consultation	Type of input, influence	Stakeholder mechanisms
1.7	Performance indicators	Availability, type	Value of shareholder incentive
1.8	Emission reductions & electricity savings	Tracking, reporting methodology	Relative values
1.9	Reporting	Frequency, type	complexity

Table 6 Categories and examples of data collected in RFI part 2

RFI section	Category	Examples	Comparative assessment (rationale)
2.1	Market information	Program description, sector applicability	Program types
2.2	Marketing	Media, channels, incentives used	Techniques utilized
2.3	Expenditures	Marketing, promotion costs	Cost-effectiveness
2.4	Targets	Savings, number of participants	Planning effectiveness
2.6	Results	Savings, number of participants	Overall effectiveness

The interviews

Based on feedback received from the participants through the RFI, an interview was conducted by the consulting team with each participating LDC. Seven interviews were conducted. The interviews included sections on:

- Organization and management
- Planning
- Implementation and program delivery

- Tracking and verification
- Reporting

Participants were asked in each section to identify perceptions of their own best practices, challenges faced, and recommended changes.

Participants were also asked to identify exemplary programs that they have conducted, providing views on program rationale, key success factors, and advice they would give to others contemplating similar initiatives.

3.3 Limitations to data collected

While the responses to the information request were very complete in most respects, and the study team is appreciative of the significant time and effort applied to their completion, there are a few limitations that are worthy of note:

- Some responses to the RFI included program information in the aggregate (grouped by program type or sector) by virtue of the large number of programs offered during the study period. Although this is not a major concern (given that the objective of this study is not to provide a 'best program' determination), it has made calculation of certain program metrics problematic.
- Energy saving and cost data have been utilized on an 'as-provided' basis. Only a simple test of reasonableness has been applied to verify responses.
- Portions of the information received are unavailable or partially incomplete, most notably annual target data by program.
- Certain requested information received is not characterized the same way by each LDC. For example, the distinction between categories of commercial customers is not uniform across all LDCs. Therefore portions of the data do not allow for an 'apples to apples' comparison.

3.4 Identification of best practices

Criteria used by the study team to select the best from those practices that were described in the interview phase of the data collection are as follows:

- **Actionable.** To be included as a best practice, the practice has to be practical and achievable by other LDCs.
- **Results Oriented.** Such practices must materially contribute to the objective of reducing customer energy use.

On examination it became clear that the suggested best practices were of two types:

- **Industry wide** - those that have already been adopted by four or more Canadian gas LDCs.
- **Leading edge** – those practices that are not in widespread use, i.e. by fewer than four Canadian gas LDCs.

This distinction does not suggest that leading edge best practices are in some sense more important than those that are characterized as industry wide. It suggests only that some practices are more broadly adopted than others and therefore, that some may be more difficult to adopt (because of cost or other barriers), or that the lack of adoption more broadly of some practices may be a reflection of the maturity of the DSM industry.

One determinant of best practice is the relative performance (for example energy savings achieved per participant or DSM cost per customer) of utility DSM organizations and programs. This performance can be estimated by comparing data provided by LDCs in the RFI responses and linked to the practices of each LDC¹⁰.

From a practical perspective, there are very consistent results among LDCs regarding the quantitative metrics and therefore these results offer little in the way of assistance in differentiating among practices. As well, it was not possible to quantitatively justify each selection. Therefore the study team has depended to a large degree on the professional judgment of the LDC participants and the consultants. In general, the practices that are included here are based on the notion that if generally adopted, the industry would benefit.

¹⁰ A compilation of industry metrics was provided in chapter 2.

4 Organization and management

The category of DSM 'organization and management' refers to the corporate strategies, management structure and regulatory processes that provide a framework for DSM activities within a company, including:

- Corporate vision related to DSM
- Senior management level goals
- Scope/type of activities that are considered DSM
- Mandate and structure of DSM staff/group within the company
- Role of external stakeholders
- Nature of incentives to pursue DSM
- Nature of links with 'like-minded' organizations

4.1 Industry overview

The companies reviewed in this study started pursuing DSM for different reasons. In some cases, it was as a customer service response to rising natural gas prices; in other cases it was in response to regulatory requirements; and in others it was seen as a business opportunity. Today, all of the companies interviewed agree that DSM is a positive customer service tool and thus a business opportunity. There are differing views, however, on whether DSM is viewed as revenue-neutral or potentially profit-making. Three companies¹¹ – Gaz Métro, Enbridge and Terasen – had shareholder incentive mechanisms for at least one year during the study period. These mechanisms provided the opportunity for the generation of profit from DSM activities, based on TRC. In 2005, Enbridge and Terasen still have an incentive mechanism, however Gaz Métro does not. Union did not have an incentive mechanism during the years covered by this study, but recently received approval for one in 2005.

¹¹ Gaz Metro had an incentive mechanism for 2003 and 2004. Both Enbridge and Terasen had incentive mechanisms through the entire period of the study (2000-2004).

All of the companies have in-house staff working on DSM, but the configuration within the organization and the size of the group varies. The DSM group is often located within the sales and marketing group or within the customer service group. Most of the companies surveyed also contract out some DSM work to contractors or consultants. Table 7 depicts the staffing and location within the organization of the DSM group.

Table 7 DSM structure within the utility, by company

	Staff (full time equivalents)	Location in organization
ATCO	22	Stand alone unit
Enbridge	26.5	Planning & evaluation; marketing; sales; energy technology
Gaz Métro	4	Marketing
Manitoba Hydro	5.14	Customer service
SaskEnergy	1.5	Marketing & sales
Terasen	3.6	Marketing & forecasting
Union	30	Sales & marketing/channel

When asked about existing challenges associated with DSM organization and management, several companies indicated that acquiring and/or allocating sufficient resources (both human and capital) for DSM programs is a challenge. One company suggested that there was a need to have senior management ‘send down’ the message of DSM throughout the company. On the topic of emerging opportunities, several utilities indicated that the introduction of incentive mechanisms (either shareholder mechanisms or employee performance incentives) represents a significant opportunity to improve DSM performance.

4.2 Best practices

Four best practices in DSM organization and management were identified:

- BP1 Integrate DSM throughout the company as a part of routine business practice
- BP2 Create a defined process for external stakeholder involvement in DSM outside of the formal regulatory process
- BP 3 Develop appropriate, effective shareholder performance incentives to motivate DSM excellence
- BP4 Instil a corporate culture of innovation

A detailed description of each best practice follows. The best practices are numbered, for easy reference only. The numbering is not indicative of either the relative priority or importance of each best practice.

BP1
Leading edge

Integrate DSM throughout the company as part of routine business practice

This best practice refers to the extent to which DSM is perceived and pursued as an on-going routine business activity of the company, rather than as a 'side-bar' or temporary activity. In practice, integration is not an absolute (i.e. suggesting a company's DSM is completely integrated or not). It is more useful to think of integration as a spectrum, where the characteristics of 'fully integrated' DSM would include the following:

- DSM is included as a senior management goal
- All employees are aware of the company's DSM programs and performance
- Sales staff promote DSM programs equally and jointly with load building, depending on customer needs
- DSM programs and/or resources are available to all customer segments
- DSM planning & delivery is integrated into all aspects of the company – finance, accounting, strategic planning, systems planning, marketing, sales, customer service
- DSM activities are included in both short- and long-term load forecasting
- There is a mix of market transformation, prescriptive measure, custom and education-based DSM programs, indicating that the company is striving for continual improvement in energy efficiency standards and creating opportunities for customers to save energy
- Company resources are mobilized effectively to optimize attainment of incentives for excellence in DSM
- Company receives the same or greater return on investment from DSM as from capital expenditures that are rate-based

No company in the study has completely integrated DSM throughout their organization and business practices, in the manner suggested above; however, some are significantly further along the spectrum than others. Enbridge and Union are among the most integrated and achieve this leading edge best practice.

Enbridge has staff working on DSM within four groups in its organization: planning & evaluation, marketing, sales and energy technology. The company ensures that all employees are aware of its DSM programs and performance through internal communications. Enbridge successfully mobilizes its resources within these groups to improve its DSM performance and attain its shareholder incentives.

At Union, there are team performance goals for DSM in the sales & marketing and channel departments which are tied to employees' bonuses. The weighting of DSM within these balanced scorecards has increased over time. Union has also embedded DSM as a sales tool with their front line sales staff.

Both companies view the role of sales as meeting the energy needs of the customer. DSM allows the companies to take a comprehensive approach to energy use within the customers' organizations.

Integrating DSM throughout the company is a 'best practice' for several reasons. It solidifies DSM as a core business activity which is pursued with the same effort and efficiency as other core business areas and helps to avoid different parts of the company working for goals contrary to DSM.

Additionally, it uses human and capital resources within the company more efficiently (e.g. two different sales people are not calling one customer) and leverages existing relationships that company staff have with customers (e.g. key account reps). Integrating DSM activities throughout a company makes DSM more sustainable within the corporation and helps it to become part of the company culture.

While the organizational and management structures vary between companies, integration of DSM as a core business practice is a tangible and appropriate goal for all natural gas companies. However, there clearly must be senior management support and a broad willingness to accept this type of integration.

In cases where DSM plans are approved by an arms-length regulator (Terasen, Manitoba Hydro, Enbridge, Union & Gaz Métro), external stakeholders have an opportunity to provide input to DSM plans and programs, during the regulatory approvals process.

Three of these companies– Gaz Métro, Enbridge and Union – also have a defined process, which is used as a mechanism for involving external stakeholders outside of the formal regulatory process, and therefore have demonstrated a leading edge best practice. Stakeholders (representing industry groups, environmental groups, consumer groups, etc.) participate in a consultative on all aspects of DSM process (i.e. in program design, program selection, delivery, monitoring & evaluation). Gaz Métro’s stakeholder consultative consists of stakeholders that represent environmental groups, residential sector, small/medium business and the municipal sector. Gaz Métro meets quarterly with the stakeholders to solicit input on its programs. Enbridge and Union’s consultatives, consisting of the major stakeholders that participate in their rates cases (e.g. environmental groups, consumer groups, and industrial associations), meet at least quarterly with their stakeholder consultatives.

A defined process for involving stakeholders, outside of the regulatory process, is a ‘best practice’ since it:

- encourages input from stakeholders *early* in the planning process,
- leverages the utility’s capabilities with respect to DSM planning, program design and monitoring & evaluation
- reduces the number of issues that must be adjudicated in formal regulatory hearings, as many, if not all, issues can be agreed upon in settlement agreements
- may lead to improved DSM program design and evaluation, based on feedback and input obtained
- provides opportunity to educate stakeholders about the benefits of DSM programs
- Improves buy-in and support from stakeholders

While there are many benefits to involving stakeholders through the DSM planning and implementation process, there may also be some

limitations. Intense, frequent stakeholder consultation can be time consuming and there is no guarantee that an agreement among all parties will be achieved.

BP3
Leading edge

Develop appropriate, effective shareholder performance incentives to motivate DSM excellence

Another 'leading edge' best practice in natural gas DSM is the use of appropriate, effective shareholder performance incentives to motivate DSM excellence. From 2000 to 2004, three of the companies surveyed – Gaz Métro, Enbridge and Terasen – had a shareholder incentive mechanism available to them for at least one year, demonstrating this leading edge best practice. Of the three, Enbridge's has proven to be most successful with regard to motivating the utility toward excellence in DSM.

To be successful, an incentive mechanism needs to be designed in such a way that it provides a potential financial reward which is large enough to encourage the company to try to maximize/optimize its reward. Terasen has had a shareholder incentive mechanism since 1997, yet has never claimed a reward. In 2002, Terasen was eligible for a small incentive of less than \$50,000. Because the amount was small, Terasen did not seek approval from the BCUC to obtain the incentive. At Enbridge, on the other hand, the shareholder incentive provides a potential incentive which is large enough to act as a 'carrot'. Enbridge has proposed refinements to its incentive mechanism to reflect the evolution of its DSM portfolio.

The effectiveness of the incentive mechanism depends on more than just the size of the potential reward. The mechanism must also be appropriate to the program results that are being targeted. For example, while most DSM programs strive to achieve direct energy savings, market transformation programs seek to increase the market share of energy efficient technologies, indirectly achieving energy savings. Enbridge has separate incentives for market transformation programs, in recognition of this intrinsic difference.

Having an appropriate, effective shareholder incentive mechanism is a best practice since it helps to integrate DSM as a core business activity by putting DSM on the same level as other profit-generating activities within the company. It encourages cost-effective investment in DSM.

There are several possible limitations to the use of shareholder incentive mechanisms. In the case of regulated DSM, the incentive mechanism will have to be approved by the regulator. This can be a time consuming and expensive process. Stakeholder opposition to the use of shareholder

incentives may also be a limitation. Gaz Métro had a performance incentive for shareholders in 2003 and 2004, but it was recently taken away due to intervention by stakeholders. Another potential limitation is that when incentives are quite lucrative, there is likely to be increased involvement and scrutiny of stakeholders to ensure that the level of reward achieved is appropriate (e.g. greater emphasis on verification of energy savings).

BP4
Leading edge

Instil a corporate culture of innovation

The final best practice identified in the category of ‘DSM organization and management’ is having a corporate culture of innovation. It is a best practice since it encourages leadership and sustainability in DSM. For the purposes of this report, a corporate culture of innovation, with respect to DSM, includes:

- a commitment to research and development of new and alternative technologies
- development and implementation of new programs
- development and use of innovative strategies and mechanisms for improving DSM performance

Both Gaz Métro and Enbridge have a best practice in this category.

There is a need to invest in program development and technology research in order to keep identifying new opportunities for energy savings as market saturation is achieved from more mature programs or as energy efficiency standards transform marketplaces and eliminate the need for certain DSM programs. However, since R&D investments do not yield direct, immediate energy savings, companies may be dissuaded from investing significant amounts of the DSM budget in R&D as it may affect the overall cost-effectiveness of their DSM portfolio. This is not the case for Gaz Métro, however, where R&D into innovative technologies is funded through an Energy Efficiency Fund (EEF) that is separate from the ‘regular’ DSM budget. The research and feasibility studies funded through the EEF are not subject to the same cost-effectiveness tests as the equipment replacement and building retrofit programs.

There is also a need to develop and implement new programs. As DSM in the natural gas sector matures and markets are transformed, there will be less and less ‘low hanging fruit’. A program can be ‘new’ with respect to the type of participant it targets, the energy savings measure or

technology it promotes, the type of participant incentive that is offered or the manner in which the program is packaged and delivered. A successful pilot program can benefit not only the company that tests the pilot, but other utilities as well. For example, the EnerGuide for Houses program, which is promoted or delivered by several LDCs across Canada, was developed from a pilot program Enbridge delivered with the Green Communities Association. Enbridge was also the first company to develop a program for high efficiency furnaces with a variable speed motor.

4.3 Comments & recommendations

Organization and management of DSM is an important determinant of DSM success. Integration of DSM as a core business practice is key.

The leading edge best practices in DSM organization and management reflect the maturity of the DSM programs of these organizations and the ability of the regulatory environments to support them. It is anticipated that other natural gas utilities in Canada will adopt these leading edge best practices as their programs mature. Regulators need to be encouraged to continue to support and foster innovation in DSM organization and management in the utilities they regulate.

The CGA can play a role in supporting DSM innovation across Canada. Research and development into innovative technologies and the development and piloting of new programs can be resource intensive, potentially making it difficult for some of the smaller LDCs. There would be a benefit to having increased collaboration and information sharing among the Canadian natural gas companies with respect to R&D and program development. It would likely be more cost-effective and would avoid duplication of effort. The facilitation of such information sharing and collaboration is a potential role for the Canadian Gas Association.

5 Planning

DSM planning encompasses a range of activities and processes that may be necessary prior to launching an initiative or program, and may be expected to include:

- Market assessment
- Measure identification
- Stakeholder and partner negotiation
- Portfolio and program cost/benefit testing
- Detailed program design
- Marketing, sales and support activities
- Management approval

5.1 Industry overview

Given the imperatives of safety, reliability, and cost efficiency inherent in the delivery of natural gas, it should not come as a surprise that planning is seen as an important and necessary business process by Canadian gas LDCs. These utilities have well defined, sophisticated capabilities in this regard and have universally applied these skills in their DSM practice and programs.

The following common practices have been identified with respect to DSM planning:

- All of the LDCs included in this study engage in regular market research and have a quantified, documented understanding of their customer base and natural gas demand by sector and often, by sub-sector.
- Many of the LDCs have close relationships with certain market sectors; for example, through commercial sales departments (e.g. Terasen) and subject matter experts (e.g. Enbridge's steam boiler engineering capability).

- Most LDCs subject their proposed programs and program portfolios to industry-standard cost/benefit tests such as the Total Cost Resource (TRC) Test, and in some cases to the Societal Cost Test (SCT), Participant Cost Test (PCT), and Ratepayer Impact Measure (RIM) Test.
- All of the LDCs have well developed marketing campaign planning capability, either in-house or through an external agency or both.
- All LDCs, including those that are not regulated by an external regulatory agency, have a formal process for budget determination and program approval

In addition to these common practices, a number of trends and challenges in DSM planning have been identified.

Partnerships with non-utility entities are on the increase. Governments (e.g. Natural Resources Canada, the provincial governments of British Columbia and Nova Scotia), manufacturers (e.g. of water heaters, furnaces, boilers, fireplaces and infrared heaters), retailers (e.g. Home Depot working with Union and Terasen), financial institutions (e.g. the Toronto Dominion Bank finance plan offered through SaskEnergy) and equipment installers amongst others perceive value in working with utilities. The result is a proliferation of co-operative arrangements for financial support, marketing and delivery of DSM programs across the country. While this is generally viewed as very positive, the challenge for LDCs is in maintaining their direction and independence, while taking advantage of the opportunities for leverage through partnerships.

Maintaining or increasing program performance is also becoming more difficult over time. Enbridge advises that many of the easier, low cost opportunities for conservation and efficiency (i.e. the 'low hanging fruit') have been exhausted by the utility over the last ten years and that future DSM will be more costly on a unit basis. Union and Terasen note as well the negative impact of increasing free-ridership levels on program economics (reducing TRC net benefits) relative to when measures are first introduced. The challenge is to secure adequate resources to go beyond the harvesting of the 'low hanging fruit', into more difficult savings opportunities and to capture these opportunities in a practical and effective manner.

A challenge for DSM planning is that senior level support for DSM may not be in line with external aspirations for DSM (among certain governments and NGOs). Most LDCs (perhaps with the exception of Manitoba Hydro and Enbridge) do not have DSM as an explicit goal of senior management, listed on their performance scorecard.

5.2 Best practices

The study team has identified six best practices in planning. Two have been determined to be 'Industry Wide'; they have been observed in four or more LDCs; four are 'Leading Edge' and, hence, have not been adopted widely.

- BP5 Minimize planning uncertainty through multi-year approach
- BP6 Develop programs that minimize lost opportunities
- BP7 Design programs in collaboration with industry
- BP8 Assess market as part of program design
- BP9 Provide programs for 'hard to reach' customers
- BP10 Extend DSM efforts beyond natural gas conservation/efficiency

A detailed description of each best practice follows.

BP5 Industry wide	Minimize planning uncertainty through a multi-year approach
	<p>This 'Industry wide' best practice has become more common in recent years, but has not been adopted universally. Five of seven utilities are reporting a DSM planning horizon of three years or more. Manitoba Hydro has a 12yr plan (integrated with their electricity planning timeframe); Terasen has a 3 year plan (matching its Performance Based Regulation settlement timeframe); Union had a 5 year plan, and is now preparing a 3 year plan for 2006 - 2008; Enbridge is introducing a 3 year plan beginning 2006; and, Gaz Métro has a 3 year plan in place.</p> <p>A planning horizon of more than one year more closely matches the requirements of utility customers – for example, the time required for adoption of measures by industrial, large commercial and institutional customers can easily be 2 or more years. With longer term plans, LDCs wishing to offer multi-year incentive-based programs do not have to incorporate provisions to cancel programs on short notice, allowing for more certainty (and therefore of more interest) for prospective customers. Longer terms are also much more suitable for market transformation programs.</p>

Three year or longer planning periods provide utilities with a greater opportunity to do market research and program design before launching a particular program. An added advantage is that it often takes considerable time to design, pilot and roll-out a new program. A longer planning horizon allows for a smoother transition from pilot to roll-out. Some programs may have a useful life of several years – with a longer planning period and matching budget period, LDCs can continue to run such a program over an optimum time period to get economies of scale.

Longer planning timeframes can also allow a more strategic approach to planning and budgeting and allow for a portfolio of programs with differing durations. Certain costs such as those for R &D can be applied to programs over longer time periods. Similarly, administrative and personnel costs associated with planning may also be distributed over longer timeframes.

While, as outlined above, there are significant potential benefits for both the LDC and the customer, one limitation may be the potential to remove the time imperative ('act now before it's over') from a customer perspective if program availability is indefinite. Therefore even with a multi-year plan in place, LDCs may be well advised to incorporate some artificial time restrictions on certain programs.

Although not strictly speaking a limitation, multi-year planning and budgeting is most applicable to larger customer segment programming and to the development and launch of complex programs (multiple offers, partners, funding parties).

BP6 **Develop programs that minimize lost opportunities**
Industry wide

Although not in evidence in all jurisdictions, a number of LDCs have developed initiatives to address the new construction market to minimize lost opportunities for DSM. It is therefore considered an 'Industry wide' best practice.

New construction, while generally built to higher standards of efficiency than existing building stock, represents a long term lost opportunity if it is built to minimum current standard. For example, condensing gas furnaces are not required in any Canadian jurisdiction, yet are ideal in new construction: over the expected 20 year life of a mid efficiency unit (current minimum standard), a condensing furnace should yield between 10 and 15% energy savings.

LDCs that operate new construction DSM programs include: Union, Enbridge, Gaz Métro, and Terasen. Union's program is of note since it

includes a comprehensive set of measures. Since 2000, Union has offered its Build Comfort Program. This program offers homebuilders a set of incentives bundled in discrete packages from which the homebuilder can choose (i.e. a window package, a basement package and a mechanical systems package).

Some LDCs (Gaz Métro; Terasen Vancouver Island) have incorporated energy efficiency measures as a component of strategic load building in markets not traditionally served by natural gas. Areas served by Gaz Métro and Terasen Gas Vancouver Island are examples of service territories that have lower than average market penetration of gas in the residential market. These LDCs provide builders with a combined incentive that includes both a 'new load' incentive and high efficiency furnace or boiler incentive. Terasen Gas Vancouver Island currently offers \$1000 per home for participating new customers.

In general, programs that target new construction have lower unit energy savings potential than those that target retrofit applications, making them less interesting from a cost/benefit perspective. Yet new construction initiatives may offer the benefit of lower per unit acquisition costs (scale), ease of installation and administration.

Regulators and utility intervenors may perceive the application of utility DSM funds for the purpose of building 'efficient' new gas load to be controversial, particularly if fuel choice issues are involved (e.g. gas versus electricity). In the case of Vancouver Island, electricity supply is constrained which created a unique condition for the promotion of gas to a market that has traditionally been built with electric space and domestic hot water heat. In this instance the incentive offered to builders has been funded by Terasen Gas, BC Hydro and NRCan. Terasen is exploring other similar opportunities for collaboration with BC Hydro.

BP7
Leading edge

Programs are designed in collaboration with industry

This 'Leading Edge' practice is not widespread, but is worthy of consideration. In concept, industry partners (for example, heating contractors), participate with the LDC early in the program creation phase.

SaskEnergy's Industry Dialogue Table demonstrates this best practice. Many other LDCs consult with industry members on program design, though it is generally in a much less formal setting and often later in the design phase. SaskEnergy has formalized the process with quarterly

meetings to develop products and services. The residential Industry Dialogue Group consists of:

- 3 Mechanical Contractor Association representatives
- 3 Natural Gas Appliance & Equipment Dealer representatives
- 3 Independents
- 3 SaskEnergy representatives

Programs are approved by the Industry Dialogue Table prior to launch by the utility. SaskEnergy advises they are currently establishing a second such group to address commercial sector initiatives.

Historically the process of involvement with industry and other partners occurs at a later stage, often after the program concept is well advanced and some form of industry and partner involvement is seen by the LDC as positive for marketing or financial reasons.

Very early involvement at the development of the program concept might be expected to yield more buy-in and a more appropriate set of measures reflecting local market conditions and greater participation rate/savings achieved by program participants. In some jurisdictions that have experienced friction with industry associations, often as intervenors in regulatory proceedings, this dialogue table concept may also act to help defray industry criticism of LDC decisions concerning DSM.

Early involvement in the concept planning stage will invariably limit flexibility on the part of the LDC. This approach may also lengthen the planning cycle for new programs (in SaskEnergy's case, the group meets at least four times a year¹²), and potentially could become unwieldy if large numbers of programs covering multiple market sectors are planned.

BP8 Leading edge	Assess market as part of program design
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There appears to be a surprising lack of evidence of routine and detailed market assessment by LDCs before or during program design. Therefore, this best practice is considered 'Leading edge'.

¹² The Industry Table meets at a minimum 4 times per year. When working on new initiatives, the Table meets as often as necessary.

While all participating LDCs engage in market research in support of their utility activities, few include a market assessment during the process of program design. An exception is Gaz Métro which routinely completes both a formal market evaluation and a technical evaluation prior to the launch of any initiative and therefore demonstrates this best practice. The market evaluation is performed by the market research team within the marketing department and the technical evaluation by the research team within the engineering department.

A detailed market assessment would help determine applicability of the proposed measure(s) by sector, current measure costs and current market penetration, as well as prospective take-up.

Large scale programs are expensive to implement. Formal market assessments will help weed out programs having limited market interest and help 'tune' program designs (incentive levels, delivery methods, and advertising media).

The principal limitation is the extra cost that doing these market assessments routinely will entail. For example, customer focus groups for concept testing may cost several thousand dollars each, depending on the sector. With limited DSM budgets and an increasing focus on savings to be achieved, this additional effort may place a strain on the limited DSM resources available.

BP9
Leading edge

Provide programs for 'hard to reach' customers

DSM initiatives offered by LDCs may be prohibitively expensive or complex for certain customer groups, even though they may be excellent target markets in other respects. Included would be DSM programs for low-income, first-nation and other hard to reach consumers, such as those in remote communities. Few utilities are addressing these 'hard to reach' customers, making this a 'Leading edge' best practice. Gaz Métro has funded¹³ a low-income energy conservation program since 2003, demonstrating this best practice.

Gaz Métro's low income program provides incentives and financing mechanisms for social housing building envelope retrofits. The program

¹³This funding results from a portion of the Gaz Métro utility productivity savings that would otherwise have been returned to ratepayers. While management of these funds and the EEF is independent of Gaz Métro, utility DSM staff act in an advisory capacity.

covers two-thirds of the total cost of the retrofit, while the remaining third is paid through zero-interest on-bill financing. Co-op housing units within the Quebec housing authority and non-profit organizations that service low-income and homeless people are eligible for the program.

Also of note, Enbridge, in partnership with Toronto Hydro, introduced its low income initiative in 2005 comprising an educational outreach program, and direct installation of energy efficiency measures. Gas saving measures include programmable thermostats, faucet aerators, water-heater pipe-wrap and low-flow showerheads.

These types of initiatives demonstrate leadership and add an element of balance to the LDC's portfolio of programs. In concept, they would increase equity & accessibility of DSM programs by providing DSM programs for customers that may otherwise be unable to access conservation and efficiency measures.

Programs of this type might be expected to be expensive, with the utility or other sponsoring entities having to contribute a disproportionate amount of the measure cost. In the case of Gaz Métro, these costs have been addressed through a novel regulatory agreement to utilize a portion of the ratepayers' LDC productivity savings rather than to reduce rates. Such programs may be difficult and costly to administer (for example, qualifying applicants on the basis of financial need). Gas utilities, historically, in Canada¹⁴, have not considered 'hard to reach' customers a utility issue except from the point of view of providing gas service to new customers; this has been treated as a social issue.

BP10
Leading edge

DSM efforts extend beyond natural gas conservation/efficiency

The second 'leading edge' best practice in this category is the extension of DSM efforts beyond natural gas conservation and efficiency. This includes considering the *net* energy savings of a particular measure or program, not just natural gas savings. For example, when a natural gas furnace is upgraded, electricity use for the furnace fan can increase or decrease depending on the situation. This best practice also includes fuel switching programs which lead to a net energy use reduction.

Using an energy-based, rather than a fuel-based, approach to DSM is a best practice as it better reflects the total benefits and total costs of DSM

¹⁴ Low income programs have been offered in the US by natural gas and electric utilities for more than 10 years.

programs and encourages the adoption of measures that are most beneficial to society, from a total energy perspective. Natural gas LDCs are currently viewed as an authoritative source on natural gas energy efficiency. This could be extended to other resources (e.g. electricity, water).

Enbridge has the leading best practice in this regard. Enbridge includes the avoided costs of water and electricity, in addition to the avoided costs of natural gas, when calculating the cost effectiveness of a DSM program. This approach better reflects the total program benefits for the participant. Also of note, ATCO and Terasen track the electricity savings from their natural gas DSM programs, however these savings are not included in the cost effectiveness testing. Conversely, but using the same approach, Manitoba Hydro estimates natural gas savings from its general customer service programs within its electric DSM portfolio.

None of the LDCs interviewed for this study had DSM programs that were exclusively fuel switching programs in the years 2000-2004, however several utilities indicated that they see these programs as a significant opportunity and are pursuing them. In Ontario, residential fuel switching programs have not historically been included in natural gas LDC's DSM portfolios, however electric LDC DSM was introduced in 2004 and the Minister of Energy is encouraging fuel switching. Both Enbridge and Union have indicated, in their recent filings with the Ontario Energy Board, that they will pursue fuel switching initiatives where appropriate. Terasen also views fuel switching as a significant opportunity and has entered into discussions with BC Hydro.

Depending on the jurisdiction, there may be regulatory/policy restrictions or incentives related to encouraging fuel switching.

5.3 Comments & recommendations

Good planning is critical to successful DSM. While DSM planning has been one of the strengths within the industry, significant opportunities remain to achieve additional customer savings through new approaches to collaboration with industry, to composition of the DSM portfolio, and to understanding customer needs. Multi-year planning and budgeting of DSM increases the ability of LDCs to capture these significant opportunities.

The CGA could facilitate the sharing of information and best practices on DSM planning, among its members. Utilities should be encouraged by their regulators to cooperate with their electric utility counterparts on achieving net energy savings and efficient load building.

6 Program delivery

DSM delivery includes those processes and activities that are necessary to bring programs and initiatives to prospective participants, including:

- Marketing and sales: outreach, advertising, media relations, web communications, direct sales, sales through third parties.
- Fulfillment: provision of incentives to participating customers, delivery and installation of measures.
- Administration of programs: customer enquiry, processing of applications, quality control.
- Partnerships: management of partners involved in marketing, sales, fulfillment, administration and program financing.

6.1 Industry overview

Early DSM programs were usually based on the promotion of specific measures to specific customer sectors. While such programs are still present, there has been a gradual evolution toward more complex programs with multiple partners and funding agencies.

The following common practices and trends were identified:

- Natural gas LDCs are proficient at and comfortable with the delivery of their DSM programs to their customers. Program delivery is customer-focused and efficient.
- More third parties are expressing interest in assisting with gas utility conservation and efficiency programs. These include federal government departments, provincial governments, municipalities, equipment and appliance manufacturers, distributors and retailers, as well as (to a modest extent) certain electrical utilities.
- Natural gas DSM is not the exclusive domain of gas LDCs: the increased amounts of funds being made available by governments and non-government agencies to promote DSM are being pursued by non-utility entities with earnest. An example in British Columbia would be Homeworks Inc., now a unit of a

British-based social marketing organization that has sought and received government funding to offer DSM programs in the province (gas, electricity and water).

The following issues were identified:

- The proliferation of agencies and organizations offering energy efficiency advice and/or programs has the potential to be confusing for customers. It also provides competition for LDC budgets and government funding. For example, Alberta's Climate Change Central offers provincial and federally funded DSM programs throughout the province; Atco Gas efforts are limited to delivering programs that produce revenue, such as the Energuide for Houses program. Quebec has taken a different approach with the recent establishment of the Energy Efficiency Fund with revenues from Gaz Métro ratepayers. In Ontario the government has reaffirmed its commitment to DSM delivery by the LDC, both on the natural gas and electricity side.
- Increased interest in conservation and efficiency and an increase in DSM funding, generally, presents an opportunity for leveraging and partnership by Canadian Gas LDCs.
- The challenge will be to continue to carve out an appropriate delivery role for the LDC that leverages and enhances non-LDC DSM in a way that optimizes the benefits to customers.

6.2 *Best practices*

The study team has identified three best practices in delivery of DSM: two are categorized as 'Industry wide' and one as 'leading edge'

- BP11 Deliver programs in partnership with other agencies and stakeholders
- BP12 Position LDC as a provider of unbiased energy solutions
- BP13 Brand DSM

A detailed description of each best practice follows.

Canadian Gas LDCs without exception have embraced partnerships with enthusiasm. Therefore this is an ‘Industry wide’ best practice.

Partnerships have been formed with various entities and to varying degrees across the country. Agreements have been made to co-fund and co-market with government, equipment suppliers and service providers. There are numerous examples of this practice, such as EnerGuide for Houses; NRCan subsidized furnace and boiler upgrades; Commercial Building Incentive Program (CBIP) and NRCan Energy Retrofit Assistance (ERA) program, to name a few and as illustrated in the table below.

Table 8 Selected partnership examples

LDC	Partner	Program
Atco	Natural Resources Canada	EnerGuide for Houses
Enbridge	City of Toronto	‘Spray n Save’ (food services sector)
Gaz Métro	Certified heating contractors	ENERGY STAR® boilers (residential)
Manitoba Hydro	Manitoba Society of Seniors	W.I.S.E. (home energy checkups for seniors)
SaskEnergy	TD Bank	ENERGY STAR® furnace (low interest loans)
Terasen	BC Hydro	Variable speed motor (furnace incentive)
Union	Water heater manufacturers	Water heater procurement & setback

Partnering in program delivery is a best practice since it leverages utility capabilities, both financial (co-funding with governments and suppliers) and in increasing market reach (e.g. delivery of programs through trade channels: equipment specifiers, suppliers, retailers, installers and contractors).

Utilities should reasonably expect as a result of this partnering an improvement in cost performance, program quality and number of customer participants.

It is noted that to be effective partnering often requires identification of a champion in the prospective partner organization. As might be expected, adding one or more partners adds complexity in organization and communications and can result in longer lead times to develop and to implement programs.

In recent years Canadian gas LDCs have reverted to the provision of distribution services and have ceased or spun off competitive downstream activities such as appliance sales and rentals. Most, albeit slowly perhaps, have begun to reposition themselves as unbiased sources of energy solutions and advice. This has been deemed to be an 'industry wide' best practice.

Because of this best practice, natural gas distribution organizations are typically being seen by their customers as not having a bias toward specific conservation and efficiency solutions nor toward specific equipment suppliers or service providers. This is consistent with fact that many utilities are now moving from only offering 'prescriptive measures' programs to including programs that offer incentives based on savings, not on technologies (e.g. choose from a suite of options (EGH program); industry custom programs).

Distribution utilities are generally not perceived to be fuel neutral from a corporate perspective (except, perhaps, in the case of a combined utility). However, being a provider of unbiased natural gas energy solutions is a best practice because the perception of being neutral enhances the credibility of the measures and the offer presented to the customer by the utility.

This neutral positioning can produce positive perceptions of the service being offered to customers, will increase customer trust in the utility and uptake in the program. It also has the advantage of reducing the degree of 'sell' required. As well, it is consistent with DSM efforts that are screened and in some cases rewarded, based on the level of net societal benefits produced. Five of the seven LDCs participating in this study (Enbridge, Gaz Métro, Manitoba Hydro, Terasen and Union) screen programs based on SCT or TRC, and three (Terasen, Gaz Métro, Enbridge) have or had incentives based on the TRC.

Increasing partnerships, for example, with a limited number of equipment suppliers or service providers, may erode this perception of utility neutrality. The partnerships also present a market entry barrier to new contractors/equipment suppliers/ measures.

While there are several examples of individual program branding, there are relatively few Canadian 'umbrella' DSM brands in evidence except for two LDCs: Atco and Manitoba Hydro. As a result, these companies demonstrate a 'leading edge' best practice.

Atco organizes its programs under the brand 'EnergySense' and Manitoba Hydro is extending its 'Power Smart' brand to its natural gas program activities. 'Leveraging the Power Smart brand' is one of 11 key strategies in Manitoba Hydro's 2005-2017 Power Smart Plan. In the Plan, the company "recognizes that having an identifiable, trusted and positive brand image adds value to a product or service". Manitoba Hydro has seen the positive impact that branding has had on customer recognition of their electric DSM programs. As of March 2004¹⁵,

- 89% of all Manitoba Hydro customers are aware of the Manitoba Hydro Power Smart brand; and
- 79% of all Manitoba Hydro customers believe that Manitoba Hydro encourages or strongly encourages energy efficiency.

Manitoba Hydro's Plan indicates that they will build on the success of the Power Smart brand through its electric and natural gas DSM activities.

In concept, this practice presents DSM as a branded product which can be readily identified by customers and interpreted to mean conservation and efficiency. This is not to suggest that branding individual programs is inappropriate: if an umbrella brand cannot be created or promoted then most brand marketers would argue that a sub-brand is likely to be better than none.

An appropriate brand can help crystallize customer perceptions of conservation and efficiency offered by the LDC. A brand is often defined as a promise, and in this instance, should convey the nature of that promise to its customers.

A brand can increase the effectiveness of the marketing message and proposition to the customer. It can add 'instant credibility' to new programs as there is immediate recognition that it is related to the other

¹⁵ Manitoba Hydro 2005-17 PowerSmart Plan.

programs. Branding can help cut through market clutter of energy efficiency programs and set these programs apart from others.

A brand name has customer recognition value. Therefore it has value as a marketing tool and for delivering a positive public message– for customers that have participated in DSM programs in the past and those considering participation in future. Recognition also sends a positive message to external and internal stakeholders that the company is actively pursuing DSM.

The biggest drawback is the cost of developing and communicating the brand. It also needs to be complementary to the utility's overall branding.

6.3 Comments & recommendations

Canadian natural gas LDCs are experienced and effective deliverers of DSM programs. Program delivery is the only DSM activity directly seen by customers and prospective participants. The method of program delivery, how it is positioned and how it is branded helps determine the success of programs.

Currently, LDCs approach the issue of partnerships on an independent basis, even though many of their potential partners are national in scope (e.g. retailers, appliance manufacturers). There is an opportunity for development of collaborative approaches to establish these types of partnerships. The CGA DSM taskforce could potentially act as a catalyst for this purpose.

7 Monitoring, evaluation and reporting

This chapter includes a discussion of the current industry practices and the best practices in the monitoring, verification and reporting of DSM programs and activities. Monitoring refers to the tracking of program results (e.g. energy savings, number of participants) while verification refers to the processes used to confirm that the monitored and calculated results are accurate. Reporting includes internal, regulatory and public reports on DSM program results.

7.1 Industry overview

All of companies reviewed in this study have established systems in place for monitoring and evaluating the success of their DSM programs. The level of detail included in these monitoring and evaluation systems varies among the LDCs. There tends to be more focus on monitoring and evaluation in private companies with regulated DSM, as they are required to screen and evaluate programs using tests such as the Total Resource Cost test and are generally required to report the results of evaluations to the provincial regulator.

The components of these cost-benefit tests include variables where the value is determined based on direct monitoring (e.g. number of participants or number of measures installed) as well as variables where the assumed value is determined. Typical 'input assumptions' include measure cost, energy savings per measure (generally based on engineering estimates), measure life, and free-ridership.

Not all LDCs use the same input assumptions for the same types of programs, which makes comparisons of program success difficult. For example, SaskEnergy assumes a free-ridership of 0% for its ENERGY STAR® Loan program for high efficiency furnaces, while Union assumes a free-ridership of 60% for its high efficiency furnace replacement programs¹⁶. Four companies provided data in their RFIs on the number of participants and total annual energy savings from high efficiency furnace replacement programs in 2004. Based on this data, the energy savings per participant for these programs ranged from 160 m³ per year to just over 1000 m³ per year.

¹⁶ 2003 M&E Report, Appendix C.

While some variation of input assumptions is expected among companies due to differences between jurisdictions (market share of technology, housing stock, annual heating days, etc.), assumptions of free riders, free drivers, and the net efficiency gain - of the new versus old appliance - might be expected to account for much of the difference.

LDCs that have a performance incentive mechanism tend to face greater scrutiny from stakeholders regarding the methodology and input assumptions used to determine energy savings.

Reporting practices also vary among the companies. This is primarily a reflection of the fact that they are operating in different regulatory environments. Gaz Métro, Enbridge, Terasen and Union all report annually to their provincial regulators on DSM activities. All four companies report on program results – planned versus actual – as well as program expenditures. Total program benefits (TRC test), incentives earned and program evaluations are reported by most of the companies.

7.2 Best practices

The best practices identified with respect to monitoring, evaluation and reporting are:

- BP14 Ensure there is an effective feedback loop between monitoring & verification and program design
- BP15 Develop a formal methodology for verifying energy savings
- BP16 Create a concise annual report on DSM activities and results that is available and easily accessible to the public

A detailed description of each best practice follows.

BP14 Industry wide Ensure there is an effective feedback loop between monitoring & evaluation and program design

Using monitoring and evaluation as an effective feedback mechanism for program design is a common best practice within the industry. Characteristics and examples of an effective feedback loop between monitoring and evaluation and program design include:

- The monitoring & evaluation strategy is developed as part of program design, rather than mid-way or at the end of program

implementation. Manitoba Hydro is currently developing program designs for its new natural gas DSM programs. An evaluation plan is developed for each program as part of the design process.

- Feedback is sought from industry/channel partners on an ongoing basis to improve program design/delivery. This is common practice among the LDCs.
- There is frequent monitoring of program uptake and success throughout the implementation period, so that mid-course modifications can be made if necessary. Enbridge, for example, reviews program results and feedback monthly.
- Program designs are modified based on feedback. This is also common practice among the LDCs. For example, Gaz Métro discontinued delivering its energy efficiency kits program after monitoring revealed that the market for low-flow showerheads had been transformed.

This type of feedback loop is a best practice since it provides a mechanism for continual improvement of program design/delivery which will lead to improved results (e.g. energy savings achieved, cost efficiencies). It provides valuable information on how a program is performing and how it can be improved.

Developing a monitoring and verification plan during the program design phase is critical as it ensures that the success of the program can be effectively measured. Frequently monitoring and assessing the progress of programs is also a best practice as it allows for mid-course changes to the programs if needed.

BP15 **Develop a formal methodology for verifying energy savings**
Industry wide

Another industry wide best practice identified in this study was the use of a formal methodology for verifying energy savings. Having a formal methodology for estimating energy savings and program benefits is a best practice since it increases the validity of the estimated program results and makes for easier comparisons among companies and between programs.

The majority of LDCs surveyed estimate energy savings using engineering estimates for each measure. These estimates are normally based on an understanding of pre-existent conditions prior to the adoption of the

measure together with an understanding of the likely impact of the measure. In the case where the measure is a more efficient appliance, such as a furnace or a boiler, an estimate of the efficiency level of the unit being replaced along with nameplate or tested efficiency of the new unit yields (in the absence of any other factors) is taken as a reasonable approximation of the efficiency gain to be expected. In other cases, where, for example, appliances are not changed, but rather there is a measure added such as new controls or methods of heat recovery, DSM practitioners estimate the impact of the addition based on engineering calculations (of heat transfer) and industry experience. Program energy savings impacts are then calculated based on the number of participants, free rider-ship, free drivers and other factors.

Program costs and benefits are calculated using standardized protocols. The California standard tests are commonly used by Canadian gas LDCs¹⁷.

The verification approach depends on the particular DSM program. The number of participants and the number and type of measures installed or adopted are readily verified through a numerical count (e.g. number of coupons rebated) or, in some mass market programs, through customer surveys (e.g. education and awareness campaign).

Some LDCs (e.g. Terasen) have attempted to utilize actual customer meter throughput data (often called 'billing analysis') to verify savings impacts. In concept, gas usage after the installation of a measure is compared to usage before the installation or through comparison to a control group. In cases where the measure might be expected to yield significant savings (such as in an industrial application) it might warrant the installation of a sub-meter at the point where the measure is to be located and then gas throughput would be recorded prior to and after the installation of the measure. Unfortunately such sub-metering is costly and potentially disruptive (in the case of an industrial process application) and therefore is not used extensively.

Billing analysis, on the other hand, has the potential for wide application. Its usefulness depends on the sample sizes (to minimize extraneous effects) and the percentage change anticipated – relatively small impacts, from water saver measures in the residential sector, for example, are inherently difficult to measure. Terasen has had success measuring the savings associated with more significant measures, such as residential furnace and boiler replacements using this method.

¹⁷ The approach and the input assumptions for calculating the standard tests may differ among utilities and across jurisdictions.

BP16 **Create a concise annual report on DSM activities and results that is available and easily accessible to the public**
Leading edge

This best practice refers to a report which describes the LDC's annual DSM activities, includes the results achieved in each program, and provides a forward view (planned or recommended programs). Such an annual report is intended to supplement, but not necessarily replace, the variety of detailed reports that may be required to support internal management requirements, regulatory filings for new programs, or to answer specific concerns expressed by intervenors or others. Rather, the purpose of the report is to act as an executive summary of the LDC's DSM portfolio, its programs, and results. The report is publicly available and easily accessible. This leading edge best practice is demonstrated by Terasen.

Terasen's annual fall review report submitted to the BCUC and intervenors provides a clear, easy to read summary of its annual DSM results (DSM is one part of the fall review report). It is available on the BCUC website as well as on Terasen's website.

A concise, easy to read annual report on DSM can be used to promote an LDC's DSM programs both internally and externally to the company. It can increase employee, shareholder, regulator, intervenor and customer buy-in for DSM activities. It can also be a useful tool for developing partnerships with private companies, government agencies and other utilities.

The annual report provides a multi-purpose 'snapshot' that is easily and quickly read. Once a format is established it can be easily published annually. The report provides intervenors and other interested parties with pertinent information to answer most common questions: what is the utility doing in DSM, how is it performing, what it is costing, and where the utility is headed. It identifies past performance, issues and future prospects, sufficient for many intended audiences. For those that require more detail, the report acts as a summary.

The principal limitation of this type of report is its brevity. Important detail may be sacrificed, meaning that some audiences may seek additional information.

7.3 Comments & recommendations

Monitoring and evaluating the results of DSM is essential to the continual improvement of these programs. DSM reporting has uses beyond

regulatory compliance, including stakeholder buy-in and stimulating internal management support for DSM.

While the cost-benefit tests used by various LDCs may be similar, the input assumptions often differ, making it hard to compare program results, as illustrated above with respect to the furnace replacement programs. The values used for input assumptions can also be a very contentious issue with stakeholders, particularly where there is a utility incentive.

There is value in having a consistent industry wide approach for determining the value of input assumptions to cost-benefit tests. The CGA DSM task group may be able to facilitate the development of this approach.

8 Conclusions

The objective of this study has been to review the practice of Demand Side Management by Canadian natural gas local distribution utilities, and to identify those practices that are 'best in class'- practices that best exemplify the strategies and tactics incorporated into successful DSM organizations and programs. The findings clearly indicate that the participating LDCs in this study are progressive, responsive and effective proponents of conservation and efficiency. In the five years leading up to 2004 these LDCs have researched, planned, delivered and measured the impact of programs and initiatives and invested in excess of \$119 million during that period, effecting a combined 705 million m³ (27 million GJ) of first-year annual customer natural gas savings.

As interest in energy conservation continues to escalate in Canada it is imperative that LDCs share their extensive knowledge, experience and techniques. This will serve to increase the capability of the energy industry as a whole and ensure that more recent entrants as well as seasoned practitioners benefit from an understanding of what works best in DSM.

The best practices that have been identified in this study include those that have been adopted by the majority of gas LDCs (termed 'industry wide') and those that are less in evidence (termed 'leading edge'). No order of importance or priority has been assigned to these best practices and not every practice listed may be appropriate for every LDC.

In each section of the report a number of conclusions and recommendations have been drawn. Generally there is an underlying theme that LDCs together with the CGA and other key stakeholders should continue to collaborate on DSM issues and opportunities.

8.1 *Organization and management*

Organization and management of DSM is an important determinant of DSM success. Integration of DSM as a core business practice is key. Five best practices in DSM organization and management were identified:

- BP1 Integrate DSM throughout the company as a part of routine business practice (leading edge)

- BP2 Create a defined process for external stakeholder involvement in DSM outside of the formal regulatory process (leading edge)
- BP 3 Develop appropriate, effective shareholder performance incentives to motivate DSM excellence (leading edge)
- BP4 Instil a corporate culture of innovation (leading edge)

The leading edge best practices in DSM organization and management reflect the maturity of the DSM programs of these organizations and the ability of the regulatory environments to support them. It is anticipated that other natural gas utilities in Canada will adopt these leading edge best practices as their programs mature. Regulators need to be encouraged to continue to support and foster innovation in DSM organization and management in the utilities they regulate.

The CGA can play a role in supporting DSM innovation across Canada. Research and development into innovative technologies and the development and piloting of new programs can be resource intensive, potentially making it difficult for some of the smaller LDCs. There would be a benefit to having increased collaboration and information sharing among the Canadian natural gas companies with respect to R&D and program development. It would likely be more cost-effective and would avoid duplication of effort. The facilitation of such information sharing and collaboration is a potential role for the Canadian Gas Association.

8.2 Planning

Good planning is critical to successful DSM. The study team has identified five best practices in planning.

- BP5 Minimize planning uncertainty through multi-year approach (industry wide)
- BP6 Develop programs that minimize lost opportunities (industry wide)
- BP7 Design programs in collaboration with industry (leading edge)
- BP8 Assess market as part of program design (leading edge)
- BP9 Provide programs for 'hard to reach' customers (leading edge)

- BP10 Extend DSM efforts beyond natural gas conservation/efficiency (leading edge)

While DSM planning has been one of the strengths within the industry, significant opportunities remain to achieve additional customer savings through new approaches to collaboration with industry, to composition of the DSM portfolio, and to understanding customer needs. Multi-year planning and budgeting of DSM increases the ability of LDCs to capture these significant opportunities.

The CGA could facilitate the sharing of information and best practices on DSM planning, among its members. Utilities should be encouraged by their regulators to cooperate with their electric utility counterparts on achieving net energy savings and efficient load building.

8.3 Program delivery

Canadian natural gas LDCs are experienced and effective deliverers of DSM programs. Program delivery is the only DSM activity directly seen by customers and prospective participants. The method of program delivery, how it is positioned and how it is branded helps determine the success of programs. Three existing best practices in program delivery were identified in this study.

- BP11 Deliver programs in partnership with other agencies and stakeholders (industry wide)
- BP12 Position LDC as a provider of unbiased energy solutions (industry wide)
- BP13 Brand DSM (leading edge)

Currently, LDCs approach the issue of partnerships on an independent basis, even though many of their potential partners are national in scope (e.g. retailers, appliance manufacturers). There is an opportunity for development of collaborative approaches to establish these types of partnerships. The CGA DSM taskforce could potentially act as a catalyst for this purpose.

8.4 Monitoring, evaluation and reporting

Monitoring and evaluating the results of DSM is essential to the continual improvement of these programs. DSM reporting has uses beyond regulatory compliance, including stakeholder buy-in and stimulating

internal management support for DSM. The best practices identified with respect to monitoring, evaluation and reporting are:

- BP14 Ensure there is an effective feedback loop between monitoring & verification and program design (industry wide)
- BP15 Develop a formal methodology for verifying energy savings (industry wide)
- BP16 Create a concise annual report on DSM activities and results that is available and easily accessible to the public (leading edge)

While the cost-benefit tests used by various LDCs may be similar, the input assumptions often differ, making it hard to compare program results, as illustrated above with respect to the furnace replacement programs. The values used for input assumptions can also be a very contentious issue with stakeholders, particularly where there is an incentive.

There is value in having a consistent industry wide approach for determining the value of input assumptions to cost-benefit tests. The CGA DSM task group may be able to facilitate the development of this approach.



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