PROVINCE OF QUÉBEC

BEFORE THE RÉGIE DE L'ÉNERGIE

Gaz Métro Cost Allocation and Rate Structure; Marginal Operating Costs for Determining Line Extension Profitability	**)**	**R-3867-2013 Ph 3A**

DIRECT EXPERT TESTIMONY OF

PAUL CHERNICK

ON BEHALF OF

REGROUPEMENT DES ORGANISMES ENVIRONNEMENTAUX EN ÉNERGIE

(ROEÉ)

Resource Insight, Inc.

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I. Identification

Q: Mr. Chernick, please state your name, occupation, and business address.

A: I am Paul L. Chernick. I am the president of Resource Insight, Inc., 5 Water St, Arlington, Massachusetts.

Q: Summarize your professional education and experience.

A: I received an SB degree from the Massachusetts Institute of Technology in June 1974 from the Civil Engineering Department, and an SM degree from the Massachusetts Institute of Technology in February 1978 in technology and policy.

For more than 37 years, I have been engaged in the analysis of energy-utility planning and ratemaking. I was a utility analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in gas- and electric-utility regulation and planning, first as a research associate at Analysis and Inference, and after 1986 in my current position at Resource Insight (which was known as PLC, Inc., until 1990). In these capacities, I have advised a variety of clients on utility matters, including government-sponsored and non-profit consumer advocates, regulatory agencies, environmental organizations, energy-efficiency advocates, power-plant developers, large energy consumers, and utilities.

My work has considered a wide range of topics in the planning and regulation of electric and gas utilities, including load forecasting, system planning, design and evaluation of energy-efficiency programs, embedded and marginal costs, allocation of costs of service between rate classes and

jurisdictions, estimation and valuation of environmental costs of utility policies, and design of retail and wholesale rates, among other topics. My professional qualifications are further detailed in my resume, already filed as Document C-ROEÉ-0067.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified as an expert witness more than 275 times on utility issues before various regulatory, legislative, and judicial bodies, including utility regulators in six Canadian provinces (Québec, Nova Scotia, Ontario, Manitoba, British Columbia, and Alberta), thirty-five states, and two U.S. Federal agencies.

Q: Have you previously testified as an expert witness before the Régie?

A: Yes. I testified as an expert witness in phase 1 of the present matter at the Régie de l'énergie, R-3867-2013.

Q: Have you testified previously regarding marginal utility costs?

A: Yes. I have provided expert testimony on marginal costs and cost causation in numerous proceedings, as listed in my resume.

II. Introduction and Summary

Q: On whose behalf are you testifying?

A: I have been engaged by the Regroupement des organismes environnementaux en énergie (ROEÉ), to provide my independent expert testimony and opinion. I understand that my expert evidence will also be referred to by Union des consommateurs (UC) for the purposes of the preparation of its intervention evidence.

Q: What is the purpose of your testimony?

A: The purpose of this testimony is to assist the Régie de l'énergie in assessing and understanding the issues addressed in this sub-phase of this hearing: the identification of Gaz Métro's operating costs of serving additional customers, to be used in determining the profitability of line extensions and the contributions in aid of construction required to protect existing customers. Specifically, I deal with the following categories of operating costs:

- Continuing operating and maintenance (O&M) costs related to the number of customers added.
- Operating costs (or revenue offsets) related to the load or revenue of the customers added.
- One-time operating costs related to adding customers.
- Operating and maintenance costs for the line extension.

I also note that capital costs will need to be included in the profitability analysis.

Q: Have you authored any other documents in this proceeding?

A: I contributed to the experts' joint report, which I understand will be filed by Dr. H. Edwin Overcast, Gaz Métro's expert witness from Black and Veatch (B&V). That report summarizes the areas of agreement among the four experts: William B. Marcus on behalf of the OC, Richard Baudino on behalf of the FCEI, Dr. Overcast and me.

The bulk of the differences among the experts concerns costs that Dr. Overcast has proposed setting to zero and that the other experts believe that the cost estimates should be based on Gaz Métro's original proposal. Each of the three intervenor experts has raised additional issues, to expand or clarify Gaz Métro's analysis.

Q: Why should the Régie be concerned with the accuracy of the cost inputs and methodology of the profitability analysis for line extensions?

A: Appropriate computation of line-extension profitability is essential for rational choices determining when gas utilities should expand their systems, and who should pay for that expansion. Line extensions can be very expensive. An extension project that does not produce enough revenue to cover its costs (plus the other costs of serving additional customers and additional load) will burden existing ratepayers with excessive costs. On the other hand, if Gaz Métro fails to extend the system and pick up load that would more than pay for the incremental costs, existing customers (and the potential customers who are not served) will miss an opportunity to reduce their bills. Reasonable inputs and methodologies will reduce the probability of both types of errors and benefit Gaz Métro customers and the Québec economy.

In addition to the economic and consumer implications of improperly analysing the costs of line extensions, there are other public interest, environmental and sustainability implications. Inadequate analysis of line extensions may distort the investment decisions of the utility and customers.

Failing to invest in cost-effective line extensions may leave some end users dependent on oil (or perhaps even coal), which is generally more polluting than natural gas, and discourage investment in efficient combined heat and power. On the other hand, excessive extension of the system would result in large sunk costs for Gaz Métro, making an eventual transition from fossil fuels to renewable energy (from biomass, solar thermal, or through electricity from hydro, wind, and other renewables) more financially painful and potentially slowing that process. My understanding is that ROEÉ's interest in line extensions stems from its support for regulatory policy that

fully accounts for public-interest, sustainability and environmental considerations, on an equal footing with economic issues.

Q: Please summarize your concerns about Gaz Métro's filings in this subject A sub-phase of the proceeding.

A: My concerns relate primarily to the following issues:

- The derivations of some of Gaz Métro's cost estimates are incomplete and unreviewable.
- Gaz Métro excludes some categories of costs.
- Gaz Métro treats some costs that are related to volume or revenue as customer-related, overstating the cost of adding small customer and understating the costs of adding large customers.
- Gaz Métro proposes a range of costs for meter maintenance, from zero to a typical value, without explaining why some projects would not require maintenance of the meters, or how Gaz Métro would determine the cost for each project.
- The B&V filing proposes to inappropriately set some of Gaz Métro's cost estimates to zero, and to change some Gaz Métro point estimates to a range from zero to the Gaz Métro estimate. Again, B&V does not explain how these ranges would be used.

Many of these errors and omissions would understate the costs of line extension projects and encourage unprofitable expansion, while other problems may under- or over-state profitability, depending on the situation.

Q: On which documents have you relied in developing this evidence?

A: My primary sources were the following Gaz Métro filings in this proceeding:

- B-0144, Gaz Métro-6, document 1, "Study of the marginal costs of long-term service delivery applied to the profitability analysis," 4 October 2016, translated in C-FCEI-0057.
- B-0145, Gaz Métro-6, document 2, "Marginal costs of long term service delivery," H. Edwin Overcast, Black & Veatch, 22 September 2016, which I will refer to as the "B&V Report."
- B-0196, Gaz Métro-8, Document 1, responses to the Régie's questions, translated in C-FCEI-0068;
- B-0207, Gaz Métro-8, Document 2, responses to the ACIG questions, translated in C-FCEI-0077;
- B-0209, Gaz Métro-8, Document 3, responses to the FCEI questions, translated in C-FCEI-0078;
- B-0210, Gaz Métro-8, Document 4, responses to the expert Richard Baudino questions, translated in C-FCEI-0074;
- B-0211, Gaz-Métro-8, Document 5, responses to the OC questions, translated in C-FCEI-0079;
- B-0212, Gaz Métro-8, Document 6, responses to the ROEE questions, translated in C-FCEI-0080;
- B-0213, Gaz Métro-8, Document 7, initial responses to my questions, translated in C-FCEI-0081;
- B-0220, Gaz Métro-7, Document 2, "Methodology for evaluating the profitability of system extension projects, additional evidence," response to Decision D-2017-009 (16 February 2017), translated in C-FCEI-0089.
- B-0225, Gaz Métro-3, Document 7, supplemental responses to my questions.

- B-0226, Gaz Métro-8, Document 9, supplemental responses to the Régie's questions.
- B-0227, a spreadsheet containing some data and computations supporting the values in Tables 2–4 in the B&V Report.

III. Purpose of the Incremental O&M Estimates

Q: How do you anticipate that the incremental or marginal O&M cost estimates in this proceeding will be used?

A: I understand that the O&M cost estimates developed in this phase will be used in analyses of the profitability of providing service to additional customers, particularly through extensions of mains and other lines. I anticipate that the profitability analyses will compute the present value of all revenues (connection fees, fixed monthly customer charges, volumetric charges) and subtract the present value of all costs (e.g., depreciation and return on capital investment; taxes on investment; initial, recurrent and periodic O&M) If the difference is negative, the line extension is not profitable for existing customers, unless the new customers are willing to make contributions in aid of construction equal to the difference.

Q: Does this phase include all the inputs to the profitability analysis?

A: No. Important details of this computation (e.g., the process for computing upstream costs, the discount rate, the analysis period, the working capital rate, turnover and vacancy rates) will be developed in Phase 3B of this docket. The input values will be subject to adjustment over time, as new data become available. The cost of the specific line extension (the mains, connections, and meters) must be computed for each project.

Q: What is an appropriate analytical framework for the analysis of incremental O&M?

A: The objective is to identify a reasonable expected value for the costs that will be incurred over the analysis period. Short-run marginal costs, which assume no changes in investment or other conditions, are not relevant to these long-term analyses.[1]

Q: What is the role of a range of values in the O&M estimates?

A: Gaz Métro provides a range of estimates, from zero to the average or expected cost of the service, for several cost categories (processing CRP applications, customer retention, various meter maintenance costs). The B&V Report (B-0145) proposes to zero out the low end of the cost of dealing with customer calls on the specious grounds that "not all customers make calls to the utility" (p. 8). The high end of the range is the average cost per customer, which thus reflects the reality that some customers never call to the utility, some call frequently, and most customers fall in between. There is no way to know whether a newly connected customer (or the subsequent customers in the building) will be a rate caller or a frequent caller.

These ranges add nothing to the analysis of profitability, for two reasons. First, the values presented as the high end are not high-end estimates: they are averages, reflecting high-cost and low-cost situations. Gaz Métro is proposing ranges from zero to average, rather than just using the average.

[1] The relevant costs may not be long-run costs in the strict economic sense of the marginal costs when *all* inputs are variable; that would require a time scale in which all of Gaz Métro's pipes are replaced, its office space optimized, its distribution service centers relocated, and so on.

Second, Gaz Métro has not explained how it would use these ranges. Where Gaz Métro has distinguished the costs of serving different types of customers (as for meter maintenance), those values can be used in the profitability analysis, by multiplying the cost for each type of meter by the number of those meters to be added.[2] It is not clear how Gaz Métro would know, as it is proposing to extend a line, whether the eventual new customers would use the call center, apply for a CRP grant, or require customer retention services in the future.

The Régie should simply adopt a policy of using the best estimate of average costs for each activity, disaggregated to the extent relevant and feasible. The estimates presented by Gaz Métro may be refined or restated in Phase 3B, in rate proceedings, or in applications for approval of specific extensions.

IV. Continuing Customer O&M

Q: What categories of continuing customer O&M has Gaz Métro identified?

A: Gaz Métro has identified the following eleven categories of continuing customer O&M. I have included the line numbers from Tables 2 through 4 of the B&V Report (B-0145, pp. 9–11), for each cost category.

2: Mailing bills

4: Meter reading

7: Payment processing

[2] The same would be true if Gaz Métro had separate estimates for the services required to serve single- and multi-family buildings, read meters in urban and rural areas, and the like.

8: Customer calls (residential and CII)

9: Bad debt

10: Collection and recovery

11&12: Customer retention costs

13: Preventive service line maintenance

14: Corrective service line maintenance

20–24: Meters inspection and maintenance

25: Meter telemetry cellular line

Gaz Métro divides customer retention costs between the commercial-industrial-institutional (CII) market and the major industries (VGE), and also divides meter maintenance costs among types of tests and meters. Not all of these costs are applicable to all classes of customers. For example, Gaz Métro incurs no credit checks, retention costs, or telemetry for residential customers.

Q: Has Gaz Métro documented its estimates of these costs per customer-year?

A: To some extent. Gaz Métro provided computations partially supporting most of the estimates in Filing B-0227. There are numerous documentation problems in these analyses, such as:

Mailing bills: Gaz Métro asserts that the cost is 83¢/bill for "Imprimée" and 41¢/bill for "Postel" billing, but does not provide the development of these estimates.[3]

Customer calls: Gaz Métro provides no supporting documentation for the estimate of $12.84/customer-month, other than the statement

[3] The Imprimée value is the same as the computation of the cost of sending a confirmation letter, which may be coincidental.

that it is an "Average cost mainly composed of salaries and benefits based on an internal study conducted by the Customer Information Team."

Payment processing: Gaz Métro provides annual costs per customer for the residential, CII and VGE markets, but provides no backup for any of those values, stating simply that the values are "Average costs based on the number of historical transactions per market and costs per transaction under contract with suppliers, based on information obtained from discussions with accounts receivable managers."

In many cases, Gaz Métro will need to provide clearer and more comprehensive documentation for these estimates, either in Phase 3B, in applications for approval of line extensions, or in subsequent rate proceedings.

Q: Has Gaz Métro properly developed annual costs for these customer-related costs?

A: In most cases for which Gaz Métro provided documentation, total costs appear to be reasonably converted into costs per customer-year. For a couple categories, Gaz Métro computes costs by estimating the amount and cost of labour for the activity. In several categories, Gaz Métro breaks costs down by the type of customer, meter, billing method, etc. Nonetheless, there are categories for which Gaz Métro provides average values where disaggregated values may be more appropriate. The cases that I have identified are as follows:

Meter readings: Gaz Métro provides total costs for *cyclique* and *grand debit* meter readings, but computes an average cost for

all readings. Gaz Métro's documentation does not define the *grand debit* (or high flow) meters, but it is likely that these are used for VGE or some very large CII customers. Meter-reading costs should be computed separately by type of meter or customer class.[4]

Customer calls: Gaz Métro assumes that the average residential customer puts the same burdens on customer service as the average CII customer. This seems unlikely, especially for large CII customers and interruptible customers, who are likely to have more interactions and more complex interactions with Gaz Métro, regarding choices of rates, load-factor computation, subscribed volume, and other rate complications.

Connection maintenance: The large CII and VGE customers are likely to have longer connections, for which inspection and leak detection would be more expensive. Their larger connections may also be more expensive to repair when corrective maintenance is required.

Gaz Métro should disaggregate these cost categories by type of customer or explain why the uniform value is appropriate.

Q: Should these O&M costs be treated as constant over time?

[4] Gaz Métro includes the meter readers' salaries and benefits as well as a clothing cost, but does not include any transportation costs. Gaz Métro probably provides a vehicle or reimburses the meter readers for use of their own vehicles, at least outside the urban centers. If so, that cost should be added to the meter-reading cost.

A: No. Many operating costs will tend to rise with inflation or wage rates. Some operating costs may be reasonably forecast to decline due to technological progress. For example, at some point the cost of remote metering may fall to a level at which Gaz Métro and the Régie find that the costs of that system is less expensive than the current metering-reading system, and Gaz Métro commits to installing remotely-read meters. The capital cost of metering would then increase (for the costs of the new meters and the communications equipment), while the meter-reading expense would decline. If and when Gaz Métro can reasonably anticipate this transition, it should start incorporating those costs (including conventional metering for some years, followed by increased capital and lower operating costs) in its line-extension analyses.

In addition, some costs will start as soon as the customer is connected to the system, while others may not start immediately.

Q: Which continuing expenses would start immediately with addition of new customers?

A: The following line items (from B-0145, pp. 9–11) clearly start as soon as the customer starts receiving gas:

2: Mailing bills

4: Meter reading

7: Payment processing

8: Customer calls (residential and CII)

25: Meter telemetry cellular line

Indeed, new customers may have more questions about their usage, bills and other issues than established customers.

Q: Which continuing expenses potentially start later than the customer's initial connection?

A: There are two categories of expenses that are may be lower or non-existent in the first few years of a customer's service from Gaz Métro: customer distress and maintenance. If that is the case, the profitability analysis should start these costs in some later year, but not ignore them. The result would be that the line extension would appear more profitable than if the cost were incurred from year one, but less profitable than if the costs were ignored altogether.

Q: What costs are related to customer distress, and why would those costs be delayed?

A: The costs of bad debt, collection and recovery primarily result from financial stress on customers. Heavily stressed consumers are unlikely to be able to finance their share of the costs of conversion to natural gas. Over time, some percentage of households and businesses will experience difficulties and impose costs on Gaz Métro and other customers. In addition, some percentage of customers may eventually relocate without paying their bills.

Q: What delay would you propose using for these cost categories?

A: Since Gaz Métro has not provided any relevant information, I do not have a firm recommendation. Until Gaz Métro can provide data on the interval between addition of new connections and the incurrence of costs for bad debt, collection and recovery, I recommend that these costs be included starting in the second year of Gaz Métro's service to the customer.

Q: What costs are related to maintenance, and why might those costs be delayed?

A: Gaz Métro identified costs for preventive and corrective maintenance of service connections, and for the inspection and maintenance of meters. Those activities generally occur on a regular schedule, which may be less than annual and start some years after the equipment is installed. If those

conditions apply, the costs should be included in the profitability analysis starting in the year in which they would first occur.

If Gaz Métro's practice is to maintain a class of equipment every third year, starting three years after installation, the cost should be included in years three, six, nine and so on, at three times the average annual expenditure.[5]

Even that assumption may be optimistic for the maintenance of the service connections, depending on Gaz Métro's practice. If Gaz Métro conducts a post-construction inspection shortly after gas starts flowing to a new customer, the maintenance might well begin in the first year.

Q: Are some of the O&M costs lumpy, rather than continuous with the number of customers added?

A: Yes, to some extent. For example, the B&V Report argues as follows:

> Call center costs such as billing inquiries or leak reports are only costs at the margin when an additional call from a customer would require additional call center resources such as a customer service representative or additional work stations. Thus, cost at the margin for new customers is zero until all of the call center capacity is used up. (B-0145, p. 2)

> Meter reading falls into the category of costs that only increase marginally in a stepwise manner. No single customer addition is likely to increase the costs of meter reading. (Ibid, p. 7)

Based on this analysis, B&V proposes that marginal cost of meter reading be set to zero and that the low end of the costs of customer calls also be set to zero.

Q: Is B&V's argument correct?

[5] The B&V proposal to set the minimum cost of service line maintenance to zero may be related to Dr. Overcast's view that only short-run costs matter, or to an assumption that Gaz Métro will let a service drop go for decades without maintenance.

A: While the B&V Report is correct that some costs are lumpy, the lumps are much smaller than the Report suggests. B&V assumes that large numbers of customers would need to be added to cause any cost increase, such as adding a full-time customer service representative or meter reader. As shown in Filing B-0227, Gaz Métro assigns staff to functions in increments as small as 0.5 days per month, or 2.9% of a full-time equivalent.[6]

In addition, whatever the increment of supply for any function, any particular line extension may add the number of customers (or demand) that push Gaz Métro to add that increment. That is true for gas supply capacity, the number of monthly hours of meter-reading labour, or any other utility function.

From Filing B-0227, the average meter reader reads about 424 customers in 0.5 day.[7] If a particular additional customer is just enough to require another half-day of meter reader time, that customer's incremental cost is 424 times the average cost used in Gaz Métro's computations, or about $2,850 annually. If the customer makes no difference in the number of meter readers employed, the incremental cost is zero. The cost of serving an incremental customer may vary from year to year, depending on the number of customers in the region and whether the incremental customer tips Gaz Métro into another hour of reader employment. The range in incremental costs is thus $0 to $2,850, with an average of $6.71.

[6] The pattern of assigning staff part-time to meter reading is also apparent in the response to the Régie's question 1.1 in Filing B-0226.

[7] This number is lower in the Montréal region, and higher elsewhere, from the response to the Régie's DDR 7, question 1.1 in Filing B-0226.

Q: Does B&V explain why lumpy or stepwise costs should be ignored in the profitability analysis?

A: It would be more correct to say that B&V *attempts* to explain its position. B&V asserts that "By the time a 'step' increase in O&M is needed, there will likely have been numerous customer additions to the system that can absorb the added cost with no impact to existing customers." (B-0145, Gaz Métro-6, Document 2, p. 2) When asked for a numerical example, Gaz Métro at first refused (Filing B-0213, question 3.2) and when ordered to respond (Filing A-0087, ¶ 48) provided a pdf printout of an incomprehensible spreadsheet (Filing B-0225, question 3.2).

The response to my question 3.2 does not explain how the attached table, which presents two computations over a six-year period for some example extension, is intended to support the claim in the B&V evidence (B-0145). The problems with this response include the following:

- The response does not even identify a benefit to the existing customers from cost "absorption." Gaz Métro may intend that the reader compare two values in the response to demonstrate a benefit, but it does not identify which values those are.
- The table shows a set of costs described as the "Hypothetical threshold @ 25,001 customers" for each of three cost categories—CII costs, rotary meter inspection, and a cost (apparently capital) of the service connection—for each of years 5 and 6. Those threshold values are similar to, but not quite the same as, the corresponding marginal costs. No derivation of the threshold values is provided. Indeed, B&V do not even describe the significance of the threshold values.
- The example appears to assume that the line extension project adds only one customer for years 1 and 2, 25,000 customers in years 3 and 4, and

25,001 customers in years 5 and 6. Since the example does not include any joint costs (such as a main extension), the purpose of the changing customer numbers is unclear.

- Both of the analyses report a "Revenue requirement revised for 25,000 customers extra +0% inf" that is about 11% lower than the marginal cost inputs. The difference is larger than the total of the CII and meter costs O&M costs, implying that B&V assumes that the cost per meter of installing a service connection is lower for 25,000 connections than for one. No basis is provided for this assumption. Perhaps B&V is assuming that the connections would be adjacent to one another and installed in a coordinated fashion, allowing Gaz Métro to efficiently deploy equipment and labour; if that is B&V's intent, it would only be realistic (even assuming that the value makes sense) under very limited circumstances, and would not apply to additions dispersed in space and time.
- The example adds an "O&M cost" to the incremental distribution revenue, as a benefit to of the extension. It is not clear how the additional cost can be considered a benefit to other customers.
- The "O&M cost" in ¢/m^3 varies from year to year. The drop from year one to year two appears to be the difference between first-year and continuing costs, while the drop to year 3 appears to be due to B&V's assumption that connection costs are lower when more connections are being added. I do not understand the increase in this line in year five, when just one customer is added but the cost jumps 20%.
- The second analysis introduces a "Rate reduction benefit revenue (¢/m^3)" for years three to six. That value seems to be the difference in the unexplained O&M costs line from year 1 for years 3 and 5 and year

2 for years 4 and 6. B&V do not explain how the change in costs between years is a measure of benefit.

As best I can determine, this computation summarizes the profitability analysis for a particular in-fill project that requires only service connections, allows for some economy of scale in adding connection lines, and happens to be profitable. This example could not support B&V's sweeping generalization, even if the computations were meaningful and reasonable for this specific project.

Q: Does Gaz Métro offer any additional reasons for ignoring some costs?

A: Yes. Gaz Métro asserts that additional meters do not require additional meter-reading labour, on the grounds that the number of meter readers has not increased since 2009, even as the number of meters has increased. Gaz Métro asserts that the decline in meter-reader labour results from improved work scheduling, deployment of new technologies and an increase in the remotely-read meters. (B-0226, response to question 1.1)

Table 1 shows the data on number of meters and number of readers from discovery, and the ratio of meters per reader.

Table 1: Meters and Meter Readers

	2009		2016		Meters/reader	
Region	**Readers**	**Meters**	**Readers**	**Meters**	**2009**	**2016**
Montréal	10.0	167,969	10.0	188,971	16,797	18,897
Estrie	0.7	8,136	1.0	10,578	11,623	10,578
Rouyn	0.8	3,365	0.3	3,253	4,206	10,843
Mauricie	1.0	5,042	0.5	5,292	5,042	10,584
Québec	1.0	8,598	1.0	11,294	8,598	11,294
Saguenay	0.6	2,660	0.3	3,120	4,433	10,400
Total	14.1	195,770	13.1	222,508	13,884	16,985

Source: Response to Régie Set 7, question 1.1, Filing B-0226

Q: Is this a valid argument?

A: No. First, if technical and scheduling improvements have reduced the amount of meter-reading labour despite rising number of meters, the reduction in labour would have been even greater without the additional customers. Second, the data indicate that the reduction in readers in three regions (Rouyn, Mauricie and Saguenay) that had each full-time-equivalent of meter reader serving 4,000 to 5,000 customers in 2009. By 2016, Gaz Métro had apparently reorganized workloads to bring each of those regions to 10,400 to 10,800 customers per reader. In Estrie, where each reader was serving 11,600 meters in 2009, Gaz Métro added meter-reader times to bring the workload down to 10,600 customers per meter, in the range of the other regions.[8]

V. Load and Revenue-Related Expenses

Q: What categories of operating costs result from additions of new loads, as distinct from additions of new customers?

A: Gaz Métro identifies four categories that it treats as being driven by the number of customers added, but that probably vary more with the added revenue, which I list below, with the line numbers from the B&V Report (B-0145, pp. 9–11):

9: Cost of Bad Debts

10: Collection and recovery costs

11: Customer retention costs - Major accounts

12: Customer retention costs - Major industries

A small customer who goes into financial distress or leaves unpaid bills will impose lower costs of bad debt and debt collection than a larger one, for

[8] Montréal has a higher ratio, probably due to a higher customer density.

the same number of months of unpaid bills. Customer retention costs also vary with the size of the customers, with the VGE customers requiring about 31 times as much attention as the CII customers. It seems reasonable to assume that customer retention costs also vary within the VGE and CII markets.

In addition, working capital would increase in proportion to revenues.

Increases in peak load would result in increased O&M for upstream operations (such as compression) and capital addition (such as looping of mains and supply lines) that are needed to support the load added by the line extension.

Increases in gas consumption would probably increase gas supply management expense.

All these costs should be reflected in the profitability analyses.

Q: Does Gaz Métro recognize that the customers added with line extensions affect all these costs?

A: Gaz Métro does not discuss working capital or upstream costs. I assume that the omission of working capital is an oversight and that Gaz Métro intends to address upstream costs in Phase 3B and in project-specific analyses. The B&V report asserts that "Distribution Gas Supply expenses […] have no relation to marginal costs as these costs are related to personnel managing the gas supply these costs do not vary with added throughput or customer costs." (B-0145, p. 5)

Q: Why do you disagree with B&V on the treatment of Distribution Gas Supply expenses?

A: The costs in this account cover long-term and short-term planning of Gaz Métro purchases of gas for its customers; system control for all gas on the

Gaz Métro system; and contractual relationships with Gaz Métro's suppliers, third-party suppliers, and self-supplying customers. Whether "these costs vary with added throughput" is an empirical matter, not a theoretical question. It seems intuitive that Distribution Gas Supply expenses are higher for a large gas distributor than a small distributor.[9] Line extensions will result in consumption of more gas by more customers, increasing the complexity of the supply, and dispatch and contract operations and requiring more (or more skilled) staff and other resources.

To test B&V's assertion, I analyzed the relationship between Gaz Métro's Distribution Gas Supply expenses (from the response to my question 4.2, stated in 2016 dollars using the inflation factors provided by Gaz Métro in response to my question 4.6) and various measures of Gaz Métro's gas dispatch provided in response to my question 4.4, for 2003–2015.

As shown in Figure 1 and Figure 2, there is a clear upward trend in Gas Supply expense as a function of either sales or throughput. These graphs are for the most recent nine years of data, which produce more stable relationships than the older data, but the trends are clear in the longer period as well.

[9] Gaz Métro was unable to provide any cross-utility data on these costs (response to question 4.7, Filing B-0225)

Figure 1: Gas Supply Expense (2016$) as a Function of Sales

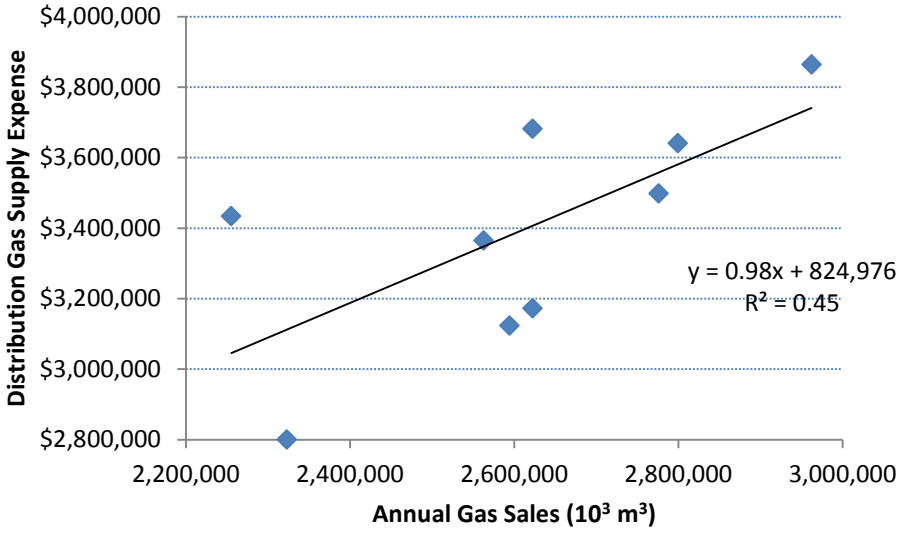
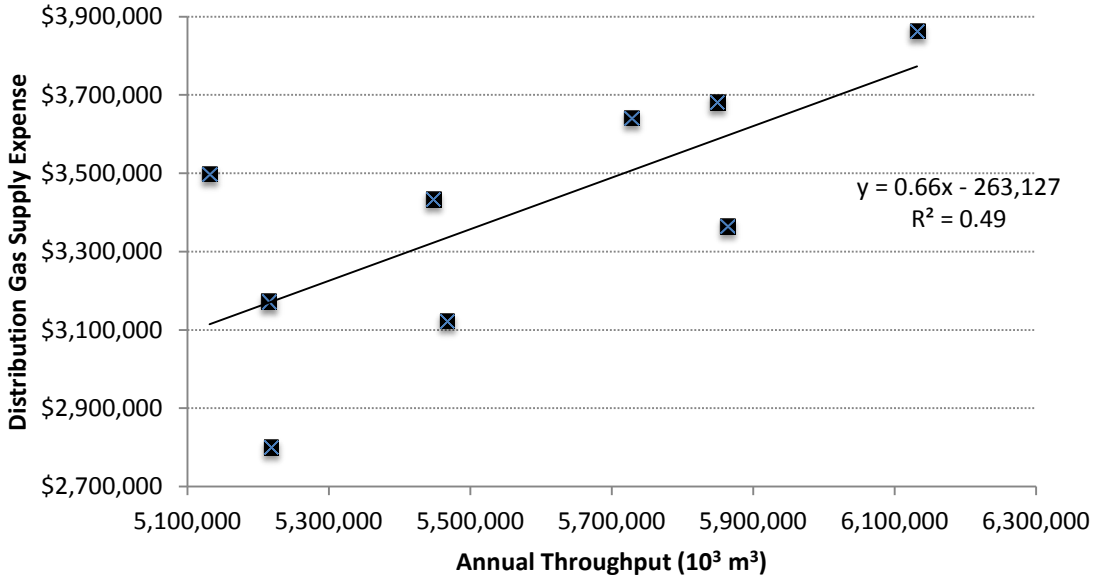


Figure 2: Gas Supply Expense (2016$) as a Function of Throughput



Interestingly, the slopes of the regression lines ($0.98 and $0.66/10^{3}m^3) are very similar to the average costs over these periods ($1.30 and $0.60/10^{3}m^3), suggesting that the average cost is a good proxy for the marginal cost of this service. Of the 29 positions identified in the response to my question 4.1, it appears that nine (the economist, three long-term planners, and five operators) deal with the gas that Gaz Métro purchases for

its sales customers, while six (in the network control center) deal with the dispatch of both sales and transport gas, and fourteen (in the contracts group) deal primarily with transport customers, but also to some extent with supply customers. Overall, it seems that the cost of the gas supply function is about equally distributed between sales and transport gas, at about $\$0.70/10^3m^3$.

Q: How should the incremental costs be computed for use in the profitability analyses?

A: The costs of bad debt, collection and recovery and working capital should be stated (or restated) as a percentage of revenues. The costs of customer retention should be restated as a function of customer revenues, such as a power function.

The Distribution Gas Supply expenses should be treated as related to throughput, and assessed at the costs I derive above.

The upstream costs should be differentiated by region, and analyzed in Phase 3B of this proceeding.

Q: Do all of these volume-related cost components start immediately?

A: The Distribution Gas Supply expenses and working capital would start immediately. The bad debt, collection and recovery costs may be delayed, as I noted above. The timing of upstream additions should be considered in Phase 3B of this proceeding.

I assume that Gaz Métro's customer retention efforts for larger customers are routine efforts, independent of how long the customer has been served by Gaz Métro. If that assumption is correct, the retention costs should start immediately.

VI. One-time Operating Costs

Q: What one-time operating costs has Gaz Métro identified?

A: Gaz Métro has identified the following five categories of one-time customer O&M. I have included the line numbers from Tables 2 through 4 of the B&V Report (B-0145, pp. 9–11), for each cost category.

1 Mailing of subscription confirmation letter

3 Cost of opening a billing file

5 Input of a new contract

6 Cost of a credit check conducted internally

15 Processing of CRP application

Q: Do you have any comments on these estimates?

A: I have two observations. First, some of these costs may be incurred several times for a single customer location, during the analysis period for a line extension. Every time a new customer moves into the building or unit, Gaz Métro will incur the cost of opening a billing file, setting up a new contract, and conducting a credit check (for non-residential customers). Gaz Métro should develop estimates of the rate of customer turnover by class or market, so that it can include multiple events in the profitability analyses.

Second, the range of estimate of the costs of a CRP application is not useful without some guidelines as to the values to be used in various situations. If new construction is not eligible for the CRP, there should be no applications and no costs. If essentially all existing residential and CII buildings that connect to the Gaz Métro system file CRP applications, the "maximum" value reported by Gaz Métro should be used for all of them.

Q: Has Gaz Métro omitted any costs from this category?

A: I believe so. Gaz Métro must incur costs prior to the commitment of customers to connection to the new line, for marketing; explaining the connection process, rates, the CRP, and other matters to potential customers; and estimating the costs of service connections so that customers can commit to the connection. Those costs must be included in the evaluation of the decision to proceed with the line extension.

Q: Can you provide the Régie with an idea of the possible significance of your proposed corrections in the marginal costs estimated by the B&V and Gaz Métro?

A: Not comprehensively, at this time. I expect that some of the issues I have raised will be considered in Phase 3B, such as the pre-commitment costs, the costs of customer turnover, vacancy rates, analysis period, discount rate and upstream costs. Gaz Métro may clarify other issues (such as the details of its estimates of various O&M costs, its practices regarding customer retention, the timing of bad debt and collect costs, or restating some costs on a volumetric basis) in this phase or in Phase 3B.

The customer-related O&M that is the subject of much of Gaz Métro's analysis in this phase is a small part of the cost of most line-extension projects. Nonetheless, there may be extension projects that are marginally profitable, for which using Gaz Métro's cost estimates, rather than B&V's zero estimates for some costs, may swing the analysis away from profitability. The same is true for inclusion of costs that Gaz Métro has neglected, such as gas supply, working capital and the costs related to customer turnover. Other improvements (such as restating some costs on a volumetric basis) may make projects more or less profitable, depending on the customer mix and other factors.

Q: Does this conclude your evidence on this matter?

A: Yes.