RATE REFORM - PHASE 2:

ADDITIONAL EVIDENCE

FOLLOW-UP ON DECISION D-2016-126

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INTRODUCTION

On August 4, 2016, the Régie de l'énergie (the "Régie") rendered procedural decision D-2016-126 regarding the application of Gaz Métro Limited Partnership ("Gaz Métro"). The Régie indicated that it would address, in Phase 2 of the case, cost allocation, rates and service conditions relative to the supply, transportation and load-balancing services. It also indicated that the follow-ups resulting from the previous decisions concerning these services, as well as overhaul of the interruptible service, would be addressed in that phase.

In addition to the documents already filed, the Régie determined that additional evidence should be produced:

- Information concerning, among other things, the classification and allocation of costs between the different customer categories; and
- Information on the conditions of service and rates.

This document groups together these two major subjects. All of the follow-ups requested in decision D-2016-126 are addressed herein, with the exception of the analysis of operational flexibility (presented in exhibit Gaz Métro-5, Document 6) and the one on the importance of uniform deliveries in the supply plan (presented in exhibit Gaz Métro-5, Document 7).

1 INFORMATION RELATIVE TO THE 2017 SUPPLY PLAN

In decision D-2016-126, the Régie asked Gaz Métro to conclude its evidence by providing a variety of information from its 2017 supply plan concerning the planned tools and customers' needs:

> "*[62] The Distributor should submit, for each of the tools provided in the Plan, the following detailed information:*
>
> - *Intrinsic characteristics of the tools (available capacity by day and by year, storage, withdrawal and injection capacity, liquefaction and vaporization capacity, contract duration, etc.)*
> - *Economic characteristics of the tools (fixed cost, variable cost, cost of space, withdrawal and injection, cost of liquefaction and vaporization, total cost of the tool, unit cost of the tool, etc.).*"

All of the information regarding the tools contained in the 2017 supply plan is presented in Schedule 1.

2 ALLOCATION OF SUPPLY COSTS

In addition to the information concerning the tools contained in the 2017 supply plan, the Régie asked Gaz Métro in decision D-2016-126 to provide a breakdown of the customer needs used to establish the supply plan as well as the study on the 2017 allocation of costs according to the current and proposed methods. The results of these exercises will be presented in section 2.5.

However, Gaz Métro would first like to address the following request from the Régie:

> "*[64] The Distributor should also explain in detail how the allocation methods it proposes make it possible to establish a relationship of causality between customers' needs and the tools chosen in the Plan.* "

This question is central to all of the proposals made by Gaz Métro in Phase 2 of this case. To respond, Gaz Métro feels it important to return to the initial evidence and the principles of causality that enable adequate functionalizing of the costs between the services. These elements are addressed in sections 2.1 to 2.4.

2.1 REVIEW OF THE INITIAL EVIDENCE

In the initial evidence filed in this case, Gaz Métro presents the causality analysis for the supply costs[1]. Understanding the source of the costs and which ones are causal is crucial to any study of cost allocation.

This analysis made it possible to determine that the major principles chosen at the time of unbundling are still fair:

- The costs related to the annual demand correspond to the costs of transportation and supply necessary to service this demand if it were uniform (LF of 100%[2]). The demand can thus be represented in the form of average daily demand;
- All excess costs to meet an average daily demand are stranded costs necessary to meet the peak. These costs are those associated with load-balancing.

[1] B-0133, Gaz Métro-5, Document 1, section 2.

[2] The load factor (LF) of a customer is evaluated using the equation Average annual volume (A)/Peak (P).

However, Gaz Métro notes that certain specific costs are an exception to this rule and are not related to the consumption profile[3].

The analysis of cost causality therefore led Gaz Métro to propose a new method of functionalization based on the average costs of the tools that make it possible to meet a uniform annual demand and on the excess costs. The allocation of the supply costs for all types of customers, and ultimately the rate – since it is calculated on this allocation – were subsequently established. The allocation (and the rate) for every cubic metre consumed by customer *i* is summarized by the following equation, regardless of the portfolio of supply tools employed to meet the demand:

$$\underbrace{[Coût\ unitaire\ du\ transport]}_{Transport} + \underbrace{\left[\left(\frac{1}{CU_i}-1\right)\times Coût\ unitaire\ \text{échoué}\right] + [Autres\ coûts]}_{\text{Équilibrage}}$$

Où *Coût unitaire du transport* = Coût moyen des outils pouvant répondre à une demande annuelle uniforme

Coût unitaire échoué = Coûts excédentaires pour répondre à la demande moyenne quotidienne

Autres coûts = Coûts de flexibilité opérationnelle + coûts du maintien du 85 TJ/jour + coûts échoués non reliés à la température

[3] These are stranded costs not related to the temperature, costs associated with maintaining 85 TJ/day and operational flexibility costs (B-0133, Gaz Métro-5, Document 1, p. 102).

This approach based on average costs and excess costs is different from the current approach, which functionalizes the costs of each of the tools between the services according to their sequencing and which presents certain problems[4].

2.2 Causality of supply costs in the case of a non-optimized plan

Over the years, Gaz Métro has sought to optimize all of its supply tools in order to reduce the cost of meeting the peak-day demand. However, even though this optimization makes it possible to reduce the total amounts allocated to the customers, it does not affect the causality of the costs. In fact, the causality of the costs is instead related to customer demand. To fully illustrate the effect of customer demand on costs, a supply plan without optimization is first analyzed.

The costs of supply without optimization are evaluated assuming that the only supply tool available is annual transportation. In such conditions, Gaz Métro would be required to contract the necessary transportation capacities to meet peak consumption.

It should be noted that in decision D-2016-126, the Régie ordered Gaz Métro:

> "*[68]* […] *to evaluate what it costs the Distributor in terms of supply, transportation and load-balancing to service an interruptible customer.*
>
> *[69] In this exercise, the Distributor should also identify, for each of these components, where applicable, the avoided costs attributable to this category of customer.*"

To fully understand the cost causality, including the avoided costs related to interruptible demand, the analysis must be done by adding to the continuous demand the demand before interruption associated with the customers with interruptible service. In the 2017 supply plan, the peak-day continuous-service demand is evaluated at 33,231 10^3m^3/day[5]. For the 2017 Rate Case, the impact of the demand before interruption of the interruptible customers was evaluated at 1,791 10^3m^3/day. In total, absent interruption, the total peak-day demand to supply would have been 35,022 10^3m^3/day[6].

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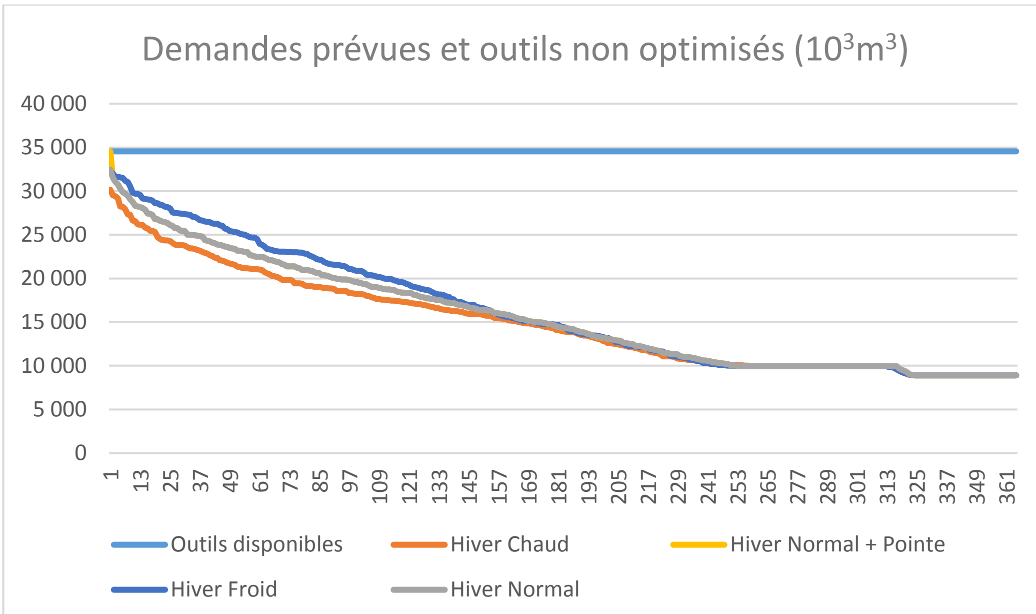
[4] In this regard, see exhibit B-0133, Gaz Métro-5, Document 1, sections 6.1 and 6.2.

[5] R-3970-2016, B-0176, Gaz Métro-2, Document 1, section 9.

[6] Peak-day continuous demand + Impact of interruptible customers without interruption = 33,231 10^3m^3/day + 1,791 10^3m^3/day = 35,022 10^3m^3/day.

Thus, for the 2017 plan, without optimization and in order to supply the total customer demand, Gaz Métro would have had to contract 35,022 10^3m^3/day of transportation between Dawn and the franchise. With that kind of supply plan, Gaz Métro would have been able to cover all of the temperature scenarios studied in the 2017 Rate Case. Graph 1 presents this situation. In it, demand is arranged from the highest consumption to the lowest in the year

Graph 1



The unit cost paid to TransCanada PipeLines Limited ("TCPL") for the use of FTSH (Firm Transportation Short Haul) Dawn – GMIT EDA is 3.304 ¢/m^3[7]. This rate was used to evaluate the cost of the non-optimized 2017 supply plan. Thus, the cost would have been $422.4 M (35,022 10^3m^3/day x 365 x 3.304 ¢/m^3), to which a surplus of $12.7 M can be added for October 2016[8]. Altogether, without optimization and without any compression expense, the costs would be $435.1 M.

Therefore, regardless of the scenario, be it warm winter, normal winter, normal winter with a peak equivalent to the demand for the coldest day, or even cold winter, the total cost to transport the supply within the franchise at the required time would be $435.1 M for the 2017 Rate Case.

[7] Schedule 1, lines 14 to 16, column 13.

[8] As of November 1, 2016, the supply structure was moved from Empress to Dawn causing a variation in the transportation cost. The surplus for October, the only month in the 2017 plan where the point of purchase was still at Empress, is evaluated at $13.3 M. Excluding compression, the surplus is $12.7 M. See R-3970-2016, B-0079, Gaz Métro-11, Document 5, Schedule 1.

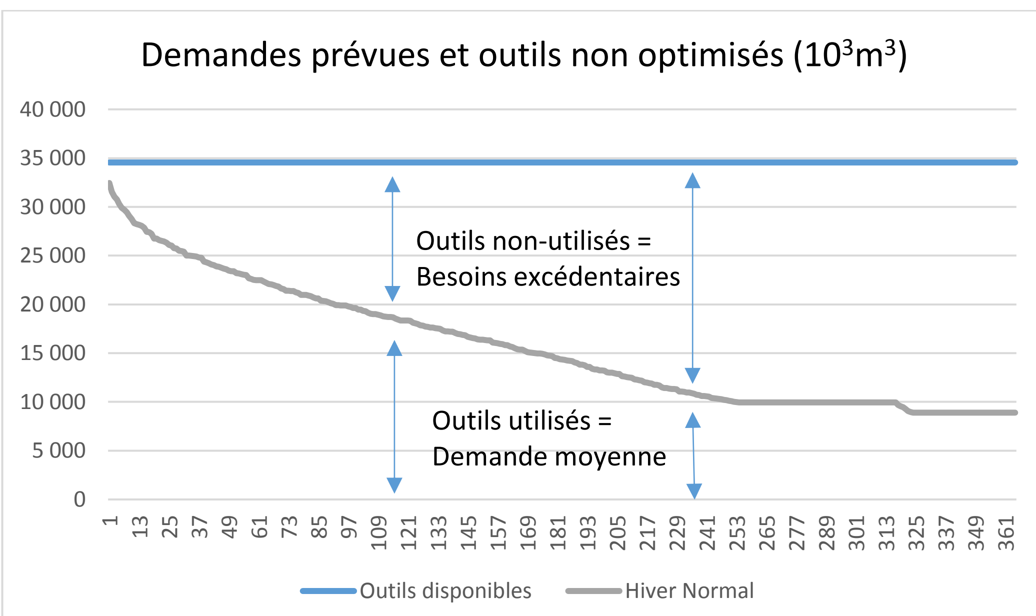
Before optimization of the supply plan, the variation of the consumption volume in the year never affects the cost of moving the supply within the franchise. Only a revision of the peak required for winter would affect the supply cost, by increasing or decreasing the necessary tools.

This means that when the supply plan is not optimized, each customer causes a cost equivalent to the customer's winter peak (P) since it is the coincident peak of all the customers that is responsible for the total cost of moving the supply within the franchise. Therefore, a *priori*, the cost of the available tools can be allocated between the customers as follows:

$$\text{Coût d'approvisionnement client}_{\text{i}} = \frac{\text{Coût total des outils disponibles}}{\sum_i P_i} \times P_i$$

On the other hand, based solely on this equation, customers who had a zero winter peak (seasonal summer customers) would not be allocated any cost for their consumption. To allocate costs to all customers, and thus ensure there is no free service, the total supply cost must be separated into two components: the costs related to used capacities (the "tools used") and the costs related to unused capacities (or "unused tools"). The following graph shows the portion of used and unused tools for a normal winter scenario.

Graph 2



It can therefore be assumed that each unit consumed generates a unit cost equivalent to the tools used to transport supply at any given time during the year (i.e. 3.304 ¢/m³, as explained above). For all customers, the cost to allocate for the usage of the tools would therefore be:

$$\text{Coût d'utilisation des outils du client}_{\text{i}} = \text{Consommation annuelle client}_{\text{i}} \times 3{,}304\ ¢/\text{m}^3$$

Once the cost of the tools used is allocated between the customers, the surplus cost (total supply cost *less* cost of tools used), corresponding to the cost of the unused tools, can then be allocated based on the winter peak of each one:

$$\text{Coût causé pour l'excédent de la consommation en hiver du client}_i =$$

$$\frac{(\text{Coût total d'approvisionnement - Coût des outils utilisés})}{\sum_i (P_i\text{-}A_i)} \times (P_i - A_i)$$

Où P_i = Pointe hivernale du client *i*; et
A_i = Consommation moyenne annuelle du client *i.*

By adding the tool usage cost, the causality of the costs and the absence of free service are respected.

2.2.1 Causality of the costs for different winters

Graph 1 presents three different winters: hot, normal and cold. In all three, overall customer consumption is affected by temperature. However, regardless of the winter, the costs before optimization do not change: they are still $435.1 M. On the other hand, since the cost is calculated on a unit basis to enable pricing by m³ consumed, the unit cost varies according to the winter given the higher or lower demand.

The best way to ensure respect of cost causality is therefore to have the option of adjusting the functionalization of the costs based on the actual temperature conditions. To illustrate, here are estimates produced to quantify the consumption for a hot winter, a normal winter and a cold winter (without the possibility of interruption for interruptible-service customers):

1) Hot winter: total consumption of 5,448.0 10^6m³;
2) Normal winter: total consumption of 5,701.6 10^6m³;
3) Cold winter: total consumption of 5,897.7 10^6m³.

Considering a total cost before optimization of $435.1 M and a unit cost of 3.304 ¢/m^3 as well as an additional cost of $12.7 M for October, the causality of the costs for the hot, normal and cold winters can be allocated as follows:

Tableau 1

	Consommation totale	Coût total	Coût d'utilisation[9]	Coût excédentaire	Coût excédentaire par m^3 consommé
	($10^6 m^3$)	*(M$)*	*(M$)*	*(M$)*	*(¢/m^3)*
Hiver Chaud	5 448,0	435,1	192,7	242,4	4,449
Hiver Normal	5 701,6	435,1	201,1	234,0	4,104
Hiver Froid	5 897,8	435,1	207,6	227,5	3,858

Since the total costs do not vary based on customers' level of usage, then the higher the consumption for a given coincident peak, the more the surplus cost decreases. Essentially, the variation can be explained by the fact that customers whose consumption is affected by temperature contribute through their usage cost to a variable increase entirely dependent on the winter.

Additionally, in the case where customers would use more without affecting the peak value, as presented in Graph 3, allocating a usage cost to these customers will make it possible to further reduce the surplus costs. This effect can be seen in Tableau 2.

[9] Usage cost = Total consumption x 3.304 ¢/m^3 + $12.7 M.

Graph 3

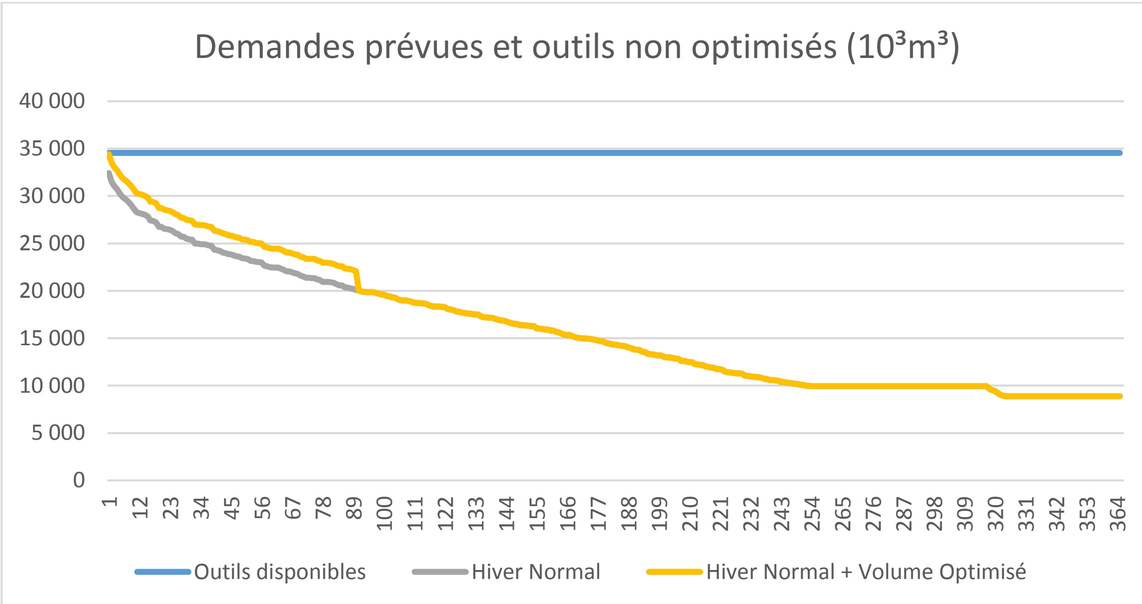


Tableau 2

	Consommation totale	Coût total	Coût d'utilisation[10]	Coût excédentaire	Coût excédentaire par m³ consommé
	($10^6 m^3$)	*(M$)*	*(M$)*	*(M$)*	*(¢/m³)*
Hiver Normal	5 701,6	435,1	201,1	234,0	4,1
Hiver Normal + Volumes	5 872,7	435,1	206,7	228,4	3,9

Before optimization, the cost remains the same as long as additional consumption does not lead to an increase in the peak to supply. On the other hand, any additional consumption generates a minimum usage cost, which decreases the surplus cost allocated based on the peak.

[10] Usage cost = Total consumption x 3,304 ¢/m³.

For the different scenarios presented thus far, the usage cost is represented by the transportation service whereas the surplus cost is represented by the load-balancing service. According to the current method (based on ranking) and the proposed method (based on an average cost and a surplus cost), here is how the costs before optimization would be functionalized.

Tableau 3

Méthode d'allocation	Coût d'utilisation Transport	Coût excédentaire Équilibrage	
		Espace	Pointe
	(M$)	*(M$)*	*(M$)*
Méthode actuelle			
Hiver Chaud	201,1	103,1	130,9
Hiver Normal	201,1	103,1	130,9
Hiver Normal + Volumes	201,1	103,1	130,9
Hiver Froid	201,1	103,1	130,9
Méthode proposée			
Hiver Chaud	192,7	s/o	242,4
Hiver Normal	201,1	s/o	234,0
Hiver Normal + Optimisation	206,7	s/o	228,4
Hiver Froid	207,6	s/o	227,5

The current functionalization method, in contrast to the proposed method, does not take into account the interdependence between the usage costs and the surplus costs. The tools are functionalized for each service at the time of the rate case and the functionalization is not reviewed at year end to ensure that the costs allocated to the transportation service still represent a LFof 100%. Therefore, with the current method, during a cold winter, an overpayment will result owing to the higher consumption, because no cost will have been allocated for the surplus usage relative to a normal winter. Since this overpayment will be returned in the future transportation rates and thereby reduce the future cost of usage, this equates to giving a rebate to all customers regardless of whether they consume more during the winter or not. On the other hand, it is the customers whose consumption varies depending on the winter who vary the total consumption in a cold winter (at a constant peak). For there to be a fair distribution of the economies of scale, their additional contribution in usage costs should be deducted from the surplus costs and not shared with the customers whose consumption does not vary during the winter.

2.3 CAUSALITY OF THE SUPPLY COSTS IN THE CASE OF AN OPTIMIZED PLAN

The previous section served to demonstrate how the proposed method of functionalization makes it possible to properly represent the causality of the costs in a context where the supply plan is not optimized. However, the situation is different when other tools are employed to reduce the supply costs.

Before directly noting the effect of the cost optimizations on the 2017 plan, we need to address a few aspects. These aspects will help to better understand the effects of the various tools in the plan on its optimization:

- Cost optimization using seasonal tools;
- Cost optimization *vs*. the requirements of an extreme winter; and
- Use of the tools during a peak day.

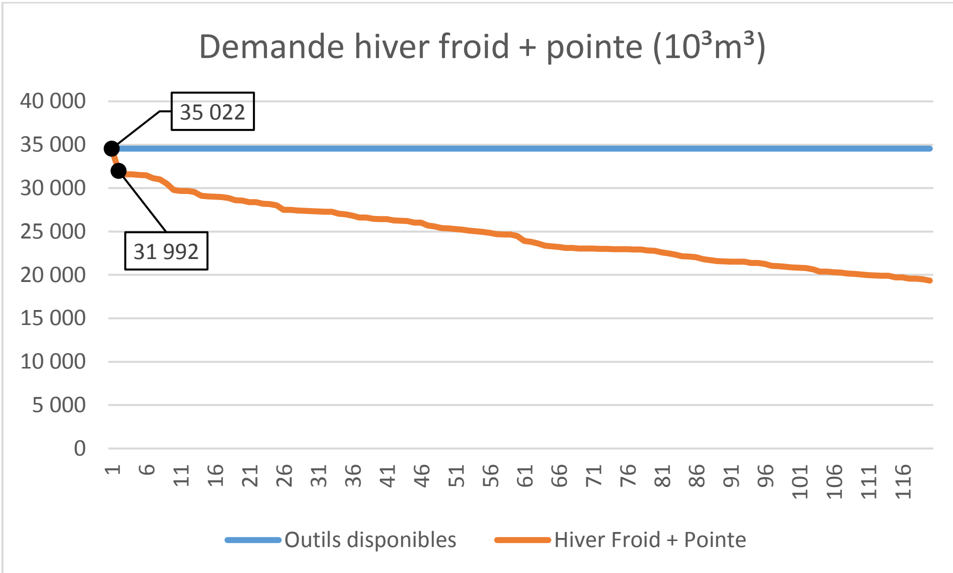
Then, a look at cost optimization, one tool at a time, will help to understand the effect each tool has on the costs of moving the supply to the franchise. Similarly, the analysis will demonstrate how these cost reductions can be integrated into the logic of cost causality presented for a supply plan without optimization.

2.3.1 Cost optimization using seasonal tools

When the customer demand to supply is not stable, the supply costs can be reduced by replacing the annual tools with seasonal tools that cost less per peak unit to service. **This is true even if the seasonal tools cost more per unit of total consumption.** The following example demonstrates this.

Graph 4 presents the demand during a cold winter during which the maximum peak is reached.

Graph 4



Based on this demand, the difference between the peak demand and that of the second coldest day is 3,030 10^3m^3 (35,022 10^3m^3 - 31,992 10^3m^3). The tools required for this type of demand without optimization will cost a total of \$36.6 M[11], or an average unit cost of \$12.1/m³ on the peak day[12]. This means that a replacement tool that makes it possible to supply the 3,030 10^3m^3 at a cost lower than \$36.6 M could optimize the supply plan and reduce the total costs. Even if the unit cost is much higher compared to the annual tool, the replacement tool will reduce the total costs (and therefore the surplus costs) as long as this unit cost is lower than \$12.1/m³.

2.3.2 Cost optimization *vs.* the requirements of an extreme winter

In a non-optimized supply plan, i.e. one comprised only of tools that give the distributor capacity at any time during the year, only the potential peak need be calculated. Indeed, since this potential-peak capacity is always available, customers can be supplied at any time of the year.

The requirements of an extreme winter are relevant only when the supply plan is optimized by replacing annual tools with seasonal ones. The requirements of an extreme winter thus

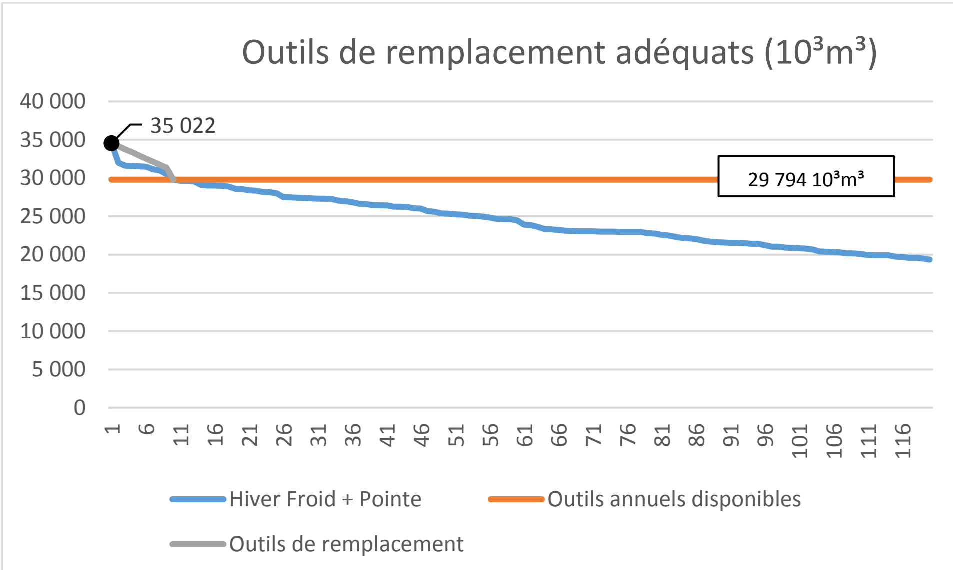
[11] 3,030 10^3m^3 x 3.304 ¢/m³ x 365 = \$36.6 M.

[12] \$36.6 M ÷ 3,030 10^3m^3 = \$12.1/m³.

make it possible to test if the replacement tools have sufficient capacity to replace the annual tools.

The following graph reanalyzes the demand of Graph 4 and illustrates a situation where the replacement tools make it possible to respond to an extreme winter.

Graph 5



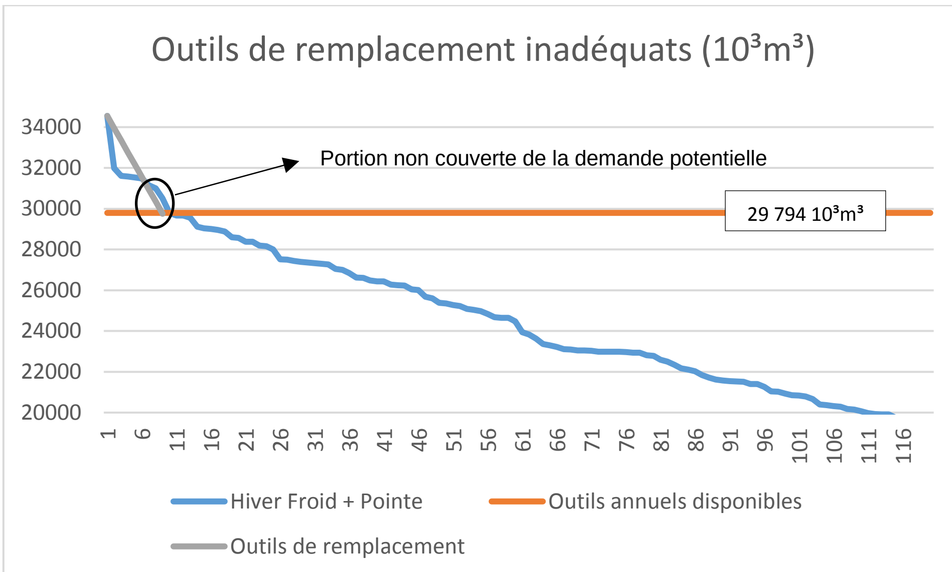
In this case, the replacement tools are able to reduce the annual tools from 35,022 10^3m^3 to 29,794 10^3m^3, or by 5,228 10^3m^3. To replace the annual tools, the replacement tools must also cover the other days during which demand can exceed 29,794 10^3m^3. In Graph 5, the curve for the replacement tools illustrates the capacity of these tools, which gradually decreases over time. Since their capacity is always greater than the potential demand, these tools really do make it possible to reduce the annual tools by 5,228 10^3m^3. In Graph 5, the requirements of an extreme winter are therefore less than the peak requirements.

In the case where the capacity provided by the replacement tools is lower than the potential demand, this means that the annual tools cannot be reduced by a value equivalent to the full capacity of the replacement tools. For example, if the replacement tools can theoretically supply 5,228 10^3m^3 at peak, but cannot cover demand higher than

29,794 10^3m^3 for the other cold days, then in reality they cannot replace the entire peak 5,228 10^3m^3 supplied by the annual tools.

Here is an illustration of this type of situation, again using the demand of Graph 4.

Graph 6



In this case, the replacement tools are not able to adequately replace the annual tools for 5,228 10^3m^3. In fact, the capacity of the replacement tools is too low relative to the annual tools' capacity to be able to reduce them by 5,228 10^3m^3. Based on the capacity that can be provided by the replacement tools, the demand can be reduced to only 31,491 10^3m^3. So, in this situation, the replacement tools make it possible to reduce the peak demand by only 3,531 10^3m^3 (35,022 10^3m^3 - 31,491 10^3m^3), despite the fact that they supply up to 5,228 10^3m^3. The replacement can nevertheless still be cost-effective if the cost of the replacement tools is lower than that of the annual tools for 3,531 10^3m^3.

In this last situation, the peak of 35,022 10^3m^3 could be serviced by the annual tools for 31,491 10^3m^3 and the replacement tools for the difference of 3,531 10^3m^3. The test of an extreme winter would illustrate this situation by indicating that a total tool of 36,719 10^3m^3 is required for the winter[13] and that this total is higher than 35,022 10^3m^3. The distributor

[13] Peak + demand not covered by the replacement tools = 35,022 + (5,228-3,531) = 36,719 10^3m^3.

would find itself in an "extreme winter" situation. In reality, this instead indicates that the replacement tools cannot replace the capacity provided by the annual tools and that they cannot reduce the peak by an equivalent of 100% of their potential.

The extreme-winter calculation is thus required only when the distributor optimizes its total costs for moving the supply within the franchise. This calculation serves to determine if the potential of the replacement tools can be fully utilized. When the extreme-winter demand is higher than the peak demand, then the potential of the replacement tools can be only partly used, which reduces the savings related to the replacement tools.

So, if the replacement tools can reduce the long-term costs, this means that the total costs of the extreme-winter plan will necessarily be less than the total costs of the plan without optimization, even if for a given year these replacement tools can be only partly used.

2.3.3 Use of the supply tools during a peak day

The evaluation of the peak requirements is the determining factor in purchasing tools able to move the supply during the year. Purchasing transportation that covers the peak requirements therefore makes it possible to cover any other demand during the year. When the plan is optimized, the extreme-winter test is useful to determine if the replacement tools are able to reduce the transportation tools by a ratio of 1:1 or less. However, in all cases, the evaluation of the peak requirements is based on a regression model which mainly considers the *temperature* factor[14].

Every year, the actual peak-day demand varies according to the temperatures observed. However, since the tools must cover a historic peak demand, the tools are purchased (or sold, if surplus) to cover this potential peak demand.

[14] The factor of the previous day's temperature and a wind-related factor (crossed factor PDxWind) also influence the regression. Furthermore, once the peak has been calculated using the regression, the total of the subscribed volumes of customers with combined rates, the total of the maximum volumes of continuous service customers in levels 4.9 and 4.10 without combined rates, and the average monthly volume for the winter months of biogas dedicated network customers are considered in order to obtain the overall peak. It should still be noted that the peak obtained using the regression currently represents more than 80% of the overall peak.

During this day, all of the tools are necessary and used. Customer consumption is not ranked or sequenced during this day: there is no first or last customer. All of the customers consume concurrently.

Since temperature is the primary element in modelling the peak-day requirements, all of the customers who have higher consumption in the winter contribute to the peak and to the cost of the tools used during the peak day[15]. Therefore, during the peak day provided for in the supply plan, all customers who consume more than their annual average will proportionally use part of all of the tools utilized to supply the amount exceeding this annual average, regardless of their consumption profile the other days of the winter.

The cost of all of the tools exceeding the average demand must therefore be divided among all of the customers who consume more in winter than their annual average. These excess tools cannot be divided by customer category because they are required globally by all of the customers whose peak demand exceeds the average demand.

2.4 OPTIMIZATIONS OF THE 2017 PLAN

The supply tools to meet the peak demand in the optimized 2017 supply plan are detailed in Table 30 on page 92 of exhibit B-0176, Gaz Métro-2, Document 1, of file R-3970-2016. The supply plan is established based on the demand after interruptions and a continuous peak-day demand of 33,231 10^3m^3. The following table summarizes the information for the tools of the 2017 plan.

[15] See the analysis presented in Schedule 2.

Tableau 4

Outils	Capacité
	(10^3m^3/jour)
Demande de pointe (CT 2017)	***33 231***
Plan 2017 optimisé	
Usine LSR + GM GNL	6 032
Saint-Flavien	1 524
Pointe-du-Lac	1 203
Transport fourni par les clients	426
Outils de transport + STS + Achat/(Vente) de transport	24 046
Total	**33 231**

Source : Plan d'approvisionnement 2017.

As mentioned in section 2.2, this analysis is performed by adding to the continuous demand the demand before interruption of the interruptible-service customers. This increases the peak demand from 33,231 10^3m^3/day to 35,022 10^3m^3/day. Tableau 5 shows how Gaz Métro could respond to this demand based on an optimized plan and on a non-optimized plan.

Tableau 5

Outils	Capacité
	(10^3m^3/jour)
Demande de pointe	***35 022***
Plan 2017 sans optimisation	
FTSH (Dawn - GMIT EDA)	35 022
Plan 2017 optimisé	
Interruptions	1 791[16]
Usine LSR + GM GNL	6 032
Saint-Flavien	1 524
Pointe-du-Lac	1 203
Transport fourni par les clients	426
Outils de transport + STS	24 046
Total	**35 022**

So, optimizing the supply plan makes it possible to replace transportation tools by a quantity of 10,550 10^3m^3/day relative to the non-optimized plan (35,022 10^3m^3 - 24,046 10^3m^3- 426 10^3m^3). The following paragraphs present each of the tools and explain the savings attributable to them.

a) Interruptible

Interrupting customers during the peak day serves to reduce the demand to supply. Based on the current interruptible-service customers, a demand of 1,791 10^3m^3 at peak does not need to be supplied. Gaz Métro can therefore reduce the annual transportation capacities to be contracted by 1,791 10^3m^3 relative to the plan without optimization. At a unit cost of 3.304 ¢/m³, this represents $21.6 M[17].

In exchange, interrupted customers are entitled to a rate discount. In the evidence for the overhaul of interruptible service filed in this case, the peak unit cost for the discount granted

[16] 1,791 10^3m^3/day = Impact of demand before interruption of interruptible-service customers. See section 2.2.

[17] 1,791 10^3m^3 x 365 days x 3.304 ¢/m³ = $21.6 M.

to interruptible customers based on the current offer was evaluated at $12.67/$m^3$[18]. For 2017, the total cost of discounts granted can thus be estimated at $22.7 M[19].

So, based on the existing conditions, interruptible-service customers receive more than 100% of the savings they generate. Continuous-service customers therefore do not benefit from a reduction of their total bill related to the current interruptible offer.

b) LSR plant + LNG customers

The LSR plant has a maximum withdrawal capacity of 5,764 10^3m^3 during the peak day and the exchange between natural gas in a gaseous state and natural gas in a liquid state with LNG customers makes it possible to obtain an additional 268 10^3m^3. Gaz Métro can therefore reduce the annual transportation capacities to be contracted by 6,032 10^3m^3. At a cost of 3.304 ¢/m^3, the LSR plant and the exchange with LNG customers therefore enable a reduction of $72.7 M in the costs to move natural gas[20].

In case R-3800-2012, the cost of the LSR plant – assuming maximum operation – was evaluated at $9.9 M[21]. So, no matter its level of use, the LSR plant will always cost much less for responding to the peak than the equivalent transportation tools.

c) Saint-Flavien

The Saint-Flavien storage site can be used to inject 1,320 10^3m^3 in the network at peak. At a cost of 3.304 ¢/m^3, this site can reduce annual transportation purchases by $15.9 M[22].

Based on the costs of the 2017 Rate Case, the cost associated with the Saint-Flavien site is $13.1 M. The Saint-Flavien site therefore enables savings in the purchase of annual transportation tools.

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[18] B-0134, Gaz Métro-5, Document 2, p. 18.

[19] 1,791 10^3m^3 x $12.67 /$m^3$ = $22.7 M.

[20] 6,032 10^3m^3 x 365 days x 3.304 ¢/m^3 = $72.7 M.

[21] R-3800-2012, B-0013, Gaz Métro-1 Document 1, p. 24.

[22] 1,320 10^3m^3 x 365 days x 3.304 ¢/m^3 = $15.9 M.

d) Pointe-du-Lac

The Pointe-du-Lac storage site can be used to inject 1,203 10^3m^3 in the network at peak. At a cost of 3.304 ¢/m^3, this site can reduce annual transportation purchases by $14.5 M[23].

Based on the costs of the 2017 Rate Case, the cost associated with the Pointe-du-Lac site is $5.0 M. The Pointe-du-Lac site therefore enables savings in the purchase of annual transportation tools.

e) Seasonal transportation tools

The 2017 supply plan did not contain any tools used seasonally (for the winter period only). Normally, the seasonal transportation tools enable savings compared with the annual transportation tools when the demand can be optimized.

f) Customer-provided transportation

Transportation provided by customers is at their cost and directly replaces annual transportation tools of Gaz Métro. Since Gaz Métro does not generate any revenue or incur any cost for this transportation, this tool's impact on customers as a whole is neutral.

g) Transportation tools + STS

Storage Transportation Service (STS) is a firm service for transportation only from early November to late March. So this tool cannot replace an annual firm transportation service. However, its cost is the same as the FTSH equivalent. Therefore, STS does not generate any savings relative to the equivalent transportation tool, but does offer other advantages such as nomination windows. In terms of costs, STS will be addressed with the other transportation tools.

For the 2017 Rate Case, the following transportation tools are available:

[23] 1,203 10^3m^3 x 365 days x 3.304 ¢/m^3 = $14.5 M.

Tableau 6

Outils de transport + STS	Capacité
	(10^3m^3/jour)
Apport à la pointe	*24 046*
FTLH primaire	2 974
FTSH Dawn-EDA	2 903
Transport par échange (Dawn-EDA)	2 164
FTSH Parkway-EDA (ou NDA)	12 219
STS Parkway-EDA (ou NDA)	5 705
Vente de transport	-1 919

On the peak day, with the plan optimized, Gaz Métro is left with an excess 1,919 10^3m^3/day. In the 2017 Rate Case, Gaz Métro planned to utilize 731 10^3m^3/day of primary Firm Transportation Long Haul (FTLH) and 1,188 10^3m^3/day of FTSH Dawn-EDA[24].

Thus, after the planned sale of tools, the annual transportation tools remaining to meet the demand are:

Tableau 7

Outils de transport + STS	Capacité
	(10^3m^3/jour)
Apport à la pointe	*24 046*
FTLH primaire	2 243
FTSH Dawn-EDA	1 715
Transport par échange (Dawn-EDA)	2 164
FTSH Parkway-EDA (ou NDA)	12 219
STS Parkway-EDA (ou NDA)	5 705

[24] R-3970-2016, B-0176, Gaz Métro-2, Document 1, p.93.

To optimize the total costs of moving the commodity, Gaz Métro will seek to contract the annual transportation tools at a lower cost or obtain tools that offer additional options (such as STS).

However, this optimization can be limited by contractual obligations. For example, maintaining primary FTLH may be necessary even if it is more expensive than FTSH Dawn-EDA. Also, for 2017, the transition to Dawn is fully effective only as of November 1, 2016: some primary FTLH tools are still necessary in October of 2016.

With respect to the simple option of purchasing some FTSH Dawn-EDA (Option 1), the difference of the purchases from other points can be noted by comparing the unit cost by point.

Tableau 8

Outils de transport + STS	Capacité	Coût	Coût total
	(10^3m^3/jour)	*(¢/m³)*	*(M$)*
Option 1 Apport à la pointe (FTSH Dawn-EDA)	24 046	3,304	290,0
Option 2 FTLH primaire	2 243	4,640	38,0
FTSH Dawn-EDA	1 715	3,304	20,7
Transport par échange (Dawn-EDA)	2 164	2,853	22,5
FTSH Parkway-EDA (ou NDA)	12 219	2,914	130,0
STS Parkway-EDA (ou NDA)	5 705	2,968	61,8
Total	24 046	3,102	273,0
Surcoût / Économies			**-17,0**

Gaz Métro's annual transportation contracts thus enable savings of $17.0 M relative to the simple purchase of FTSH.

Using the STS Parkway-EDA section makes it possible to generate $7.0 M[25] of these savings. Since this section does not allow for firm transportation year-round, these savings are necessarily related to the surplus cost.

[25] (2.968 ¢/m³ - 3.304 ¢/m³) x 5,705 10^3m^3 x 365 = -$7 M.

The difference of $10.0 M ($17.0 M - $7.0 M) is related to tools that can be used at any time during the year. These tools represent 18,341 10^3m^3/day (= 24,046 10^3m^3/day - 5,705 10^3m^3/day). In a normal winter, 15,596 10^3m^3/day[26] is used on average: 85% of the savings of $10.0 M can be allocated to the usage cost and 15% to the surplus cost.

2.4.1 Comparison of the non-optimized and optimized plans

The optimized plan costs less than the non-optimized plan since it replaces the annual transportation tools with other less expensive (or more functional) options based on the demand[27].

Tableau 9 summarizes the savings achieved taking into account all of the tools used on the peak day.

Tableau 9

Outils	**Coût/économie**
	(M$)
Coût du plan non optimisé[28]	**435,1**
Transport	*201,1*
Équilibrage	*234,0*
Réduction du coût d'utilisation	
Outils de transport	*-8,5*
Réduction des coûts excédentaires	
Usine LSR + Client GNL (à utilisation maximale)	*-62,7*
St-Flavien	*-2,8*
Pointe-du-Lac	*-9,5*
Service STS	*-7,0*
Outils de transport	*-1,5*
Coût du plan optimisé	**343,1**
Transport	*192,6*
Équilibrage	*150,5*

[26] 5,701.6 10^6m^3 (Tableau 1) / 365 days.

[27] In general, the optimizations aim to reduce the costs. However, for specific reasons, Gaz Métro may replace a traditional tool with one that is more expensive.

[28] Distribution of transportation and load-balancing services based on a normal winter (see Tableau 1).

Thus, following the principle of cost causality, the costs of the optimized plan are $192.6 M for transportation (a savings of $8.5 M compared with the non-optimized plan) and $150.5 M for load-balancing (a savings of $83.5 M compared with the non-optimized plan). So the total cost of the transportation and load-balancing tools should be $343.1 M.

To simplify the analysis, it was carried out using only the costs related to the contracted transportation and load-balancing tools. In fact, for the rate case, other costs were associated with the transportation and load-balancing services [29]. The transportation and load-balancing exhibits for the 2017 Rate Case present a total supply cost of $351.1 M[30]. Tableau 10 shows the reconciliation between the above-evaluated cost of $343.1 M for the optimized plan and the cost of $351.1 M in the 2017 plan. Each of the elements presented in the table is subsequently explained.

[29] See exhibit R-3970-2016, B-0253, Gaz Métro-8, Document 8, pp. 1 and 2.

[30] $224.7 M in transportation (R-3970-2016, B-0253, Gaz Métro-8, Document 8, p. 1, l. 48) and $126.4 M in load-balancing (R-3970-2016, B-0253, Gaz Métro-8, Document 8, p. 2, l. 23), for a total of $351.1 M.

Tableau 10

		Coût				Références
		(M$)	*Coût d'utilisat.*	*Coût excédent.*	*Autres coûts*	
1	**Plan optimisé**	**343,1**				
2	*Transport*	*192,6*	x			
3	*Équilibrage*	*150,5*		x		
4	Coûts service interruptible	-21,6		x		1 791 10^3m^3 x 3,304 ¢/m^3 x 365 jrs
5	Transferts (gaz perdu, distribution)	-6,7	x			R-3970-2016, B-0253, p. 1 l. 39 + l. 40
6	Variation d'inventaire	10,3		x		R-3970-2016, B-0253, p. 1, l. 30 + l. 41 + l. 42
7	Cavalier	-10,0	x			R-3970-2016, B-0253, p. 1, l. 44
8	Compression	14,4	x			R-3970-2016, B-0253, p. 1, l. 5 + l. 6 + transport SH[31]
9	GAC + Transport en franchise	0,7	x			R-3970-2016, B-0253, p. 1, l. 22 + l. 25
10	Service de transport Champion	3,9	x			R-3970-2016, B-0253, p. 1, l. 9
11	Entreposage à Dawn	10,6		x	x	R-3970-2016, B-0253, p. 2, l. 3
12	Coût de l'excédent de transport à la pointe	2,3			x	Comparaison du coût total des outils en excédent et des revenus de vente prévus[32]
13	Outils saisonniers octobre 2016	3,3		x		Outils saisonniers FTLH non inclus dans le besoin de pointe.[33]
14	Autres éléments	0,8	x			R-3970-2016, B-0253, p. 1, l. 7 + l. 15 + l. 16
15	**Plan 2017**	**351,1**	195,7	150,8,	4,6	

Explanations related to the reconciliation:

- **Interruptible-customer costs:** The costs of the optimized plan were evaluated by adding to the continuous demand the demand before interruption of the customers

[31] The amount for the compression of the SH transportation tool is not directly presented in the filed exhibits. It is evaluated at $8.7 M.

[32] For the 2017 RC, Gaz Métro has a transportation surplus of $1,919 10^3m^3$/d at the peak of November 2016 to September 2017. At an estimated average cost of 5.23 ¢/m^3, the total cost of this surplus is $33.5 M. Gaz Métro anticipates earning revenues of $31.2 M from the partial sale of these tools, which leaves a net cost of $2.3 M.

[33] In October 2016, Gaz Métro had seasonal tools that were not required to service the peak of 2017. The compression costs included on line 8 have been deducted.

with interruptible service (see section 2.2). The costs related to this additional demand should be removed because, for the 2017 plan, these customers' consumption was in fact considered interrupted.

- **Transfers:** These elements are related to the usage of natural gas for distribution and lost gas. They are part of the demand but are allocated to distribution rather than transportation. They should be removed.
- **Inventory variation:** Given the transfer to Dawn on November 1, 2016, the inventory value has decreased significantly, thereby increasing the transportation costs in the current functionalization.
- **Rider:** The $10 M rate rider comes from Régie decision D-2016-156 in case R-3970-2016[34]. It represents the savings related to the variation of the anticipated location differential between Empress and Dawn between the filing of the 2017 Rate Case and the Régie's decision.
- **Compression:** The compression costs were not considered in the analysis. Since they are functionalized to transportation in the 2017 Rate Case, they must be added.
- **Champion transportation service:** The cost of the Champion transportation service is not part of the transportation costs required to service the peak. However, this cost is functionalized to transportation in the 2017 Rate Case. Consequently, for the purposes of reconciliation with the exhibit filed, the cost of this service must be added[35].
- **CMG and transportation within the franchise:** The costs of CMG and transportation within the franchise were not considered in the analysis. They must be added.
- **Storage at Dawn:** Storage at Dawn makes it possible to use certain nomination windows and provide an alternative source for purchasing supply. However, storage at Dawn does not directly enable moving supply within the franchise. Since

[34] D-2016-156, section 11.6.

[35] Even though it is included in the service cost, the cost of Champion is not considered in the 2017 transportation rate. Indeed, as explained in section 3.3.2, the Northern Zone transportation price was temporarily set to a level equivalent to that of the Southern Zone.

storage at Dawn does not replace transportation tools, this cost was not considered in the analysis.

- **Transportation surplus for peak requirements:** At the time of the 2017 Rate Case, a transportation tool surplus of 1,919 10^3m^3/day[36] was noted. The residual after-sale purchase cost of a significant portion of this surplus must be added. The costs of these tools not needed to meet the peak demand are stranded costs unrelated to temperature (or the peak) or operational flexibility costs.
- **Seasonal tools, October 2016:** FTLH seasonal tools were held in October 2016 but not required for the peak. Therefore, the cost of these tools is not included in the tools required to meet the peak.
- **Other elements:** For the 2017 Rate Case, delivery charges and credits paid or received from customers are required because of the transfer to Dawn. In addition, the delay in the Dawn transfer is generating stranded costs on the Union M12 contract. These temporary costs related to the Dawn transfer are in addition to the costs of the tools to meet the peak in the supply plan.

Of these costs, the transfers, the rate rider, the compression costs and the costs of CMG and transportation within the franchise are related to the usage cost.

With respect to the inventory variation costs, since they are necessarily related to a consumption profile for which the peak exceeds the average demand, they represent surplus costs.

The cost of storage at Dawn can make it possible to reduce the costs of supply for load-balancing or be required for the use of nomination windows. Part of the cost of this storage has to be functionalized to the surplus costs and another part to the operational flexibility costs. In exhibit Gaz Métro-5, Document 6, Gaz Métro proposes to split the costs of storage at Dawn as follows: 78.2% seasonal costs and 21.8% as operational flexibility costs. Out of a total of $10.6 M in Dawn storage costs for the 2017 Rate Case[37], $8.3 M was identified as surplus costs and $2.3 M as operational flexibility costs.

[36] R-3970-2016, B-0176, Gaz Métro-2, Document 1, p. 93.
[37] R-3970-2016, B-0253, Gaz Métro-8, Document 8, p. 2, l. 3.

Finally, the unsold transportation surpluses as well as the gains on assignments of transportation are all associated with stranded costs not related to temperature. These costs are therefore neither usage costs nor surplus costs.

Adding these costs to the optimized plan presented in Tableau 9 results in the following functionalization of costs.

Tableau 11

	Type de coûts	Coûts
		(M$)
1	Coûts d'utilisation (Transport) *(Tableau 10, lignes 2 + 5 + 7 + 8 + 9 + 10 + 14)*	195,7
2	Coûts excédentaires (Équilibrage) *(Tableau 10, lignes 3 + 4 + 6 + 11 + 13 - Tableau 11, ligne 3)*	150,8
3	Flexibilité opérationnelle	2,3
4	Coûts échoués non reliés à la température *(Tableau 10, ligne 12)*	2,3
5	**Total**	**351,1**

2.4.2 Comparison of the optimized plan and the proposed functionalization method

So far in section 2, the costs have been functionalized step by step in order to show their causality. Among the aspects demonstrated, it is important to retain the following:

- All of the costs, other than the operational flexibility costs and the stranded costs unrelated to temperature, are caused by the relative winter peak of each customer. However, using only this relative peak of each customer means that no costs are allocated to customers who have no winter peak;
- To avoid having certain customers in a situation where they benefit from free service, a usage cost must be determined. The allocation of a usage cost has no “causality” other than that of assuring that no customer ends up with free service. So it is preferable to allocate a usage cost linked to the cost of firm tools for the year.
- Since all customers are allocated a usage cost for each unit consumed, the costs exceeding the usage costs cannot be allocated directly based on the customers’

relative peak. To take into account the portion already allocated by the usage cost, the surplus costs have to be allocated based on the difference between the peak and the average demand for all customers.

In exhibit B-0133, Gaz Métro-5, Document 1, Gaz Métro proposes a new way of functionalizing the costs between the transportation and load-balancing services. While the application of this new method is slightly different than the steps followed in section 2.4.1, it relies on the same cost causality to determine the transportation and load-balancing costs.

So, for the usage cost, the proposed functionalization method makes it possible to calculate this cost based on all of the tools that are usable at a given point in the year. To ensure this usage cost is fair and reasonable, the proposed functionalization method uses the average cost of the tools, which allows a neutrality relative to the overall optimization of the costs[38]. The average cost multiplied by the anticipated or actual usage makes it possible to calculate the fairest usage cost to be allocated to each customer for transportation.

Subsequently, the surplus costs, i.e. all other costs except for those related to operational flexibility or stranded costs unrelated to temperature, are functionalized according to the consumption profile. Since the LF represents the average demand versus the customer peak, the subsequent allocation of costs will be relative to the difference between customers' peak consumption and their average demand, which represents the causality of these costs.

Gaz Métro calculated the costs to be functionalized to transportation and to load-balancing for the 2017 Rate Case by applying the proposed method. The detailed results are presented in Schedule 3. The results obtained are similar to the functionalization results presented in Tableau 11, which itself was based solely on the causality of the costs. The following table presents the reconciliation between the two sets of results.

[38] For this topic, see exhibit B-0133, Gaz Métro-5, Document 1, section 6.3.

Tableau 12

		Coûts
		(M$)
1	Coût transport nouvelle méthode *(annexe 3, Coût de transport DT2017, Frais de transport pour revenu requis, l. 14)*	210,1
2	Coût de transport Champion *(Tableau 10)*	3,9
3	Coût excédentaire octobre 2016 estimé	-7,5[39]
4	Écart de coût de compression	-0,9[40]
5	Cavalier tarifaire *(Tableau 10)*	-10,0
6	***Total*** ***(lignes 1 + 2 + 3 + 4 + 5)***	***195,6***
7	Coûts d'utilisation estimés *(Tableau 11)*	195,7
8	*Écart (lignes 6 - 7)*	*-0,1*
9	Coûts excédentaires nouvelle méthode *(annexe 3, Équilibrage, l. 16)*	142,4
10	Coût excédentaire octobre 2016 estimé	7,5
11	Écart de coût de compression	0,9
12	***Total (lignes 9 + 10 + 11)***	*150,8*
13	Coûts excédentaires estimés *(Tableau 11)*	150,8
14	*Écart (lignes 12 - 13)*	*0,0*

The results show that a difference in transportation of approximately $100,000 between the usage costs and the surplus costs is not reconciled. This difference is explained by the estimation of the costs from the plan without optimization whereas the proposed method uses more precise costs.

2.4.3 Cost functionalization conclusion

To obtain the total cost of each service, the costs of the deferred expenses, assets, taxes and returns must be added. Since inventory is needed only for load-balancing purposes

[39] An adjustment of $7.5 M was necessary for the month of October 2016. In section 2.2, a cost of $12.7 M was added to the estimated supply cost, which corresponded to the surplus cost of the FTLH replaced in November 2016 by the FTSH (without compression). However, in terms of the proposal, the cost is instead the projected rate in October 2016 (new method = 8.812 ¢/m³) - the annual rate at Dawn (new method = 3.978 ¢/m³) x October 2016 volumes = $20.2 M. The difference: $20.2 M - $12.7 M = $7.5 M.

[40] The compression costs in the new method are $15.3 M *vs.* the estimated costs of $14.4 M in the current method (Tableau 10).

(for the peak or operational flexibility), all of the inventory-related costs are entered under load-balancing. All that remains for the income tax and return is the effect of the deferred expenses related directly to each service and the lead/lag.

Tableau 13

Revenus requis selon la méthode proposée

	Fourniture	Transport	Équilibrage			Total
			Pointe	Coûts échoués	Flexibilité opér.	
	(M$)	*(M$)*	*(M$)*	*(M$)*	*(M$)*	*(M$)*
Coût nouvelle méthode	0,0	210,1	142,4	2,3	2,3	357,1
Champion	0,0	3,9	0,0	0,0	0,0	3,9
Frais reportés et actifs	0,0	31,9	8,5	0,0	0,0	40,4[41]
Impôts	-0,01	0,5	2,3	0,0	0,0	2,8[42]
Rendement	-0,04	1,3	8,2	0,0	0,0	9,4[43]
TOTAL – Revenu requis	**-0,05**	**247,7**	**161,4**	**2,3**	**2,3**	**413,6**

The analysis of the costs' causality led to a proposed functionalization of the costs that is different from the current functionalization.

[41] Schedule 3, "Revenue Requirement DT-2017" tab, l. 8, col. 6. Equivalent to the total of R-3970-2016, B-0249, Gaz Métro-8, Document 1, l. 7, col. 5 + l. 9, col. 4 and col. 6 – $10 M rate rider.

[42] Schedule 3, "Revenue Requirement DT-2017" tab, l. 10, col. 6. Equivalent to the total of R-3970-2016, B-0249, Gaz Métro-8, Document 1, l. 11, col. 2, col. 4, col. 5 and col. 6.

[43] Schedule 3, "Revenue Requirement DT-2017" tab, l. 11, col.6. Equivalent to the total of R-3970-2016, B-0249, Gaz Métro-8, Document 1, l. 12, col. 2, col. 4, col. 5 and col. 6.

Tableau 14

Fonctionnalisation des coûts

Méthode	Fourniture	Transport	Équilibrage				Total
			Espace	Pointe	Coûts échoués	Flexibilité opér.	
	(000$)	*(000$)*	*(000$)*	*(000$)*	*(000$)*	*(000$)*	*(000$)*
Actuelle[44]	2 272	270 317	77 111	63 911	0	0	413 611
Proposée	-52	247 700	0	161 383	2 300	2 280	413 611

Once the costs have been functionalized, they can be allocated among the customers.

2.5 ALLOCATION OF THE COSTS

In decision D-2016-126, the Régie asked Gaz Métro to break down, for each of the rate categories and subcategories, the customer needs used to establish the supply plan and to justify the assumptions made.

> "*[63] The Distributor should also provide, for each of the rate categories and subcategories appearing in exhibit B-0039, the customer needs used to establish the Plan. The Distributor should present and justify the assumptions made to support the chosen segmentation, taking into account the level of data disaggregation used in the plan. The customer needs should in particular include the following information:*
>
> - *The annual volumes;*
> - *The summer volumes;*
> - *The winter volumes;*
> - *The peak-day needs;*
> - *The extreme-winter needs;*
> - *The load factor (LF);*
> - *The interrupted volumes;*
> - *The MGAI volumes[footer omitted];*
> - *The CMG volumes.*"

[44] R-3970-2016, B-0249, Gaz Métro-8, Document 1, l. 13.

The Régie also asked Gaz Métro to explain in what way the complementarity or non-complementarity of the consumption profiles impacts the economies of scale and their distribution among the customers:

> "*[65] The Distributor should also specify in what way the complementarity or non-complementarity of the consumption profiles of the different customer categories impacts:*
> - *The economies or diseconomies of scale associated with the costs of the tools retained in the plan;*
> - *Their distribution among the different customer categories.* "

Lastly, the Régie asked that the complete supply, transportation and load-balancing cost allocation study (STL Study) be presented according to the current and proposed methods.

> "*[66] In addition, the Régie orders the Distributor to file a document presenting the complete STL Study according to the current methods and another document presenting the complete STL Study according to the proposed methods.* […]".

In section 2.5.1, Gaz Métro reviews the concepts used to respond to the Régie's requests. The distribution and allocation exercises requested in paragraphs 63 and 66 of the decision are presented in sections 2.5.2 and 2.5.3, along with the analysis of the results.

2.5.1 Justifications for the assumptions made

Before beginning the distribution of customer needs and allocation of costs per customer, a review of certain concepts is necessary. This will make it possible to demonstrate how the complementarity of the profiles affects the economies of scale and how they should be distributed.

2.5.1.1 Effect of temperature on consumption and cost allocation

Under the current method, the costs functionalized to transportation and load-balancing are mostly unaffected by the actual observed temperature. The functionalization exercise is carried out at the start of the year based on the projected volume for a normal temperature. Then, depending on the winter observed, a difference in the projected volume will create overpayments or shortfalls that will be returned to the customers via the transportation and load-balancing services. Since the functionalization is never reviewed at year-end, the allocation is never a function of the actual temperature.

In the proposed method, the costs functionalized to transportation and load-balancing are affected by the observed temperature. The costs functionalized to transportation are relative to the number of units actually consumed, which means that during a cold winter, more costs are functionalized to the transportation service and fewer are functionalized to load-balancing[45]. **So, the functionalization adjusts automatically according to whether the perceived temperature is warmer or colder.**

It is thus at the functionalization stage that the temperature's impact can be captured and not at the cost allocation stage since the method of allocating the costs does not influence the total costs to be allocated to transportation and load-balancing.

2.5.1.2 Relativity of the consumption profiles based on the temperature

In reviewing customers' overall consumption for the years 2010 through 2014, the most important factor noted for the variation in customer consumption is always the temperature. For these years, an R^2 of 0.93 to 0.96 was observed (maximum 1)[46] between the demand and the degree-days without taking into account any other factor (working days and non-working days, wind or temperature of the previous day).

Since the daily variation in customers' consumption results almost entirely from the variation in the temperature, it is possible to consider that the customers' consumption profiles are all interrelated based on their CU.

To illustrate this point, here are three different consumption profiles based on normal temperatures.

[45] On this topic, see section 2.2.1.
[46] B-0133, Gaz Métro-5, Document 1, Schedule 4, graphs 47 to 51.

Tableau 15

	A	H	P	Écart H-A	Écart P-H	Écart P-A	Écart H-A	Écart P-H	Écart P-A
	(unités)	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(%)*	*(%)*	*(%)*
Client 1	100	180	300	80	120	200	62 %	71 %	67 %
Client 2	100	150	200	50	50	100	38 %	29 %	33 %
Client 3	100	100	100	0	0	0	0 %	0 %	0 %
Total	**300**	**430**	**600**	**130**	**170**	**300**	**100%**	**100%**	**100%**

Based on the relativity of the consumption profiles, if the temperature is colder than normal, customer 1's consumption will increase more than that of customer 2, whereas customer 3's consumption will not change.

Tableau 16

	A	H	P	Écart H-A	Écart P-H	Écart P-A	Écart H-A	Écart P-H	Écart P-A
	(unités)	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(%)*	*(%)*	*(%)*
Client 1	126	201	300	75	99	174	62 %	71 %	67 %
Client 2	114	160	200	46	40	86	38 %	29 %	33 %
Client 3	100	100	100	0	0	0	0 %	0 %	0 %
Total	**340**	**461**	**600**	**121**	**139**	**260**	**100 %**	**100 %**	**100 %**

The effect is reversed when the temperature is warmer. Customer 1 will reduce its consumption more than customer 2's. And once again, customer 3's consumption will remain the same.

Tableau 17

	A	H	P	Écart H-A	Écart P-H	Écart P-A	Écart H-A	Écart P-H	Écart P-A
	(unités)	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(unités)*	*(%)*	*(%)*	*(%)*
Client 1	78	163	300	85	137	222	62%	71%	67%
Client 2	92	144	200	52	56	108	38%	29%	33%
Client 3	100	100	100	0	0	0	0%	0%	0%
Total	**270**	**407**	**600**	**137**	**193**	**330**	**100 %**	**100 %**	**100 %**

Although the preceding examples present only one variation in the overall winter temperature, variation of the peak would provide the same results: **the relative relationship of the profiles always remains the same.**

2.5.1.3 Calculation of individual and overall customer consumption

To establish the supply plan, it is not useful to calculate each customer's actual or projected consumption amounts, except in the case of certain major gas consumers. This is mainly owing to the fact that the overall consumption of all customers depends almost entirely on the variation of the temperature. So, using total daily consumption data to build the supply plan makes it possible to obtain adequate projection scenarios.

The supply plans, whether for warm winter, cold winter, extreme winter or the peak period, cannot be directly divided among the customers since they are calculated globally and not per customer.

If individual calculations were done, the total projected peak obtained would be higher. Indeed, the calculations are based on historical data. However, the coldest day can be different in each region for a given year. Furthermore, depending on whether the peak is a working day or a non-working day, each customer's individual peak may not occur on the same day either. The result is that the non-coincident peak of customers is always higher than the coincident peak.

The difference between each customer's individual peak and the calculated overall customer peak represents the economies of scale related to an overall planning of the supply for all of the customers instead of for each individual customer. Indeed, if customers each provided their own supply, they would each have to cover their own peak, regardless of whether or not it coincided with that of the other customers. By calculating a peak for all of the customers, the distributor is achieving savings that benefit all customers that have a peak during the winter.

The economies of scale are therefore related to the complementarity of the customers' delivery profiles

2.5.1.4 Distribution of the economies of scale

The elements presented allow for the following conclusions:

- Since the economies of scale are related to the complementarity of the consumption profiles (section 2.5.1.3), they should therefore be allocated based on these profiles.
- For this to occur, the economies of scale must be completely functionalized to the load-balancing service[47]. In section 2.5.1.1, it was mentioned that the proposed method for functionalizing the costs takes into account the effect of the temperature and the actual volumes consumed: the economies of scale are thus automatically in load-balancing.
- The allocation of the costs functionalized to the load-balancing service is done according to the particular profile of the customers (P-A) in each rate class. Given the relativity of the profiles (section 2.5.1.2), the economies of scale will be distributed fairly among the rate classes.

So, using the consumption profile of each rate class enables a precise distribution of the economies of scale.

2.5.1.5 Allocation of the costs for customers with interruptible service

To allocate the costs to interruptible-service customers, it first must be determined how the interruptible service's value will be recognized. On the one hand, interruptible-service

[47] If the economies of scale were instead functionalized to transportation, the allocation would be done according to the customers' volume and not their profile.

customers can be seen as regular customers who make Gaz Métro a *value proposition*. On the other, interruptible customers can be seen as customers who receive an inferior service delivery for which a reduction of the costs (and subsequently the rate) is required.

In exhibit B-0134, Gaz Métro-5, Document 2[48], Gaz Métro explains that the interruptible volumes can be considered a supply source that enables it to limit the costs by limiting the surplus annual transportation tools that need to be contracted. The interruptible service can thus be viewed as a value proposition. In fact, Gaz Métro can make use of other supply options on the market to which the interruptible offer must be compared. For example, Gaz Métro could find tools that would result in the interruptible service not providing it with any value and therefore being useless. In addition, the interruptible offer must provide a benefit to the other customers: otherwise, it amounts to not having an optimal supply plan for the customers with continuous service.

The value proposition model was also validated during a customer survey: customers prefer significant variable premiums to more modest fixed premiums [49]. Furthermore, the existing cost and rate reduction model is not attractive to the interruptible customers, who are migrating a bit more every year to continuous service. Nevertheless, this cost and rate reduction model helps lower customers' rate by an amount that exceeds the savings obtained by reducing the peak tools.

Moreover, the contribution of the interruptible customers lies in the reduction of the annual transportation tools to meet the peak. This cost reduction does not depend on the number of days of interruption required. Indeed, if interruptible customers make it possible to reduce the transportation tools required by 10,000 m^3/day and an equal distribution of the savings among the interruptible- and continuous-service customers is targeted, then the value will always be *10,000 ³/day x 50% x Annual transportation cost*, regardless of the number of days of interruption projected.

So, for the interruptible service to provide greater value, as much for the customers who offer this service as for the continuous-service customers, the contribution of the

[48] See section 4.1.1.

[49] Most of the customers surveyed expressed a greater interest in an interruptible model that provides a very substantial financial advantage only when there are interruptions. On this topic, see section 6.2.2 of exhibit B-0134, Gaz Métro-5, Document 2.

interruptible service must be considered a supply cost, the same as the other tools purchased to service the peak demand. This cost should be allocated to all customers, in the same manner as the supply tools.

At present, allocation of the load-balancing costs to the interruptible service is done by modifying the A, H and P parameters based on the number of days of interruption[50]. This inferior allocation is a result of the fact that the interruptible service is currently viewed as a lower quality service. To the extent that it would from now on be seen as a supply "tool," allocation of the costs to interruptible service must be based on the actual consumption profile and thus unmodified parameters.

2.5.2 Distribution of customer's needs

Based on the principles stated in the preceding sections, Gaz Métro broke down the customer needs among each of the rate categories and subcategories, as requested in paragraph 63 of decision D-2016-126. The distribution results are presented in Schedule 4.

2.5.3 Cost allocation study

The complete allocation study based on the **current** methods and rates is presented in Schedule 5. The complete allocation study based on the **proposed** methods and rates is presented in Schedule 6.

The cost allocation study ultimately makes it possible to measure the level of cross-subsidization, i.e. the difference between the costs and revenues in each customer category and for each of the services. For the measurement of cross-subsidization to be adequate, each of the steps in the allocation study must be based on the same causality. The functionalization between the services, the allocation between the rate classes and the revenues generated were therefore evaluated based both on the current methods and rates and on the proposed methods and rates. This resulted in different costs and revenues for each service presented in schedules 5 and 6.

[50] Exhibit R-3559-2005, SCGM-12, Document 11, section 2.

Also, since the functionalization and rates of the supply, transportation and load-balancing costs aim to be connected as closely as possible to the causality of the costs (see section 5), the cross-subsidization for these services should be close to 100% for all of the customers.

However, in the current allocation (Schedule 5 – "Detailed summary" tab), the cross-subsidization varies significantly[51]. There are two reasons for this:

- Certain current allocation factors are not representative of the cost causality presumed in the current functionalization, such as, for instance, revenue;
- The formula used to obtain the A, H and P parameters modified based on the number of days of interruption does not well represent Gaz Métro's actual costs.

Gaz Métro produced a cost allocation for its proposed method that follows the causality noted when functionalizing the costs. Since the allocation factors are the same as the factors used to functionalize the costs, and since the contribution of the interruptible service is recognized as a value proposition rather than a reduction of the allocation, the level of cross-subsidization is approximately 100% for all of the customers[52].

Tableau 18 and Tableau 19 present the results of the current allocation and the proposed allocation.

[51] For example, in load-balancing, for rate $D_{5.08}$, the cross-subsidization measurement is -584% (Schedule 5, "Detailed summary" tab, column P, l. 23).

[52] In supply, the result varies from 96% to 101% because the allocation factor does not distinguish between the system gas customers and the fixed-price gas customers, which produces a distortion in the cross-subsidization measurement.

Tableau 18

Allocation des coûts - Méthode actuelles

	Fourniture (excluant molécule)			Transport			Équlibrage		
	Revenus	Coûts	Interfin	Revenus	Coûts	Interfin	Revenus	Coûts	Interfin
	(M$)	*(M$)*	*(%)*	*(M$)*	*(M$)*	*(%)*	*(M$)*	*(M$)*	*(%)*
D_1 0 - 36 500	0,57	0,72	80%	34,29	33,62	102%	31,18	28,69	109%
D_1 36 500 - 109 500	0,45	0,55	82%	26,63	26,03	102%	24,09	22,66	106%
D_1 109 500 - 1 095 000	0,84	0,90	94%	44,90	43,15	104%	43,32	43,29	100%
D_1 1 095 000+	0,30	0,36	83%	19,62	18,94	104%	14,30	15,93	90%
D_3	0,01	-0,04	-34%	10,54	10,87	97%	2,37	2,19	108%
D_4	0,07	-0,17	-39%	121,51	125,02	97%	25,59	24,36	105%
D_5	0,03	-0,05	-53%	12,82	12,69	101%	0,18	3,90	5%
Total	**2,27**	**2,27**	**100%**	**270,32**	**270,32**	**100%**	**141,02**	**141,02**	**100%**

Tableau 19

Allocation des coûts - Méthode proposée

	Fourniture (excluant molécule)			Transport			Équlibrage		
	Revenus	Coûts	Interfin	Revenus	Coûts	Interfin	Revenus	Coûts	Interfin
	(M$)	*(M$)*	*(%)*	*(M$)*	*(M$)*	*(%)*	*(M$)*	*(M$)*	*(%)*
D_1 0 - 36 500	-0,01	-0,01	101%	30,21	30,21	100%	42,84	42,84	100%
D_1 36 500 - 109 500	-0,01	-0,01	101%	23,35	23,35	100%	29,00	29,00	100%
D_1 109 500 - 1 095 000	-0,01	-0,01	101%	38,29	38,29	100%	38,95	38,95	100%
D_1 1 095 000+	-0,01	-0,01	101%	16,89	16,89	100%	14,24	14,24	100%
D_3	0,00	0,00	97%	9,96	9,96	100%	2,11	2,11	100%
D_4	-0,01	-0,01	96%	112,77	112,77	100%	22,29	22,29	100%
D_5	0,00	0,00	96%	11,65	11,65	100%	16,54	16,54	100%
Total	**-0,05**	**-0,05**	**100%**	**243,12**	**243,12**	**100%**	**165,96**	**165,96**	**100%**

The cross-subsidization measurement represents the difference between the causality used in the functionalization of the costs, the allocation of the costs and the production of the rates. Since these three elements aim to represent the same causality, it shows that there is a lack of consistency in the current method. Either the cost functionalization and service pricing should be modified to better represent the causality of the costs or else the allocation should be modified to be more representative of the cost functionalization.

In the proposed method, the same causality relationships were used for the cost functionalization, cost allocation and rate proposals. Consequently, there is no cross-subsidization between the costs and revenues.

3 FUNCTIONALIZATION OF THE CHAMPION PIPELINES

In the 2015 Rate Case[53], Gaz Métro had proposed merging the Northern and Southern zones for transportation service effective November 1, 2016. The Régie refused to render a decision on the merger, asking Gaz Métro to first present an analysis on the functionalization of the Champion pipelines and the pipelines that it owned[54].

Following a new request to merge the zones in the 2017 Rate Case, the Régie again deferred its decision:

> "*[295] The Régie considers the merger of the Northern and Southern zones an issue that requires reflection and in-depth analysis, particularly with respect to the potential impacts of migration and competition on the transportation service, but also with respect to the issues related to cross-subsidization and the allocation of the Champion costs.*
>
> […]
>
> *[298] The Régie therefore deems it more appropriate to rule on the merger of the Northern and Southern zones based in particular on the functionalization of the Champion pipeline and on the other rate-related implications.* ***For these reasons, the Régie postpones the discussion on merging the Northern and Southern zones for transportation service within the scope of case R-3867-2013.*** "[55]

[53] R-3879-2014, B-0421, Gaz Métro-16, Document 1, section 2.5.

[54] D-2015-181, paragraph 129.

[55] D-2016-156.

This section is intended to respond to the Régie's requests concerning the merger of the zones and functionalization of the costs of Champion and the transmission pipelines.

3.1 BACKGROUND

The costs of the Champion pipelines have, since Gaz Métro's acquisition of Gaz provincial du Nord du Québec in 1985, always been functionalized to the transportation service. In the 2000 Rate Case (R-3426-99), which was held before the rate unbundling, exhibit SCGM-8, Document 8 presented the Champion costs as part of the transportation costs[56]. When the rates were unbundled in 2001, the Champion costs were therefore naturally kept as part of the transportation service and have remained there since. Consequently, in the 2017 Rate Case, the Champion costs are included in the transportation costs[57].

As for the other transmission pipelines belonging to Gaz Métro, their costs are functionalized to the distribution service.

Since the rate unbundling, the costs of the Champion pipelines functionalized to the transportation service are recovered from the Northern Zone customers while the costs of the transmission pipelines functionalized to the distribution service are recovered from all customers, including those in the Northern Zone.

Previously, the transportation tools between Empress and GMIT-NDA (Northern Zone) were significantly less expensive than those between Empress and GMIT-EDA (Southern Zone). The positive difference for the Northern Zone customers offset the additional cost related to Champion. Since the transition to Dawn, the cost between Dawn and GMIT-NDA is close to that between Dawn and GMIT-EDA[58]. The functionalization of the Champion costs to transportation and their pricing for Northern Zone customers only thus generates a differential between the bill of a Northern Zone customer and that of an identical Southern Zone customer. For the 2017 Rate Case, the difference between the prices of each of the zones is 2.062 ¢/m^3[59].

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[56] R-3426-99, SCGM-8, Document 8, p. 1, l. 3.

[57] R-3970-2016, B-0253, Gaz Métro-8, Document 8, p. 1, l. 9.

[58] The fixed price of the Dawn-Parkway-GMIT EDA services is 2.920 ¢/m^3 and that of the Dawn-Parkway-NDA services in October 2016 is 2.477 ¢/m^3.

[59] Difference between lines 23 and 22 of exhibit R-3970-2016, B-0259, Gaz Métro-11, Document 7, p. 1. It should be noted, as explained in section 3.3.2, that the prices of the Northern and Southern zones were temporarily harmonized.

3.2 COMPARISON OF THE CHAMPION PIPELINES AND GAZ MÉTRO'S TRANSMISSION PIPELINES

The Régie, the stakeholders and Gaz Métro agreed on the similarity of the Champion pipelines and the transmission pipelines owned by Gaz Métro[60]. Gaz Métro reiterates that those pipelines provide the same service.

In both cases, they are steel pipelines moving high-pressure gas: the pressure class is over 4,000 kPa.

The network design criteria of the Champion pipelines and the transmission pipelines are the same[61]. They are designed to meet the peak demand of the continuous-service customers only: during the design process, the hourly volume of the interruptible-service customers is not taken into account.

As well, their sole function is to deliver the volumes of natural gas required by customers during the year. Unlike the distribution pipes, they do not have the function of providing access to the gas network to the customers connected to them.

Since the rate unbundling, Gaz Métro has allowed customers to withdraw from services they can provide themselves, i.e. supply, compression, transportation and load-balancing. The price of these services offered by Gaz Métro essentially reflects the price of the same services on the market. However, for the Champion pipeline, it was never possible for customers to contract the transportation service themselves. Unlike all of the other transportation service tools, customers are thus captive to the transportation provided by Champion in the same way it is captive to the transportation provided by Gaz Métro's transmission pipelines.

The Champion pipelines extend from Ontario to Québec and are regulated by the National Energy Board. Gaz Métro's transmission pipelines are part of the distribution network and only extend through Québec. They are regulated by the Régie.

The functionalization of the pipelines to various services (see section 3.1) generates differences in the allocation and pricing of the costs associated with these pipelines. To begin with, the Champion costs are allocated and priced based on the volumes withdrawn in the Northern Zone.

[60] D-2015-181, paragraph 125.

[61] These criteria are presented in exhibit B-0100, Gaz Métro-2, Document 13.

So there is no cross-subsidization related to the Champion costs between the Southern Zone customers and those in the Northern Zone. As for the costs of Gaz Métro's transmission pipelines, they are allocated based on the factor of capacity attributed and used (CAU)[62]. However, they are priced differently according to a rate structure approved by the Régie. The difference between the allocation and pricing creates a certain cross-subsidization between the rate classes.

Finally, whereas the return authorized by the Régie and recovered in the distribution service includes compensation on the value of Gaz Métro's transmission pipelines, the return specific to Champion is included in the cost charged to Gaz Métro and functionalized to transportation.

3.3 ANALYSES

Various analyses have been produced to propose a suitable solution for merging the zones and for functionalizing the costs. They are presented in the following sections.

3.3.1 Functionalization to the same service

As mentioned in section 3.2, the Champion pipelines and Gaz Métro's transmission pipelines provide the same service. These pipelines:

- Are steel and move high-pressure gas;
- Are designed to meet the peak demand of the continuous-service customers;
- Deliver natural gas but do not of enable access to the gas network;
- Cannot be replaced by another transportation tool.

In the 2015 Rate Case, in response to a request for information from the Industrial Gas Users Association (IGUA), Gaz Métro explained:

> "*When gas distributors GMi, Gaz Inter-Cité Québec (GICQ) and Gaz Provincial du Nord du Québec (GPNQ) were merged in 1985[footnote omitted], the three companies' distribution and transmission networks were combined into one large network. At that time, the Champion Pipeline corporation (Champion) was also acquired from Northern & Central Gas Corporation, but there was no merger and it remained a separate entity from GMi. Champion's assets were therefore not merged with those of Gaz Métro and consequently*

[62] D-2016-100, section 9.1.

> *not included in its rate base. Moreover, Champion's pipelines have essentially the same function as the transmission pipelines belonging to Gaz Métro.*"[63]

Therefore, if Champion's assets had been included in Gaz Métro's rate base, Champion's pipelines would have likely been treated as other Gaz Métro transmission pipelines.

The fact that the Champion pipelines and Gaz Métro's transmission pipelines are functionalized to different services creates an unfairness between the customers in the two zones. The costs of Champion's pipelines are recovered exclusively from the customers who use them, namely those in the Northern Zone. This is not the case for the costs of Gaz Métro's transmission pipelines, which are recovered from the entire customer base through the distribution rates, even for those pipelines used only by the customers in the Southern Zone. Functionalizing the costs of those pipelines to the same service and allocating and pricing them the same way could remove this unfairness.

For these reasons, Gaz Métro proposes functionalizing the costs of Champion's pipelines and Gaz Métro's transmission pipelines to the same service[64] and allocating and pricing their costs the same way.

3.3.2 Alignment of the Northern and Southern Zone rates

The arguments in support of merging the Northern and Southern zones were presented in detail in the 2015 Rate Case[65] and were repeated in the 2017 Rate Case[66]. Essentially, Gaz Métro had presented three elements in favour of merging the two transportation-service zones based mainly on fairness between the customers:

- The principle of not discriminating between customers based on their location, adopted by the Régie during the creation of Gaz Métro and since reiterated;
- Integration of the Northern and Southern Zone transportation services so that the zones' cost structures are not entirely separate and isolated; and

[63] R-3879-2014, B-0412, Gaz Métro-27, Document 2, response to question 3.2 in Request for Information No. 1 from IGUA.

[64] The service in question to which the pipeline costs should be functionalized is presented in section 3.4.

[65] R-3879-2014, B-0421, Gaz Métro-16, Document 1, section 2.5.4.

[66] R-3970-2016, B-0077, Gaz Métro-11, Document 3, section 3.1.

- The anticipated unfavourable rate difference for the Northern customers owing to the investments in Champion.

These arguments are still relevant today.

In decision D-2015-181, the Régie indicated that it agreed with the arguments put forward by Gaz Métro to justify the merger[67]. While awaiting the filing of the analysis on the functionalization of Champion's pipelines and Gaz Métro's pipelines, the Régie had, moreover, approved applying a single rate to the transportation service for all customers and the creation of a deferred expense account (DEA) to record the difference between the revenues generated by the application of identical rates for the customers of the Northern and Southern zones and the revenues that would have been generated by the Northern Zone customers if the temporary harmonization request had been denied[68].

Gaz Métro reiterates the importance of having a single zone for the transportation service.

3.3.2.1 Impact on migrations to the transportation service

Merging the zones for the transportation service would result in offering a single price for Gaz Métro's service that should be competitive with the market alternatives of two separate zones. Following the merger, Gaz Métro's transportation rate would be based on the overall supply costs, including the tools for transportation to GMIT-NDA and to GMIT-EDA. Customers would therefore theoretically be exposed to a difference between the price of the distributor's service, the prices of the Northern Zone market and the prices of the Southern Zone market.

Here is a simple example based on the transportation volumes and prices in the 2017 Rate Case[69] that illustrates the problem.

[67] D-2015-181, paragraphs 126 and 127.
[68] D-2015-214 (paragraph 95) and D-2016-156 (paragraph 299).
[69] R-3970-2016, B-0259, Gaz Métro-11, Document 7, p. 1, l. 7 to 11.

Tableau 20

	Coût unitaire Marché primaire	Volume	Coût
	(¢/m³)	*(10^6 m³)*	*(000 $)*
Zone Nord	2,682	154	4 119
Zone Sud	3,181	5 384	171 243
Total		**5 538**	**175 362**
Tarif zones fusionnées	3,167	5 538	175 362

To begin with, Gaz Métro notes that the transportation price differential on the primary market is relatively low, namely 0.499 ¢/m³.

In this example, if there are no migration rules, Northern Zone customers would be better off contracting their own transportation service and Southern Zone customers would be better off using the distributor's service. In the long term, if the customers that have the option of migrating to their own service in the Northern Zone decided to supply the needed transportation capacity themselves, the distributor's prices would tend toward the higher price in the Southern Zone. The customers captive of the distributor in the Northern Zone would be disadvantaged as a result.

Customers that want to provide their own transportation service must consume at least 75,000 m³ per year and cannot be engaged in distribution rate D_5[70]. These requirements prevent 97% of Northern Zone customers from providing their own transportation.[71] At present, no Northern Zone customers provide their own transportation service. In fact, there are no volumes delivered by customers in the Northern Zone projected in the 2017 Rate Case[72].

Furthermore, rules exist to prevent a customer that wants to migrate between the services based on market opportunities from doing so to the detriment of the other customers. The rules restrict a customer that withdraws from the distributor's service to being assigned

[70] *Conditions of Service and Tariff,* article 18.2.2.

[71] Based on data for 2016.

[72] R-3970-2016, B-0259, Gaz Métro-11, Document 7, p. 1, l. 26.

transportation capacities for a period equivalent to the average of the transportation contracts held by Gaz Métro[73], i.e. close to 15 years. It should be noted that Gaz Métro proposed in Phase 2 of this case that the assignment of transportation capacities for customers wanting to provide their own transportation have a duration of five years. The rules concerning the return to the distributor's service would nevertheless be tightened, as would those concerning the minimum yearly obligations for customers whose peak requirement is higher than or equal to 300 10^3m^3[74].

Gaz Métro estimates that with the rules for entering and leaving the transportation service, and given the low differential between the transportation prices on the primary market of the Northern and Southern zones, the risk created by customer migrations following the merger would be low.

From a conceptual perspective, merging the transportation-service zones, and thus applying a single rate for the entire franchise, should also be accompanied by uniformity in the market opportunities available to the customers. However, the market alternatives are different for the customers in the Northern and the Southern zones. a mechanism that could mitigate the differential between the two zones would be to apply a rate rider equal to the difference in the cost of transportation on the primary market.

However, Gaz Métro's transportation service, as well as its alternatives on the secondary market, have prices that vary over time and are not necessarily the same as the primary market prices. a rate rider based on the price differential of the primary market would therefore not perfectly cover the differences between the market prices of the two zones.

Furthermore, applying a rate rider for customers that provide their own transportation makes the rate structure more complex because it exposes customers to more prices and conditions.

[73] *Conditions of Service and Tariff*, Article 12.2.3.1.1.

[74] B-0136, Gaz Métro-5, Document 3, sections 1.3.2 and 1.4.

Given the following elements:

- The recognized advantages of merging the transportation-service zones;
- The low differential on the primary market between the price of transportation in the Northern Zone and its price in the Southern zone;
- The strict existing and proposed migration rules for the transportation service; and
- The fact that no customers currently provide their own transportation in the Northern Zone.

Gaz Métro feels that there are no issues related to the possible migration of customers in the Northern Zone to their own transportation service should the zones be merged and that there is no need to apply rate measures aimed at mitigating such migrations.

3.3.3 No free service

The transportation service is comprised of a rate for customers of the distributor's service and a rate for customers providing their own service (articles 12.1.2 and 12.2.2 respectively of the *Conditions of Service and Tariff)*. This dual pricing comes from functionalizing the Champion costs to the transportation service. Since the customers in the Northern Zone cannot contract this service from another supplier, they must continue to pay the price related to the Champion pipelines when they leave the distributor's service.

It has already been noted in section 3.3.1 that the Champion pipelines and Gaz Métro's transmission pipelines should be functionalized to the same service. If they are functionalized to the transportation service, a separate rate for customers providing their own transportation should then be maintained to ensure there is no free service.

Gaz Métro should in that case distinguish the return, the amortization and a part of the cost of distribution attributable to its own transmission assets from its distribution revenue requirement in order to recover it through the transportation rate.

Furthermore, in the case where the two zones are maintained, functionalizing the transmission pipelines to transportation could necessitate evaluating the pipelines' economic value in each zone. As Gaz Métro has already mentioned[75], complex hypotheses should be considered to determine the costs by region recovered by each regional rate.

If the transmission pipelines of Gaz Métro and Champion were functionalized to the distribution service, the rate for customers providing their own transportation service (article 12.2.2 of the *Conditions of Service and Tariff*) would simply be eliminated.

3.3.4 Clear price signal for supply services

Gaz Métro notes that the desired goal of unbundling the rates was to give customers a broader range of choice enabling them to better manage their energy needs without, in the process, having certain customers gain an advantage to the detriment of the others. Therefore, customers should be given a clear indication of prices for the services they can contract directly from external suppliers; for the unbundled services, the principle of “user pays” should be respected. This would enable customers to directly compare the price of Gaz Métro’s supply services (supply, transportation and load-balancing) to the prices on the market.

However, the Champion costs, functionalized to the transportation service, are the exception to the rule. Since the Northern Zone customers could not contract this service themselves, it was necessary to evaluate a separate price for those pipelines during unbundling. This rate indicated to the customers in the Northern Zone that some transportation still needed to be paid after they had provided their own transportation to the GMIT-NDA delivery point.

The price signal enables a customer to choose among alternative services and reflects the causality of the costs. Functionalizing Champion to transportation alters the price signal. To begin with, the rate for Gaz Métro’s transportation service presented in article 12.1.2.1.1 of the *Conditions of Service and Tariff* includes a part related to Champion, whereas the cost of the alternate tools to the GMIT-NDA delivery point excludes it; customers have to add the rate in article 12.2.2.1 to the cost of the alternative. And given the alignment between the transmission pipelines of Champion and Gaz Métro, whereas

[75] B-0149, Gaz Métro-2, Document 18, p. 27.

the Champion cost should be allocated based on the CAU factor, it is recovered based on the volumes withdrawn.

Functionalizing the costs of an exclusive service such as Champion to transportation limits the price signal sent to the customer.

3.4 GAZ MÉTRO PROPOSAL

The analyses have enabled the following observations:

- The costs of the Champion pipelines and Gaz Métro's transmission pipelines should be functionalized to the same service. They should also be allocated and priced the same way;
- All of the customers in a given rate category using Gaz Métro's service should benefit from the same rate conditions, regardless of their location;
- The importance of not having free service requires the addition of an extra rate when an exclusive service is functionalized to transportation; and
- The rates should enable a clear price signal so customers can choose the most advantageous services for them.

For these reasons, Gaz Métro proposes functionalizing the transmission pipelines of Champion and Gaz Métro to the distribution service and allocating its costs based on the CAU factor. Furthermore, Gaz Métro proposes merging the transportation-service rates of the Northern and Southern zones.

3.4.1 Impact on customers

The costs associated with Champion for the 2017 Rate Case total $3.9 M[76]. Tableau 21 presents the variation in the revenue requirement of the 2017 Rate Case if the Champion costs had been functionalized to the distribution service the same as Gaz Métro's transmission pipelines.

[76] R-3970-2016, B-0253, Gaz Métro-8, Document 8, p. 1, l. 9.

Tableau 21

Fonctionnalisation des coûts de Champion en distribution

		Transport	Distribution
(1)	Revenu requis initial *(M$)*[77]	460,8	526,5
(2)	Revenu requis 2017 *(M$)*[78]	269,5	532,1
(3)	Champion *(M$)*	-3,9	3,9
(4) = (2) + (3)	Revenu requis - Champion fonctionnalisé au service de distribution *(M$)*	265,6	536,0
(5) = (4) / (1) - 1	Variation par rapport au revenu initial	-42,4 %	+1,8 %
(6) = (4) / (2) - 1	Variation par rapport au revenu requis approuvé dans la décision D-2016-156	-1,5 %	+ 0,7 %

Functionalizing the Champion costs to the distribution service for the 2017 Rate Case would have decreased the required revenue for the transportation service by 1.5% and increased the required revenue for the distribution service by 0.7%.

For the transportation service, this variation directly results in a 1.5% rate decrease. Indeed, the rate is established by dividing the required revenue by the volumes subject to the rate which remain constant.

In the case of distribution, given the approved rate strategy which aims to evenly distribute the variations in required revenue across all rate classes, the rates for this service would have generated a 0.7% increase in the projected revenue for all customers.

The following table presents the rate impacts on the total bill, assuming a supply price of 13.678 $¢/m^3$[79] and a cap and trade system (CATS) price of 3.326 $¢/m^3$.

[77] R-3970-2016, B-0250, Gaz Métro-8, Document 2, l. 2.

[78] R-3970-2016, B-0250, Gaz Métro-8, Document 2, l. 1.

[79] R-3970-2016, B-0176, Gaz Métro-2, Document 1, p. 37, Table 5, Price at Dawn, 2016-2017: $3.61/GJ converted to $¢/m^3$.

Tableau 22

	D_1 Petit	D_1 Grand	D_3	D_4	D_5
Variation de la facture totale	+0,3 %	+0,1 %	+0,1 %	-0,1 %	- 0,2 %

3.4.2 Changes to the *Conditions of Service and Tariff*

The proposed merger would lead to the following changes in the text of the *Conditions of Service and Tariff*.

To begin with, the reference to Northern and Southern zones would be removed from articles 12.1.2.1 and 12.1.2.1.1.

« ***12.1.2.1. Prix du transport***

Pour chaque m^3 de volume retiré, le prix du transport, en date du 1er novembre 2016, est de 4,291 ¢/m^3.

Les prix du transport peuvent être ajustés périodiquement pour refléter le coût réel d'acquisition.

~~***12.1.2.1.1. – Prix de base du transport***~~

~~*Pour chaque m^3 de volume retiré, les prix de base du transport, en date du 1er novembre 2016, sont les suivants :*~~

~~***zone Sud***~~	~~***zone Nord***~~
~~*4,291 ¢/m^3*~~	~~*4,291 ¢/m^3*~~ »

Next, with the proposal to functionalize the Champion costs to the distribution service, customers providing their own transportation service shall not be billed the distributor's transportation price. Therefore, articles 12.2.1 and 12.2.2.1 would be modified accordingly.

« ***12.2.1 APPLICATION***

Pour tout client qui désire fournir au distributeur le transport servant à acheminer jusqu'au territoire du distributeur le gaz naturel qu'il retire à ses installations.

Sous réserve de l'article 18.2.2, seuls les clients en service de distribution D_1, D_3 et D_4 peuvent fournir au distributeur leur propre transport. ~~*De plus, les clients de la zone Nord doivent continuer à utiliser une partie du service de transport du distributeur.*~~ »

« ***12.2.2.1 Prix du service du distributeur***

~~*Pour chaque m³ de volume retiré, le prix de transport, en date du 1er novembre 2016, est le suivant :*~~

~~*zone Sud*~~	~~*zone Nord*~~
~~*n/a*~~	~~*2,561 ¢/m³*~~

~~*Le prix de transport peut être ajusté périodiquement pour refléter le coût réel d'acquisition.*~~

The distributor receives the natural gas from the customer at the agreed upon delivery point and delivers it to the customer at its facilities. The customer shall not be billed for the distributor's natural gas transportation price. "

Finally, the concept of "zone" will no longer be required. Article 1.3 will thus be changed to reflect these proposals.

« ***1.3 DÉFINITIONS***

[…]

~~***Zone Nord***~~

~~*La région de l'Abitibi-Témiscamingue desservie par le distributeur.*~~

~~***Zone Sud***~~

~~*L'ensemble du territoire desservi par le distributeur à l'exception de la zone Nord.*~~ »

3.4.3 Deferred expense account

As explained in section 3.3.2, in decisions D-2015-214 and D-2016-156 the Régie approved applying a single rate to the transportation service for all customers and the creation of a deferred expense account (DEA) to record the difference between the revenues generated by the application of identical rates for the customers of the Northern and Southern zones and the revenues that would have been generated by the Northern Zone customers if the temporary harmonization request had been denied. Insofar as Gaz Métro proposes to merge the Northern and Southern zones, it also proposes that at the time of this merger, the amounts held in the DEA be distributed among the customers in both zones based on the volumes they have consumed.

Gaz Métro asks the Régie to approve:

- **Functionalizing the costs of the Champion pipelines and Gaz Métro's transmission pipelines to the distribution service and allocating its costs based on the CAU factor;**
- **Merging the Northern and Southern zones to the transportation service;**
- **Distributing the amounts held in the DEA created following decision D-2015-214 to all customers in both zones based on the volumes consumed; and**
- **Making the proposed changes to articles 1.3, 12.1.2.1, 12.1.2.1.1, 12.2.1 and 12.2.2.1 of the *Conditions of Service and Tariff*.**

4 BENCHMARKING

In paragraph 72 of its decision D-2016-126, the Régie ordered the Distributor to submit additional evidence regarding the:

> "*[72]* […] *benchmarking of the methods of allocating the supply, transportation and load-balancing costs used by other North American gas distributors;* […]"

The Régie later continued by indicating it felt that, in addition to allocation, this benchmarking should also focus on the pricing of those same services:

> "*[74]* […] *benchmarking of the pricing of the supply, transportation and load-balancing services used by other North American gas distributors;* […]"

Gaz Métro therefore turned to the American Gas Association (AGA) and the Canadian Gas Association (CGA) to obtain the desired information.

The result of these surveys is presented in the following tables.

Tableau 23

Facteurs principaux d'allocation selon le service

Distributeur	Fourniture	Compression	Transport	Équilibrage
Gaz Métro	Volume	Volume	Volume	Moyennes annuelle, hivernale et pointe
Pacific Northern Gas	Volume	Volume	Volume et distance	Capacité
FortisBC	Volume	Volume	Capacité	Capacité
AltaGas	n/a	n/a	Capacité	Capacité
SaskEnergy	Volume	Volume	Capacité	Volume
Enbridge Gas Distribution	Volume	Volume	Volume	Moyennes annuelle, hivernale et pointe
Delta Natural Gas	Volume	Volume	Volume	n/a
Questar Gas	Volume et pointe	Volume et pointe	Volume et pointe	Volume et pointe
ENSTAR Natural Gas	Volume	Volume	Volume et pointe 3 jours	n/a
Xcel	Volume	Volume	Capacité	Volume

Note that "peak" refers to the maximum daily consumption observed. When the term "capacity" is used, the respondents did not specify if it referred to pre-established capacity or a capacity derived from the consumption history.

The following table indicates the main pricing factor by service. This factor is greyed when it differs from the main allocation factor. Also, the "Services" column indicates whether the distribution and transportation services are bundled or not.

Tableau 24

Facteur principaux de tarification selon le service

Distributeur	Fourniture	Compression	Transport	Équilibrage	Services
Gaz Métro	Volume	Volume	Volume	Moyennes annuelle, hivernale et pointe	Dégroupés
Pacific Northern Gas	Volume	Volume	Volume	Volume	Groupés
FortisBC	Volume	Volume	Capacité	Capacité	Groupés
AltaGas	n/a	n/a	Capacité	Capacité	Groupés
SaskEnergy	Volume	Volume	Capacité	Volume	Groupés
Enbridge Gas Distribution	Volume	Volume	Volume	Moyennes annuelle et hivernale et pointe	Dégroupés
Delta Natural Gas	Volume	Volume	Capacité	n/a	Dégroupés
Questar Gas	Volume et pointe	Volume et pointe	Volume et pointe	Volume et pointe	Dégroupés
ENSTAR Natural Gas	Volume	Volume	Moyennes annuelle et pointe	n/a	Dégroupés
Xcel	Volume	Volume	Capacité	Volume	Dépend selon l'état

While the application of the supply, compression and transportation services is universal, Gaz Métro notes that such is not the case for load-balancing. In fact, load-balancing, as Gaz Métro defines it, is included in the supply service by the other distributors. Load-balancing for the other distributors relates more to the volume imbalances that Gaz Métro treats in the supply service. Moreover, the load-balancing service is not unbundled by any of the respondent distributors.

5 CROSS-SUBSIDIZATION

In addition to the benchmarking of the supply, transportation and load-balancing service pricing discussed in the previous section, the Régie ordered Gaz Métro in decision D-2016-126 to submit additional evidence on various topics related to rates and conditions of service. These topics, listed in paragraph 74 of the decision, will be addressed in the following sections (sections 5 to 9).

To begin with, the Régie asked for clarification regarding the:

> "*[74]* […] *principles to consider relative to cross-subsidization between the different customer categories for the supply, transportation and load-balancing services;* […]"

The desired goal of unbundling the rates was to give customers a broader range of price options enabling them to better manage their energy needs. It amounted to, among other things, promoting free competition in all of the services available to natural gas consumers and thus having them pay the true cost of each service (except distribution). In decision D-96-44[80] concerning the opportunity to offer or not unbundled services, the Régie stated:

> "*In fact, the Régie is of the opinion that market forces should apply wherever possible when the nature of things does not strictly impose the existence of a monopoly, and doing this requires a choice of services and suppliers.*
>
> *To the extent that the advantages granted to a particular customer do not run counter to the interests of the customers as a whole, the Régie feels that consumers should pay only for the services that they deem necessary to their needs*."

To enable this free choice while protecting those customers that continue using Gaz Métro's services, the principle of "user pays" must be respected. This means that cross-subsidization must be as close to 100% as possible.

The situation is different in the case of the distribution service. In fact, for this service, a certain level of cross-subsidization can be desirable. This question was addressed in Gaz Métro's submission prepared as part of the *Avis sur les mesures susceptibles d'améliorer les pratiques tarifaires dans le domaine de l'électricité et du gaz naturel* (Opinion on the measures likely to improve rate practices in the electricity and natural gas sectors) and will be further discussed in Phase 4 of this case.

[80] Page 38.

"*In order to establish an adequate tariff for distribution, there must in fact be a balance struck between the regulatory principles, the business objectives targeted and the administrative issues resulting from the tariff's application. In other words, the distribution tariff must not only be close to the costs but also be commercially viable (i.e. take into account the competitive position, development of the different markets, social considerations and environmental impacts) and be sufficiently simple so that customers are able to detect an adequate price signal. In so doing, such a distribution rate structure will enable the distributor to maintain and grow its customer base.*

Consequently, in contrast to the transportation, supply and load-balancing services, the distribution service cannot be priced based solely on a simple process of cost allocation since the vast majority of the costs are fixed. For example, a downward variation (load reduction or departure of a customer) or upward variation (load increase or arrival of new customers) in the natural gas volumes distributed does not affect the (fixed) costs related to network safety. The result is that a certain level of cross-subsidization can be beneficial for all customers insofar as it enables the penetration of certain markets and maintenance of the existing customer base."[81]

6 HOURLY MANAGEMENT OF THE NETWORK

In decision D-2016-126, paragraph 74, the Régie asked Gaz Métro to analyze the:

"*[74]* […] *relationships between the daily management of the nominations and the hourly management of the network:*

- *usefulness of asking customers to displace hourly consumption amounts in order to limit the daily peak requirements or limit the use of advanced tools such as liquefied natural gas (LNG);* […]"

During the 2015 Rate Case, Gaz Métro presented the limitations of hourly interruptions in optimizing gas *supplies*[82]. Gaz Métro explained that:

- The standard in the North American gas industry is daily management of supplies (North American Energy Standards Board - NAESB);

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[81] R-3972-2016, C-GM-0003, Gaz Métro-1, Document 1, p. 11.

[82] R-3879-2014, B-0263, Gaz Métro-7, Document 4, p. 15 and A-0056, pp. 56 to 62.

- The hourly nomination windows allow for balancing the deliveries on a daily basis: deliveries are adjusted several times during the day so their total equals the total withdrawals;
- The tracking done by supply-tool providers is daily: penalties are incurred for overly large daily imbalances;
- Gaz Métro's hourly management of the network does not concern the supply services but rather the distribution service; and
- Gaz Métro's Ontario peers (Union Gas and Enbridge Gas Ontario) plan their supply on a daily basis.

Furthermore, the transportation contracts signed with the supplier TCPL specify the maximum hourly withdrawal volume. This maximum hourly withdrawal volume is equal to 5% of the daily capacity contracted, i.e. a level slightly higher than a uniform hourly volume of 1/24th (or 4.2% of the daily capacity contracted). Beyond the 5% threshold, TCPL cannot guarantee the pressure level in the pipelines. However, this operational constraint is not an issue in the management of supplies, at present.

The current daily planning is done to ensure that each winter day is serviced given the daily characteristics of the tools, but independently of the hourly consumption profile for each of the days. Taking into account the distribution of the consumption during a day and the hourly characteristics of the storage tools, conditions to be satisfied by the supply plan are added. **Hourly management of the supplies would not enable a reduction in the costs of the supply plan beyond the optimization that is achieved by daily management of the supplies.** This is what the following paragraphs demonstrate.

The following example shows that the transportation capacities cannot be reduced by planning the supplies hourly since the daily peak must also be supplied:

- The peak-day demand is 1,000 GJ/day;
- The maximum hourly demand is 45 GJ/hr, or 1,080 GJ/day when calculated over 24 hours; and
- The maximum hourly volume for the supply tools, according to TCPL's rules, is 1/20th of the daily capacity contracted, or 50 GJ/hr.

If the supplies were planned hourly, and the sole objective was to meet the hourly peak demand, the capacities contracted would be based on that volume. As such, it would be necessary to ensure that 1/20th of the capacities contracted equalled 45 GJ/hr. However, this would represent a daily capacity of 900 GJ/day, which is less than the total peak-day demand of 1,000 GJ/day. Since the distributor must be able to meet the daily peak, it cannot contract less than 1,000 GJ/day.

In a case where the maximum hourly demand were higher, for example 55 GJ/hr, the maximum hourly volume of the supplies of 50 GJ/hr would not have been enough to meet the demand. It would have therefore been necessary to contract a capacity of 1,100 GJ/day in order to withdraw 55 GJ/hr under TCPL's guaranteed minimum pressure. Gaz Métro has determined that it does not need to protect itself against that possibility for the moment.

As for the advanced tools, such as the LSR plant, the situation is somewhat different. For hourly management of the tools to be useful, it would need to help reduce erosion. However, to reduce the erosion of the storage sites, the daily demand has to be decreased. So distributing consumption during the day does not affect the level of erosion unless the daily demand is reduced. For example, the tool erosion is the same if a customer withdraws its entire daily volume during the same hour or uniformly during the day.

Gaz Métro concludes that it would not be useful to ask customers to displace their hourly consumption, within the same day, in order to reduce the costs of the supply plan. In fact, the supply tools are purchased in advance and in that context, hourly management would not enable a reduction in the peak capacities contracted or the use of advanced tools beyond the optimization achieved through daily management of the supplies.

Gaz Métro understands that the scope of the follow-up requested by the Régie in paragraph 74 could exceed the supply services provided by Gaz Métro. The text of the decision refers to "hourly management of the network." While Phase 2 of this case does not concern its distribution network, Gaz Métro understands that the Régie might wonder about the possibilities of optimizing it. The distributor wishes to remind the Régie that the distribution network's rate structure will be examined in Phase 4 of this case.

7 ADVANCED METERING INFRASTRUCTURE

The Régie also asked Gaz Métro to examine the possibilities offered by installing an advanced metering infrastructure[83]. However, it is important to bear in mind, as mentioned in the previous section, that Phase 2 of this rate case concerns the supply services. So the possibilities offered by advanced metering addressed here have to do only with the supply, transportation and load-balancing services. The possibilities for optimizing the distribution network will be addressed during Phase 4.

7.1 ADVANCED METERING INSTRUMENTS

During Phase 1 of this rate case, Gaz Métro presented the four types of meter it uses: diaphragm, rotary, turbine and ultrasonic. Schedule 2 of exhibit B-0023, Gaz Métro-2, Document 1 describes each type of meter. All of these meters are able to measure consumption hourly. The constraint in acquiring real-time hourly or daily data has more to do with the types of meter reading.

Meter reading is currently done in three different ways: pedestrian, radiometry and telemetry.

Tableau 25

Nombre de compteurs par type de relève

Type de relève	Septembre 2016
Pédestre	1 480
Radiométrie	220 571
Télémétrie	1 327

[83] D-2016-126, paragraph 74.

Pedestrian reading

Pedestrian meter reading is done manually by a Gaz Métro employee. The employee directly reads the meter. This outdated method is being gradually replaced by radiometry. However, pedestrian meter reading is useful when there is a deficiency with the other reading methods.

Radiometry

This method of meter reading is done by means of radiofrequency (RF) transmitters. The information is acquired via signals transmitted by the device when a Gaz Métro vehicle passes close by. The vehicles periodically travel routes to take customer meter readings at least once per billing cycle. If the data is not collected during a billing cycle, the volume withdrawn is estimated and then corrected the following month.

There are two types of transmitters. The first kind remains in stand-by mode between queries from the meter-reading vehicle. This device does not store any daily or hourly consumption data. The second type of device transmits a signal at regular intervals and can store hourly readings for the 40 days preceding communication with the meter-reading vehicle. This data could make it possible to precisely reconstruct a customer's consumption for a given month instead of using projected volumes for billing purposes. For example, for a billing cycle beginning August 15 and ending September 15, this device could precisely indicate the supply volumes for the month of August.

Consequently, the radiometry devices that do not store data are slowly being replaced. Gaz Métro expects that, based on the current rate of conversion, within less than ten years, all of its radiometry devices will be the type that transmit at regular intervals. More specifically, all customers consuming 75,000 m^3/year or more and currently subject to article 13.1.2.2 of the *Conditions of Service and Tariff* concerning the personalized load-balancing rate, will have their consumption read by this device by 2018. An information technology (IT) development project would be necessary to transpose the captured data to the billing systems so the maximum daily consumption of these customers could be directly monitored.

Additionally, fixed antenna network technology enables real-time data transmission, but is not used by Gaz Métro. This type of infrastructure is comprised of NANs (Neighborhood Area Networks) in which meters are interconnected and WANs (Wide Area Networks) serviced by collectors that agglomerate the data of nearby meters and by routers that enable wider geographic coverage. The information is transmitted from the collectors by cellular or satellite telecommunication. Hydro-Québec's remote meter reading project uses this technology and required installing collectors and routers on existing communication towers, in the facilities or on the power distributor's poles. If Gaz Métro wanted to gather real-time data, this is likely the technology it would use.

Telemetry

With telemetry, meter data is transmitted over the customer's telephone line, over a telephone line installed by Gaz Métro or by cellular telephone. With a telephone call, Gaz Métro is able to obtain the hourly or daily consumption data for the past seven days, depending on the parameters set.

Only rate D_4 and rate D_5 customers, rate combination D_3 and D_5 customers, and certain customers in remote regions have their meter read by telemetry.

7.2 SUPPLY TOOL OPTIMIZATION

The Régie asked Gaz Métro to analyze the:

> "[…] *possibilities offered by installing an advanced metering infrastructure* [for the] *optimization of the supply tools and management of the network using hourly or daily readings processed in real time* […]."[84]

Gaz Métro has analyzed this matter by distinguishing between the "gas supplies" aspect and the "pricing" aspect.

With respect to supplies, advanced metering makes it possible to gather more detailed customer-profile data. This better quality data could improve the forecasting models used to acquire the supply tools. Gaz Métro notes that it already has the hourly consumption profile for the overall demand because it ensures the supply of its network by section in real time. This profile enables Gaz Métro to adjust its supplies based on the total needs projected for the gas day, without requiring customers' individual information in real time.

In terms of pricing, advanced metering makes it possible to observe the parameters of a consumption profile more precisely, better reflecting the costs on the customer's bill, and therefore send a better price signal. This type of pricing encourages lower peak consumption. In this section, Gaz Métro also examines the relevance of managing demand on an hourly basis and

[84] D-2016-126, paragraph 74.

in real time, applying a personalized load-balancing rate to all customers, and considering the observed peak rather than the estimated one.

7.2.1 Potential improvement of the forecasting models

Daily data are used in the supply plan to forecast the peak-day consumption.

The advanced metering infrastructure would make it possible gather more detailed consumption-profile data for each rate class. This better quality data could improve the demand forecasting models used to acquire the supply tools.

7.2.2 Hourly demand management

As explained in section 6, the hourly consumption peak does not currently generate any additional supply cost relative to the daily peak. Even if the information were available for certain customers, it would not be useful to consider it in pricing the supply services.

Since the supply plan is always done a *priori* (for Gaz Métro and for the other gas distributors[85]), real-time rate incentives would be of no use with respect to supplies.

Furthermore, the daily planning of gas supplies is always done a *priori* with the goal of ensuring that the anticipated needs are met by the tools contracted. So real-time pricing is not useful in managing supplies.

7.2.3 Use of the observed peak for the load-balancing rate

At present, most customers are subject to an average price for the load-balancing service. As indicated in exhibit B-0136, Gaz Métro-5, Document 3[86], the access threshold for the personalized load-balancing rate is related more to an overall rate strategy, which will be analyzed during Phase 4 of this case

For customers subject to a personalized load-balancing rate (article 13.1.2.2 of the *Conditions of Service and Tariff*), only those with distribution rate D_4 and distribution rate D_5 and those with rate combination D_3 and D_5 are billed based on a daily meter reading.

[85] R-3879-2014, B-0263, Gaz Métro-7, Document 4, p. 11.
[86] Page 42.

These readings make it possible to precisely record the consumption peak (parameter "P"). For all other customers, the "P" parameter is estimated using a formula (article 13.1.3.1 of the *Conditions of Service and Tariff*).

That being said, and as mentioned in section 7.1, the infrastructure needed to record the actual daily peak will be installed on the premises of most personalized-rate customers by 2018. However, aside from the technological constraints, an IT project to allow the daily data to be used for billing will also be required.

Since the vast majority of the customers subject to the personalized rate are billed based on an estimation of their peak-day consumption, considering the actual daily reading in the service pricing would enable a better price signal and have the potential to reduce the peak demand and lower the supply costs. In fact, for the customers without daily readings, the estimated peak is only a projection based on the profile for a customer's type of heating. During the coldest days, customers without daily readings have no direct incentive to reduce their consumption.

7.3 Optimization of the interruptible services, MGAI and CMG

Once again, as explained in section 6, Gaz Métro feels that it is not necessary to manage supplies on an hourly basis. So an interruptible service based on hourly data would be of no use if it is only to limit customers' daily consumption, which is already possible with the current service.

Furthermore, since Gaz Métro plans the supplies before the start of the year, managing interruptions in real time with a price mechanism would not enable a reduction in the tools contracted to meet the demand for all winter days. Gaz Métro thus also rules out the possibility of managing interruptible-service customers' demand in real time.

The same conclusions apply to managing Make-up Gas to Avoid an Interruption (MGAI): without hourly or real-time interruptions, this service would serve no purpose.

For Competitive Make-up Gas (CMG), Gaz Métro contracts additional transportation capacities and bills the cost directly to the customer. With the supply plan being deemed optimized before a CMG customer engages with the distributor, using hourly or real-time measures would not provide any reduction in costs.

However, managing interruptions on an hourly basis could be useful in the case of the distribution network. This element will be analyzed in Phase 4 of this case.

7.4 Peak/off-peak pricing

In decision D-2016-126[87], the Régie asked Gaz Métro to evaluate the possibility of offering customers peak/off-peak rates as a means of modulating their demand. Such an offer would not be useful for the supply services.

Peak/off-peak pricing involves a rate differentiated based on a criterion related to peak-period consumption. This criterion can be a predefined calendar period, or days during which the temperature is below a certain threshold.

To begin with, it would be unfair to bill a network gas rate or transportation rate differentiated based on the time of year. In fact, since direct-purchase customers must deliver their supply according to a uniform profile, the price of Gaz Métro's supply and transportation services must be annualized (based on 12 months).

In the case of load-balancing, Gaz Métro prefers pricing based on the daily peak which targets the main inducer of cost. In fact, peak/off-peak rates would not penalize customers that consume a large volume during the same day, even though they generate higher costs than if they had distributed their consumption evenly over all of the days of the peak period.

Furthermore, a differentiated rate for the colder periods would not guarantee a reduction of the units consumed during the peak, unlike the interruptible service, for example. The tools and resulting costs could not therefore be reduced.

7.5 Infrastructure sharing

In decision D-2016-126[88], the Régie asked Gaz Métro to evaluate the possibility of sharing the advanced metering infrastructure deployed by Hydro-Québec for its distribution operations. In section 7.1 Gaz Métro presented the meter-reading technologies it uses.

[87] Paragraph 74.
[88] Paragraph 74.

The infrastructure available now and in the near future will allow for hourly data reading. As mentioned, processing the data so it can be used for billing would also require IT changes. Consequently, even if the precision of the data used in billing was hourly, Gaz Métro does not foresee the need to make use of Hydro-Québec's infrastructure.

As for data transmitted in real time, Gaz Métro notes that Hydro-Québec has devices that enable transmission of the data from its meters over cellular telephone networks. With respect to the supply services, Gaz Métro would not derive any value from real-time transmission since the supplies are all contracted in advance and the network is monitored in real time by systems already in place to ensure safety or enable optimization transactions. Nor does Gaz Métro foresee the need to utilize Hydro-Québec's infrastructure for real-time billing of the supply, transportation and load-balancing services.

Finally, given that the distribution rate structure will be determined in Phase 4 of this case, Gaz Métro will evaluate the best method for data transmission at that time.

8 PARAMETERS USED FOR THE LOAD-BALANCING RATES

In decision D-2016-126[89], the Régie asked Gaz Métro to study the possibility of using contract parameters for pricing the load-balancing service instead of the actual data from the previous year.

In section 2.5.1.2, it was demonstrated that the relativity of the customers' consumption profiles to each other always stays the same. The importance of this constant relativity for adequately sharing the economies of scale was also explained in section 2.5.1.4. The relativity of the profiles is explained by the fact that all of the profiles will vary based on the observed temperature in proportion to their consumption variability relative to the degree-days observed. So, for the relativity of the profiles to be maintained, the customer profiles considered must reflect equivalent degree-days. Using the customer consumption data from the previous winter, during which time the customers experienced similar weather conditions, meets this criterion. In contrast, the relativity of the profiles would be broken if the previous winter's consumption data were used for certain customers while the maximum contract data were used for others.

Gaz Métro therefore feels that using contract data instead of actual data would not be appropriate.

9 SUPPLY SERVICE WITH TRANSFER OF OWNERSHIP

In decision D-2016-126[90], the Régie asked Gaz Métro to analyze the usefulness of retaining supply service with transfer of ownership.

Gaz Métro has offered its customers supply service with transfer of ownership since 1985, following the deregulation of supply. Supply service with transfer of ownership is an alternative to supply service without transfer of ownership for customers that prefer to supply their own natural gas.

[89] Paragraph 74.
[90] Paragraph 74.

9.1 COST/BENEFIT ANALYSIS OF SUPPLY SERVICE WITH TRANSFER OF OWNERSHIP

9.1.1 Cost of supply service with transfer of ownership

Unlike for supply service without transfer of ownership, customers who undertake to supply their natural gas with transfer of ownership, provide it to Gaz Métro at an agreed upon delivery point. In return for this gas, the distributor pays an amount corresponding to the quantity delivered, at the price of the network gas service in effect. Then, for their withdrawals at their facilities, the customers pay Gaz Métro an amount corresponding to the quantity consumed, at the price of the network gas service in effect. When a customer uniformly delivers the quantity it consumes during the year, but consumes more during certain months, this results in a difference between the amount paid at the time of the customer's delivery and the amount billed at the time of consumption if the network gas prices are different. Similar differences in costs are also seen for the customers of Gaz Métro's supply service since the price of the network gas over the 12 months of a year is not equal to the uniform average of the actual acquisition price, i.e. the cost functionalized to the supply service. In both cases, the differences tend to cancel each other out when the supply prices are stable over the long term and related to the variability of the monthly price.

With respect to supply service without transfer of ownership, Gaz Métro does not buy back the commodity. In maintaining a uniform delivery profile, these customers do not generate any cost differences equivalent to those generated by customers using supply service with transfer of ownership.

Gaz Métro therefore feels that supply service with transfer of ownership does not create any disadvantage for the network gas customers. And under the assumption of long-term price stability, the customers of this service do not create any disadvantage for the customers of supply service without transfer of ownership either.

9.1.2 Benefits of supply service with transfer of ownership

To begin with, a customer of supply service with transfer of ownership that experiences a volume imbalance during the year is exposed to less of a financial settlement at year-end. Indeed, if the customer delivers a lower (higher) quantity than its consumption, it will have already paid for the withdrawn units exceeding (below) the amount delivered at the network gas price. Depending on the market price, a year-end adjustment could apply. So service with transfer mitigates the risk related to financial settlement at the end of the year.

Also, for a customer wanting to obtain its supply directly from a natural gas supplier, uniform delivery can be restricting. In fact, the uniform-delivery requirement forces the customer to acquire natural gas months before it consumes the gas. Since supply service with transfer of ownership provides for Gaz Métro purchasing the delivered natural gas at a price equivalent to that of the network gas, this enables a customer to obtain supply from the supplier of its choosing, regardless of its credit status.

It should be noted that this mechanism of assuming the cost of financing the uniform supply purchase does not exist to the detriment of the network gas customers. In fact, the network gas customers benefit from an equivalent mechanism since the rate is based on a uniform purchase, after functionalization, and they pay only at the time of consumption.

In conclusion, not only does supply service with transfer of ownership allow customers to mitigate the risk related to year-end financial settlement, but it also enables them to take advantage of market opportunities regardless of their access to credit. Furthermore, the current rate does not negatively impact Gaz Métro's supply-service customers.

9.2 COMBINING SERVICES

On November 11, 2016, as part of the 2018 Rate Case, Gaz Métro filed a proposal for changes to the *Conditions of Service and Tariff* to allow for combining services. Gaz Métro proposes using supply service with transfer of ownership to easily enable combining services[91]. Gaz Métro's proposal would lend supply service with transfer of ownership additional utility.

Gaz Métro feels that supply service with transfer of ownership should be retained.

[91] R-3987-2016, B-0011, Gaz Métro-2, Document 1.

CONCLUSION

This evidence is in addition to the exhibits already submitted as part of Phase 2 of case R-3867-2013[92]. It covers all of the follow-ups requested by the Régie in decision D-2016-126, except for the analyses concerning operational flexibility and the importance of uniform deliveries. Those subjects are addressed in exhibits Gaz Métro-5, Documents 6 and 7, respectively.

Gaz Métro asks the Régie to:

- **Note the responses in the follow-ups related to decision D-2016-126 and declare itself satisfied;**
- **Approve functionalizing the costs of the Champion pipelines and Gaz Métro's transmission pipelines to the distribution service and allocating its costs based on the CAU factor;**
- **Approve merging the Northern and Southern zones for the transportation service;**
- **Approve distributing the amounts held in the DEA created following decision D-2015-214 to all customers in both zones based on the volumes consumed; and**
- **Approve the amendment of articles 1.3, 12.1.2.1, 12.1.2.1.1, 12.2.1 and 12.2.2.1 of the *Conditions of Service and Tariff*.**

[92] B-0133, Gaz Métro-5, Document 1, B-0134, Gaz Métro-5, Document 2 and B-0136 Gaz Métro-5, Document 3.

SCHEDULE 1: SUPPLY CONTRACTS (TRANSPORTATION AND STORAGE)

This schedule is filed in Excel format only.

N.B. : Certain data on page 1 is redacted and filed under confidential cover.

SCHEDULE 2: IMPACT OF CUSTOMERS IN A PEAK MODEL USING REGRESSION

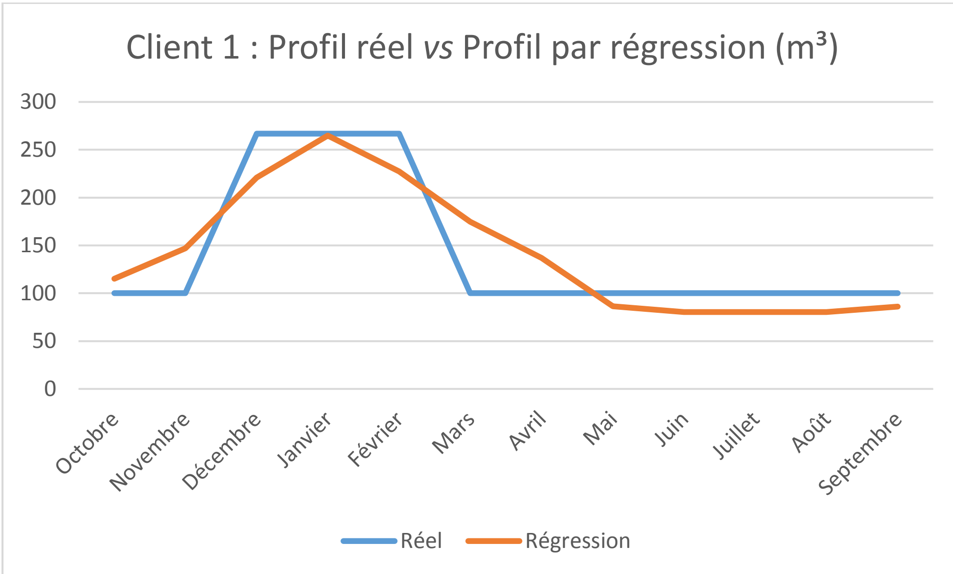
Peak-day demand is an essential element in developing the gas supply plan. It is evaluated based on a regression whose main explanatory variable is temperature (expressed in degree-days).

Using this basic principle, a theoretical explanation can be developed to demonstrate that the causality of the supply costs is related to the projected variation in a customer's consumption relative to the temperature.

According to a model using a simple regression based on the degree-days of the day, any customer who consumes more when the temperature is colder will have an upward effect on the overall peak demand estimated by the distributor. The following graphs present different theoretical examples of customers whose "actual" [93] profile is compared to the profile obtained using a regression based on the actual degree-days.

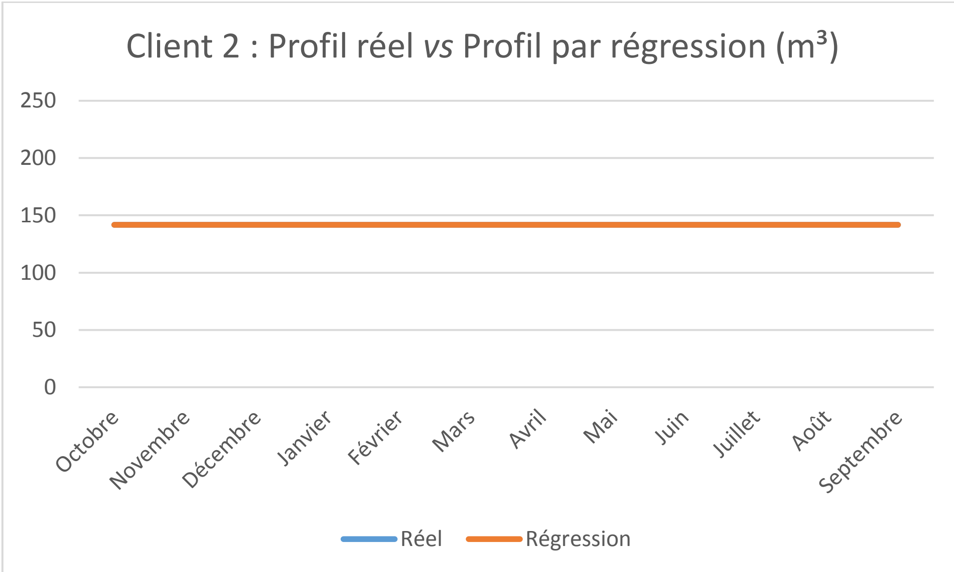
[93] The term "actual" is used to indicate that the profile concerned has not been obtained with a regression. It is nevertheless a theoretical profile example.

Graph - A



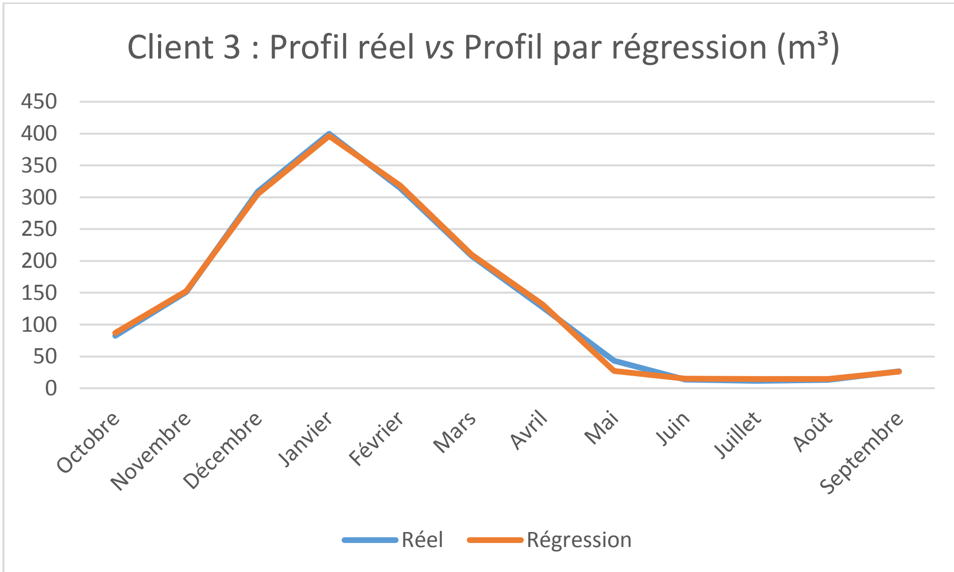
For customers who consume more from December to February, but in a stable manner, a regression will nevertheless result in a heating-type profile, with a higher demand during the peak day than in the other months. At peak, the customers will take a volume equivalent to their actual consumption. Off peak, the regression will result in a lower volume than the actual consumption. If Gaz Métro had customers with this profile, their impact on the costs would be closer to the regression than the actual.

Graph - B



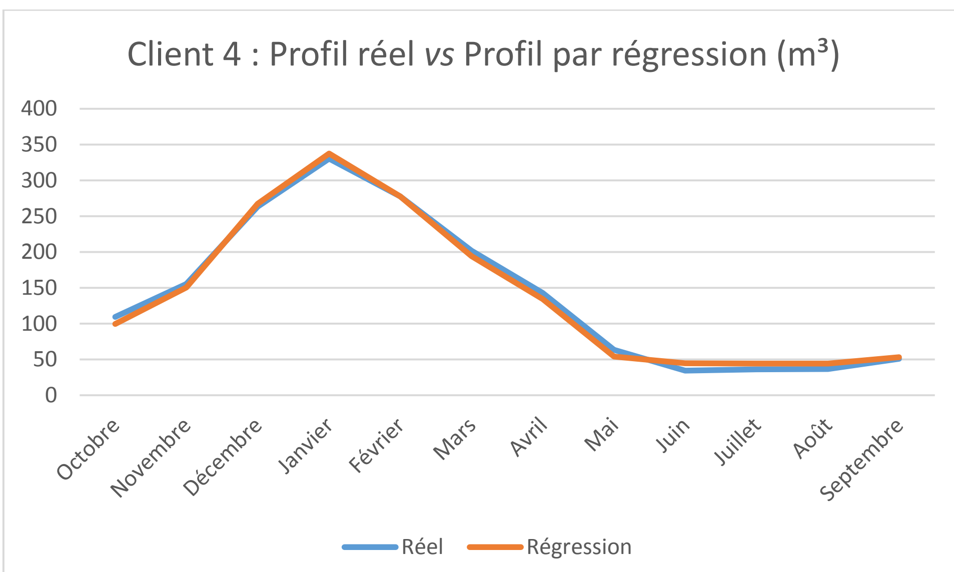
1 For customers whose consumption is stable, the regression mirrors the actual consumption.
2 However, Gaz Métro notes that no customer's consumption is perfectly stable. All consumption
3 profiles are affected in some way by temperature.

Graph - C



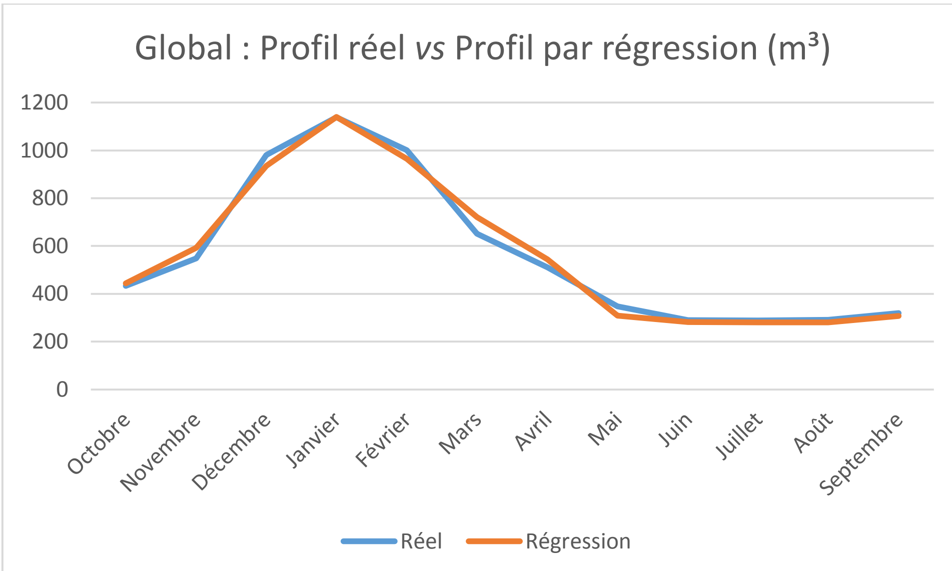
1 This graph represents the profile of the small rate D_1 customers. The basic consumption in summer is lower and increases in winter. The consumptions estimated by the regression model are very close to the actual figures.

Graph - D



This graph represents the profile of the large rate D_1 customers. It is similar to the profile of the small customers presented in Graph - C, except that the basic consumption in summer is higher. Once again, the consumptions estimated by the regression model are very close to the actual figures.

Graph - E



The result obtained by combining the consumptions is equal to the sum of the regressions by customer. In cumulating the profiles, the overall customer demand obtained with the regression is close to the actual demand. However, when each customer's individual peak (instead of the peak calculated by group or overall) is considered, the sum of the customer peaks always exceeds the regression result. The combined individual peaks do not all coincide whereas a peak calculated by regression is always coincident.

Based on the overall customer profile observed between 2010 and 2014[94], the variation in demand closely tracks the variation in degree-days. So customers are all influenced to some extent by the temperature. The relationship can be direct, null or inverse and in all cases is well represented by the regression model. Since the relationship between overall demand and temperature is very strong, this also indicates that customers with a more erratic consumption profile relative to the temperature (e.g. Customer 1: Graph - A) have an almost non-existent

[94] B-0133, Gaz Métro-5, Document 1, Schedule 4, pp. 6 to 8.

impact on total demand. Therefore, the regression model used enables the most accurate estimate of customer consumption.

The causality of the costs is thus connected only to the projected variation in a customer's consumption relative to the temperature. This relationship is represented by the difference between the peak factor (P) and the average demand (A). This remains true regardless of the customer's actual profile during the winter, as demonstrated in the cases illustrated.

SCHEDULE 3: PROPOSED FUNCTIONALIZATION METHOD (2017 RATE CASE)

This schedule is filed in Excel format only.

SCHEDULE 4: DISTRIBUTION OF CUSTOMER NEEDS

This schedule is filed in Excel format only.

SCHEDULE 5: COST ALLOCATION STUDY – CURRENT METHODS

This schedule is filed in Excel format only.

SCHEDULE 6: COST ALLOCATION STUDY – PROPOSED METHODS

This schedule is filed in Excel format only.