REVIEW OF SUPPLY, TRANSPORTATION AND LOAD BALANCING SERVICES

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EXECUTIVE SUMMARY

The current rates for supply, transportation and load balancing were all developed during the rate unbundling that took place in the early 2000s. Since that time, the supply structure for Gaz Métro Limited Partnership ("Gaz Métro") has undergone significant changes. In recent years, these changes have led to many follow-ups concerning functionalization and pricing for costs arising from gas supply. With the imminent move to Dawn, and considering that more than fifteen years have passed since the rate unbundling, Gaz Métro has decided to review all the rates related to gas supply.

A complete analysis of the costs and rates for the supply, transportation and load balancing services has been conducted. This global approach led to comprehensive proposals for changes, based on the principles of cost causation and fairness.

First, the analysis of the causation of gas supply costs demonstrated that the costs are essentially allocated based on three characteristics:

- Average customer demand, i.e. the quantity actually consumed by customers each year. This average demand is the equivalent of consumption based on a uniform or stable profile throughout the year.
- Excess over average demand, i.e. the maximum capacity required by the customers beyond their average daily consumption. This excess is represented by the portion of seasonal demand from a customer that exceeds its average daily consumption if it has a uniform profile.
- Total volume consumed by all customers. Some supply costs are not related to the customer's consumption profile. These costs are a function of the volume of the total supply to deliver in franchise.

Since the supply costs are indissociable, i.e. that they are not purchased to meet a particular service, but to meet total demand, there is no reason to directly divide the cost of each tool between the transportation and load balancing services. Gaz Métro therefore proposes to present the supply costs globally, rather than by service.

To respect the cost causation observed, Gaz Métro proposes to functionalize the costs in rates based on the consumption profile.

In terms of the costs of purchasing the supply, as they are more or less equivalent to the average demand in quantity, they can be functionalized directly to the supply service. However, an adjustment is required, since the purchase prices may be different from the price that Gaz Métro would have paid to fulfil uniform demand.

The transportation rate will be calculated based on the average purchase cost of the transportation tools that make it possible to fulfil a uniform consumption profile. The seasonal tools, such as storage sites or transportation tools purchased for the winter, will be excluded from this calculation since they may not meet a uniform demand. This method would provide a transportation rate which would represent the average customer demand at all times, both in the rate case and in the annual report, and which would be exempt of seasonal costs.

Subsequently, all the other costs that are not functionalized in transportation or supply would only depend on the seasonal consumption profile or would not be linked to any consumption profile. Since all these costs end up in load balancing, Gaz Métro proposes a two-component rate: one component related to the profile and one component related to the volume consumed. For the component related to the profile, the load factor (LF) would be used to allocate the costs; it represents the ratio of the average daily demand in comparison with the maximum customer demand. For the component not related to the consumption profile, Gaz Métro proposes to use the consumption volume.

At the same time as this exercise was being carried out, Gaz Métro also analyzed all the conditions related to the supply, transportation and load balancing services, to ensure that each of these is aligned with the distribution of the costs and proposed rates, which led to several proposed changes. Different proposals arose from these analyses, including abolishing the inventory adjustment service and integrating the costs related to this service into the load balancing costs, since they are entirely related to holding inventory to balance the demand of all customers.

Gaz Métro is therefore presenting a global, integrated solution that covers all aspects related to the supply, transportation and load balancing services. Gaz Métro's proposal not only responds to all the follow-ups requested by the Régie de l'énergie (the "Régie"), but also establishes rates that are more representative of the cost causation. Finally, the solution presented is also better suited to the current supply structure, while being flexible enough to adapt to future changes.

INTRODUCTION

In November 2013, Gaz Métro submitted an application on the general case dealing with the distribution cost and rate structure. In procedural decision D-2014-011, the Régie was of the opinion that it would be preferable to split the case into two phases.

> “*[23] Furthermore, given the scope of the issues to process in this matter and the chronology to be followed, the Régie feels that each of the key steps of the process should be subject to approval before undertaking the next step.* ***Consequently, the Régie orders that the case be split into two phases. Phase 1 will deal with all the cost distribution methods. Phase 2 will deal with the rate structure, inter financing and the rate strategy***” [translation].

The Phase 1 hearings on the allocation of the distribution costs took place in April 2014. While waiting for a final decision to be rendered on this phase, Gaz Métro began work on Phase 2 concerning the supply, transportation and load balancing services.

The document that follows presents a complete review of the functionalization, allocation and rate-setting methods for the costs of the supply, transportation and load balancing services.

Initially, other than questions related to the distribution service, only a few components of the load balancing service were intended to be reviewed in this case, but in recent years, several follow-ups have been requested by the Régie, mainly due to changes in the gas supply market since unbundling, including:

- Accessibility threshold for customized load balancing rates (D-2011-182)
- Minimum and maximum load balancing prices (D-2011-182 and D-2013-106)
- Pricing of operational flexibility costs (D-2012-175)
- Functionalization of natural gas purchase costs (D-2014-065 and D-2014-165)
- Functionalization of transportation and load balancing costs (D-2014-065 and D-2014-165)
- Breakdown of overpayments and shortfalls in transportation and load balancing (D-2014-065 and D-2014-165)
- Handling of transportation and reduction MAOs (D-2014-065)

- Migration of interruptible customers between interruptible and continuous services (D-2014-201)
- The 2% purchased volume leeway for customers with combined rates (D-2014-201)

In Exhibit R-3879-2014, B-0574, Gaz Métro-16, Document 3, Gaz Métro explained that the examination of these matters could not be carried out separately but, rather, had to be processed as part of a global analysis.

> "*One of the important findings as a result of the analyses carried out was that the approach in which the rate components are modified separately, in silo, does not allow for establishing rates that fully reflect cost causation. To be able to respond to all these concerns, a global solution must be presented. This is why Gaz Métro suggests handling the functionalization of the costs by dividing them between transportation and load balancing in Phase 2 of R-3867-2013"* (p. 4) [translation].

The supply, transportation and load balancing services are therefore reviewed in this document. This allows for an exhaustive examination of all supply costs, avoiding piecemeal adjustment insofar as possible. To achieve this, Gaz Métro recommends beginning from the base, i.e. with the study of the causal links of the various costs associated with the supply chain. This study is presented in section 2. Functionalization and the way the costs are recovered in the rates for the various services is covered next. Some subjects are also covered in Gaz Métro 5, Document 3.

Note that one of the Régie's follow-ups also requests a review of the interruptible offer, in decision D-2014-201. Since this offer interacts directly with the purchase of supply tools, a review of the interruptible offer was included here in the Phase 2 analyses. This is the subject of Gaz Métro 5, Document 2.

1 OBJECTIVES

Gaz Métro is targeting three major objectives in this evidence:

- Conduct a complete analysis of the causation of costs associated with the supply chain.
- Review the pricing for the supply, transportation and load balancing services, in order to adapt it to the new supply context.
- Respond to various follow-ups requested by the Régie about the supply chain, using a global solution.

Analysis of Cost Causation

To review or modify the rate setting structure of a service, we need to understand the source and causation of the inherent costs of that service. The supply cost causation was analyzed at the time of rate unbundling. The analysis allowed for establishing the basic cost functionalization principles for the transportation and load balancing services. In decision D-97-047, the Régie chose the **average and excess demand** method. This method will be discussed later.

At that time, the transportation capacities contracted by Gaz Métro were almost entirely comprised of firm transport long haul ("FTLH") between Empress and the franchise. The supply was purchased daily, on a relatively stable basis, and, depending on the season, sent directly to the customers, to franchise storage sites or to the Union Gas storage site at Dawn. Over the years, the supply structure of the commodity was modified due to bigger and bigger purchases at Dawn. The FTLH contract capacities were replaced, in part, by firm transport short haul capacities ("FTSH") between Dawn or Parkway and the franchise.

As the changes occurred, further modifications were made to the functionalization methods among the services.[1] However, before making other adjustments in response to the follow-ups requested by the Régie, Gaz Métro believes it is time to re-examine the basic principles of these methods by analyzing the cost causation in the current supply context and the anticipated future context after the complete transfer of the supply system to Dawn. Section 2 will present this analysis.

Review the pricing of the services

Once the causal links are examined, the rate-setting structure can be reviewed and changes can be proposed, if required.

The principles for setting new rates for the supply, transportation and load balancing services are essentially the same as for establishing the distribution rates. These principles were presented in the 2012 Rate Case[2] and they include fairness and simplicity.

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[1] See, for example, R-3752-2011, Gaz Métro-12, Document 1.
[2] R-3752-2011, Gaz Métro-13, Document 8, section 2.2

A rate is considered fair if the applicable price for the customer is lower than the standalone cost and higher than the marginal cost associated with it. This principle was mentioned by Dr. Overcast in Phase 1 of this case:

> « *Theoretical economists have developed the theory of subsidy free prices to evaluate traditional regulatory cost allocations. Prices are said to be subsidy free, in the economic sense, so long as the price exceeds marginal cost but is less than standalone costs (SAC). Indeed all of this theory provides useful insight to the regulatory process where, as a practical matter, costs must be allocated between classes of service and within classes of service. For example, if the process of cost allocation results in rates that exceed standalone costs for some customers or class of customers, prices must be set below the stand alone cost but above marginal cost to assure that those customers make the maximum practical contribution to common costs.*[3] »

For the distribution service, the difference between the marginal cost and the standalone cost is large due to the distributor's considerable economies of scale. This allows Gaz Métro to distance itself, if required, from the cost of service study to take other considerations into account (competitive position, commercial aspects, etc.). For the supply, transportation and load balancing services, there is little room for manoeuvre between the marginal cost and the customer's standalone cost (or the cost of providing their own service). To be fair, the rates must therefore reflect the costs more accurately. Gaz Métro therefore tries to bring the rates closer to the causal link. Sections 4 to 7 present the proposed changes to the rate-setting structures.

In the course of its reflections, Gaz Métro also tried to simplify the rate-setting structures, where possible. Simple rate-setting structures send the customers a clear price signal while facilitating management and limiting administrative costs. The quest for simplicity must not run counter to the fairness principle, however.

Response to follow-ups requested by the Régie

As mentioned in the introduction, the Régie requested several follow-ups concerning the supply, transportation and load balancing services. An isolated examination of these topics is not optimal and may lead to contradictory solutions. a full review of the cost causation and the rate-setting structures allowed Gaz Métro to respond to the Régie's follow-up requests with a consistent and global solution.

[3] R-3867-2013, B-0005, Gaz Métro-1, Document 1, p.4.

2 COST CAUSATION OF GAS SUPPLY

The supply, transportation and load balancing rates attempt to allocate and price, as accurately as possible, the costs caused directly by the customers. Examining the cost causation is therefore crucial before studying the pricing of the various services. This examination is presented in the next section.

The gas supply is defined essentially by two major components: **the purchase of the commodity** and its **transportation** to the franchise, in light of the customers' daily needs. Each of these components will be examined separately.

Load balancing is not, in itself, a component of the supply cost, but rather a rate-setting component. In fact, the supply tools are always purchased to meet a total demand that encompasses both transportation and load balancing needs, not to meet a need arising from only one or the other. This means that the same supply tools may be used to meet the transportation need and the load balancing need of customers. The examination of the cost causation for supply and transportation specify which types of consumer profiles generate which costs and allow us to functionalize the costs among the services, including load balancing, and, ultimately, to set the rates.

2.1 TRANSPORTATION COST CAUSATION

To examine the causation of transportation costs, the following assumptions were established:

- There is no constraint on the purchase of the commodity, i.e. the commodity is considered to be available at all times at the same price, from any purchase point.
- There is no constraint on the volume that can be received by the distribution network.
- There is no operational flexibility constraint related to changes in the demand over the course of a day.

These assumptions allow the specific causation of the transportation costs to be evaluated separately from the other variables.

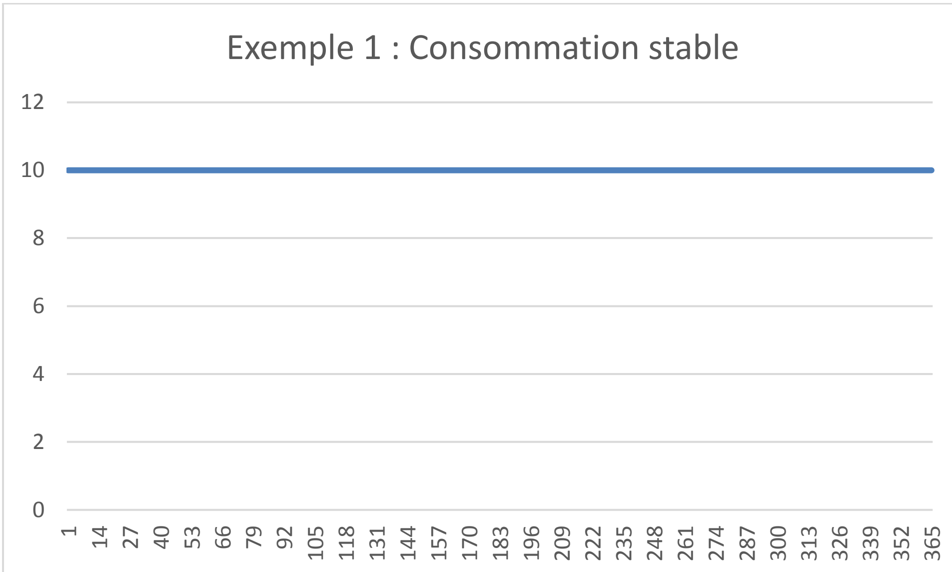
In the evaluation of the cost causation, **the diagrams produced are always in order of highest to lowest consumption over the year.**

Finally, since the only transportation network in Canada that connects to supply points in Québec is TransCanada PipeLines Limited ("TCPL"), all the scenarios using transportation tools will be made in consideration of the fact that the TPCL firm transportation tools cannot be purchased seasonally (for a period of less than 12 months).

2.1.1 Stable volume vs. seasonal volume

To begin the evaluation of the cost causation from the simplest illustration, let us start with the transportation costs for a customer with 100% stable consumption.

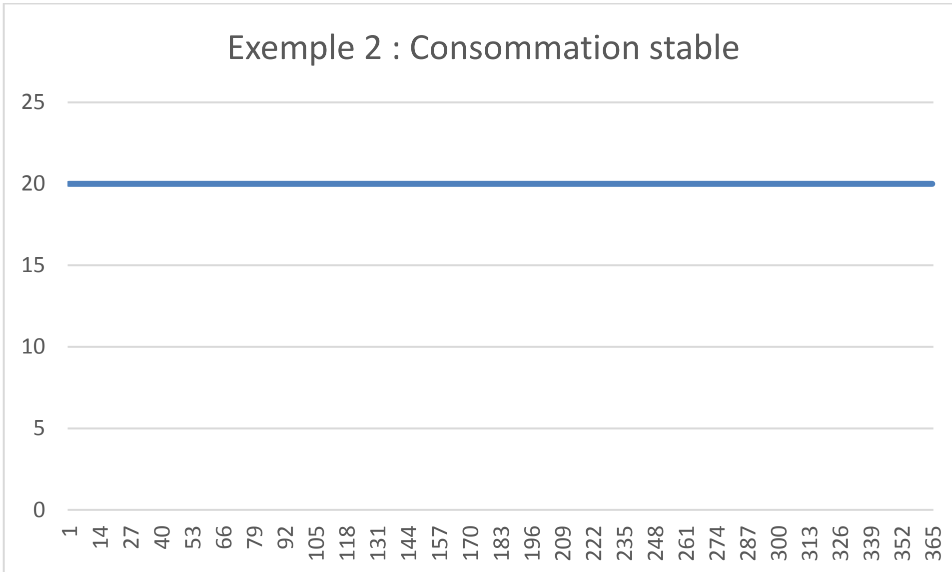
Graphique 1



This consumer must deliver 10 units per day from the place where it purchased the supply to the consumption location. In total, this customer will consume 3,650 units a year. Each transportation unit purchased will therefore be used to transport and consume natural gas. At a purchase cost of $1 per transportation unit, the total cost to transport the supply is $3,650, which also comes to $1 per unit consumed.

What would happen if the next year the customer doubled its production but maintained a 100% stable consumption profile?

Graphique 2

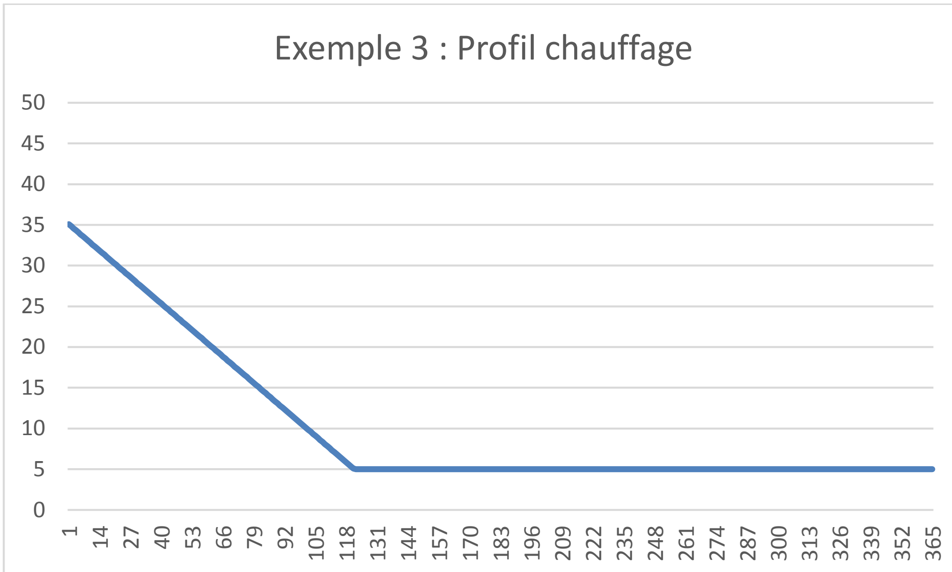


The customer would then have to deliver 20 units per day from the supply purchase location in order to consume it. In total, the customer would consume 7,300 units per year. Once again, each transportation unit purchased would be used to transport and consume natural gas. Still at a purchase cost of $1 per transportation unit, the total cost for transporting the supply would increase to $7,300, which is again $1 per unit consumed.

So if all Gaz Métro's customers had 100% stable consumption, the volume consumed would perfectly represent the cost causation. However, given that a significant number of Gaz Métro's customers do not have stable consumption, we have to examine whether the cost causation is the same for customers who do not have 100% stable consumption.

Let us return to example 1 where the customer consumed 3,650 units per year, but now suppose that the customer profile is not stable.

Graphique 3

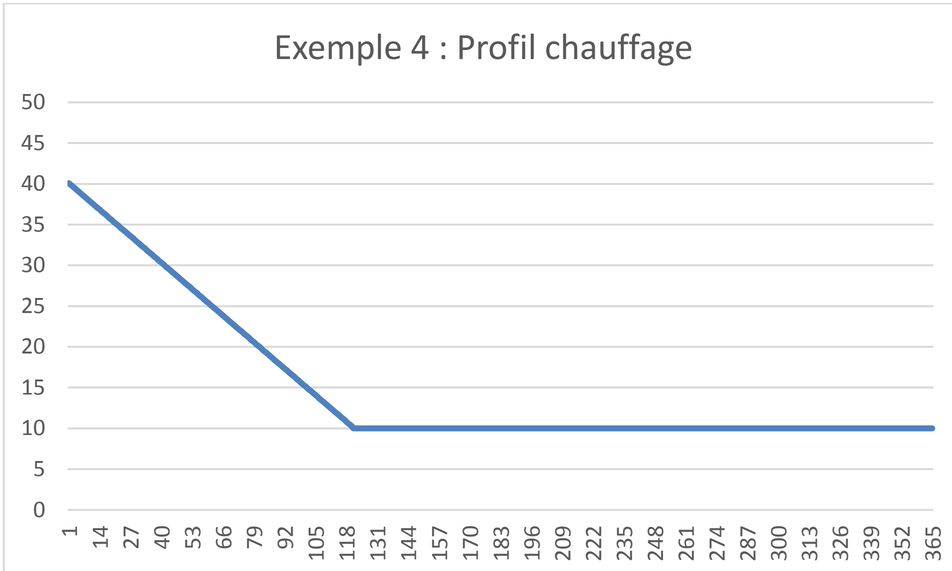


In this case, the customer needs at least 5 units a day, but may need 35 units on the coldest day of winter. It must therefore deliver 5 units per day outside the heating period and an increasing number of units during the winter, from 5 to 35 units per day. Since the only available supply tool is transportation on an annual basis, as mentioned in the initial assumptions, this customer has to purchase transportation capacity equal to 35 units for 365 days of the year in order to deliver 35 units on the coldest day. So even though its consumption is only 3,650 units (as it was in the first example), the total cost for transporting the supply will be $12,775 ($35 \times 365$), which comes to $3.50 per unit consumed ($12\,775 \div 3\,650$). Of a total purchase of 12,775 transportation units in the year, 3,650 will be used and 9,125 will be unused. This unused transportation portion corresponds to the customer’s load balancing need.

Therefore, the more stable the customer’s consumption profile, the fewer unused transportation units there are and the lower the unit cost per unit consumed.

To illustrate this situation, here is a scenario in which the customer with a heating profile adds stable consumption equipment to increase its basic consumption from 5 to 10 units a day.

Graphique 4



The customer now needs at least 10 units per day, but may need 40 on the coldest day of the winter. It will have to deliver 10 units per day outside the heating period and an increasing number of units during the winter, from 10 to 40 units per day. To be able to deliver 40 units on the coldest day, this client will have to purchase transportation capacity equal to 40 units for all 365 days of the year. Although its total consumption will be only 5,475 units ($3\,650 + 5 \times 365$), the customer's total cost to transport the supply will be \$14,600 (40×365), or \$2.67 per unit consumed ($14\,600 \div 5\,475$). Of a total purchase of 14,600 transportation units in the year, 5,475 units will be used and 9,125 will be unused.

By increasing its proportion of stable consumption, the customer increases its total transportation cost from \$12,775 to \$14,600, but the cost per unit consumed decreases from \$3.50 to \$2.67. This cost reduction per unit can be explained by the fact that the increase in stable volume does not increase the unused transportation units. This number remains constant at 9,125 units, despite the overall increase in consumption and the increase in the customer's peak use.

The change in the cost per unit can also be explained by the change in the customer's load factor ("LF"). The LF is the measure of the customer's consumption stability. It represents the total number of units required to serve the customer and is calculated as follows:

$$CU = \frac{Consommation\ réelle}{Consommation\ potentielle\ maximale} = \frac{Consommation\ moyenne}{Consommation\ de\ pointe}$$

Before the increase in basic consumption, the customer's LF was 3,650 units consumed of a potential of 12,775 units, or 28.6%. After the increase in basic consumption, its LF rises to 5,475 units consumed of a potential 14,600 units, or 37.5%.

While for customers with a stable consumption profile, the cost per unit consumed remains the same no matter what volume is consumed, this cost varies for customers that do not have a 100% stable profile. The closer the customer's LF is to 100%, the closer its per-unit cost will be to the stable profile customer's cost. The closer the LF is to 0%, the higher the number of unused transportation units and therefore the further its per-unit cost from the stable profile customer's cost.

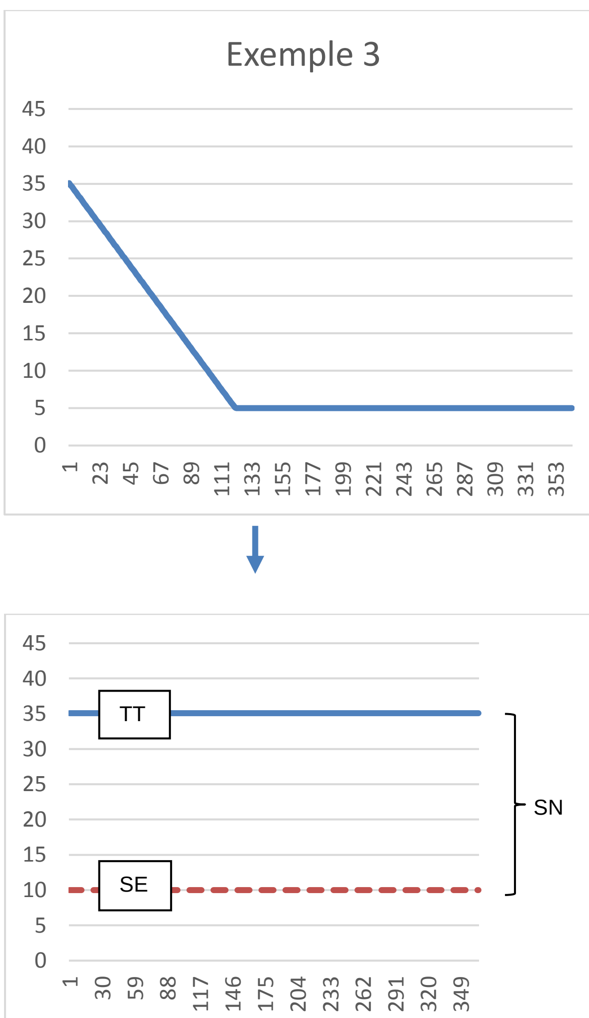
More specifically, for all customers, the cost per unit varies based on the number of used and unused transportation units. When the customer has 100% stable consumption, no matter what the volume is, the cost per unit consumed remains the same: there are no unused transportation units. When the consumption is not stable, then the per-unit cost changes based on the stable portion of the consumption and the number of unused transportation units.

In examples 3 and 4, the number of unused transportation units is the same, and the total cost of the unused units is the same in each case, but since the stable consumption is higher in example 4, this total cost is divided over a greater number of units consumed, which lowers the cost per unit consumed.

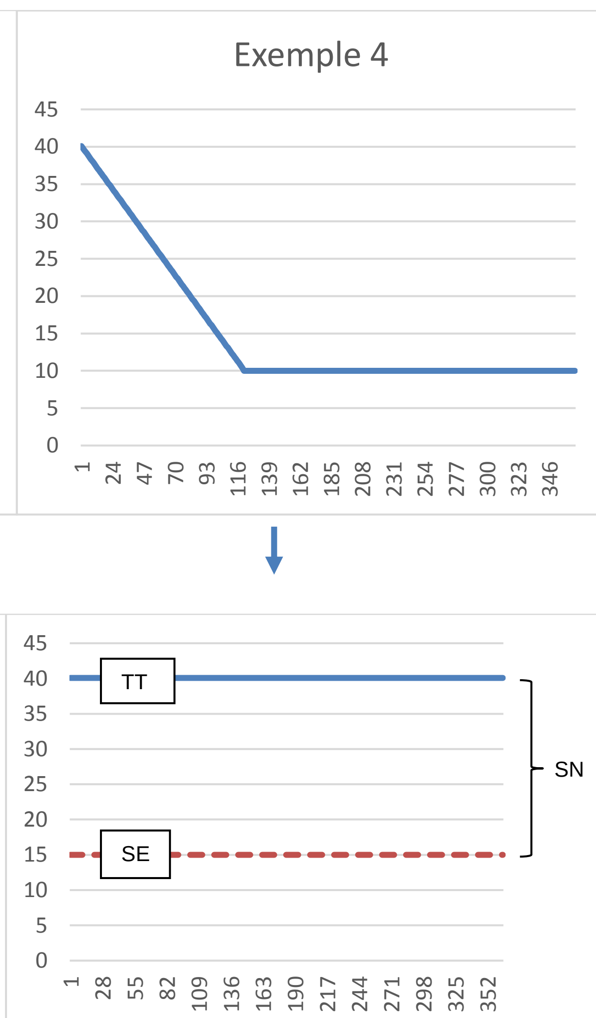
The causation of the supply cost for delivering natural gas from the purchase location to the distribution network therefore depends solely on the ratio between the used and unused transportation units. When a customer has a LF of 100%, the transportation costs are optimal. Any lower LF automatically leads to unused transportation units, which increases the cost per unit consumed.

Let us return to examples 3 and 4 to determine whether it is possible to systematically subdivide the costs to isolate the effect of the units consumed and the unused units.

Graphique 5



Graphique 6



The costs of each profile can be represented differently. Stable equivalent consumption (SE), represented by the dotted red line, corresponds to the transportation units required each day to meet the customer's total consumption need. The solid blue line represents total tools (TT) to purchase to meet the customer's peak need. The gap between the blue line and the red line allows us to calculate the seasonal need (SN) we need to meet.

In each case, the total number of used and unused units is the same, regardless of the graphic representation of the customer's needs. Based on the new diagram, the customer in example 3 has a stable equivalent consumption of 10 units per day, for a total of 3,650 units. The peak is set at 35 units per day, or 25 units more than the stable equivalent consumption. For the entire year, 25 unused units per day represents a total of 9,125 unused units. These results are the same as those obtained in the original diagram of the consumption profile (Graphique 3).

As for the new diagram of the example 4 profile, the stable equivalent consumption is 15 units per day, for a total of 5,475 units. The peak is 40 units per day, which is 25 units per day above the stable equivalent consumption. Once again, these 25 unused units per day equal 9,125 unused units for the year.

In both cases, the customer's consumption to establish a stable equivalent portion is equal to the customer's average consumption per day. The LF is obtained by dividing the average consumption by the peak consumption or the used units by the total units required to supply the customer. The LF rises from 28.6% in example 3 to 37.5% in example 4.

The consumption profile diagram uses two straight lines to isolate the stable equivalent consumption while maintaining the relative measure of the cost of the additional units required to supply the customer. Using the new diagram, the gap between the peak need and the average consumption is 25 unused units in both example 3 and example 4. This discrepancy clearly shows that in each example, the total number of unused units is 9,125 units. The total cost allocated to balance the consumption of these two profiles should therefore be the same, despite a different total consumption.

So the cost of the units used by the customer is still comparable ($1/unit in examples 3 and 4). To show the cost causation, this portion must be allocated based on the volume consumed by the customer.

However, at equal consumption, the weight of the excess units that are not used to transport the supply changes based on the customer's LF. The lower the LF, the more seasonal the customer's consumption and the higher the unused transportation costs. The average and excess demand method retained when the services were unbundled[4] creates this same dynamic and allows us to conclude that **the supply costs must be split between transportation and load balancing services based on a LF equivalent to 100%.**

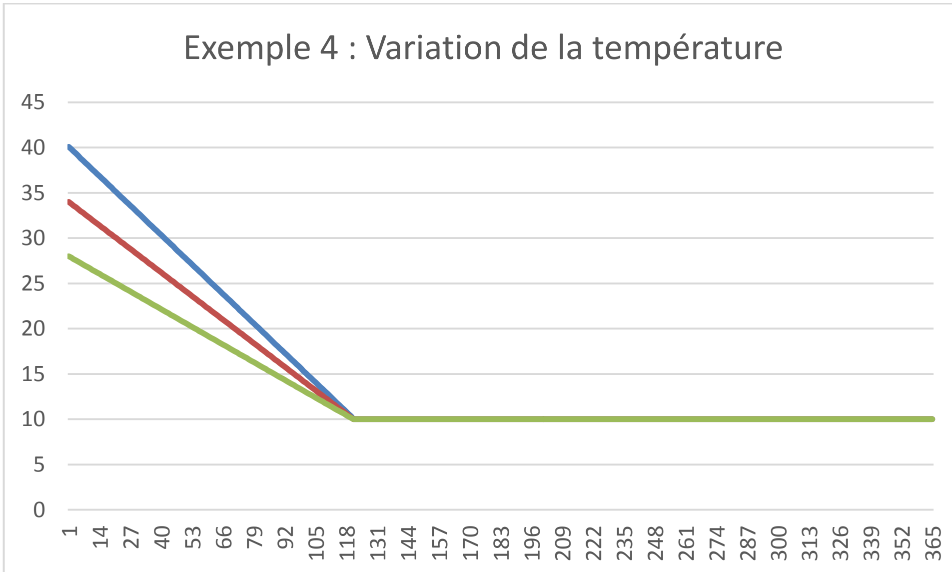
2.1.2 Use of the real vs. projected profile

The profiles presented until now have been rather simple. In reality, however, the annual need of a customer with a seasonal profile will generally vary based on the temperature. The warmer the winter, the less the customer will consume, but the colder the winter, the more it will consume. Is the choice of real or projected profile important? How will it affect the dynamic we saw earlier?

To illustrate this situation, let us return to example 4 and add a temperature variation.

[4] Decision D-97-047. In this decision, the Régie retained the average and excess demand method proposed by Sharon L. Chown, on behalf of Approvisionnement Montréal, Santé et Service Sociaux (AMSS), in case R-3323-95.

Graphique 7

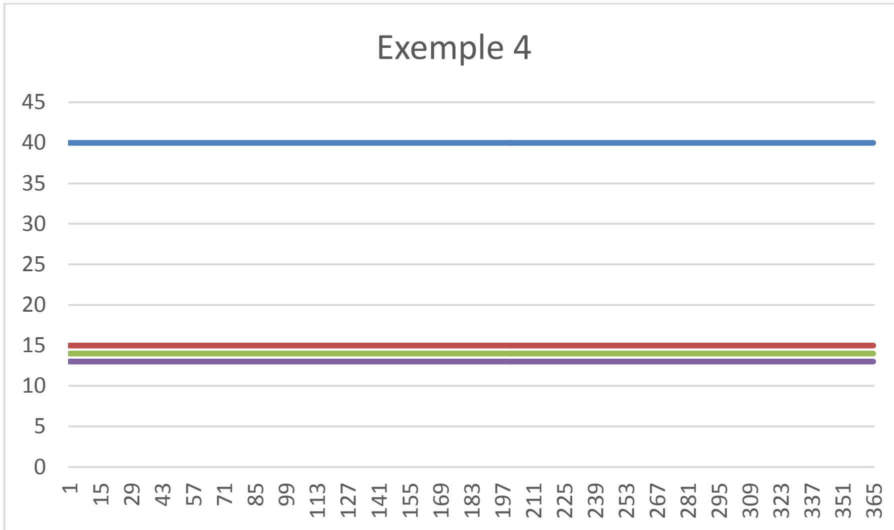


The customer will consume different total quantities based on a cold winter (blue line), a normal winter (red line) and a warm winter (green line). But no matter what the real consumption is, the client's peak need is always based on its potential consumption for the most extreme temperature during a cold winter, or 40 units. This means that, in every scenario, the customer will need to purchase transportation tools totalling 14,600 transportation units (40×365) to secure its supply. Furthermore, the customer's supply cost will remain steady at $14,600, whether the winter is cold or warm. However, depending on the winter, the number of used and unused units will vary.

In the cold winter scenario – the one used to determine the maximum need – the used and unused units are those shown in example 4: 5,475 used units and 9,125 unused units. If the temperature is milder, however, we get a different ratio. In a normal winter, the used units drop to 5,110 and the unused units increase to 9,490. Finally, in a warm winter, the number of used units is just 4,745, while the number of unused units increases again to 9,855. So the less cold the winter in comparison to maximum need, the more unused units the customer's profile generates.

To determine the customer's stable equivalent portion, we can show all these graphs with straight lines, as in Diagrams 5 and 6:

Graphique 8



Depending on the winter, the number of unused units ranges from 27 units per day in a warm winter (40 – 13) to 25 units per day in a cold winter (40 – 15). To correctly allocate the costs, the customer's **real use** of transportation tools, not the **projected use**, gives the real number of unused units by this customer for a given year. If we use the projected parameters, rather than the real value, the units allocated under the stable equivalent portion will no longer give a LF of 100%.

For example, suppose that the number of units expected to be used in the rate case at a normal temperature for this customer is set at 14 per day, at a cost of $1/unit. The profile considered to be stable therefore has an average cost of $14/day. If, in fact, the winter is warmer or colder than normal, then the $14 cost will no longer be equal to a stable profile. For a cold winter, the stable profile would be worth $15/day. To achieve a balance between revenues and costs, since 15 units per day will be consumed even though the cost was established based on a stable consumption of 14 units, the rate would have to be $0.93/unit (units) to exactly recover the allocated costs. But the real cost per unit is $1. This means that when the rate is established in advance at $1, an excess rate of $0.07 per unit is generated in comparison to a stable profile with a LF of 100%, whereas the real excess should have been 0. a warm winter would have the reverse effect for this customer.

Since the temperature changes every year, for the cost causation to be as accurate as possible, the real consumption profile must be used to calculate the stable equivalent consumption profile. Otherwise, the costs would be automatically allocated based on the wrong consumption profile (stable vs. seasonal), depending on whether the winter was colder or warmer than normal.

In conclusion, **the allocation of costs based on actual used and unused transportation units allows us to properly split the total costs of natural gas transportation between the stable equivalent consumption profile and a seasonal consumption profile. The real profile must be used, because it is the only one that reflects the effect of temperature on the client's consumption.**

2.1.3 Costs based on consumption profile

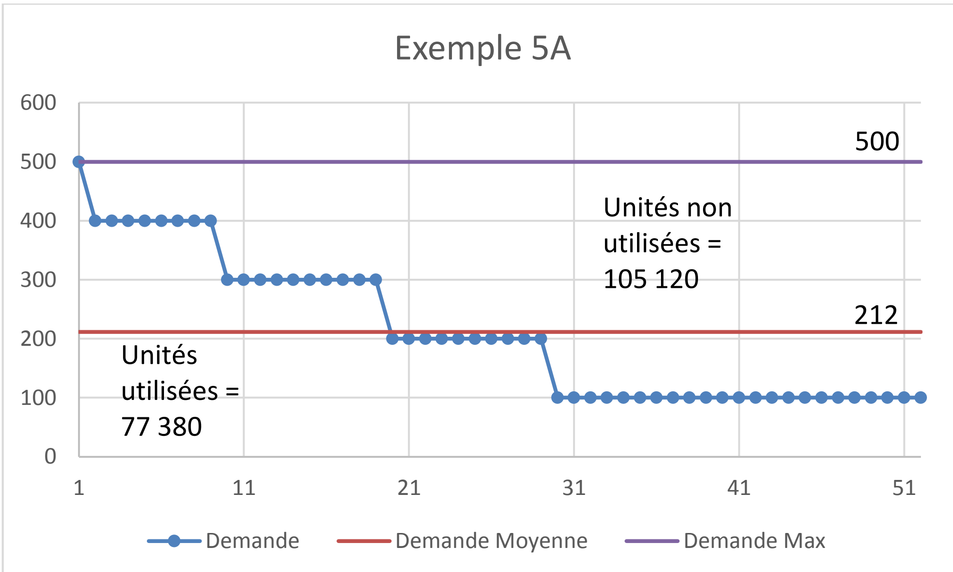
The allocation of costs based on used and unused units accurately portrays the cost causation of delivering the supply, no matter what the customer's profile is. In terms of the stable equivalent portion, the allocation is the same for all units consumed. In terms of the portion allocated on the basis of a seasonal consumption profile, however, the incidence of the cost per unit consumed reflects the profile of each customer. a closer examination of the incidence of the cost of different profiles is therefore necessary to understand how the seasonal profile influences costs.

The cost causation will be analyzed in two steps:

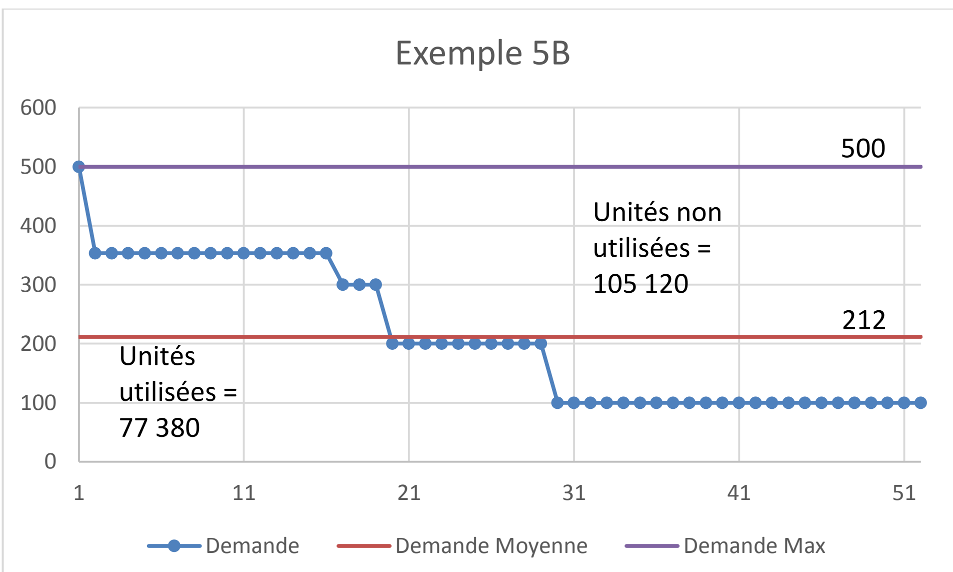
- The first step will observe the change in costs for unused units when peak demand and average demand stay the same. Only the winter consumption profile will be changed.
- The second step will observe the change in costs for unused units when the difference between peak demand and average demand changes. In this case, average demand will stay the same, but the winter consumption profile and peak demand will change.

To begin, here are four scenarios in which the consumption profile (real daily consumption) changes, while average demand and peak demand remain the same. To simplify the scale, consumption is ordered from the week with highest real consumption to the week with lowest real consumption. The x-axis is therefore divided into weeks, rather than days, unlike the previous graphs.

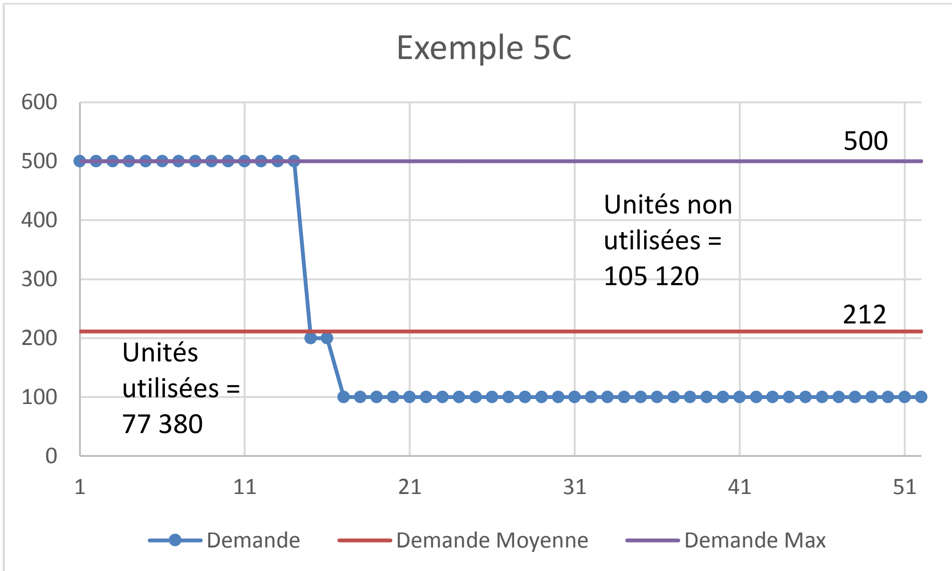
Graphique 9



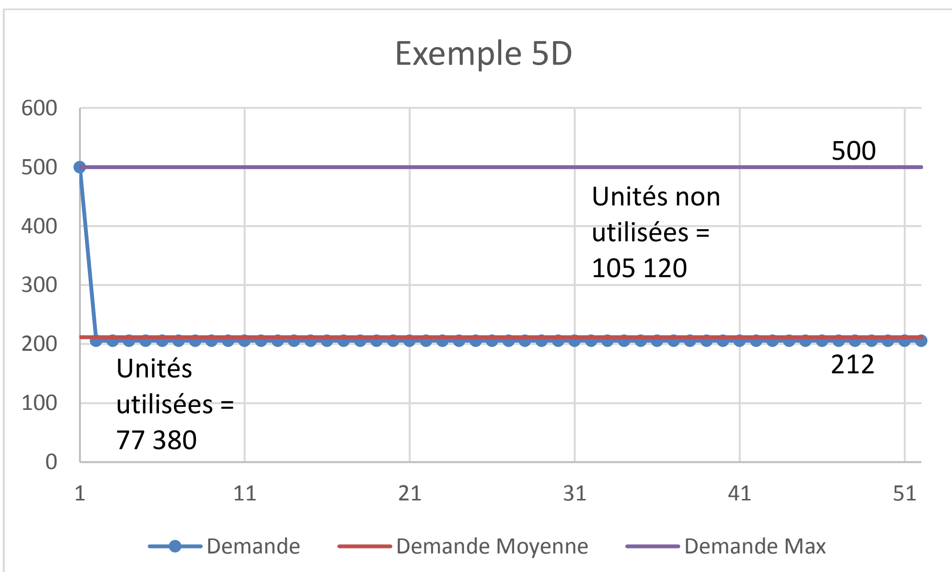
Graph 10



Graph 11



Graph 12



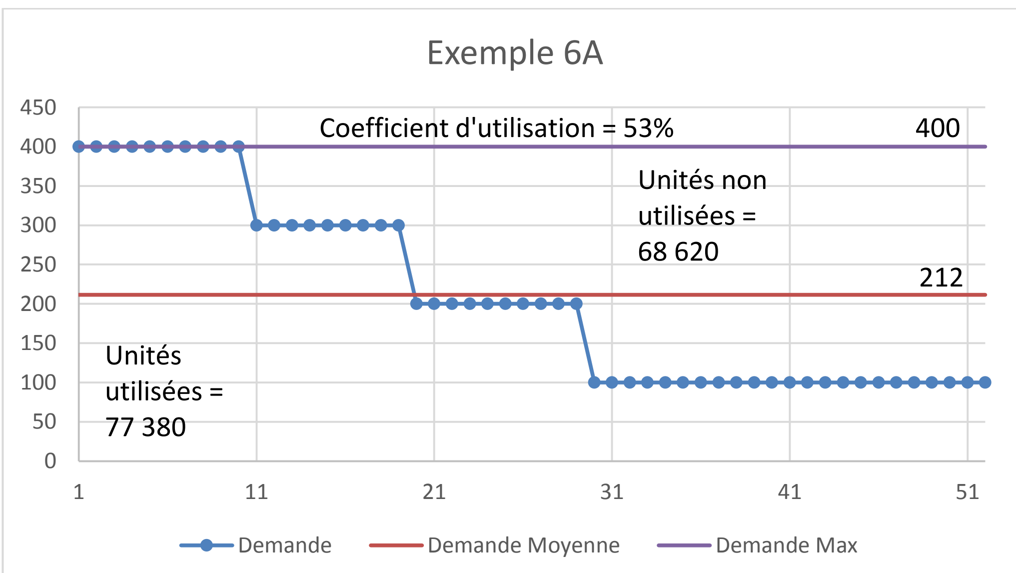
In these four scenarios, despite the different consumption profiles, the customers each consume a total of 77,380 units in the year, or 212 units per day, and they have a peak of 500 units per day. Still working with a supply cost of $1/unit, the total cost of transporting the supply of all these customers in franchise is the same: $182,500 ($500\ unités \times$

$365\ jours \times 1\ \$$). The total cost of the units used, in each case, is $77,380. The cost of the unused units is $105,120 ($182\,500 - 77\,380$). These customers all have the same LF: 42.4% ($212 \div 500$). The cost of serving the customers in these four scenarios is the same despite the fact that they consume different quantities every day.

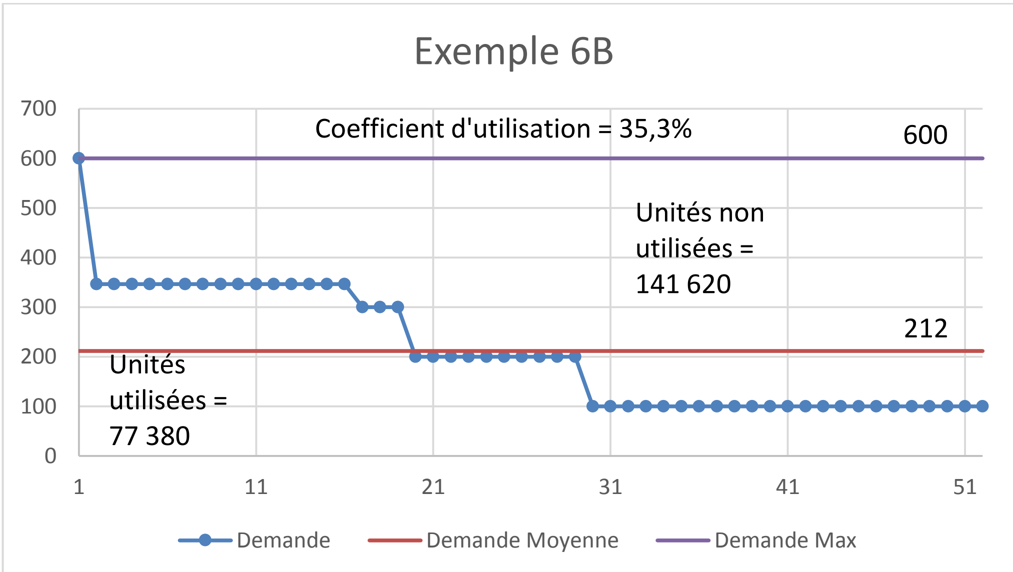
The difference between the peak demand and the average demand therefore allows us to calculate the customer's unused units, no matter what their daily consumption profile is. Furthermore, two different customers who have the same annual consumption and LF automatically generate the same number of used and unused units.

What happens when the peak need is different? Here are four other scenarios in which the average demand remains constant but the peak and daily demand change:

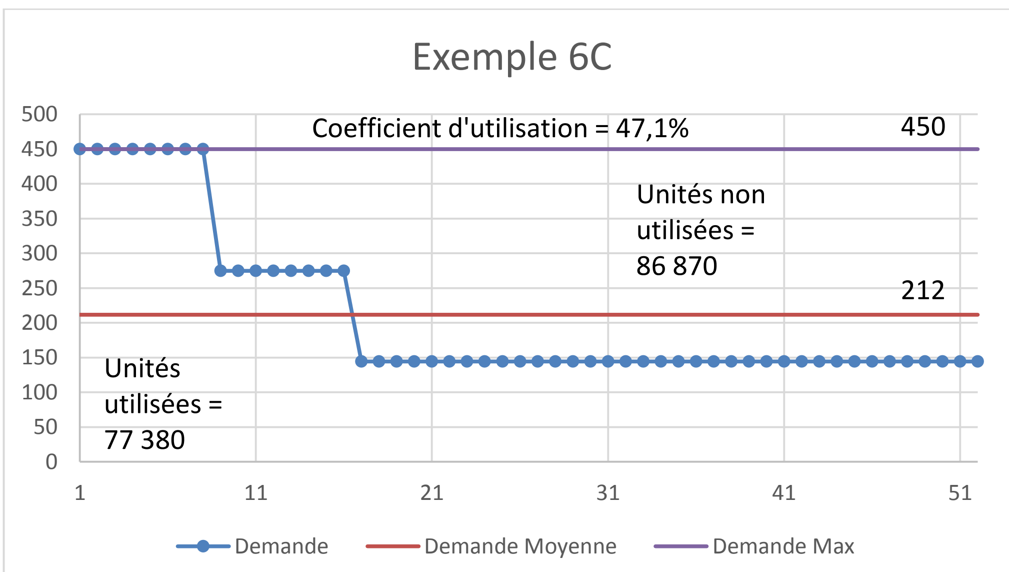
Graph 13



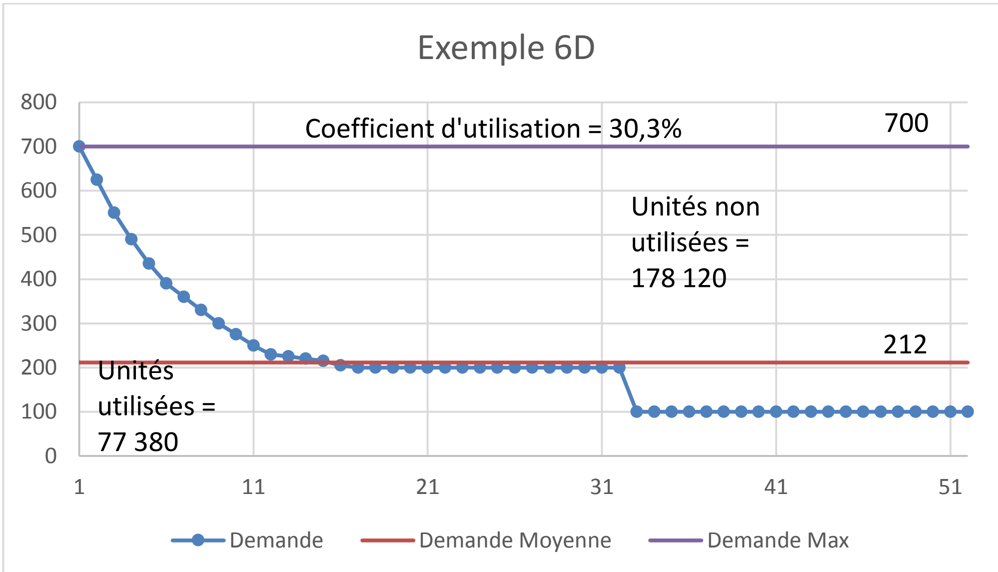
Graph 14



Graph 15



Graph 16



Once again, in all these scenarios, all the customers have the same annual consumption of 77,380 units, but their daily profile and peak demand differ. We can see that the bigger the difference between peak demand and average demand, the greater the number of unused units. In example 6D, the average daily difference is 488 units ($700 - 212$), which generates the highest total number of unused units, at 178,120. At the price of $1/unit, the excess over the average in this case produces the greatest extra costs: $178,120. This also reflects the lowest LF in all the scenarios, at 30.3% ($212 \div 700$).

The costs related to the seasonal consumption profile therefore change based on the difference between average demand and peak demand. Consequently, the lower the LF, the higher the cost. Table ***1*** sums up the differences in the four scenarios presented.

Table 1

Scénario	Coefficient d'utilisation (%)	Unités non utilisées	Coût réel ($)
	(1)	(2)	(3)
6D	30,3	178 120	178 120
6B	35,3	141 620	141 620
6C	47,1	86 870	86 870
6A	53,0	68 620	68 620
Total	**39,4**	**475 230**	**475 230**

The cost of the unused units does not change linearly with the LF. Since the LF is a relative measure based on the customer's average demand and maximum demand, and since the unused units increase based on the decrease in the LF, the relationship can be shown mathematically. The number of unused units in relation to used units changes inversely to the LF. This function can be shown as: $\frac{1}{LF} - 1$. Knowing the cost to distribute based on the seasonal consumption profile, and using this formula, it is possible to calculate the exact per-unit cost for each customer.

Table 2

Scénario	Coefficient d'utilisation *(%)*	$\frac{1}{CU} - 1$	Coût par unité non utilisée *($)*	Coût unitaire par client *($)*
	(1)	(2)	(3)	(4) = (2) x (3)
6D	30,3	2,3019	1,00	2,3019
6B	35,3	1,8302	1,00	1,8302
6C	47,1	1,1226	1,00	1,1226
6A	53,0	0,8868	1,00	0,8868
Total	**39,4**	**1,5354**	**1,00 $**	**1,5354**

In this case, the cost per unused unit is set at $1 (column 3). The customer's per-unit cost (column 4) is therefore equal to the answer to the equation $\frac{1}{CU} - 1$. The cost per unused unit may change annually, however, which would give a different per-unit cost than the answer to the equation in column 2.

The per-unit cost established is then used to accurately calculate the cost of the unused units for each customer.

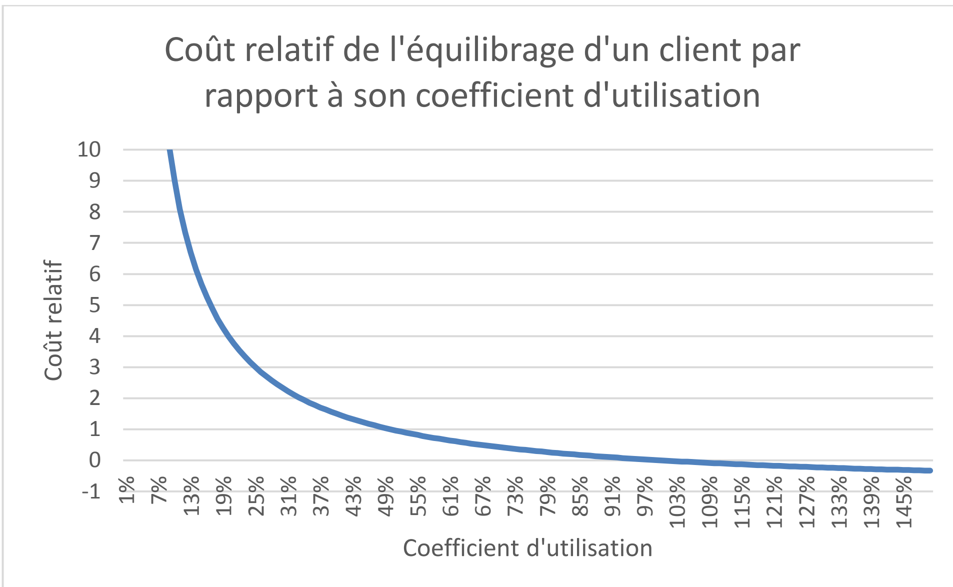
Table 3

Scénario	Coefficient d'utilisation *(%)*	Coût par client *($)*	Unités consommées	Coût estimé formule CU *($)*	Coût réel *($)*	Écart *($)*
	(1)	(2)	(3)	(4) =(2) x (3)	(5)	(6)=(5) - (4)
6D	30,3	2,3019	77 380	178 120	178 120	0
6B	35,3	1,8302	77 380	141 620	141 620	0
6C	47,1	1,1226	77 380	86 870	86 870	0
6A	53,0	0,8868	77 380	68 620	68 620	0
Total	39,4	1,5354	309 520	475 230	475 230	0

The cost causation to distribute based on the seasonal consumption profile is therefore closely connected to the customers' LF. This relationship is inversely proportionate and allows the costs to be distributed accurately, based on the units consumed by the customer. The customer's daily consumption profile has no influence on the number of used and unused units when the average and maximum demand are constant.

The costs over those established to meet stable demand are therefore caused by all customers with a LF lower than 100%. The lower the LF, the more the cost per unit consumed increases exponentially, as shown in the graph below. For example, a LF of 50% will result in a cost of 1 ($1 \div 0{,}5 - 1 = 1$), whereas a LF of 75% gives a cost of just one-third of that ($1 \div 0{,}75 - 1 = 0{,}33$).

Graphique 17

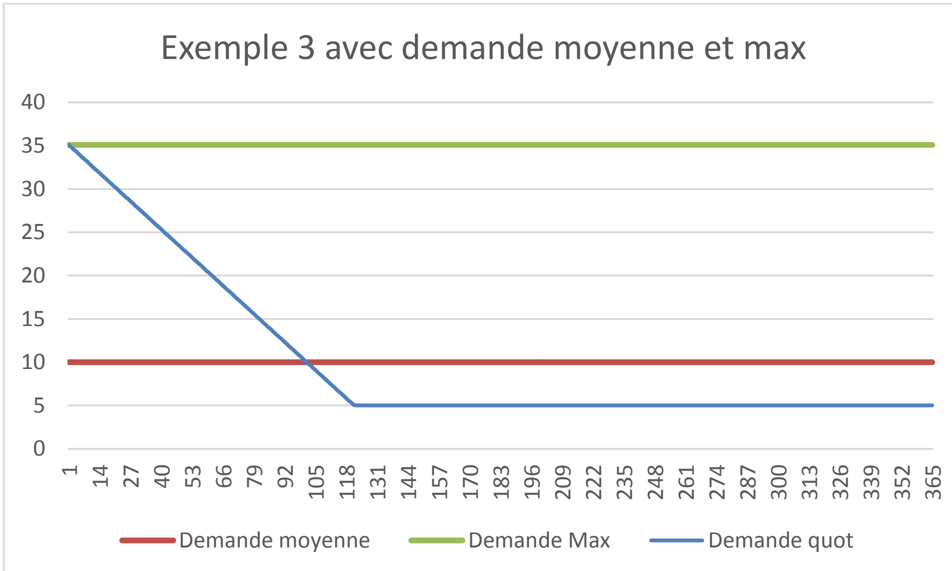


2.1.4 Optimization of transportation costs

Until now in this demonstration, the cost causation has been analyzed on the assumption that the only natural gas supply tool available was TCPL transportation. In fact, the distributor can replace or reduce the transportation tools by storing in franchise or transferring continuous service demand to interruptible service.

First, let us determine in greater detail how the distributor can reduce total transportation costs. To this end, example 3 will be used again, with the addition of average and maximum demand.

Graphique 18



In its simplest form, this customer will purchase 35 transportation units per day for a period of 365 days. The customer can then deliver the natural gas it needs, no matter when or how many times its maximum demand occurs. Although it only needs 10 transportation units per day to meet its annual consumption of 3,650 units, it will have at its disposal an annual total of 12,775 units (35×365).

To reduce its total cost, this customer can transform a portion of its continuous demand into interruptible demand. It could, for example, acquired a back-up energy source. For its peak need, this back-up energy source will allow for a direct reduction of the required transportation tools. If the back-up energy source can replace two units on peak days, then the customer can reduce its transportation purchase to 33 units per day ($35 - 2$).

The evaluation cannot end at this step, however. The back-up energy source, in this case, must also cover the need for days on which consumption will be higher than 33 units. To evaluate what the back-up energy source must cover, this customer must first evaluate its maximum need per day.

Tableau 4

Journées	Demande max.
1	35
2	34,75
3	34,5
4	34,25
5	34
6	33,75
7	33,5
8	33,25
9	33
10	32,75

For eight days, every year, the customer's daily demand will be potentially higher than 33 units. The energy source will have to cover the excess over 33 units for each of these days. The total excess to cover can be calculated by comparing the maximum demand before and after adjustment for the alternative energy source.

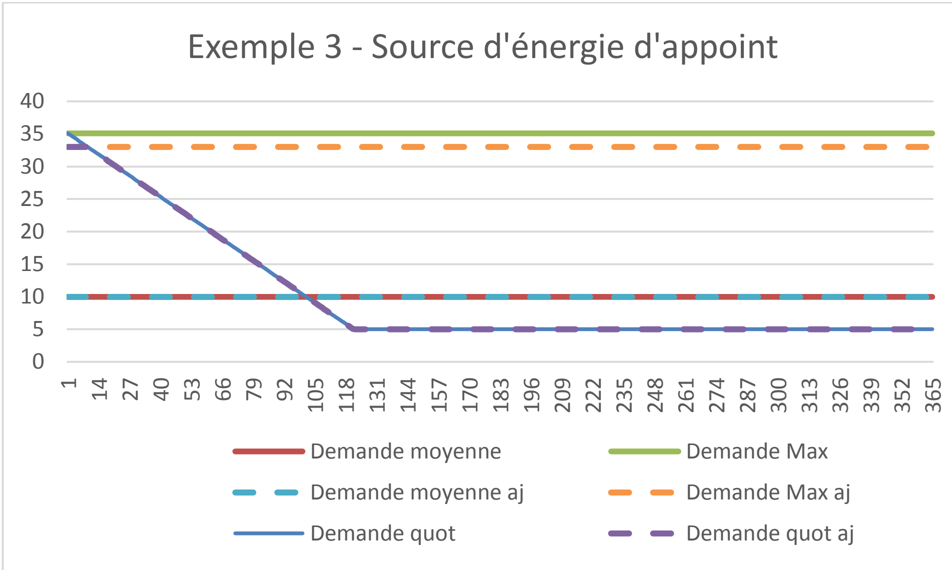
Tableau 5

Journées	Demande max.	Demande max. ajustée	Écart	Écart cumulatif
	(1)	(2)	(3) = (1) – (2)	(4)
1	35	33	2	2
2	34,75	33	1,75	3,75
3	34,5	33	1,5	5,25
4	34,25	33	1,25	6,5
5	34	33	1	7,5
6	33,75	33	0,75	8,25
7	33,5	33	0,5	8,75
8	33,25	33	0,25	9
9	33	33	0	9
10	32,75	32,75	0	9

In total, although the back-up energy source only has to cover 2 units on the peak days, it must be able to be used during the winter for up to 8 days and cover a minimum of 9 units. If the back-up energy source cannot cover this minimum, then the transportation tool purchase cannot be reduced by 2 units. For example, if the back-up energy source could only be used for a maximum of 5 days, then the transportation tools could only be reduced by 1.25 units at most (35 - 33,75). Also, if the back-up energy source could only cover a total of 7.5 units for the entire winter, then in this case the transportation tools could only be reduced by 1 unit a day (35 - 34, demand on the fifth day, which requires a capacity of 7.5 units).

That said, assuming that the back-up energy source can cover a peak need of 2 units and that it has the capacity to cover up to 8 days per year (that is, a capacity of 9 units during the winter), the customer will be able to adjust its natural gas needs.

Graphique 19



Adding a back-up energy source will allow the customer to reduce the transportation tool purchase by 2 units. Practically speaking, this means a reduction in total transportation units purchased from 12,775 to 12,045 units (33×365). Since the customer is partly replacing its consumption with another energy source, this also marginally reduces its annual consumption from 3,650 to 3,641 units. The number of unused units then falls by 721, from 9,125 to 8,404 unused units. At a per-unit transportation cost of $1, the potential cost reduction is $721. The net reduction will be equal to $721 less the cost of the back-up energy source. Assuming an annual cost of $500 for the back-up energy source, the saving on the transportation tools is $221. In a sense, the back-up energy source replaces the transportation tool and serves as a lower-cost equivalent.

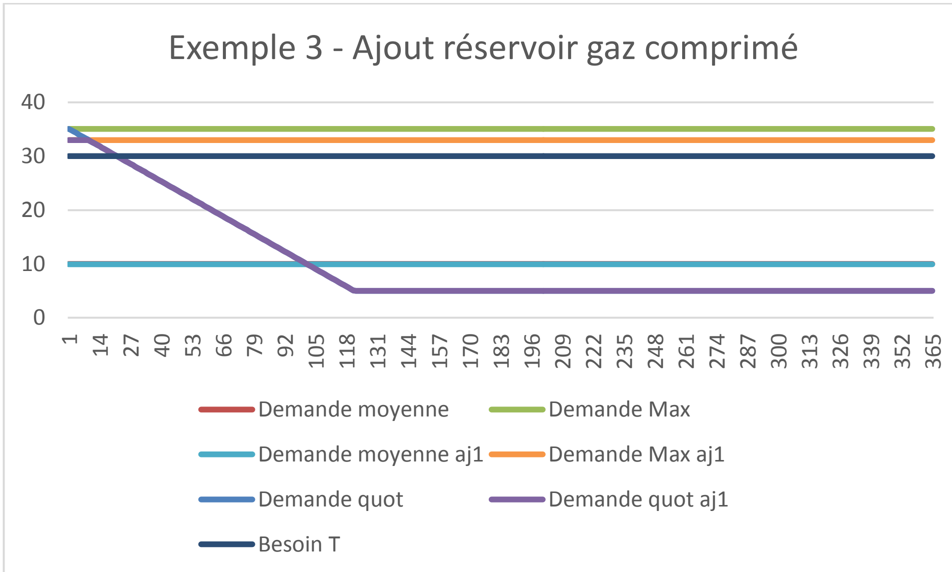
Now let us assume that the customer wishes to reduce its transportation costs even more. To achieve this, this customer purchases a compressor and a compressed gas tank and installs them on its property. The conduit connecting the tank with the facilities can provide up to 3 units a day. This could allow the customer to reduce the transportation units from 33 to 30 units per day. The customer has to be certain that the tank has the required capacity to compensate for this reduction in peak demand.

Tableau 6

Journées	Demande max. ajustée 1	Besoin en transport	Écart	Écart cumulatif
	(1)	(2)		(4)
1	33	30	3	3
2	33	30	3	6
3	33	30	3	9
4	33	30	3	12
5	33	30	3	15
6	33	30	3	18
7	33	30	3	21
8	33	30	3	24
9	33	30	3	27
10	32,75	30	2,75	29,75
11	32,5	30	2,5	32,25
12	32,25	30	2,25	34,5
13	32	30	2	36,5
14	31,75	30	1,75	38,25
15	31,5	30	1,5	39,75
16	31,25	30	1,25	41
17	31	30	1	42
18	30,75	30	0,75	42,75
19	30,5	30	0,5	43,25
20	30,25	30	0,25	43,5
21	30	30	0	43,5

The tank will have to cover up to 20 days to cover the demand between 30 and 33 units per day. Furthermore, the tank will need a minimum capacity of 43.5 units, or it may run out before the 20th day of use. Assuming that the customer can acquire such a tank, its transportation requirements will be changed again.

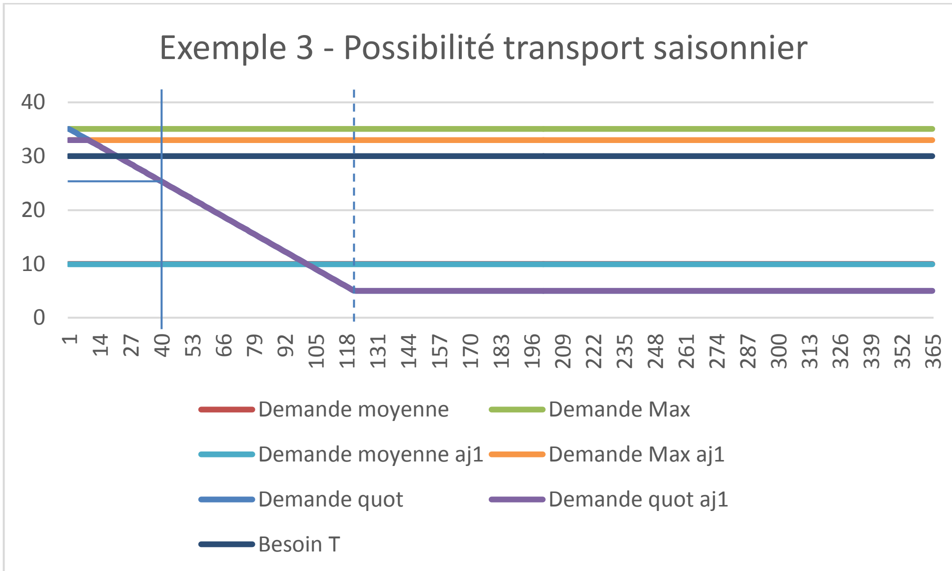
Graphique 20



This time, the demands will be the same since there is no transfer to another energy source, but the transportation tool requirement can be reduced to 30 units per day. The potential saving is $1,095 ($3\ unités \times 365\ jours \times 1\ \$$). If the cost of the tank covering the peak and the capacity is less than $1,095, then the customer can achieve additional savings. Assuming that the annual cost of the tank is $800, then this customer can reduce its cost for unused units by $295. The tank replaces the transportation tool at a lower cost equal to $0.73 per unused unit ($800\ \$ \div 3\ unités\ par\ jour \div 365\ jours$).

Finally, suppose that the client is offered the chance to purchase 5 units per day of seasonal transportation (covering winter) at a lower cost than the annual transportation cost. This would reduce its annual transportation needs to 25 units per day. Going back to the last graph, we can assess whether this possibility can reduce the customer's annual tool purchase while still meeting its needs.

Graphique 21

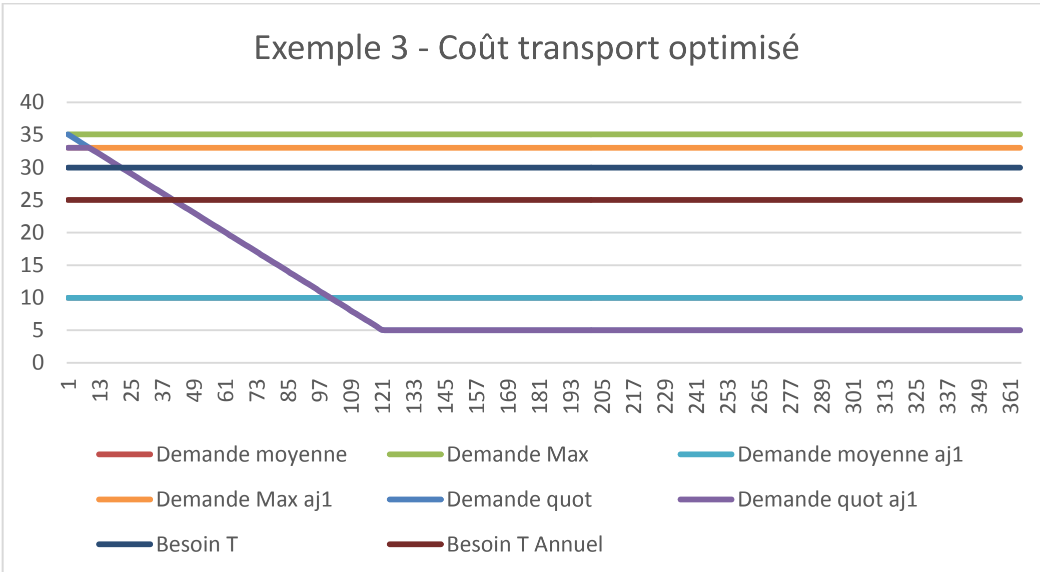


The first vertical line shows that the customer will, according to its own projection, consume 25 or more units a day for a maximum period of 40 days. The second vertical line, dotted, represents all the customer's winter needs. The customer can meet all its needs up to the dotted line using seasonal transportation. Beyond this dotted line, the seasonal tool cannot meet its need.

The customer can therefore reduce its annual purchases thanks to the seasonal transportation offer of 5 units per day, but the price will have to be proportionally lower than the cost of annual transportation. The seasonal transportation tool consists of 150 days of transportation during the winter at a cost of $2 per unit. The cost in comparison to the annual transportation tool is therefore $0.82 ($150\ jours \times 2\ \$\ par\ unité \div 365\ jours$). Since this price is less expensive than that of the annual transportation tool, which costs $1/unit, the client can acquire it and reduce its transportation costs by $0.18/unit. This will reduce the cost of its unused units by $325 per year ($5\ unités\ par\ jour \times 0{,}18\ \$ \times 365\ jours$).

By applying all of these measures, the client can optimize its transportation costs by replacing or reducing its annual transportation costs with less costly alternatives. Here is a graph showing all of the optimizations:

Graphique 22



To meet its annual need of 3,650 units and its maximum need of 35 units in a day, the customer replaced:

- part of its consumption with a back-up energy source, at a cost of $500;
- part of its annual transportation purchases with storage capacity at its consumption site, at a cost of $800;
- part of its annual transportation purchases with seasonal transportation, at a cost of $1,500;

Initially, its total supply cost was $12,775, of which only $3,650 allowed for complying with its consumption needs (used units). All of the alternatives used by the customer reduced the total supply cost to $11,925 ($25 \; unités \; par \; jour \times 1 \; \$ \times 365 \; jours + 500 \; \$ + 800 \; \$ + 1\,500 \; \$$). For its real consumption of 3,650 units, this lowers the total per-unit cost from $3.50 to $3.27. Since the cost of its stable demand has stayed the same at $1 per unit, the cost for its seasonal demand decreases from $2.50 to $2.27 per unit, a reduction of about 9% of the cost.

This example shows that all of the optimizations allow for reducing the total transportation costs. Since these optimizations are only possible when there is a seasonal demand, the savings are related to the seasonal consumption profile.

Although this example is for a particular customer and is attributable to that customer, for a distributor, the exercise can be carried out for global demand. Since global demand represents the combined needs of all customers, the savings can also only be related to all customers that consume with a seasonal profile.

Consequently, **the cost of storage tools in franchise, interruptible service and seasonal transportation must be allocated directly based on the consumption profile**. All costs associated with the replacement tools must also be allocated based on the consumption profile.

Furthermore, since these costs must, in the long term, be lower than the annual transportation costs, this reduces the total costs that these customers have to absorb.

2.1.5 Causation of stranded transportation costs

If part of the demand is seasonal, the distributor has stranded transportation costs, related to unused transportation units. To serve these customers, the distributor has to purchase transportation tools, or their equivalent, to meet the maximum projected demand.

As demonstrated in examples 1 to 6 of this evidence, a seasonal consumption profile generates unused transportation units. The cost causation of the transportation tools allows us to subdivide the costs between the stable equivalent portion and the seasonal portion.

When the unused units are found in the seasonal portion, their cost can be allocated based on the customer's consumption profile. This allocation is appropriate provided the unused units are the result of the seasonal demand.

In addition to seasonal demand, there can be two other causes for unused transportation units:

- Decrease in consumption by a stable customer for which tools have already been purchased.
- Difference between real demand and projected demand.

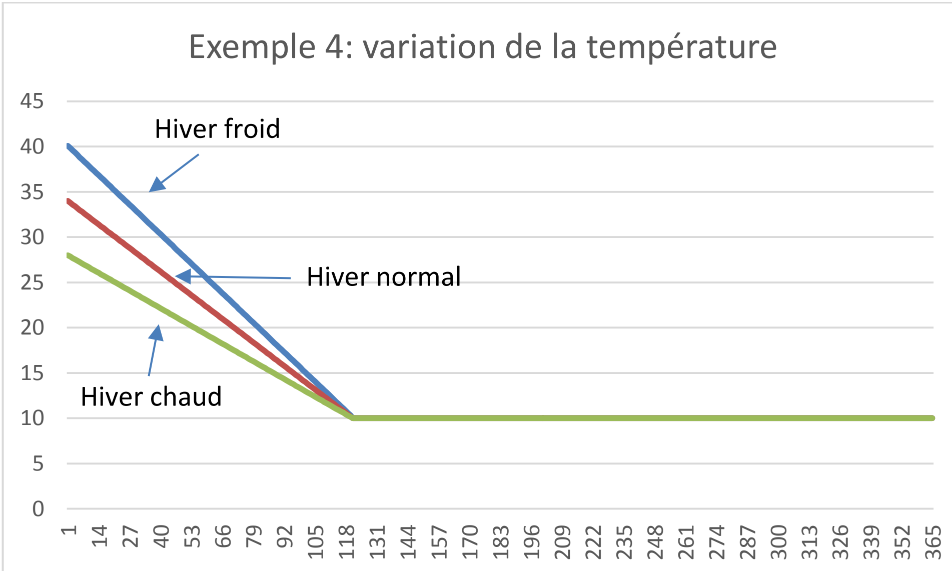
To clearly illustrate the difference between these three situations that generate stranded costs, here are some examples for each.

Change in seasonal demand related to temperature

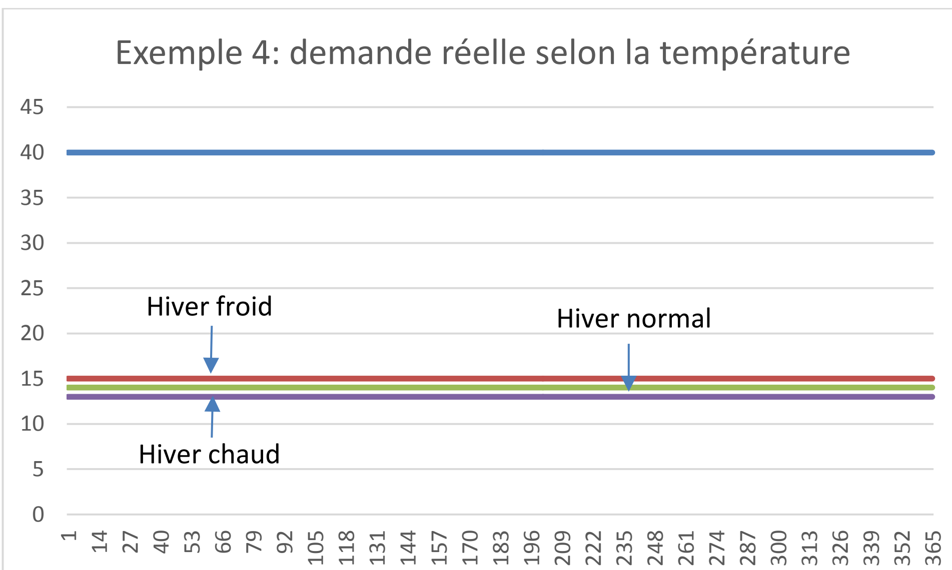
First, although the stranded cost dynamic (unused units) associated with seasonal consumption has already been explained, it is still useful to review the topic again.

Most of the examples presented so far in this evidence are based on maximum demand, but this demand reflects a scenario with very cold temperatures. Changes in temperature influence the number of used and unused units. To illustrate this dynamic, the graphs showing the effect of temperature in example 4 are repeated here:

Graphique 23



Graphique 24



When the temperature changes, it influences seasonal demand. In a cold winter, the customer's seasonal consumption will be higher. In a warm winter, it will be the opposite and the customer's seasonal demand will be lower. The effect on annual consumption will be felt in the same way. But since the transportation tools are purchased to meet maximum demand, they remain constant, no matter what type of winter it is.

Therefore, in a warm winter, there will be more unused units than in a normal winter. In a cold winter, the opposite will be true and the number of unused units will be lower than in a normal winter. The total stranded costs are therefore greatly influenced by temperature.

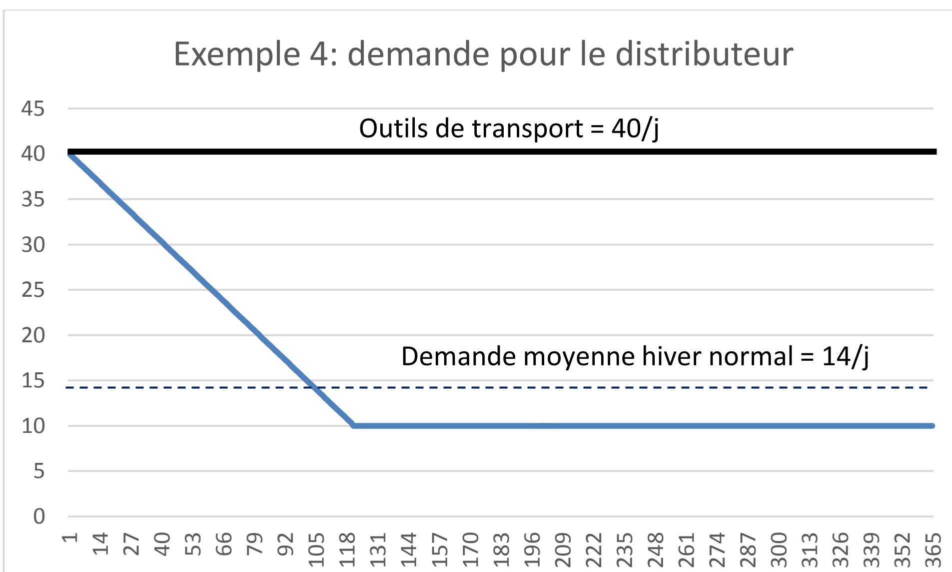
When the cost of the unused units is allocated based on the consumption profile, this dynamic maintains the cost causation: the lower the customer's LF, the more the temperature influences its consumption and the more responsible it is for the change in this type of stranded cost.

As already mentioned, there are reasons other than temperature that can create stranded costs.

Drop in stable portion of consumption

Stranded costs may occur when there is a lasting decrease in the customers' stable consumption. To illustrate, let us go back to example 4, assuming that the customer's demand is actually the distributor's total demand:

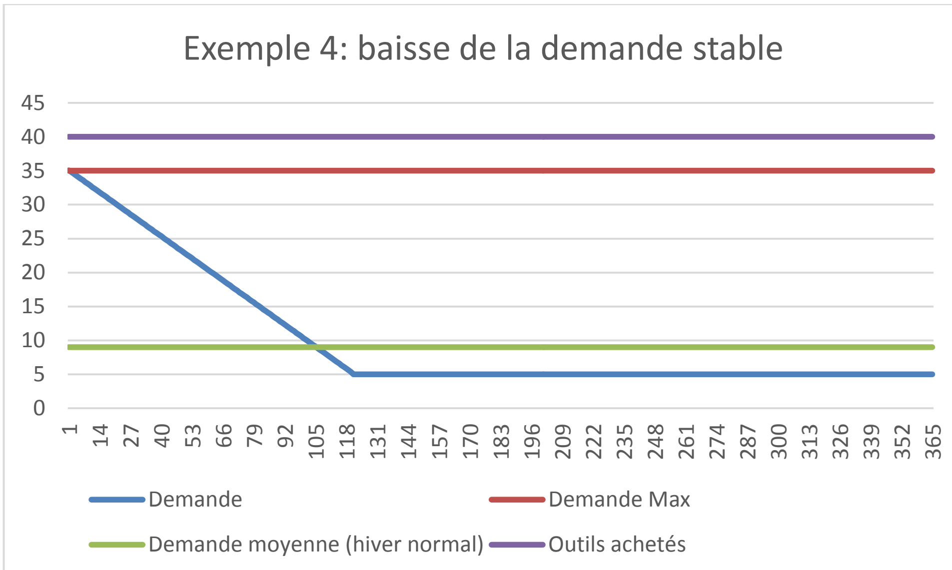
Graphique 25



To simplify the explanations, the distributor simply purchases the transportation tools to meet maximum need. The distributor contracts these tools for a two-year period.

Then a major stable customer shuts down in the second year. This customer had a demand of 5 units per day.

Graphique 26



The distributor is left with an excess of 5 units per day of transportation, which is added to the stranded costs. For the year, this represents a total of 1,825 unused transportation units. The seasonal profile of the customers is not the cause of these additional stranded costs. In this case, the stranded cost cannot be allocated based on the seasonal consumption profile. The cost was caused because one customer shut down.

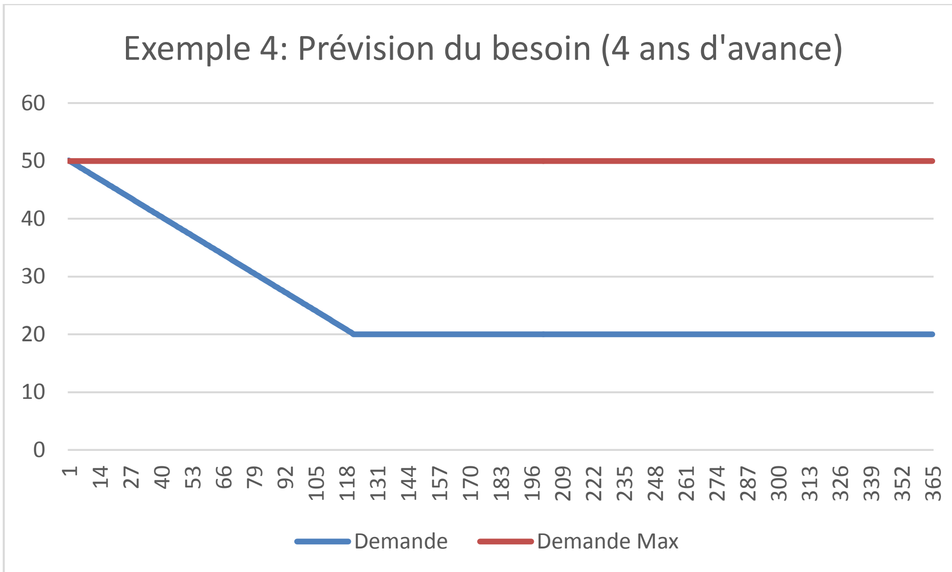
<u>Difference between real demand and projected demand</u>

A change in real demand compared to what was projected can also generate stranded costs.

Generally, distributors have to purchase their transportation tools several years in advance, as the contracts are long-term. To make the purchases, each distributor has to evaluate future demand and establish a progression scenario for probable demand. It is possible, however, that the probable scenario will not occur. This situation can lead to stranded costs over time.

To illustrate this situation using example 4, the projected demand for four years later was generated:

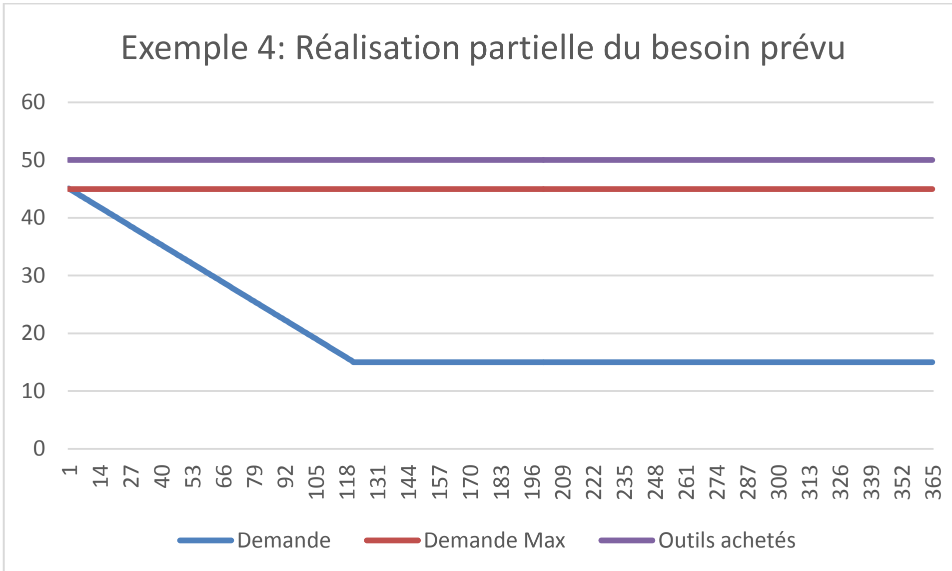
Graphique 27



The distributor's scenario projected the connection of stable profile customers totalling 10 additional units per day.

When the year in question arrived, however, stable profile customers totalling only 5 additional units were connected.

Graphique 28



The distributor ended up with 5 units' worth of excess transportation tools a day. This represents 1,825 unused units for the year. This time, none of the existing customer caused the stranded costs. The causation of the stranded costs could also be the connection of customers whose intentions were not achieved, a change in the market situation which reduced sales potential between the time of projection and the actual time, or another contextual reason.

Therefore, there may be stranded costs that are not related to temperature, but it may be difficult to establish a clear causal link for these other stranded costs. In the examples presented, isolated situations were analyzed, but in reality, transportation tools are purchased at varying intervals and different times. Furthermore, many customers join and withdraw every year. So how can we assess the costs that are related to the drop in consumption of a particular customer from those related to a gap between real and projected demand in a probable scenario? Since the supply costs take the customers' global demand into account, it is not possible to directly assess stranded costs.

The previous paragraphs show that only stranded costs related to a change in temperature can be allocated based on the seasonal consumption profile. The other stranded costs require specific allocation so they do not penalize a particular type of customer.

2.2 Causation of supply costs

2.2.1 Different evaluation of transportation

To correctly examine the supply cost causation, the following assumptions have been made:

- There is no constraint on the transportation purchase, i.e. the entire supply purchased can be transported in franchise at any time.
- There is no constraint on the volume that can be purchased each day, as market liquidity allows for considerable volumes to be exchanged at a market price.
- There is no constraint on operational flexibility related to changes in demand over the course of a day.

These assumptions will allow us to evaluate the causal link that is specific to the supply costs alone.

Supply cost causation also has to be evaluated differently from transportation cost causation. Transportation is contracted multi-annually for the same quantity every day of the year. To supply customers with a seasonal profile, the number of transportation units purchased is higher than the number of transportation units consumed (used and unused units). Likewise, the per-unit cost of transportation, under the same contract, is the same throughout the year. Since the transportation market is less flexible, the distributor also has to purchase the capacity required to serve the seasonal customers' peak potential in advance.

In the case of supply, the distributor does not have to purchase excess quantities in advance. The purchases each year are more or less equal to the customers' real consumption. Due to increased demand in winter in Canada and the northern United States, however, the price may vary seasonally, based on inventory and temperature.

Therefore, unlike transportation, the seasonal price increases are not due mainly to unused units (stranded costs) but to the change in the price of the commodity.

2.2.2 Effect of consumption profile

To observe the effect of the consumption profile on the cost of supply purchase, average monthly prices have been set. These prices are presented in Tableau 7:

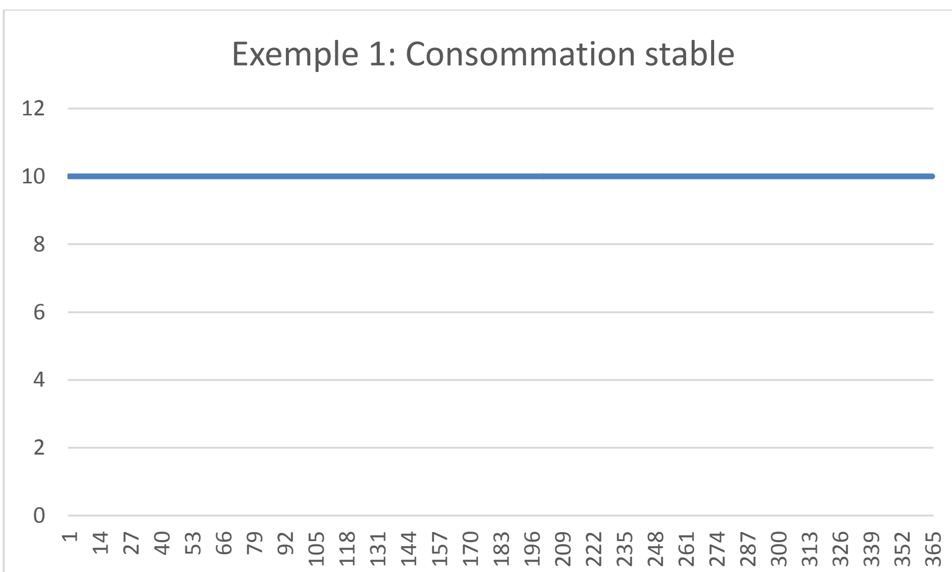
Tableau 7

Prix de la fourniture par unité

Janv.	Févr.	Mars	Avr.	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.	Année
4,00	4,00	4,00	4,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00	4,00	3,50

To examine cost causation, let us go back to examples 1 to 4 that we used in the transportation section.

Graphique 29

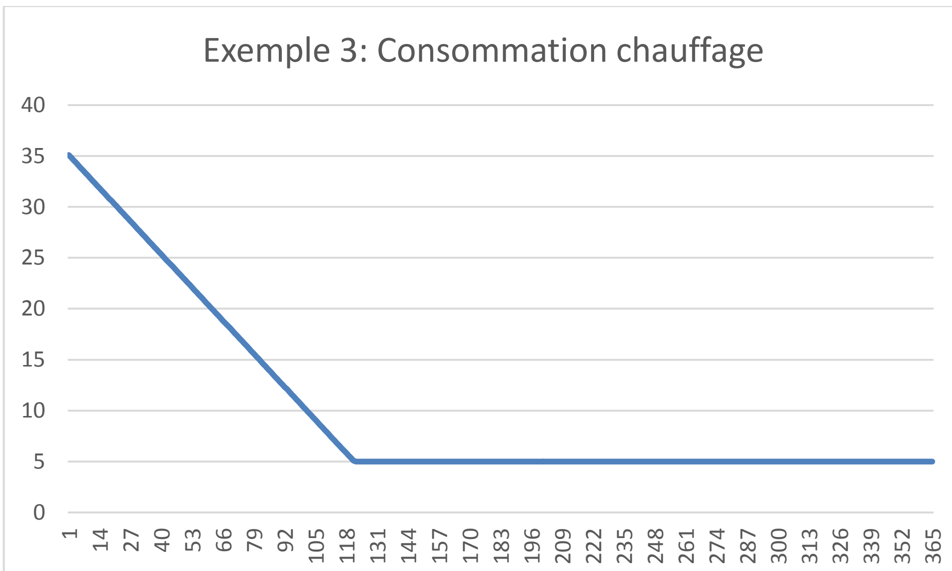


Since the customer has stable consumption, the purchase cost will be equal to the index in each period. With this type of consumption, the customer's average cost is equal to the average annual price of the supply, or $3.50. The total cost equals the average annual price multiplied by the total consumption. At 10 units consumed per day, the total cost of the supply for this customer will be $12,775 ($10 \times 365\ jours \times 3{,}50\ \$$).

If this customer doubles its consumption while maintaining a stable profile, its costs will double also. Its average cost will still be equal to the average annual cost, $3.50. At 20 units consumed per day, the total supply cost will be $25,550 ($20 \times 365\ jours \times 3{,}50\ \$$).

But what about customers with seasonal consumption?

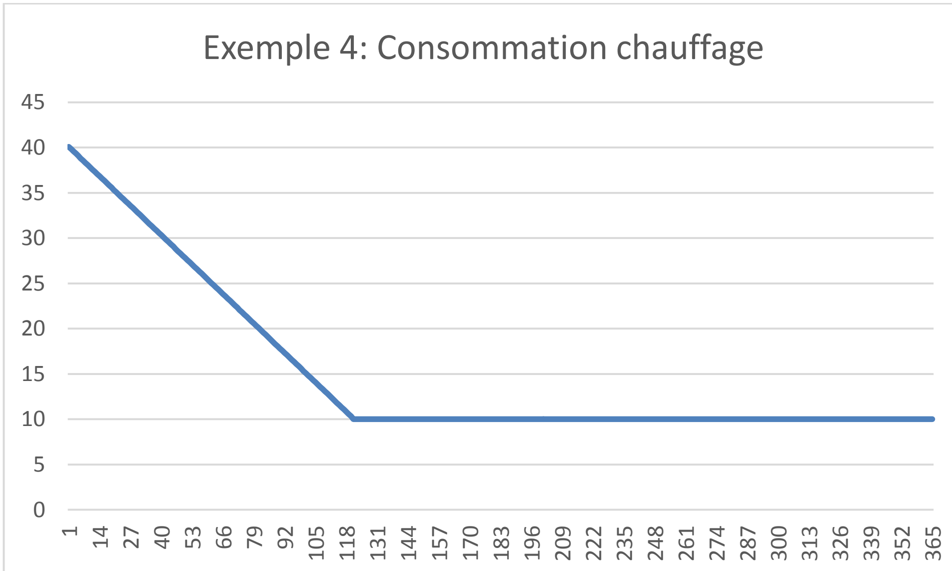
Graphique 30



Since all seasonal consumption occurs between November and April (period of the year when prices are at $4.00, according to Tableau 7), this customer will purchase more supplies during the winter than during the rest of the year. Of its total consumption of 3,650 units, 920 are consumed from May to October, at a cost of $3, and 2,730 are consumed from November to April, at a cost of $4. The customer's total cost will be $13,680, or an average of $3.75 per unit consumed.

The cost per unit consumed is therefore different for a customer that consumes seasonally than one that consumes stably. Still using the same prices, what happens when this seasonal customer increases its basic consumption?

Graphique 31



The customer will still have to purchase a greater supply during the period from November to April, despite the increase in its stable consumption over the year. Its total consumption is now 5,475 units. For the months from May to October, its consumption has doubled to 1,840. For the months from November to April, the customer has added 905 units and now consumes 3,635 units. The customer's total cost increases to $20,060, but the cost per unit decreases to $3.66. The effect of the price change is lower in comparison to the average price for the year because the customer increased its LF from 28.6% to 37.5%.

Although in this example, the seasonal effect leads to an increased cost for seasonal profile customers, this is not always what happens. Some years the seasonal price may be lower. The factors that explain a lower price in winter may be tied to inventories that are too high or very warm winter temperatures. In the long term, however, the global seasonal effect is likely to be to the disadvantage of seasonal customers.

The supply situation is different from the effect of seasonality on transportation costs. First, unlike transportation, supply purchases are partly periodic, which allows the distributor to avoid excess commitments when the winter is not cold. There are therefore few or no unused supply units. Although seasonality inevitably leads to transportation costs every year, it may lead to costs or savings in terms of supply, depending on how the prices change over the year.

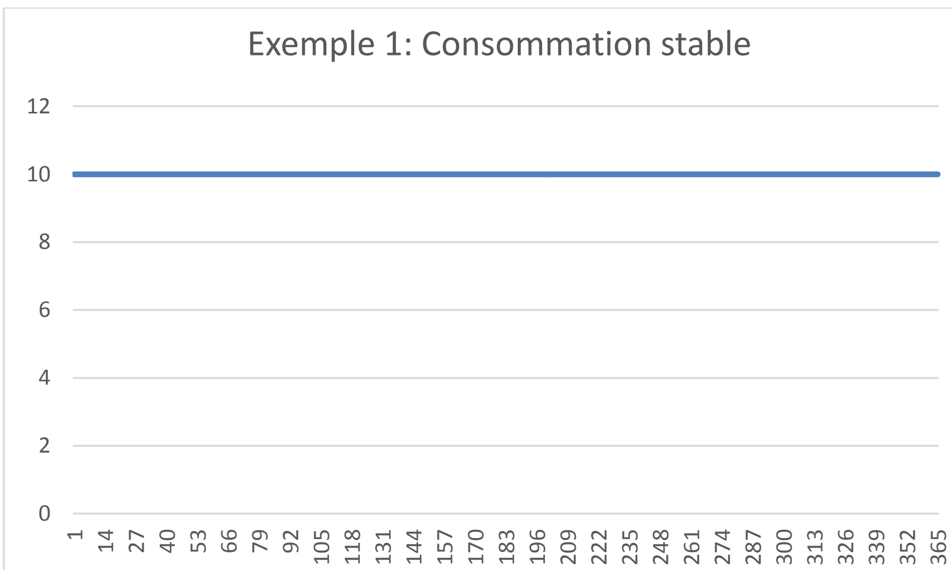
Tableau 8

Prix de la fourniture par unité

Janv.	Févr.	Mars	Avr.	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.	Année
3,00	3,00	3,00	3,00	4,00	4,00	4,00	4,00	4,00	4,00	3,00	3,00	3,50

The annual price would still be $3.50 per unit after inverting the prices.

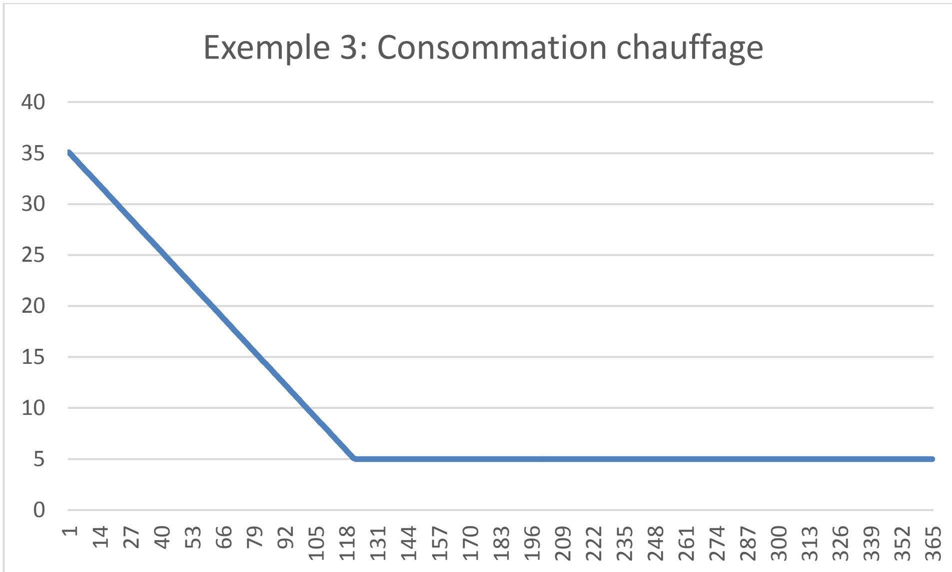
Graphique 32



A stable profile customer will maintain the same total price after the prices are inverted, as the average annual per-unit cost will still be $3.50. Therefore, the total cost will still be $12,775 ($10 \times 365\ jours \times 3{,}50\ \$$). By doubling its consumption, its cost will double again to $25,550 ($20 \times 365\ jours \times 3{,}50\ \$$). In both cases, the per-unit cost will still be $3.50, based on the initial prices or the inverted prices.

However, inverting the prices will affect customers with a seasonal profile.

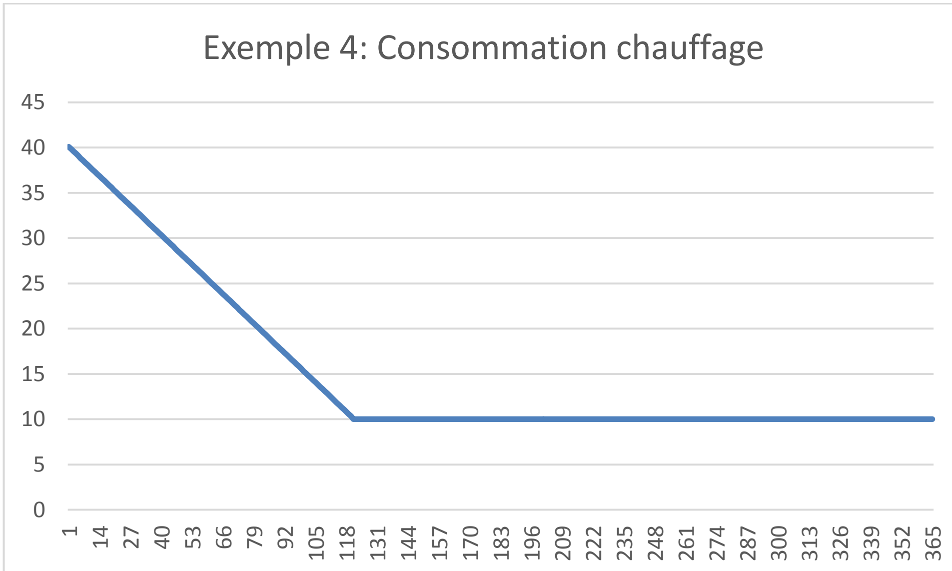
Graphique 33



Since all seasonal consumption occurs in the period from November to April (the period of the year when the prices are $3.00, according to Tableau 8), this customer will have to purchase more supply during the winter than during the rest of the year. Of its total consumption of 3,650 units, 920 units will be consumed from May to October at a cost of $4, and 2,730 will be consumed from November to April, at a cost of $3. The customer's total cost will be $11,870, or an average of $3.25 per unit consumed. Once the cost of the supply is inverted, the seasonal customer's per-unit cost will post an inverted gap compared to the annual per-unit cost.

This example can be confirmed by calculating the cost of the supply for example 4:

Graphique 34



In example 4, the customer still has to purchase more supply in the winter, despite the increase in its stable consumption over the year. Its total consumption increases to 5,475 units. For the months from May to October, its consumption has doubled to 1,840. For the months from November to April, the client added 905 units and now consumes 3,635 units. The customer's total cost increases to $18,265, but the cost per unit decreases to $3.34. The effect of the price variation is again inverted in comparison to the first supply price scenario. And this effect is lower than in example 3 because the customer increased its LF from 28.6% to 37.5%.

In conclusion, for profiles that coincide with the seasonal price variation, the cost caused by a seasonal profile customer is different from the cost caused by a stable customer when the prices during the year change from the average annual per-unit price. The greater the seasonal consumption in comparison with the total consumption (the lower the customer's LF), the greater the impact of the change in seasonal price on the customer.

2.2.3 Market or annualized supply price?

To correctly represent the cost causation related to supply, do we have to separate the supply cost for a stable profile and a seasonal profile? Not necessarily, since it depends on the operational and commercial constraints faced by the distributor.

Unlike transportation, which requires firm purchases based on peak demand or extreme winters, supply purchases are adjusted throughout the year to meet the demand profile. This means that the number of units purchased during the year is more or less equal to the number of units consumed during the year.

Consequently, if the distributor priced the supply at the monthly market price, then the seasonal purchase costs would be directly reflected in the annual purchase cost of each customer. In the previous section, based on purchases at market price, the per-unit cost for the stable customer was $3.50, while the per-unit cost for the seasonal customer ranged from $3.25 to $3.75, depending on the supply scenario used and the customer's consumption profile.

This pricing is not optimal, however. The supply service was unbundled to allow customers to purchase their supplies directly. It is important, therefore, to assess the impact of this unbundling to ensure that the cost recovery is equivalent for both customers in the distributor's supply service and customers who purchase their own supplies.

Likewise, the distributor may wish to cushion the price changes over the year for its customers. For consumers, it may be difficult to receive a bill that includes, for a single month, a price boost in the supply price during a very cold winter.

Essentially, the distributor may choose between a supply price that reflects the monthly market price or a supply price based on an annualized price. The choice will influence the way the seasonal effect is handled.

If the distributor chooses a monthly market price for the supply:

- The consumption profile of a customer on the distributor's supply service will automatically be reflected in its monthly purchases. As a result, a customer with a stable profile will consume the same quantity each month, at market price, which will be the same as using an annual cost with no seasonal effect. As for the seasonal profile customer, it would consume more units during certain months of the year. The seasonality of the supply price would therefore be reflected in its total costs at the end of the year.

- To achieve balance among these categories of customers, customers who purchase their natural gas directly would have to deliver it based on their own consumption profile, reflecting their costs based on their profile, whether their profile is stable or seasonal. In the case of customers who deliver their natural gas steadily, that is, based on a stable equivalent profile, the distributor should be able to invoice them for the difference in cost (savings or excess) based on their profile.

If the distributor chooses an annualized price for the supply:

- The consumption profile of customers on the distributor's supply service is important. The supply cost would be set at the uniform annual cost. In the examples in the previous section, that means that no matter whether the real cost generated is $3.25, $3.50 or $3.75, all customers would be allocated a per-unit supply cost equal to the annual per-unit cost of $3.50. The cost differential compared to the $3.50 would then be allocated based on the customer's seasonal consumption profile.
- To balance these categories of customers, customers who purchase their supply directly would have to deliver it based on a uniform delivery profile. As a result, their profile would be equivalent to the stable profile. The distributor would have to sell or store the supply to meet the seasonal consumption profile of these customers, which would generate costs more or less equal to those from the customers in its supply service. As a result, changes in costs related to uniform delivery to customers would be recovered from these customers based on their seasonal consumption profile. If customers who purchase their own natural gas deliver it based on their consumption profile, they should be exempt from the costs generated by the use of an annual per-unit cost, because they are assuming the costs directly.

For Gaz Métro, the cost of the supply is annualized and the customers that purchase their own natural gas must take uniform delivery. The cost allocated to supply is therefore the same for all customers for the year, regardless of their consumption profile.

In conclusion, the choice of supply cost based on a monthly market price or an annualized price changes the allocation that must be made in order for the cost causation to be properly represented in the customer's total cost. Since Gaz Métro has an annualized per-unit cost for the supply, i.e. based on an average annual market cost for a stable profile, and since customers who purchase their own supply directly must deliver it using a uniform profile, the allocation of supply costs must consider the natural gas purchase profile required to meet the seasonal needs of all customers.

2.2.4 Splitting costs based on consumption profile

Since Gaz Métro uses an annualized per-unit cost for the supply and asks its customers who purchase their supply to deliver uniformly, then the costs must be split based on the consumption profile. This split allows for an appropriate cost allocation.

The cost of purchasing the supply must therefore be split between a portion equivalent to a stable profile and a portion corresponding to the seasonal profile.

To allocate the supply costs related to the stable profile, the allocated cost must be equal to the average annual cost. This cost can be established simply using the monthly price of the benchmark index.

$$\sum_{i}^{12} Taux\ mois\ i \times nombre\ de\ jours\ mois\ i \Big/ 365$$

It is the approximate price that a customer with a stable profile could expect to pay for its natural gas purchases. In the examples in the previous sections, this price was $3.50 (Tableau 7 and Tableau 8).

Once the cost is allocated to the stable profile, the excess must be allocated based on the seasonal profile. In theory, the perfect breakdown of these costs would consist of allocating them based on the customers' consumption periods. This is how the seasonal supply cost was calculated in examples 3 and 4. This revealed differences of $0.14 or $0.25, based on the variations in the customer's consumption profile. Although this method is accurate, it is not practical in Gaz Métro's particular situation because of the difficulty of measuring the real impact of the variation in consumption by the customer or group of customers.[5] Therefore, we need to find another way to approximate the cost caused by customers with a seasonal profile.

In general, the lower the LF, the greater the difference between the real cost caused by the seasonal profile and the annualized cost. The LF can therefore serve as an approximate basis for allocating the costs of customers with a seasonal consumption profile.

However, using the LF to allocate seasonal supply costs will not be as accurate as for unused transportation units. In the case of transportation, the unused units are allocated using the LF, while for supply, the excess cost over the stable purchase of units are used. Furthermore, the excess transportation costs are always included, as they are purchased in advance. In the case of supply, the excess cost or savings depends on the market context and the severity of winter conditions. In addition, while the transportation capacities are established at the beginning of the year and their cost is fixed and does not change over the year, the supply cost changes every day, based on the offer and demand in the market.

All these differences mean that using the LF for supply cost allocation may differ from the real excess cost that a customer incurs. To demonstrate this, new monthly supply prices are used:

[5] An analysis of this topic is presented in Schedule 4.

Tableau 9

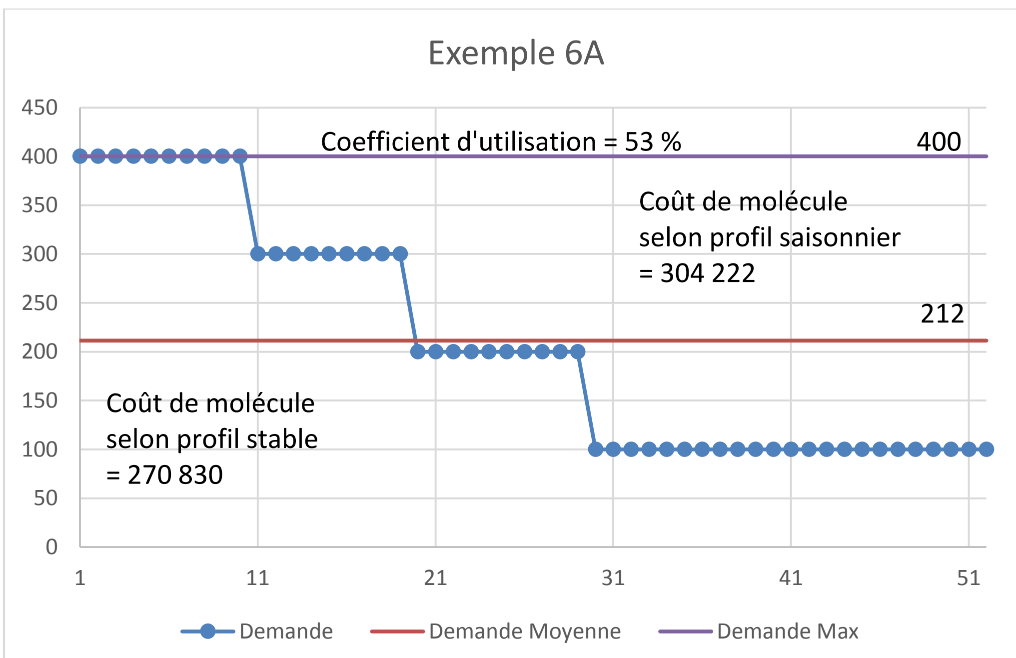
Prix de la fourniture par unité

Janv.	Févr.	Mars	Avr.	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.	Année
5,00	4,00	4,00	3,20	3,20	3,00	3,00	3,00	3,20	3,20	3,20	4,00	3,50

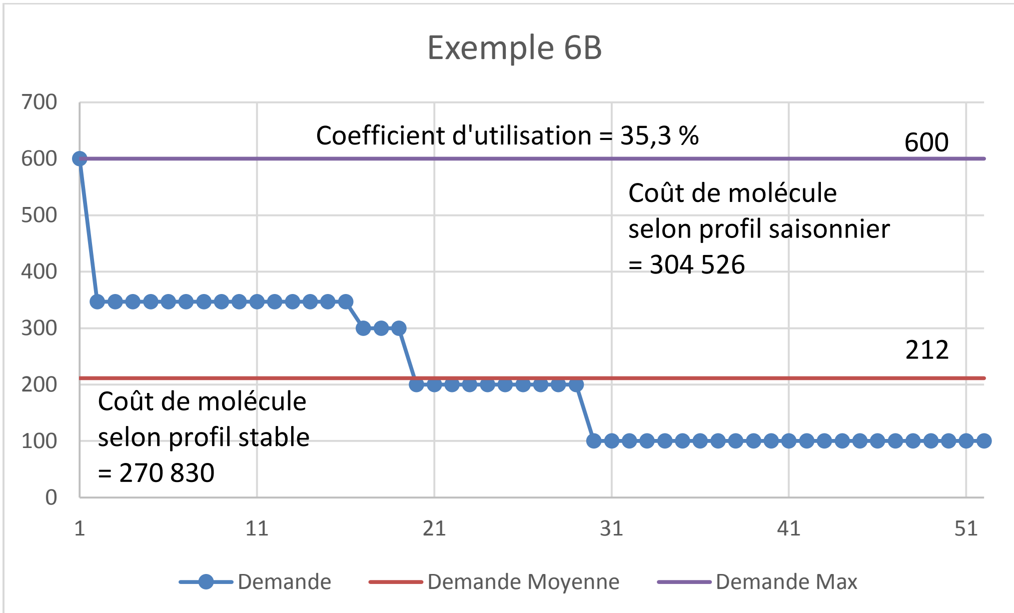
1 These prices, which are more varied during the winter, will demonstrate the monthly
2 supply price variation and its effect on the cost for a seasonal profile.

3 Let us return to examples 6A to 6D to calculate the excess supply cost:

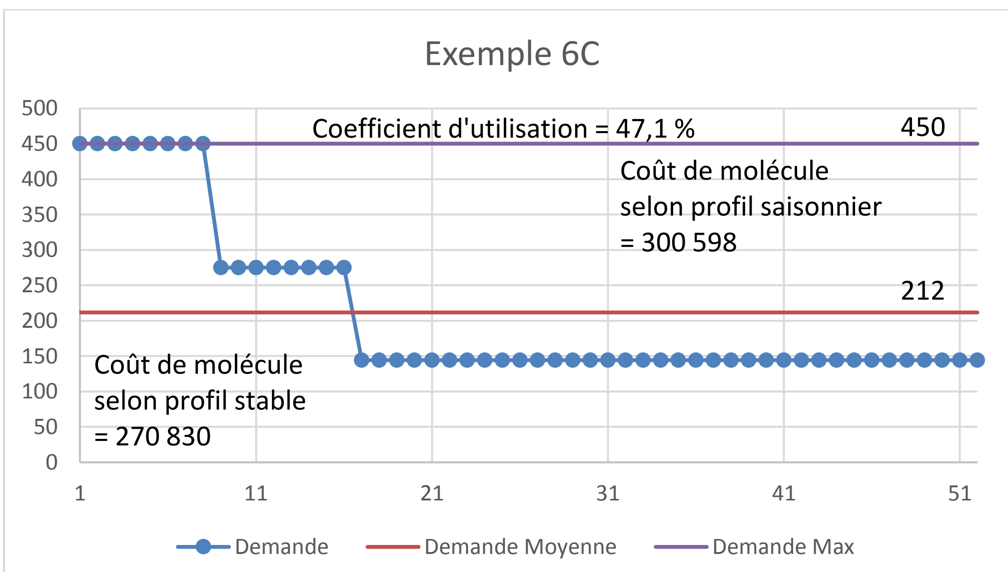
Graphique 35



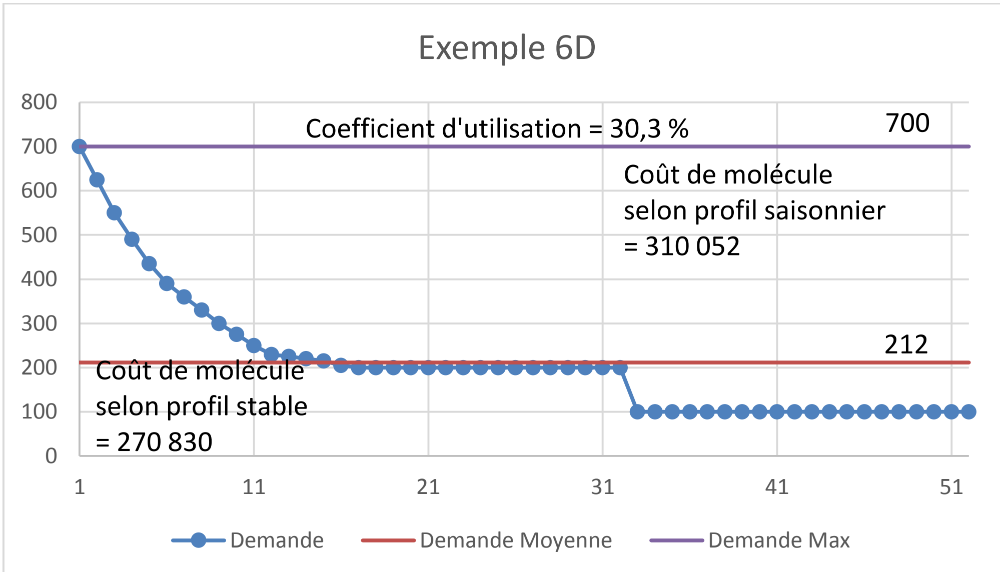
Graphique 36



Graphique 37



Graphique 38



Here is a summary table of gaps between the uniform cost and the variable cost, based on profiles:

Tableau 10

Scénario	Coefficient d'utilisation *(%)*	Coût uniforme *($)*	Coût réel *($)*	Écart *($)*
	(1)	(2)	(3)	
6D	30,3	270 830	310 052	-39 222
6B	35,3	270 830	304 526	-33 696
6C	47,1	270 830	300 598	-29 768
6A	53,0	270 830	304 222	-33 392
Total	**39,4**	**1 083 320**	**1 219 398**	**- 136 078**

Unlike the situation for transportation, here the cost does not always drop based on a higher LF. The excess supply cost due to the seasonal profile in scenario 6A is almost the same for scenario 6B, despite a LF that is 17.7% higher.

What happens if the highest price occurs during the winter, but not necessarily during the coldest month? Here are some different prices to test this:

Tableau 11

Prix de la fourniture par unité

Janv.	Févr.	Mars	Avr.	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.	Année
4,00	5,00	5,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00	3,50

In this price scenario, the monthly index (consisting of prices from the previous month) is higher in February and March. The daily prices were therefore higher in January and February. We can suppose that inventories dropped significantly from the end of December to the end of January, which resulted in a price increase toward the end of winter.

Tableau 12

Scénario	Coefficient d'utilisation *(%)*	Coût uniforme *($)*	Coût réel *($)*	Écart *($)*
	(1)	(2)	(3)	
6D	30,3	270 830	301 174	-30 344
6B	35,3	270 830	307 676	-36 846
6C	47,1	270 830	299 243	-28 413
6A	53,0	270 830	306 357	-35 527
Total	**39,4**	**1 083 320**	**1 214 450**	**- 131 130**

Once again, based on this price scenario, the real costs generated by variable profiles no longer follow the increase in the LF.

These results are inconsistent with the results of the tests conducted in section 2.1.3 for transportation, where the seasonal costs followed the changes in the LF. When the customers' consumption profiles change based on factors other than temperature, the LF cannot provide a perfect cost breakdown.

The causation of seasonal supply costs for each customer varies essentially based on two gaps:

- The gap between the monthly volume and the annual average volume
- The gap between the monthly supply price and the annual average supply price

This explains why the use of a consumption factor such as the LF, which is less accurate than the application of a monthly variation in consumption combined with a change in the supply price, cannot accurately allocate the seasonal supply costs for different profiles when they are not related to changes in temperature.

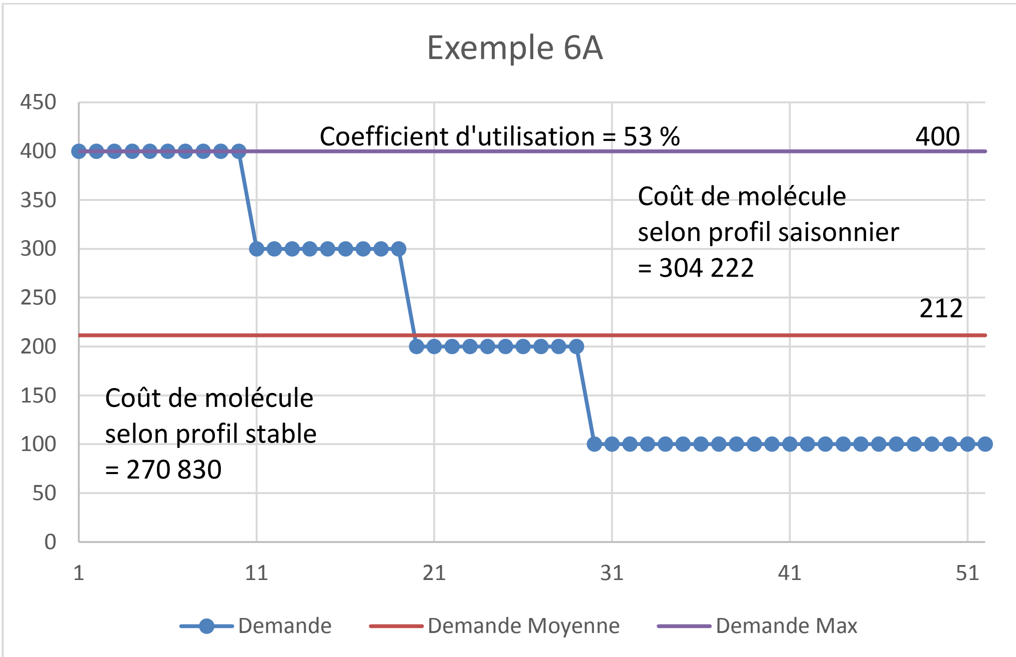
2.2.5 Costs incurred by customers purchasing their own supply

Customers who purchase their own supply cause different costs, based on whether or not they deliver based on a uniform profile.

When the customer delivers based on its exact consumption profile, (“deliver and burn”), it does not cause excess supply costs for the distributor even if its consumption is seasonal.

However, when the customer delivers based on a uniform delivery profile, it causes the same seasonal costs as customers in the distributor’s supply service. To explain this, let us return to example 6A from the previous section:

Graphique 39



If the customer purchases its own supply, it will deliver 212 units per day throughout the year. At an average annual cost of $3.50 per unit, its cost will be $270,830. The distributor will have to provide up to 400 units per day in winter, when the price is higher, and only 100 units per day when the price is lower.

If the distributor does not have any storage capacity, its cost will be $33,392 ($304\,222 - 270\,830$). In the months of December, January, February and March, the additional cost between the market price and the average annual price will be absorbed by the distributor. During the summer, the difference between the resale price of the excess supply and the average annual price will also increase the distributor's total cost.

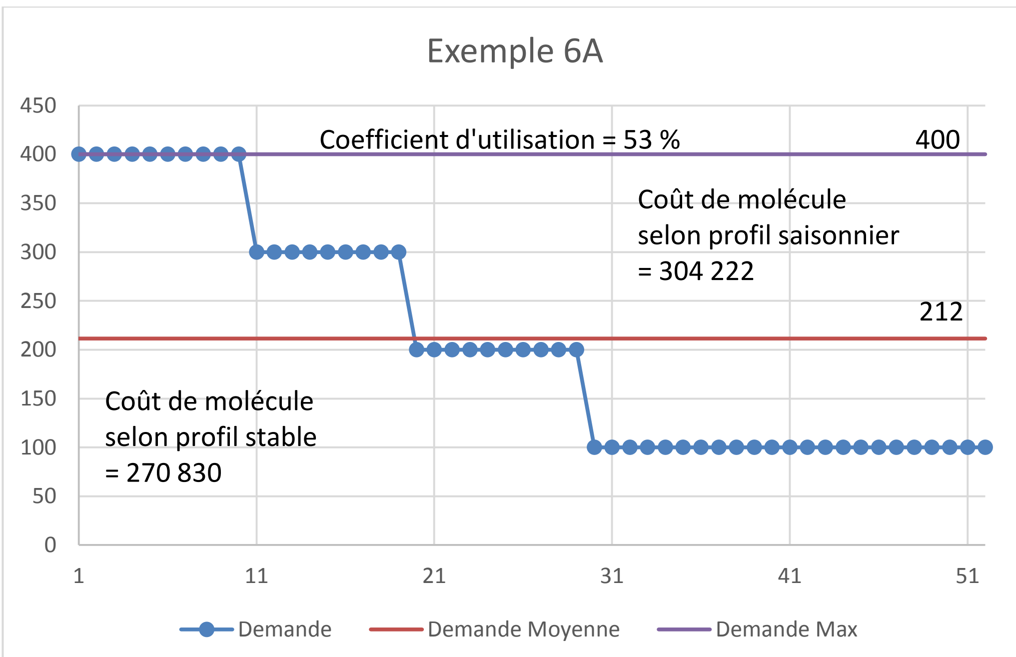
Since direct supply purchase customers generate the same costs for the distributor as customers using its supply service, the causation of these costs is the same for both types of customers.

2.2.6 Supply storage

To avoid having to buy more supply during the winter, the distributor may store natural gas. Already, to optimize transportation costs, storage in franchise is contracted. In addition, the distributor may purchase storage outside the franchise to reduce its natural gas purchases in winter and replace them with summer purchases.

To illustrate this, let us return to example 6A, in which the customer makes its own supply purchases:

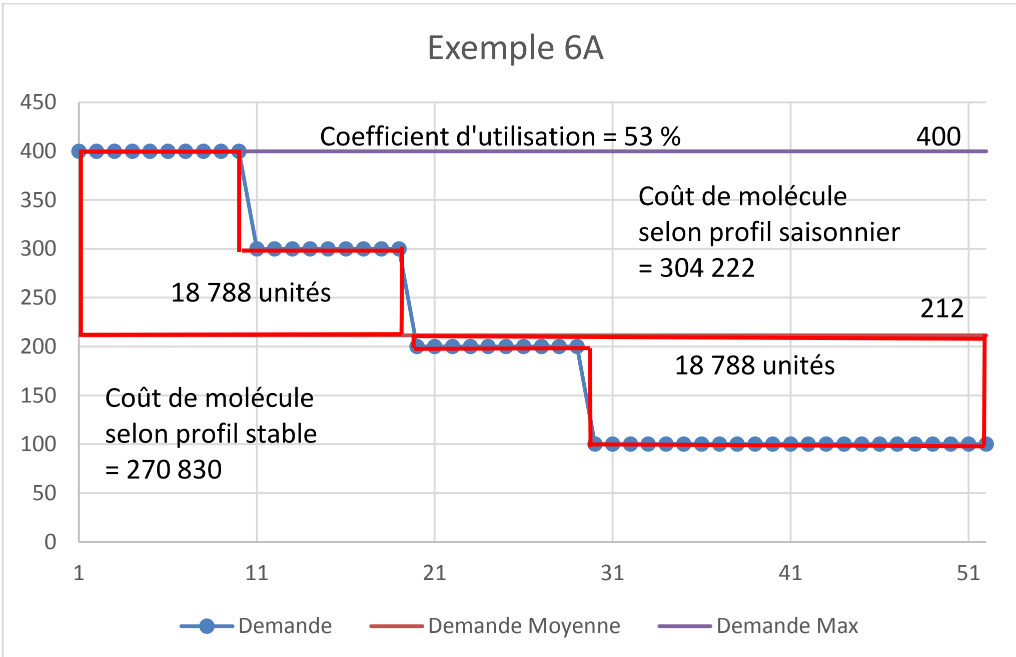
Graphique 40



As mentioned, to balance this customer, the distributor must purchase additional quantities of natural gas during the winter and sell the excess received during the summer.

However, rather than spending variable amounts based on price fluctuations and to avoid purchasing and reselling natural gas to balance the customer, the distributor can purchase storage capacity:

Graphique 41



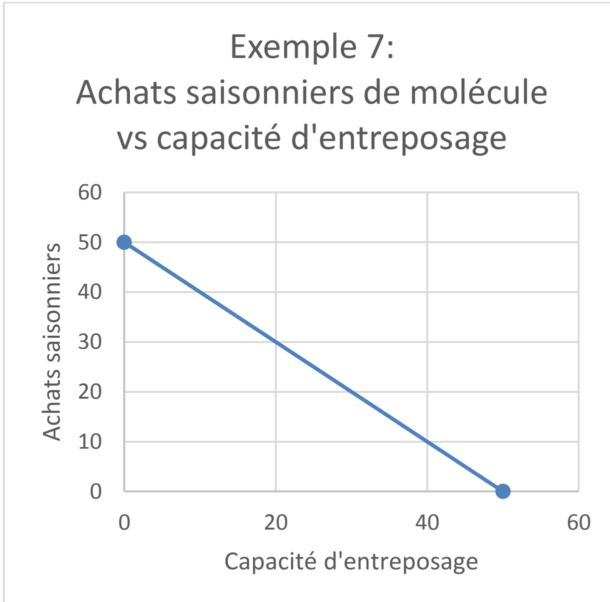
By contracting 18,788 units of storage capacity, in order to inject 112 units per day in summer and withdraw 188 units per day in winter, the distributor will not have to purchase and resell supply for this customer.

If the storage is already required for transportation tool optimization needs (storage in franchise), then this tool can also be used to balance supply.

If the storage is not in franchise, the cost of the storage contracts, including injections and withdrawals, are all replacement costs for the purchase and resale of the supply which would otherwise be required. In the example presented, the cost of 18,788 units of storage capacity will replace the $33,392 generated by the seasonal supply consumption.

The greater the storage capacity, the smaller the gap between seasonal purchases and uniform purchases. This dynamic can be illustrated as follows:

Graphique 42



For example, for a seasonal need of 50 units in winter, when the storage capacity is zero, the supply purchase in winter must be 50 units higher than uniform purchase, and the purchase in summer must be 50 units lower than uniform purchase. However, with a storage capacity of 50 units, the supply purchase can be uniform all year long.

The storage costs will be more stable over the years, while the cost of seasonal purchases will change based on market prices. However, since storage is used to replace seasonal purchases, **these costs are still attributable to all customers with a seasonal purchase profile, whether they are in the distributor's supply service or they purchase their own supply.**

A greater proportion of the storage costs will be allocated to customers that would have created the greatest seasonal cost if the distributor had not opted for the storage solution.

2.3 Other factors

2.3.1 Causation of supply purchase and transportation costs from different physical locations

When the services are unbundled, as was the case for supply, transportation and load balancing, the distributor has to have rates comparable to the costs that a customer would have to pay if it did not use the distributor's services and instead procured them on the market. For this to be the case, the functionalization of the costs among the services must provide costs that reflect the established causation while making sure that the rates stemming from this functionalization are not to the detriment of the distributor's service over the market or vice versa.

Therefore, when the supply is purchased from different purchase points, the causation observed remains the same as when all purchases are made from the same physical location: the costs are allocated based on a uniform profile and a seasonal profile. Furthermore, the distributor's supply purchase price for different purchase points must be established at the price of the delivery point for customers that provide their own supplies (also called the "reference point").

Based on a uniform purchase profile, the simple difference of annual cost between the reference point and the different purchase location can appropriately determine the cost of the supply and the transportation cost.

For example, here is a table showing the annual cost of supply at four different points:

Tableau 13

Lieu d'achat	Coût annuel	Différentiel référence A	Différentiel référence B	Différentiel référence C	Différentiel référence D
	(1)	(2)	(3)	(4)	(5)
A	3	0	-1	-2	-3
B	4	1	0	-1	-2
C	5	2	1	0	-1
D	6	3	2	1	0

The annual cost at the reference point is equal to the uniform supply cost, while the differential with the reference point is equal to the delivery cost for uniform consumption.

The difference between the cost realized based on non-uniform purchases and the annual cost can only be related to a seasonal purchase profile.

Here is a second table showing the annual cost based on a uniform profile and the real cost per point, using purchase location a as the reference point:

Tableau 14

Point de référence A

Lieu d'achat	Coût annuel	Coût réel	Coût fourniture uniforme	Coût acheminement uniforme	Coût non uniforme
	(1)	(2)	(3)	(4)	(5)
A	3	4	3	0	1
B	4	4	3	1	0
C	5	6	3	2	1
D	6	5	3	3	-1
Allocation			Profil uniforme	Profil uniforme	Profil saisonnier

As a result, when the supply is purchased from several different locations, the supply cost must always be equal to the annual cost at the reference point, based on a uniform delivery profile. Then, the gap in relation with the real purchase cost must be separated based on the cost origin. **When the cost is caused by uniform purchases, it must be allocated to the customers' portion of uniform consumption (units used). The costs arising from non-uniform purchases are automatically incurred to meet the customers' seasonal needs. These costs must be allocated based on the customers' seasonal consumption profile.**

2.3.2 Causation of costs related to inventory maintenance for supply and transportation

We saw earlier that to optimize the costs associated with transportation and supply purchase, contracts are made for storage. But beyond the cost of the storage tool, maintaining an inventory in these storage sites generates financing costs, as well as costs related to "support" for price variations over time. Once again, to determine the allocation required for the cost of inventory, we need to examine the causation.

Maintaining an inventory only serves the needs of customers with a seasonal profile, because the uniform portion of the demand requires no inventory. The costs related to inventory must therefore be broken down based on the seasonal consumption profile.

Currently, customers that provide their own natural gas through direct purchases without transfer of ownership and customers that provide their own transportation are not invoiced for amounts related to inventory (articles 14.2.1 and 14.2.2 of the *Conditions of Service and Tariff*). Is this still appropriate? Should these costs only be allocated to the distributor's customers that are charged a supply cost (customers in the distributor's supply service and customers that use direct purchase with transfer of ownership)?

We demonstrated in section 2.2.6 that storage could reduce seasonal supply purchase and resale transactions by injecting excesses during the summer and withdrawing them during the winter. This method allows for reducing seasonal purchases in winter, which means the cost of storage replaces the cost of seasonal purchase.

Since the cost of seasonal purchase is generated by both customers that provide their own supply and those that use the distributor's supply service, the replacement cost should be considered to be generated by all customers equally. **The variation in the**

annualized cost between the time of injection and withdrawal, as well as the financial cost of maintaining the inventory, should therefore be supported by all customers, as are the costs of seasonal purchases by all customers.

2.3.3 Operational flexibility

Until now, to examine the causation of supply purchase costs and transportation tools, one of the basic assumptions has been the lack of constraints related to operational flexibility due to the variation in demand over the course of a day.

In reality, however, daily demand always varies a little. This demand projection is processed in the planning for the gas day on the previous day. Other than this daily variation, an adjustment of supplies during the day may be required to more accurately meet real customer demand and injection needs, when required. For example, to secure the supply adjustment over the course of the day to the extent possible, a margin is added to the projected demand, either an increase in winter, because it is easier to decrease supply than increase it, or, inversely, a decrease in summer, because it is easier to increase supply than decrease it.

This adjustment during the course of the day is identified as operational flexibility. In the 2016 Rate Case, Gaz Métro presented a detailed evidence relating to this operational flexibility.[6]

To make these adjustments, it is not enough to have supply tools that supply natural gas on a daily basis. We also need to have tools that allow for changes in the quantities delivered over the course of the day. In terms of natural gas supply, we also need tools to handle an increase or decrease in the need for the commodity.

A totally stable customer, i.e. one that consumes exactly the same volume every day and at every moment of the day, which is practically impossible, does not need any operational flexibility, so to speak. Its daily need never has to be changed. In any case, it still benefits from Gaz Métro's management method to ensure supply security for all its customers. Furthermore,

[6] R-3879-2014, B-0615, Gaz Métro 103, Document 3, Section 1

if this customer had a breakdown that caused a temporary closure, its profile would no longer be totally stable. It is therefore not protected from the need for operational flexibility.

Therefore it appears inappropriate to allocate operational flexibility costs based specifically on a stable equivalent profile.

Does that mean that the cost of operational flexibility related to transportation tools or supply purchase should be allocated based on the customer's consumption profile? No, essentially for two reasons:

- The seasonal consumption profile of all customers is just in the winter, but the need for operational flexibility is year-round.
- The need for operational flexibility is not related to the customers' LF.

If customers always consumed the exact supply quantity projected, there would be no need for operational flexibility. But it is not because a customer's consumption is related more to temperature that it generates greater gaps in demand in a day in relation with the projected demand. This explains why the operational flexibility need is present both in the summer and winter.

Neither the stable consumption profile nor the seasonal consumption profile cause the need for operational flexibility. And as is the case for stranded costs not related to temperature, it is practically impossible to connect:

- The gap between real daily consumption and planned global consumption for all customers; and
- The variation in a particular customer's real and planned consumption, since this kind of daily planning does not exist.

Here are some examples illustrating the difficulty of breaking down these costs among the customers:

On one day, the distributor expects to deliver 100 units to the franchise. But one customer consumes 10 units less than expected. The distributor must therefore adjust the nomination downward. The cost of operational flexibility, for that day, could be attributed to the customer that consumed less than the distributor projected.

The next day, the distributor once again expects to deliver 100 units to the franchise. That day, everything goes as planned. The cost cannot be attributed to any particular customer.

Finally, on another day, the distributor once again expects to deliver 100 units to the franchise. One customer consumes 10 units less than projected and another one consumes 5 more than projected. In total, the distributor has to adjust the nomination downward. In this case, is the customer that consumed less than projected responsible for all of the flexibility costs? Although, while the higher consumption for the second customer reduced the gap, it still consumed a different volume of natural gas than expected. In addition, projections are made globally by the distributor and may differ from what each customer itself expects to consume. If two customers consumed what they each personally projected, can the distributor's projection gap be directly allocated to either of them?

In reality, all customers may have variations in consumption every day. The distributor builds a template that tries to summarily determine the daily need based on all these variations. However, regardless of the template, there will always be gaps between the distributor's projection and the daily need of all customers.

It is practically impossible to break down and allocate the costs related to operational flexibility directly to particular customers, or even to establish a specific profile for doing so.

That said, the greater the volume consumed by a customer, the greater the risk it will have a significant impact on demand when its consumption differs from the projection. It is therefore reasonable to believe that the need for operational flexibility is related to the consumption of all customers.

In conclusion, the operational flexibility costs related to transportation tools and supply purchase must be allocated separately, in order not to penalize a specific type of customer. **Since the need for operational flexibility increases with the total volume to supply, the most direct causal link for operational flexibility is the volume consumed by the customers.**

2.4 Summary of cost causation

In summary, we can see that the cost causation, for both supply purchase and transportation, depends mainly on the customers' consumption profile.

Transportation of the supply

First, for the transportation of the supply, the more uniform the customer's consumption over the year, the lower its cost per unit consumed. On the other hand, the greater the customer's consumption at peak periods in comparison to its average consumption, the higher its cost per unit consumed.

Graphs 9 to 12 demonstrate this: the four consumption profiles with the same average consumption and the same peak consumption generate identical costs, despite a variable daily consumption profile.

Furthermore, when the peak varies in relation to the same average consumption, the total cost and the per-unit cost vary based on the difference between the peak and the average consumption. Graphs 13 to 16 demonstrate that the higher the peak in comparison to the average consumption, the higher the number of unused units and the higher the total cost and per-unit cost.

The customer's load factor therefore effectively represents the delivery cost of the supply from the purchase point to the distribution network. The $\frac{1}{CU} - 1$ formula efficiently breaks down the costs among the customers, as shown in Table ***3***.

Finally, the optimization of delivery costs by replacing transportation tools with other supply tools reduces the total cost of the unused units. However, this does not change the cost causation of the supply delivery.

Purchase of the supply

As for the cost of supply purchase, the causation of these costs depends mainly on variations in the market price. In general, for the long term, the market price is highest in the season in which demand is highest, i.e. winter. However, short-term fluctuations may mean this is not always the case. Consequently, the load factor cannot, on its own, explain the variations in cost, because the real market price varies monthly without necessarily being related to changes in temperature.

Although the load factor is less accurate, it nevertheless can be used to break down these costs among the customers.

Stranded costs

Delivering supply to customers that do not have a uniform consumption profile generates costs for unused transportation units (or a replacement tool). Unused units are, by definition, stranded costs. Depending on the climatic conditions in winter, the number of unused units will be higher or lower. The vast majority of stranded costs are therefore caused by increased consumption related to temperature.

However, a sustainable net drop in uniform demand may also increase stranded costs when it cannot be offset by the addition of new customers. So in some cases, the reduction in demand by stable consumption customers may also result in stranded costs.

Other costs

The cost of purchasing supplies from several physical locations can be split based on the consumption profile. The gap in the annual price between the purchase point and the reference point represents the cost caused by the need for uniform purchase, while the gap between this annual price and the price actually paid represents the cost caused by a need for seasonal purchase.

The costs related to holding inventory for the supply and transportation are accessory costs. If Gaz Métro did not use storage to reduce its supply acquisition and delivery costs, there would be no need to maintain an inventory. The costs arising from maintaining an inventory are therefore directly related to cost reduction. Consequently the cost causation is the same for the tool or the cost that is replaced by the inventory.

Finally, the costs of operational flexibility are not caused by a particular customer or consumption profile, however, the greater the hourly variation in a customer’s consumption, the more the distributor must be able to provide operational flexibility. Consequently, although no factor can be directly identified to explain the costs of operational flexibility, the volume consumed by the customers is representative of the risk of a fluctuation in hourly consumption by the customers. Therefore, the volume consumed represents an indirect causal link for operational flexibility.

3 PRESENTATION OF ALL SUPPLY COSTS

At this time, the supply costs are segmented into several exhibits in submissions to the Régie. Thus, the costs related to uniform supply purchase, seasonal supply purchase, transportation and load balancing are divided into different exhibits, even though they are not separated at the time of purchase.

Gaz Métro is therefore considering grouping the exhibits related to supply costs[7] into a single exhibit and adding information about the cost of the interruptible service. This exhibit could then be used as a basis for the functionalization of costs among the services, based on cost causation. The proposed new exhibit is presented in Schedule 1.

In this new exhibit, the costs would be classified based on causation:

- Supply costs (lines 1 to 10): This gives the cost for uniform delivery and information about the excess cost that must be allocated based on the seasonal profile in the load balancing.
- Transportation and transportation optimization costs (lines 12 to 39): In this section, the cost of transportation tools that can meet uniform demand is separated from the cost of seasonal transportation tools. The tools (storage sites in franchise or other) that reduce the need for daily transportation tools in winter are also included in this section.
- Other costs (lines 41 to 57): These include the seasonal supply costs, the cost of the non-franchise storage site, costs related to the premium for purchasing supply at a point other than the reference point, competitor make-up gas and deferred costs.

All transportation, transportation optimization and other costs must then be allocated into transportation and load balancing. These steps are presented in sections 6 and 7 respectively.

Gaz Métro is asking the Régie to acknowledge the new presentation of the supply costs, as shown in Schedule 1, which will eventually be used for rate cases, following the decision to intervene in Phase 2.

[7] 2016 Rate Case, R-3879-2014, B-0738, B-0739 (excluding distribution costs) and B-0740.

4 PRICING OF ADJUSTMENT COSTS RELATED TO INVENTORIES

Currently, the adjustment costs related to inventories are priced separately in the *Inventory-Related Adjustments* service (section 14 of the *Conditions of Service and Tariff*). This service exists since 2004[8] and includes all the various articles concerning inventory-related adjustments that used to be found in the supply, compressor fuel and transportation services. The inventory-related adjustments are invoiced to the customers based on their average daily consumption for the year and for the winter (parameters a and H), except for customers at the D_1 rate whose consumption is less than 75,000 m^3/year, for whom an average inventory adjustment rate applies. Customers that provide their own natural gas that they withdraw at their premises, with no transfer of ownership, and customers who provide their own transportation service are not charged these fees at present.

As explained in the analysis of cost causation in Section 2.3.2, holding an inventory is only useful if demand is not stable, and it always replaces another tool. For transportation, the inventory in franchise can reduce delivery costs. For supply, a greater inventory may reduce the cost of seasonal supply purchases. The inventory adjustment costs are therefore intimately related to the cost of seasonal natural gas consumption. Gaz Métro therefore proposes to functionalize these costs in load balancing, to treat them the same way as the costs they allow us to avoid and thereby eliminate the inventory adjustment service.

The cost stemming from the management of gas inventories would therefore no longer be billed to customers based on a separate service. They would rather be considered like other load balancing costs and billed to all customers with a seasonal profile.

4.1 CHANGE TO CONDITIONS OF SERVICE AND TARIFF

Moving the inventory-related expenses to load balancing completely eliminates section *14. Inventory-Related Adjustments*. Articles 11.1.2.2, 11.2.2.2, 12.1.2.2 and 12.2.2.2 in the supply and transportation services should also be deleted.

[8] See R-3529-2004, SCGM-11, Document 2, Section 6.1.

Fourniture

~~***11.1.2.2 Ajustement relié aux inventaires***~~

~~*Le prix de fourniture de gaz naturel est accompagné d'un ajustement pour tenir compte de la variation de la valeur des inventaires résultant d'un changement dans le prix de fourniture de gaz naturel, ainsi que des coûts reliés au maintien de ces inventaires. Cet ajustement est décrit au chapitre « Ajustements reliés aux inventaires ».*~~

~~***11.2.2.2 Ajustement relié aux inventaires***~~

~~***Avec transfert de propriété*** *: Le prix de fourniture de gaz naturel est accompagné d'un ajustement pour tenir compte de la variation de la valeur des inventaires résultant d'un changement dans le prix de fourniture de gaz naturel, ainsi que des coûts reliés au maintien de ces inventaires. Cet ajustement est décrit au chapitre « Ajustements reliés aux inventaires ».*~~

~~***Sans transfert de propriété*** *: Le client ne se voit pas facturer l'ajustement relié aux inventaires qui accompagne le prix de fourniture de gaz naturel.*~~

Transport

~~***12.1.2.2 Ajustement relié aux inventaires***~~

~~*Le prix du transport est accompagné d'un ajustement pour tenir compte de la variation de la valeur des inventaires résultant d'un changement dans le prix de transport, ainsi que des coûts reliés au maintien de ces inventaires. Cet ajustement est décrit au chapitre « Ajustements reliés aux inventaires ».*~~

~~***12.2.2.2 Ajustement relié aux inventaires***~~

~~*Le client ne se voit pas facturer l'ajustement relié aux inventaires qui accompagne le prix du transport.*~~

Gaz Métro is asking the Régie to approve:

- **the abolishment of the inventory-related adjustments service and the processing of these costs in the load balancing service.**
- **the deletion of section *14. Inventory-related adjustments* and articles 11.1.2.2, 11.2.2.2, 12.1.2.2 and 12.2.2.2.**

5 FUNCTIONALIZATION AND PRICING OF THE SUPPLY SERVICE COSTS

Currently, customers that do not use the Gaz Métro supply service must undertake to deliver an agreed daily volume from an estimated average daily volume for the contractual period (article 11.2.3.1 of *Conditions of Service and Tariff*). This is uniform delivery.

The cost of the supply, for customers that do not use the Gaz Métro supply service, is therefore protected from seasonality. The rate must also be free from seasonality to maintain equity among customers that use the distributor's service and those that do not. Only functionalizing the costs based on a uniform profile allows the seasonality costs to be excluded from the supply service. This approach is currently in effect and must be maintained.

5.1 FEE FOR MIGRATION TO THE SUPPLY SERVICE

At present, migration fees are set out in the *Conditions of Service and Tariff* for any customer that wishes to join or leave the distributor's supply service without complying with the six-month advance warning for entry or exit (article 11.1.2.3). The migration fees were introduced in the 2007 Rate Case.

> *"Gaz Métro pointed out that when the distributor's natural gas price is lower than the market price, Direct Purchase customers might be strongly tempted to migrate to the distributor's supply service. But this migration of customers could result in an increase in the level of supply purchase and, consequently, lead to a change in the level of protection offered by financial derivatives"* [translation].[9]

[9] R-3837-2013, B-0093, Gaz Métro-6, Document 3.

At that time, the migration fees were calculated by dividing the projected effect of the prices protected by the financial derivatives for the next 12 months by the projected quantity of gas purchased for the same period. The result was then applied to $\frac{6}{12}$ of the customer's normalized historic annual consumption.

Following decision D-2014-077, changes were made to the determination of migration fees. As a result, the migration fees now include a portion that corresponds to the difference in the projected cumulative cost calculated in the "deferred costs of the gas supply service" section of the monthly calculation of the supply service cost. Moreover, these migration fees are now invoiced on the total projected annual volume of the migrating customer, instead of on $\frac{6}{12}$ of its consumption, as was the case before. The following formula shows the current migration fee calculation:

$$\left\{\frac{[(Effet\ prévu\ de\ l'ensembledes\ dérivés\ financiers) + (écart\ de\ coût)]}{Volume\ annuel\ d'achat\ prévu\ en\ gaz\ de\ réseau}\right\} \times Volume\ annuel\ projeté$$

In addition to approving the new migration fee calculation method, the Régie would terminate the financial derivative program, in decision D-2014-077. The left part of the calculation on the expected effect of financial derivatives therefore no longer affects migration fees.

All that remains is the impact of the "cost discrepancy" component in the migration fee. The cost discrepancy includes costs related to seasonality, until these costs are transferred to load balancing. This transfer is only made once a year. Furthermore, between the time when the seasonality cost is determined and the time when the cost transfer is approved, several months of the new rate case go by, during which the seasonal costs may build up in the cost discrepancy account. Consequently, the cost discrepancy account always contains some costs related to seasonality. Since these costs are charged later to all customers through the load balancing service, regardless of whether or not they use Gaz Métro's supply service, charging these costs in migration fees and load balancing costs results in double billing.

Furthermore, in exhibit Gaz Métro 5, Document 3, in the section discussing the supply costs to transfer to load balancing, Gaz Métro proposed improving the method to ensure that any excess over the uniform price of supply is transferred to the transportation and load balancing services, based directly on the costs recorded in supply.

Under these proposals, the gap in cost would only be considered once, and any potentially negative effect of customer migration would be neutralized and recovered by the load balancing service. Based on this Gaz Métro proposal, the customers of the distributor's supply service will be protected without requiring migration fees. **Gaz Métro therefore proposes to eliminate the migration fees.** Sixty-day advance entry and exit notifications will nevertheless be required for the purposes of administrative deadlines.

Gaz Métro is asking the Régie to approve the abolishment of the fee for migration to the supply service.

5.2 Changes to the Conditions of Service and Tariff for Supply

The abolishment of migration fees proposed in section 5.1 will entail the deletion of article 11.1.2.3 of the *Conditions of Service and Tariff*. Articles 11.1.3.2, 11.1.3.3 and 11.2.3.4 should also be amended to reflect the abolishment of the migration fees and the change in the entry and exit notice.

<u>Service du distributeur</u>

11.1.3.2 Préavis d'entrée

Le client qui désire se prévaloir du service de fourniture de gaz naturel du distributeur doit en informer ce dernier par écrit au moins ~~6 mois~~<u>60 jours</u> à l'avance.

En deçà du préavis demandé, le client ne pourra se prévaloir du service de fourniture de gaz naturel du distributeur que s'il est opérationnellement possible pour le distributeur de le lui fournir. ~~De plus, le client devra payer les frais de migration au service de fourniture de gaz naturel du distributeur prévus à l'article 11.1.2.3.~~

11.1.3.3 Préavis de sortie

Sous réserve de l'article 11.1.3.5, le client qui ne désire plus se prévaloir du service de fourniture de gaz naturel du distributeur doit en informer ce dernier par écrit au moins ~~6 mois~~<u>60 jours</u> à l'avance.

~~En deçà du préavis demandé, le client devra payer les frais de migration au service de fourniture de gaz naturel du distributeur prévus à l'article 11.1.2.3.~~

Nonobstant ce qui précède, le client doit avoir utilisé le service de fourniture de gaz naturel du distributeur durant une période minimale de 12 mois avant de se retirer du service.

Service fourni par le client

11.2.3.4 Préavis de sortie

Sous réserve de l'article 11.1.3.5, le client qui désire fournir au distributeur le gaz naturel qu'il retire à ses installations doit en informer ce dernier par écrit au moins ~~6 mois~~60 jours à l'avance.

~~*En deçà du préavis demandé, le client devra payer les frais de migration au service de fourniture de gaz naturel du distributeur prévus à l'article 11.1.2.3.*~~

Nonobstant ce qui précède, le client doit avoir utilisé le service de fourniture de gaz naturel du distributeur durant une période minimale de 12 mois avant de se retirer du service. »

Gaz Métro is asking the Régie to approve the deletion of article 11.1.2.3 and the amendment of articles 11.1.3.2, 11.1.3.3 and 11.2.3.4.

6 FUNCTIONALIZATION AND PRICING OF TRANSPORTATION SERVICE COSTS

6.1 BACKGROUND

In decision D-97-047, the Régie retained the proposal made by *Approvisionnements Montréal, Santé et Services Sociaux* (AMSSS)[10] as a method for unbundling transportation and load balancing costs: average and excess demand.

According to this method, the transportation and load balancing methods must be fair for customers of any consumption profile types. The average and excess demand method is relatively simple:

- The average demand (the customers' real consumption) allows us to determine the costs associated with transportation.
- The excess over the average demand, of any sort (transportation or load balancing tool), must be associated with load balancing.

[10] File R-3323-95, Cigma, Evidence of Sharon L. Chown on behalf of Approvisionnements-Montréal and Novagas Clearinghouse Limited.

The average demand is associated with a LF of 100%, or the equivalent of completely stable consumption, which ensures the fairness of the rates.[11]

In terms of transportation, the allocation to all customers, including interruptible customers, of a per-unit cost equivalent to the firm transportation cost at 100% LF was appropriate, according to the Régie. Furthermore, this separation then allowed for a distribution of storage costs that took consumption profiles into account and recognized the contribution of interruptible customers.[12]

Following the analysis of the cost causation of supply costs in the preceding sections, Gaz Métro has arrived at the same conclusion: the use of a uniform consumption profile (average demand) to determine transportation costs generates a fair transportation price for all customers, whether or not they use the distributor's service. The excess costs can then be functionalized to load balancing and allocated more accurately, taking consumption profiles into account.

Gaz Métro therefore believes that the basis of the average and excess demand method retained in decision D-97-047 is still appropriate today. However, certain adjustments are required.

After the rates were unbundled, Gaz Métro suggested a method of functionalizing the transportation costs that would comply with the average and excess demand method by first evaluating the costs for an average demand at 100% LF. These costs essentially corresponded to the cost of firm long-haul transportation between Empress and the Gaz Métro territory. The costs of the other tools were functionalized in the load balancing service.

From the time when purchases at Dawn increased considerably, Gaz Métro began to functionalize part of the short-haul transportation tools in transportation.[13] Since the annual demand in a normal winter does not take up all the annual transportation tools, to charge costs to transportation, Gaz Métro suggested a method based on the ranking of the gas supply tools that reflected the real use of each tool. This method is the one still used today. The capacities assigned to transportation correspond to the cost of the tools used successively until the average annual demand at normal temperatures is filled. Briefly, the order of use of the tools at that time was as follows:

[11] See Schedule 2 for a more complete definition of the average and excess demand method.
[12] D-97-47, Section 5.4.
[13] 2012 Rate Case, R-3752-2011, Gaz Métro 12, Document 1, Section 4.

I. *Long-haul* transportation tools
II. Dawn *short-haul* transportation tools
III. Parkway *short-haul* transportation tools
IV. STS transportation tools

The cost of the tools is therefore recorded in full in transportation until one of these tools exceeds the average annual demand. The tool that exceeds this demand is then allocated proportionally between transportation and load balancing. The transportation tools of each type are not separated between tools that can transport supply for the entire year and those that can transport it only seasonally.

In the rate case, this method complies with the principles of average and excess demand. By performing the calculation based on average demand to record the costs in transportation and load balancing, the LF is 100%, by definition.

In the annual report, however, based on winter temperature and the gap in the volume projection at the beginning of the year, the average demand differs from the average demand estimated in the rate case. By maintaining the same proportion of tools allocated to the rate case as for the annual report, the allocated costs no longer represent a LF of 100%. The overpayment or shortfall in the transportation service therefore definitely includes a cost increase or reduction related to the seasonal consumption profile. By extension, the load balancing service has a cost reduction or increase related to the stable consumption profile.

To correct this situation, Gaz Métro suggested reviewing the ranking at the end of the year so that the costs allocated to the transportation service always represent a LF of 100% in both the rate case and the annual report (R-3837-2013, B-0256, Gaz Métro-2, Document 4, section 4). This solution was not retained by the Régie, however (D-2014-065, A-0151, section 3.6.3).

Since then, the Régie has required follow-up on the functionalization of costs between the transport and load balancing services, including the functionalization of the natural gas purchase premium.

Therefore, considering the entire case since the unbundling of the rates, Gaz Métro believes that a new cost functionalization method is required. The new method will have to comply with the principle of average and excess demand in today's context and be able to adapt to future changes.

6.2 WHY CHANGE THE CURRENT FUNCTIONALIZATION METHOD

The methods used since unbundling complied with the principle of average and excess demand at the time they were introduced. This is also true for the current method, based on ranking. It could simply be corrected at the end of the year, in the annual report, so the real costs are aligned with the real average demand.

Despite this, Gaz Métro believes that a new method of functionalization should be proposed, mainly for three reasons:

- The supply costs are indissociable from each other. The acquisition of additional tools is always based on total demand, i.e. the sum of stable demand and seasonal demand. These costs should be processed globally at the beginning and presented in a single exhibit (as presented in section 3), and then functionalized to supply, transportation and load balancing. a global approach that considers all costs requires new functionalization and allocation methods.
- The order in which the tools are used to meet the total demand allows for the cost of the entire demand to be optimized. But the use of the ranking method influences the cost allocated to the stable and seasonal profiles. Depending on the tools actually used, this could increase or decrease the costs allocated among the consumption profiles, which will have repercussions on the transportation and load balancing rates.[14] Gaz Métro believes that functionalizing the costs based on stable and seasonal profiles should not be influenced by the short- or long-term optimization of supply for the total demand.
- Stranded costs are costs associated with unused capacity and should be reflected directly in load balancing. Therefore, the stranded costs related to the change in temperatures, like the other stranded costs observed in the analysis of the cost causation of stranded costs (see section 2.1.5), should be reflected directly in load balancing. This subject is detailed in exhibit Gaz Métro-5, document 3.

[14] See the analysis of the ranking method presented in Schedule 5.

6.3 PROPOSAL

To establish a supply cost functionalization method for the transportation service that complies with the causal links presented above, the following factors must be considered:

- The costs allocated to transportation must be equivalent to the theoretical cost of transporting the supply in order to meet a stable annual demand at 100% LF. They must therefore reflect the cost of the tools that can serve the stable demand. Only the transportation tools that can fulfil the annual demand meet this criterion. When a distributor has a seasonal transportation tool, it is by definition to meet seasonal demand and reduce total costs; otherwise the tool would be useless.
- As demonstrated in Schedule 5, the ranking method could benefit customers with a stable profile in favour of customers with a seasonal profile. The reverse is also true. Therefore, the functionalization method should not use ranking.
- Finally, the allocation should also consider that the total tools cannot be separated, i.e. they are not purchased directly to meet one service or another, but rather to meet total demand.

In response to these concerns, Gaz Métro proposes to stop subdividing each of the supply tool costs directly between the transportation and load balancing services. Instead, the costs would be functionalized in transportation using a theoretical average cost. Thus,

$$\text{Coût total Transport} = CMT \times \text{Demande annuelle},$$

where *TATC* = theoretical average transportation cost to meet 100% stable demand.

The theoretical average transportation cost would be evaluated based on all transportation tools for annual consumption included in the Gaz Métro supply plan.

Using of the average cost of the transportation tools for annual consumption in order to functionalize the costs to the transportation service offers several advantages:

- This average cost considers all tools that could be used to serve stable customers, and therefore the allocated cost is not influenced by the total need, which includes the seasonal need or specific operational needs.

- This average cost is compatible with the indissociable aspect of the total supply purchases. It can be used to associate a per-unit cost without directly classifying a tool as solely meeting a transportation or load balancing need.
- This average cost can allocate a cost equivalent to the average demand in both the rate case and the annual report. Only the quantities of tools used and the prices would be affected for the annual report update.
- This average cost can include the gap related to purchases from different physical locations.

To use an average cost for the transportation tools for annual consumption, we have to adjust the cost of the tools so they are comparable on the same basis, regardless of the purchase location. The cost of the transportation tools used in the average cost must reflect usage at 100% LF (stable profile). Tableau 15 shows how the average cost could be calculated using the supply plan from the 2015 Rate Case.

Tableau 15

COÜT MOYEN DES OUTILS DE TRANSPORT POUR CONSOMMATION ANNUELLE

No de ligne	Outils de transport annuels	Coût de l'outil uniforme avant fuel 10^3m^3 (1)	(000$) (2)	¢/m³ (3)	Coût fuel ¢/m³ (4)	Différentiel de lieu ¢/m³ (5)	Autres coûts ¢/m³ (6)	Coût total équivalent en profil uniforme ¢/m³ (7)	(000$) (8)
1	- TCPL LH Zone Est	3 011 771	238 094	7,9054	0,4062		-0,0002	8,3114	250 321
2	- TCPL LH Zone Nord	244 612	14 515	5,9341	0,2639		1,1810	7,3790	18 050
3	- Échange LH Zone Nord	9 633	532	5,5219	0,2639		1,1810	6,9668	671
4	- Échange LH Zone Est	481 157	23 764	4,9390	0,4062		-0,0002	5,3450	25 718
5	- TCPL SH Parkway	626 155	16 091	2,5698	0,1948	4,0088	-0,0002	6,7733	42 411
6	- TCPL SH Dawn	1 059 646	29 920	2,8236	0,0703	4,0088	-0,0002	6,9025	73 142
7	- Échange SH Dawn	789 918	19 714	2,4957	0,0703	4,0088	-0,0002	6,5746	51 934
8	Total	6 222 892	342 630	5,5060	0,2793	1,5949	0,0481	7,4282	462 247

CALCUL DES FRAIS DE TRANSPORT POUR LE REVENU REQUIS

No de ligne			
1	Coût moyen du transport annuel	7,4282	¢/m³
2	Ventes prévues incluant GNL	5 559 593	10^3m^3
3	Gaz utilisé dans les opérations	38 765	10^3m^3
4	Gaz perdu	38 706	10^3m^3
5	Coût total des ventes (L1 * (L2 + L3 + L4))	418 731	(000$)
6	Frais reporté de transport	9 467	(000$)
7	Coût total du transport	428 198	(000$)
8	Coût unitaire du transport (L7 / (L2 + L3 +L4))	7,5961	¢/m³
9	Coût total du transport	428 198	(000$)
10	Gaz utilisé dans les opérations (L3 * L8)	-2 945	(000$)
11	Gaz perdu (L4 * L8)	-2 940	(000$)
11	Frais reporté de transport	-9 467	(000$)
12	Gaz appoint	66	(000$)
13	Frais de transport pour revenu requis (GM-21 Doc 1 L1)	412 912	(000$)

In this table, the following factors must be considered:

- The tool must be able to cover the stable portion of consumption, alone or in combination (two contracts to cover the entire segment). Any contract of a length that considerably exceeds the period of seasonal need would qualify in this category. For example, a contract running from November 1 to September 30 could be considered as annual transportation, while a contract running from November 1 to April 30 would not.
- The total capacity of each transportation tool that allows for the transportation of supply in franchise must be considered to obtain the relative weight of each tool on the total of all tools available (column 1 of Tableau 15).
- The cost of the tool must include all costs required to deliver the supply in franchise. For example, to deliver the supply in franchise, the Parkway – EDA (franchise) segment must

be combined with transportation on the Union Gas network. All the Union Gas delivery costs must therefore be included in the cost of the Parkway – EDA tool (column 2 of Tableau 15).

- For the calculation of the average cost, if a variable premium is applicable to the price of the tool, it must be included for the entire capacity of the tool. This means that if transportation capacities are contracted for the entire year from a point a to Gaz Métro territory, the average cost of using this tool is its cost of use at full capacity (100% LF), even if it is only partly used.
- The cost of fuel (compression gas) must be applied as if each tool transported the supply in a uniform fashion and at full capacity. The average annual fuel rate can be used to apply a deseasonalized fuel cost to each tool (column 4 of Tableau 15).
- The cost of Gaz Métro network transmissions functionalized to transportation must be included in the cost of the corresponding tools to complete the segment. Thus, the total annual transportation capacities to the North zone must be separated from the East zone, and the costs of the Champion Pipeline must be integrated into the North zone tool (included in column 6 of Tableau 15).
- When the transportation is performed from different locations, the value of the transportation must be adjusted to make the cost of the different segments comparable. In decision D-2015-177, the Régie approved a method that allows us to determine the cost of transportation applicable for each supply purchase location other than the reference point. However, that method determines the total costs, while the proposed average cost method requires a per-unit cost to be established for each location. As indicated in the conclusion of Section 2.3.1, although the method approved relies on cost causation, it requires an adaptation in its application for the average cost. Gaz Métro analyzed the method approved by the Régie, which allowed them to determine that the calculation of the transportation costs could be simplified using the following equation:

$$volume\ d'achat \times (prix\ uniforme\ lieu\ d'achat - prix\ uniforme\ lieu\ de\ référence)$$[15].

[15] See the analysis in Schedule 6.

The same analysis demonstrates that in the average cost method, using the uniform location differential ($prix\ uniforme\ lieu\ d'achat - prix\ uniforme\ lieu\ de\ référence$) allows for obtaining the premium to apply to calculate the cost of the tool.

The average cost obtained for all the tools allows us to calculate the franchise's per-unit transportation rate. This cost multiplied by average demand, i.e. the equivalent of total consumption, allows for calculating the total cost allocated to transportation. This total transportation cost, which includes the cost of the tools, Champion Pipeline, the fuel and the location differential, will be deducted from the total costs related to the transportation and storage tools and the other load balancing costs.

In the rate case, this cost could be calculated based on the known rates and the rate projections for the fuel and the deseasonalized location differential.

When there are changes in a transporter's rates (TCPL or Union Gas) during the year, the rates could simply be updated to adjust the Gas Métro transportation rate.

At the end of the year, in the annual report, the volumes, costs and rates could be updated based on the real results to obtain an average cost of transportation tools for the annual consumption actually observed. Then, the gap in the rate between this real average annual transportation rate and the invoiced average transportation rate, multiplied by the annual volume consumed, will correspond to the overpayment or shortfall to recover in the transportation service. This overpayment or shortfall will be recovered later by adjusting the Gaz Métro transportation rate up or down.

Gaz Métro is asking the Régie to approve the annual transportation tool average cost method to functionalize the costs to the transportation service and determine the transportation rate.

6.4 MAINTENANCE OF 85 TJ/DAY CAPACITY IN FTLH

The agreement negotiated between TCPL and the Eastern distributors (hereafter the "Agreement") stipulates that a minimum capacity of 85,000 GJ/day (2,243 x $10^3 m^3$/day) of firm transportation between Empress and the Gaz Métro territory must be maintained until December

31, 2020. In decision D-2014-064, the Régie asked that the additional costs associated with maintaining this capacity of FTLH transportation be invoiced to all of the customers.

In the 2015 Rate Case, Gaz Métro presented a methodology for calculating the cost related to maintenance.[16] It was based on the difference between:

i) The global per-unit cost of delivering natural gas from Empress to the Gaz Métro territory (considering the price of FTLH Empress – GMIT transportation and the price of the supply at Empress), and

ii) The global per-unit cost of delivering natural gas from Dawn to the Gaz Métro territory (considering the price of M12 Dawn – Parkway transportation combined with FTSH Parkway – GMIT and the price of the supply at Dawn)

relative to the 85 TJ/day capacity.

Gaz Métro suggests keeping this methodology to evaluate the cost of maintenance, but allocating it to load balancing, rather than transportation, as proposed in the 2015 Rate Case. The maintenance costs would then be combined with the other costs not related to the consumption profile and charged to all customers (see section 7.3.2).

In the determination of the average transportation cost, the 85 TJ/day FTLH capacity would be considered as the transportation cost of M12 Dawn – Parkway combined with FTSH Parkway – GMIT. Note that where the cost at Empress (evaluated in i) is lower than the cost at Dawn (evaluated in ii), no maintenance cost would be transferred to load balancing and the 85 TJ/day capacity would be considered at the FTLH price when evaluating the average transportation cost.

Gaz Métro is asking the Régie to approve the adjustments to the calculation method for maintaining the FTLH transportation capacity stipulated by the Agreement.

[16] R-3879-2014, B-0421, Gaz Métro-16, Document 1, Section 2.2.

6.5 Notice of entry and exit and MAO

In terms of the transportation service, Gaz Métro also reviewed the distributor's notice of entry and exit, as well as the rules surrounding the minimum annual obligations. These analyses are presented in exhibit Gaz Métro-5, Document 3.

7 FUNCTIONALIZATION AND PRICING OF LOAD BALANCING SERVICE COSTS

7.1 Background

As previously indicated, in decision D-97-047, the Régie retained the AMSSS[17] proposal for unbundling the transportation and load balancing costs, i.e. the average and excess demand method.

For the costs that exceed the average demand, the method proposed by the AMSSS allows for the costs to be divided as follows:

- Seasonal storage capacity (Dawn): Excess of average winter demand compared to average annual demand. The cost of seasonal storage here also includes the cost of *short-haul* transportation to deliver the supply from Dawn to Montréal.
- Leading-edge storage capacity and transportation in excess of 100% LF. (Pointe-du-Lac, LSR plant): Excess on peak theoretical day compared to annual demand.
- Interruptible customers: Credit equivalent to costs avoided to serve customers in firm service.

The Régie retained this method, but asked for certain items to be modified:[18]

- It concluded that there was an overlap in the proposed calculation method for the storage costs allocated to the customers, because the volumes used to determine the gap between the theoretical peak day and the annual demand ($P - A$) were already included in the calculation to determine the gap between the average winter demand and the annual demand ($H - A$).

[17] File R-3323-95, Cigma, Evidence of Sharon L. Chown on behalf of Approvisionnements-Montréal and Novagas Clearinghouse Limited.

[18] D-97-047, p.22.

- It was of the opinion that a cost of use should be attributed to the interruptible customers.

To adapt the AMSSS proposal and avoid calculating the volume in double, Gaz Métro proposed calculating the peak using the excess of the peak day over the average winter demand ($P - H$) (R-3426-99, SCGM-10, Document 1, p. 22). This way, the total gap between the peak and the annual demand was subdivided into two parts: ($P - H$) and ($H - A$).

In the same exhibit, with regard to the credit to give to the customers, Gaz Métro proposed sharing the savings equally between the continuous service customers and the interruptible service customers (50% – 50%). Gaz Métro proposed using a peak of zero for the interruptible customers.

Furthermore, to institute this division, Gaz Métro performed calculations to determine the reduction offered in the interruptible service by combining the total cost of transportation and distribution for the interruptible services. The results of these calculations justified the various rate changes for the "improved" interruptible service.

Based on these findings, Gaz Métro proposed the following calculation to allocate the load balancing cost (R-3443-2000, SCGM-2, Document 1, p.47):

$$\frac{prix \text{ « } pointe \text{ » } \times (P - H) + prix \text{ « } espace \text{ » } \times (H - A)}{Volume\ des\ 12\ derniers\ mois}.$$

The situation at the time lent itself well to this kind of cost separation. At that time, annual demand was supplied in whole from Empress. Furthermore, the combined cost of storage at Dawn and the short-haul transportation, STS in this instance, was lower than the cost of the long-haul transportation from Empress to Montréal. Thus the supply was transported in summer from Empress to Dawn, where it was stored. In winter, the supply was delivered from Dawn to Montréal. The cost of storage at Dawn replaced the excess long-haul transportation cost in winter with a lower cost.

However, beginning with the 2005 Rate Cate, this situation changed.

> "*Previously, to meet the annual and seasonal demand of its customers, SCGM fully used its long-haul transportation capacity in winter.* […] *To reduce costs, SCGM reduced its long-haul capacity and replaced this transportation with purchases at Dawn*" [translation].[19]

Gaz Métro also introduced a mechanism so that the savings from purchases at Dawn would be recorded entirely in load balancing:

> "*The benefits arising from this new supply strategy were not felt in the transportation service, but in the load balancing service*" [translation].[20]

This mechanism attributed the excess cost of *long-haul* purchases compared to purchases at Dawn to transportation, which resulted in a reduction in load balancing costs. In the rate setting exhibits, this resulted in a transfer of costs from the load balancing service to the transportation service under the heading "Transportation Costs for Purchases at Dawn."

Likewise, in the same case, rather than separate the space and peak costs by functionalizing the storage tools in terms of space or peak (at that time, only the PDL and LSR storage tools were functionalized by peak), Gaz Métro proposed, instead, to rank the tools and observe their position in relation to average annual demand, average winter demand and peak demand. The tools were then functionalized between space and peak, based on the percentage received during the ranking.[21] This methodology allowed for functionalizing the costs between peak and space to reflect the method of establishing the peak and space prices, leading to coordination between costs and revenues. The Régie approved the new methodology in decision D-2004-196.

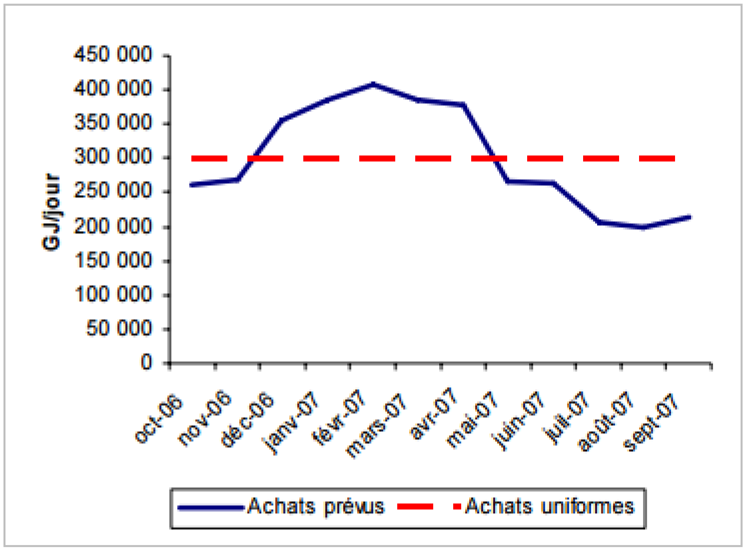
To illustrate this change, Schedule 3 presents an exhibit from the 2004 Rate Case, in which the load balancing tools are functionalized 100% by space or 100% by peak[22] and another exhibit in which the tools are functionalized based on the ranking method.[23] We can see that some tools are classified as both space and peak, depending on the percentages assigned in the ranking.

Two changes subsequently occurred concerning cost functionalization.

[19] R-3529-2004, SCGM-11, Document 1, p.3.
[20] R-3529-2004, SCGM-11, Document 1, p.4.
[21] R-3529-2004, SCGM-11, Document 1, p.7.
[22] R-3510-2003, SCGM-08, Document 13, p.2.
[23] R-3529-2004, SCGM-11, Document 1, p.18.

First, in the 2008 Rate Case (R-3630-2007), following the D-2006-140 decision, Gaz Métro examined the interfinancing related to the natural gas supply purchase profile. This document showed that gas network purchases were not uniform (R-3630-2007, Gaz Métro-11, Document 1, p.11):

Graphique 43



As the price of the supply changes each month, the average purchase price based on the projected profile was inevitably different from the average purchase price based on the uniform profile. Consequently, the gap between the average purchase price based on the real profile and the average purchase price based on the uniform profile was automatically related to the customers' need for load balancing. The method retained to correct the cost of the supply so it would reflect the exact cost of the average purchase price based on the uniform profile was to transfer the difference in dollars of the supply cost to the load balancing cost.

Another amendment had to be made when the quantities purchased at Dawn began to comprise a significant portion of the total supply purchases.[24] Since all the savings related to purchases at Dawn were considered in the load balancing, the growing purchases at Dawn increasingly reduced the total load balancing cost. As the savings in the load balancing service were higher than the cost of transportation from Dawn to Montréal, they also reduced other costs, such as the cost of the storage sites. The costs functionalized to load balancing therefore no longer

[24] 2012 Rate Case, R-3752-2011, Gaz Métro 12, Document 1, Section 4.

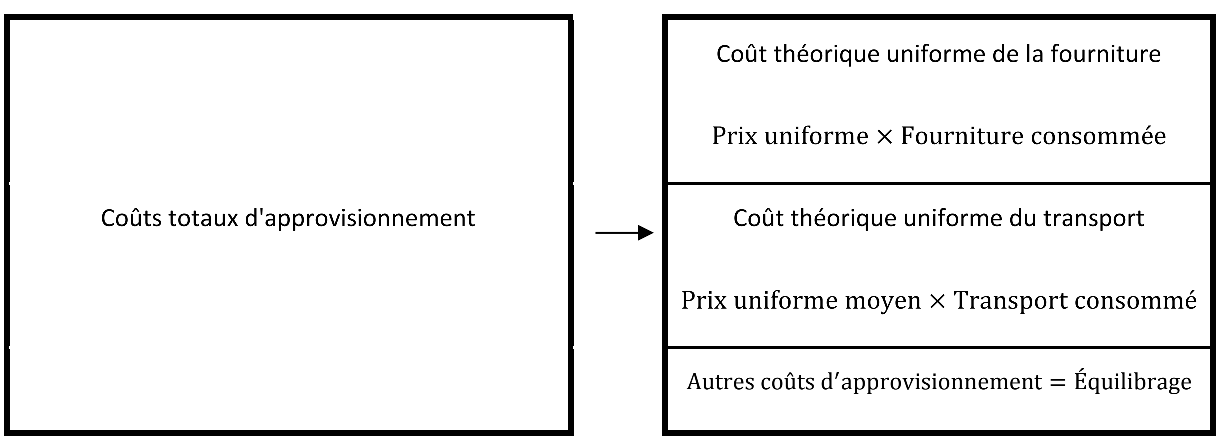
represented the excess of average demand. By further increasing the purchases at Dawn, Gaz Métro also predicted that all load balancing costs would risk ending up lower than zero, which, in itself, did not reflect reality, since load balancing was actually offered to the customers. Gaz Métro therefore reviewed the way the transportation costs were functionalized. The review allowed for reestablishing the load balancing costs in the rate case so they would once again reflect the excess of average demand.

7.2 FUNCTIONALIZATION OF LOAD BALANCING COSTS

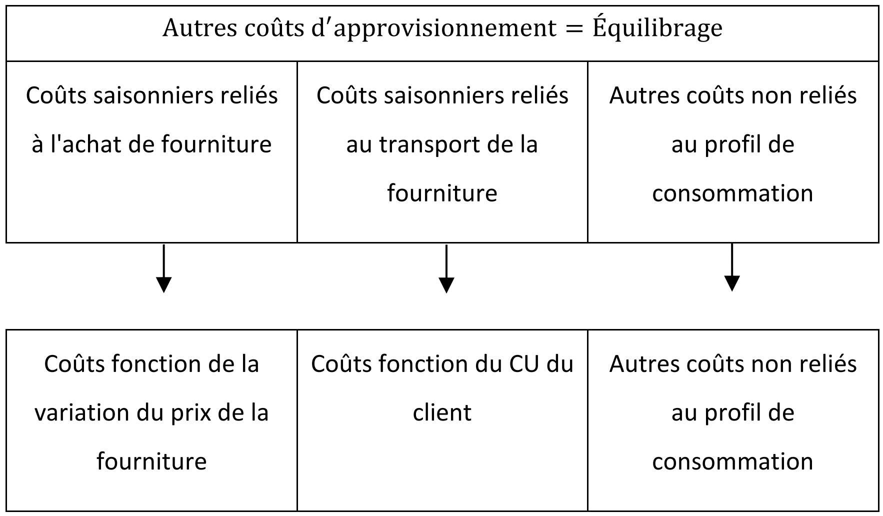
It was proposed in section 6.3 to stop using a functionalization method that directly divides supply costs between the transportation and load balancing services. Gaz Métro proposes instead to evaluate the cost of the transportation service based on the theoretical cost of the transportation required to meet 100% stable demand. Similarly, the supply service costs correspond to the theoretical supply cost associated with a 100% stable demand. This therefore means combining all supply costs and then calculating the theoretical costs of uniform supply and transportation costs. The difference between the total supply costs and the theoretical supply and transportation costs to meet stable demand is then allocated to load balancing.

The process is illustrated in Figure 1:

Figure 1



The examination of the cost causation identified three types of costs that do not correspond to stable profile:



In theory, the allocation of load balancing costs should therefore reflect the specific causation of each factor, as identified in the supply cost causation analysis.

<u>Seasonal costs related to supply purchase</u>

First, in terms of seasonal costs related to supply purchase, the analysis of the separation of costs based on consumption profile (section 2.2.4) demonstrates that:

> "*The causation of seasonal supply costs for each customer varies essentially based on two differences:*
>
> - *The difference between the monthly volume and the annual average volume*
> - *The difference between the monthly supply price and the annual average supply price*
>
> *This explains why the use of a consumption factor such as the LF, which is less accurate than the application of a monthly variation in consumption combined with a variation in the supply price, cannot accurately allocate the seasonal supply costs for different profiles when they are not related to changes in temperature."* (p.65).

To evaluate an allocation method for these costs, Gaz Métro assessed more accurately how they were affecting its specific customers. The complete analysis can be found in Schedule 4.

The analysis reveals that the allocation of these costs based directly on price gaps does not reflect the distributor's costs. For one thing, Gaz Métro has storage contracts that can eliminate the gap in the supply price for several months (the gap being substituted by the storage cost).

Given that the seasonal consumption profiles of Gaz Métro customers are relatively similar, meaning that they vary mainly based on temperature, the LF provides a fairly accurate reflection of the impact of costs associated with gaps in the supply cost.

Using the LF to allocate these costs is therefore appropriate for Gaz Métro's customers.

<u>Seasonal costs related to supply transportation</u>

As for the seasonal costs related to supply transportation, the cost analysis based on consumption profile (section 2.1.3) demonstrates that:

> "*The causation of the costs to be distributed based on the seasonal consumption profile is therefore intimately related to the customers' LF. This relationship is inversely proportionate and allows the costs to be distributed accurately, based on the units consumed by the customer. The customer's daily consumption profile has no influence on the number of used and unused units when the average and maximum demand are constant."* (p.32).

Using the LF to allocate these costs is therefore appropriate as well.

<u>Other costs not related to the consumption profile</u>

Finally, during the analysis, certain costs were identified as not being related to the consumption profile. These costs can therefore not be considered directly in the costs associated with a uniform profile (cost of supply or transportation services) or in the costs associated with a seasonal profile (based on the LF).

For the moment, the following costs have been identified as not being related to the consumption profile:

- Stranded costs not related to temperature
- Costs related to maintaining the 85 TJ/day at Empress
- Costs related to operational flexibility

For all these costs, allocation based on volume consumed allows for preventing any notion of consumption profile.

Gaz Métro is asking the Régie to approve the proposed allocation method for each of these costs:

<u>Seasonal costs related to the purchase and transportation of the supply</u>:
Based on the customers' LF

<u>Costs not related to the consumption profile:</u>
Based on the volume consumed

7.3 PROPOSED LOAD BALANCING RATE

The current rates use the following formula for load balancing:

$$\frac{prix \text{ « } pointe \text{ » } \times (P - H) + prix \text{ « } espace \text{ » } \times (H - A)}{Volume\ des\ 12\ derniers\ mois}$$

This formula takes the following factors into account: peak daily consumption (P), average daily winter consumption (H) and average daily annual consumption (A). However, the analysis of the causation showed that only peak consumption (P) in relation to average consumption (A) affects the total supply cost (section 2.1.3).

> "*The difference between peak demand and average demand allows us to calculate the customer's unused units, regardless of its daily consumption profile. Furthermore, two different customers who have the same annual consumption and LF automatically generate the same number of used and unused units."* (p.28).

The load balancing rate should therefore only consider the peak daily consumption and the average annual daily consumption in the customer's consumption profile.

Furthermore, unlike the current rate, the load balancing costs that are not related to the consumption profile should not be included in the calculation based on the LF.

Gaz Métro therefore proposes a new load balancing rate with two components:

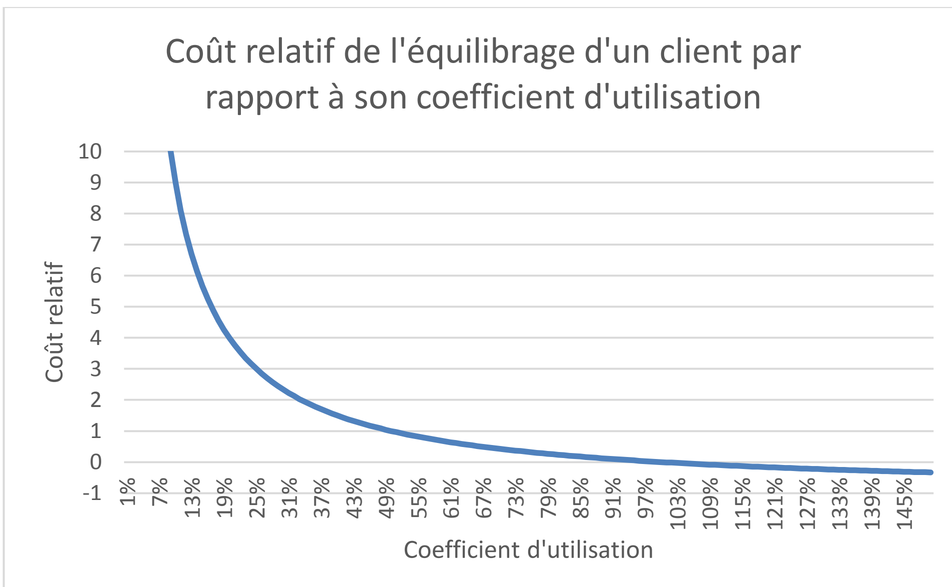
- Price component based on the LF
- Price component based on the volume consumed

7.3.1 Price component based on the load factor

A first price component based on the LF must be established. This component allows for allocating the seasonal supply costs.

As shown in the examination of the causation of costs based on the consumption profile, the lower a customer's LF, the higher the cost it causes. The graph below represents the growth curve of the cost based on the customer's LF:

Graphique 44



The formula used to distribute the costs based on this relationship is:

$$\left(\frac{1}{CU_i}-1\right)\times Taux\ moyen\ de\ pointe$$

Where LF_i = load factor of customer *i* determined by the ratio of average annual demand over peak consumption (A_i/P_i). For customers with daily readings, the peak is the real peak of consumption observed between December 1 and the last day of February.[25] For customers with monthly readings, the peak corresponds to

[25] See the section on the parameter calculation period in exhibit Gaz Métro-5, Document 3.

the highest average monthly demand between December and February, times the multiplier.[26]

7.3.2 Price component based on the volume consumed

A price component based on the volume consumed must also be established for costs that cannot be allocated based on the consumption profile.

The formula that allows for allocating the costs based on volume consumed is as follows:

$$\text{Taux moyen « autres coûts »} = \frac{(\text{Coûts non reliés au profil de consommation})}{\text{volumes totaux prévus}}$$

The per-unit rate thus determined allows for costs to be recorded by m³ consumed.

7.3.3 Addition of price components

For each m³ consumed, the load balancing rate for customer *i* is established by adding up the various components:

$$\text{Taux moyen « autres coûts »} = \frac{(\text{Coûts non reliés au profil de consommation})}{\text{volumes totaux prévus}}$$

Gaz Métro is asking the Régie to approve the new formula for establishing the load balancing price.

7.4 OTHER COMPONENTS OF THE LOAD BALANCING SERVICE TO BE REVIEWED

Gaz Métro analyzed several subjects related to load balancing and determined that several other changes are required, in addition to the formula for establishing the price. These additional analyses and the related modifications are presented in exhibit Gaz Métro-5, Document 3.

[26] See the section on the evaluation of the peak for customers with monthly readings in exhibit Gaz Métro-5, Document 3.

7.5 LOAD BALANCING RATE: CHANGES TO THE CONDITIONS OF SERVICE AND TARIFF

Articles 13.1.2.2 and 13.1.3.1 of the *Conditions of Service and Tariff* should be changed to take into account the new breakdown of the price into two components and the removal of parameter H.[27]

13.1.2.2 Prix pour les autres clients et pour les clients assujettis, en date du 30 septembre 2012, à l'article 13.1.2.2 des* Conditions de service et Tarif *en vigueur au 1er décembre 2010

Pour chaque mètre cube~~m³~~ de volume retiré, excluant les volumes de « gaz d'appoint concurrence » ou de « gaz d'appoint pour éviter une interruption », le prix unitaire en ¢/m³ est calculé de la façon suivante :

~~*402,3 x (P – H) + 2 258,7 x (H – a)*~~
~~*Volume annuel*~~

$$\left[\left(\frac{1}{CU}-1\right)\times x,xxx\right]+x,xxx$$

où *CU : Coefficient d'utilisation = Consommation journalière moyenne Annuelle (A) / Consommation journalière de Pointe (P)*

~~*A : Consommation journalière moyenne Annuelle*~~

~~*H : Consommation journalière moyenne d'Hiver (période du 1er novembre au 31 mars)*~~

~~*P : Consommation journalière de Pointe*~~

Le détail du calcul des paramètres A~~, H~~ et P se retrouve à l'article 13.1.3. ~~*Pour les clients en service de distribution D5, les paramètres A, H et P utilisés dans la formule sont les paramètres modifiés pour tenir compte des jours d'interruption.*~~

~~*Le prix ne peut toutefois pas être inférieur à -1,561 ¢/m³ ni supérieur à 7,638 ¢/m³.*~~

13.1.3 Calcul des paramètres

~~***13.1.3.1 Paramètres pour les clients en services de distribution D1, D3 et D4***~~

A = *volume du 1er octobre 2014 au 30 septembre 2015 / # jours du 1er octobre 2014 au 30 septembre 2015*

~~***H*** = *volume du 1er novembre 2014 au 31 mars 2015 / # jours du 1er novembre 2014 au 31 mars 2015*~~

P = *consommation journalière maximale du 1er ~~novembre~~décembre 2014 au ~~31 mars~~28 février 2015*

[…]

[27] Please see exhibits Gaz Métro-5, Document 2 and 3 for the justifications of the changes to articles 13.1.2.2 and 13.1.3.1 concerning customers in the D_5 distribution service, the minimum and maximum prices and the period for the calculation of parameter P.

Gaz Métro is asking the Régie to approve the changes made to articles 13.1.2.2 and 13.1.3.1 of the *Conditions of Service and Tariff*.

8 CALCULATION OF TRANSPORTATION AND LOAD BALANCING RATES: 2015 RATE CASE

To illustrate the effect of the rate proposals for the supply, transportation and load balancing services, Gaz Métro used the costs from the 2015 Rate Case (including the transportation rates updated on February 1, 2015, to account for the new TCPL rates[28]).

To generate and compare new transportation and load balancing rates based on the proposals formulated in this evidence, all accounting and rate exhibits related to these services had to be reviewed. Likewise, even though the compression service was only abolished in November 2015 and this service was considered separately in the 2015 Rate Case, the costs associated with compression were still considered in the transportation costs. Finally, to obtain an average cost that reflects the optimization of all supply tools, the North and South zones are not subject to different transportation rates.

8.1 TOTAL SUPPLY COSTS

First, as explained earlier, the total gas supply cost is generated based on the total demand of all customers. An exhibit that shows all these gas supply costs is proposed, without initially dividing the costs between the transportation and load balancing services (see section 3 in this regard). This exhibit also presents the supply costs. This addition makes it possible to calculate the transfer of the seasonal discrepancy in supply to load balancing at the end of the year, as described in section 2 of exhibit Gaz Métro-5, Document 3.

Here is the exhibit that shows all the gas supply costs for the 2015 Rate Case:

[28] R-3879-2015, B-0361, Schedule A.

Tableau 16

	COÛT DES APPROVISIONNEMENTS GAZIERS			
No de ligne	**Description**	Coûts (000$) (1)	Volume 10³m³ (2)	Coût moyen ¢/m³ (3)
1	**FOURNITURE**			
2	Coût du service de fourniture	359 748 $	2 455 382	14,6514
3	Coût du service de compression	9 953 $	1 934 635	0,5145
4	Ajustement compression pour achats directs	2 679 $	520 747	0,5145
5	Coût total de la molécule et compression facturée	372 380 $	2 455 382	15,1659
6				
7	Variation de l'écart de prix	296 $		
8	Coût de la variation de l'inventaire	- $		
9	Transfert vers l'ajustement d'inventaire	- $		
10	Coût total d'acquisition comptable	372 676 $		
11				
12	Coût du gaz de réseau au prix uniforme	372 676 $	2 455 382	15,1779
13				
14	**Transfert de l'écart saisonnier vers l'équilibrage**	**(0) $**		
15				
16	**OUTILS DE TRANSPORT ET D'OPTIMISATION DU TRANSPORT**			(1)/(2)
17	**Outils de transport annuels**			
18	- TCPL LH Zone Est	248 016 $	3 011 771	8,2349
19	- TCPL LH Zone Nord	14 515 $	244 612	5,9341
20	- Échange LH Zone Nord	532 $	9 633	5,5219
21	- Échange LH Zone Est	23 764 $	481 157	4,9390
22	- TCPL SH Parkway	17 387 $	626 155	2,7767
23	- TCPL SH Dawn	31 055 $	1 059 646	2,9307
24	- Échange SH Dawn	21 954 $	789 918	2,7793
25	- Revenus d'optimisation sur transport annuel	(12) $		
26		357 212 $	6 222 892	5,7403
27	**Outils de transport saisonnier**			
28	- TCPL SH Service STS	54 931 $	2 082 436	2,6378
29	- Échange LH Zone Est	50 114 $	7 078	707,9798
30	- Revenus d'optimisation sur transport saisonnier	- $		
31		105 045 $	2 089 515	5,0272
32	**Variation d'inventaire :**			
33	- Solde au début	34 539 $	498 340	6,9308
34	- Solde à la fin	(36 995) $	(497 364)	7,4382
35		(2 456) $	976	(251,6189)
36	**Outils d'optimisation de transport**			
37	- Usine de LSR	6 915 $		
38	- Gaz d'entreposage souterrain-PDL	4 959 $		
39	- Gaz d'entreposage souterrain-St-Flavien	13 057 $		
40	- Service interruptible	- $		
41	- Pénalités	- $		
42		24 930 $		
43	**Total des coûts d'outils de transport et d'optimisation du transport**	484 731 $		
44				
45	**AUTRES COÛTS D'ÉQUILIBRAGE**			
46	**Coûts saisonniers de la molécule :**			
47	- Gaz d'entreposage souterrain à Dawn	13 805 $		
48	- Écart saisonnier de la molécule vers l'équilibrage	7 608 $		
50		21 413 $		
51	**Autres frais :**			
52	- Gaz d'appoint concurrence	66 $	1 113	5,9486
53	- Prime d'achat à d'autres points que la référence	39 038 $		
54	- Champion Pipeline	3 003 $		
55	- Frais reportés sur outils de transport et d'entreposage	(12 851) $		
56	- Frais reporté de transport	- $		
57	- Frais reporté d'équilibrage	308 $		
58	- Gaz utilisé dans les opérations	(2 945) $		
59	- Gaz perdu	(2 940) $		
60	- Coût du surplus uniforme	- $		
61	- Coût du surplus saisonnier	- $		
62		23 679 $		
63	**Total des autres coûts d'équilibrage**	45 092 $		
64				
65	**Total des coûts de transport et d'équilibrage**	**529 823 $**		

Supply

In the first section, the supply costs are shown in detail. The cost of the supply bought and sold to the customers during the year in entered on line 5. The other costs related to supply purchases are entered on lines 7 to 9. These costs include the following:

- Variation in price gap: All costs stemming from price gaps. The main cost is the gap between the actual price paid and the cost based on the Gaz Métro supply service price (annualized price). Other costs may be found in this category, such as for past rebilling or the purchase of customers' inventory by direct purchase or at a set price. Part of the seasonal cost during the year is found in this account.
- Cost of variation in inventory: The variation in the quantity of the gas network inventory during the year may contain a seasonal price effect that must be neutralized by a transfer to load balancing.
- Transfer to inventory adjustment: The variation in the monthly price of the supply service price generates a cost that must be transferred to the inventory adjustment account. This amount will now be recovered in the load balancing service. Since this amount is already recovered or functionalized in the customer's consumption profile, it should not be included in the calculation of the seasonality to be transferred to load balancing.

Once these adjustments are made, all the costs can be added up to find the acquisition cost to invoice to the customers. This cost is then compared with the gas network acquisition cost at the uniform price to determine the seasonality cost to transfer to load balancing.

In this case, since it is a rate case, there is no seasonality cost to transfer (line 14) as the acquisition cost is already calculated based on a uniform purchase cost.

Transportation tools and transportation optimization

In the second section, the total optimized costs for supply delivery are calculated.

The annual transportation tools are first grouped together on lines 18 to 25, including the optimization income related to these tools. Compression costs of $9,922,000 were estimated and added on line 16 to represent the abolishment of the compression service and the transfer of these costs to the transportation service. The seasonal transportation tools are entered on lines 28 to 30, including the optimization income related to these tools.

Then the cost related to the variation in transportation inventory is detailed (lines 33 and 34). Note that for the purposes of this exercise, the value of the inventory was not modified in relation to what can be seen in the modified transportation rates on February 1, 2015.[29]

The costs of the tools that directly replace the transportation tools are entered next (lines 37 to 41). The costs of the storage sites in franchise, the interruptible service and the penalties for unauthorized withdrawals from the interruptible service are included in this category.

Other load balancing costs

The third section presents the seasonal costs of the supply (i.e., the cost of the Dawn storage site and the seasonal cost of the supply, lines 47 and 48), as well as all other costs related to the delivery of natural gas in franchise (lines 52 to 61). The cost of competitor make-up gas, the natural gas purchase premium, the cost of Champion Pipeline, deferred fees and natural gas used in self-consumption are also part of the other supply fees.

The total cost of supply delivery in franchise can be reconciled with the total cost in the 2015 Rate Case as follows:

Tableau 17

Catégorie de coûts	(000 $)
Coût du transport et de l'équilibrage CT2015	**509 020**
Variation effective du transport - Taux TCPL janv. 2015	*15 190*
Coût de la compression ajoutée aux coûts d'acheminement	*9 922*
Abolition de l'ajustement d'inventaire dans le transport	*-4 075*
Variation des coûts d'autoconsommation	*-234*
Coût d'acheminement de la fourniture - Proposition	**529 823**

This method of presenting the results gives a complete picture of all the supply costs, including the cost of purchasing the commodity and also the delivery costs, whether they are related to the cost of serving a stable profile or a seasonal profile. At the end of the year, these costs will be able to be compared to the real costs incurred.

[29] R-3879-2015, B-0361, Schedule A, Column 8, lines 20 to 22.

However, to obtain separate transportation and load balancing rates, further calculations are required.

8.2 Transportation rate

As explained earlier, the transportation rate corresponds to the cost of meeting the total consumption needs of the customers. To determine a fair price, the cost of transportation is based on the assumption that if the customers did not need load balancing, the supply need would be stable throughout the year. The cost of the tools required to meet stable need are therefore calculated as if they were used at a LF of 100%. By dividing the total cost of these tools at 100% LF by the quantity of units they allow to be delivered in franchise, we obtain Gaz Métro's theoretical average per-unit cost to meet a stable consumption need. This average per-unit cost can then be multiplied by the customers' total consumption need to determine the cost attributable to the transportation service.

The first step in determining the cost attributable to the transportation service is therefore to calculate the average per-unit cost of the annual transportation tools at 100% LF:

Tableau 18

COÛT MOYEN DES OUTILS DE TRANSPORT POUR CONSOMMATION ANNUELLE

No de		Coût de l'outil uniforme avant fuel			Coût fuel	Différentiel de lieu	Autres coûts	Coût total équivalent en profil uniforme	
ligne	Outils de transport annuels	10^3m^3	(000$)	¢/m³	¢/m³	¢/m³	¢/m³	¢/m³	(000$)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	- TCPL LH Zone Est	3 011 771	238 094	7,9054	0,4062		-0,0002	8,3114	250 321
2	- TCPL LH Zone Nord	244 612	14 515	5,9341	0,2639		1,1810	7,3790	18 050
3	- Échange LH Zone Nord	9 633	532	5,5219	0,2639		1,1810	6,9668	671
4	- Échange LH Zone Est	481 157	23 764	4,9390	0,4062		-0,0002	5,3450	25 718
5	- TCPL SH Parkway	626 155	16 091	2,5698	0,1948	4,0088	-0,0002	6,7733	42 411
6	- TCPL SH Dawn	1 059 646	29 920	2,8236	0,0703	4,0088	-0,0002	6,9025	73 142
7	- Échange SH Dawn	789 918	19 714	2,4957	0,0703	4,0088	-0,0002	6,5746	51 934
8	Total	6 222 892	342 630	5,5060	0,2793	1,5949	0,0481	7,4282	462 247

The annual transportation tools determined in the supply cost exhibit are used again to calculate the average per-unit transportation cost. Then, to calculate the cost of each tool at 100% LF, the following costs are taken into consideration:

- Cost of uniform tool before fuel: Cost invoiced by the transporter (TCPL or other) to the distributor.
- Cost of fuel: Per-unit cost of compression to transport the supply using the annual tool.

- Location differential: Uniform per-unit cost to purchase the supply from a place other than the reference point. For 2015, the location differential was evaluated based on the network gas price of $3.87/GJ and the projected purchase price at Dawn of $4.928/GJ (R-3879-2014, 2015 Rate Case, Gaz Métro-7, Document 1, p.90).
- Other costs: The other costs may include optimization income earned through annual transportation tools or transportation costs other than those of the transporters, such as Champion Pipeline.

The per-unit transportation cost (rate) and the transportation fee for the required income may then be established based on a per-unit cost at 100% LF of the annual transportation tools:

Tableau 19

CALCUL DES FRAIS DE TRANSPORT POUR LE REVENU REQUIS

No de ligne			
1	Coût moyen du transport annuel	7,4282	¢/m³
2	Ventes prévues incluant GNL	5 559 593	10^3m^3
3	Gaz utilisé dans les opérations	38 765	10^3m^3
4	Gaz perdu	38 706	10^3m^3
5	Coût total des ventes (L1 * (L2 + L3 + L4))	418 731	(000$)
6	Frais reporté de transport	9 467	(000$)
7	Coût total du transport	428 198	(000$)
8	Coût unitaire du transport (L7 / (L2 + L3 +L4))	7,5961	¢/m³
9	Coût total du transport	428 198	(000$)
10	Gaz utilisé dans les opérations (L3 * L8)	-2 945	(000$)
11	Gaz perdu (L4 * L8)	-2 940	(000$)
11	Frais reporté de transport	-9 467	(000$)
12	Gaz appoint	66	(000$)
13	Frais de transport pour revenu requis (GM-21 Doc 1 L1)	412 912	(000$)

In this case, the transportation rate for the entire franchise for 2015 would be set at 7.596¢/m³ (line 8), including compression costs.

To compare this rate with the rate in the 2015 Rate Case, a few adjustments are required. As a result, the combined transportation rate (North zone and South zone) on February 1, 2015, is 7.463¢/m³ without compression. Considering the lowest rate for the period from October to December, the effective transportation rate for the year in the 2015 Rate Case is actually

7.354 ¢/m^3 without compression. By adding a per-unit compression cost of 0.510¢/m^3,[30] the combined cost of transportation and compression becomes 7.864¢/m^3.

The Gaz Métro proposal is to reduce the transportation rate by 3.4% compared to the 2015 Rate Case. Since the same price applies to all the customers of the Gaz Métro transportation service, all the customers will see their price decrease by 3.4%.

8.3 Load balancing rate

Before determining the rates for the load balancing service, the income required for this service must be calculated. The load balancing fee corresponds to the total cost of delivering the supply (Tableau 16) less the transportation fees for the income required (Tableau 19) ($529\,823\ \text{k\$} - 412\,912\ \text{k\$} = 116\,911\ \text{k\$}$). Moreover, all costs related to the inventory for supply, compression and transportation are now included in the income required for load balancing (no income is therefore required for supply and compression). Finally, the income required for load balancing is calculated as a whole. The subdivision of the load balancing costs between costs to recover based on the profile and costs to recover based on volume is performed in the rate calculation instead. Here is the required income adjusted based on Gaz Métro's proposal for the 2015 Rate Case.

[30] R-3879-2014, B-0310, Gaz Métro-21, Document 7, column 4, line 14.

Tableau 20

Établissement du revenu requis
(000 $)

		Distribution (1)	SPEDE (2)	Transport (3)	Équilibrage (4)	Total (5)
1	Frais de transport, d'équilibrage et de la distribution	22 839		412 912	116 911	552 662
2	Rabais à la consommation et autres	28				28
3	Compte d'aide à la substitution d'énergies plus polluantes	1 000				1 000
4	Autres revenus d'exploitation	(3 196)				(3 196)
5	Dépenses d'exploitation	190 900				190 900
6	Plan global en efficacité énergétique (PGEÉ)	18 680				18 680
7	Amortissements immobilisations	98 703			1 347	100 050
8	Amortissements frais reportés et actifs intangibles	47 212		9 467	4 831	61 510
9	Fonds vert	6 045				6 045
10	Impôts fonciers et autres	26 144				26 144
11	Impôts revenu	28 685	1 507 (1)	(1)	2 180 (1)	32 372
12	Rendement sur la base de tarification	128 324	339		8 872	137 535
13	Revenu requis incluant l'approvisionnement du client GNL	565 362	1 845	422 379	134 141	1 123 727
14	Coût d'utilisation de l'usine LSR remboursé par le client GNL				(2 056)	(2 056)
15	Revenu requis avant retrait des coûts relatifs aux services D, T et É du client GNL	565 362	1 845	422 379	132 085	1 121 671
16	Coûts des services D, T et É remboursés par le client GNL					
17	Volumes (10^3m^3)	34 471		34 471	34 471	
18	Coût unitaire par service (¢/m³)	2,632		7,596	(1,149)	
19	Coût par service remboursé par le client GNL	(907) (3)		(2 618)	396	(3 130)
20	Revenu requis de la clientèle réglementée (li 15 + li 19)	564 455	1 845	419 761	132 481	1 118 541

For the purpose of simplifying the evidence, the cost of the load balancing service reimbursed by the customer GNL in the 2015 Rate Case was maintained. The result gives a total required income of $132,481K in load balancing (line 20 of Tableau 20). The total required income must be subdivided between the costs related to delivering the supply and the other costs (stranded costs not related to temperature, costs for maintaining the 85 TJ/day between Empress and the franchise and costs related to rate flexibility). This lets us calculate the portion of the load balancing costs to recover based on the consumption profile and the portion of load balancing costs to recover based on the volume consumed by the customers.

Here is how the subdivision of the load balancing costs can be performed:

Tableau 21

	RÉPARTITION DES COÛTS D'ÉQUILIBRAGE		
No de ligne	**Description**	Coûts (000$) (1)	
1	**Revenu requis au service d'équilibrage**	132 481	$
2			
3	**Coûts reliés au maintien de capacité de transport LH**		
5	- Différence du coût entre le transport LH et SH Parkway	-	$
6		-	$
7	**Coûts échoués non reliés à la température**		
8	- Coûts échoués (écarts de prévision, baisse consommation)	-	$
9	- Revenus compensatoires reçus de la clientèle	-	$
10		-	$
11	**Coûts reliés à la flexibilité opérationnelle**		
12	- Service M12	55	$
13	- Service C1	5	$
14	- Entreposage Union Gas	319	$
15	- Pénalités sur service ferme	-	$
16		378	$
17	**Coûts d'équilibrage reliés à l'acheminement de la molécule**	**132 103**	**$**

In the 2015 Rate Case, there is no excess transportation capacity in the winter, which means that the total capacities were deemed necessary to meet the customers' peak demand. That means there are no stranded costs not related to temperature. As concerns the cost of maintaining the 85 TJ/day between Empress and the franchise, given that the reference point for 2015 was Empress, there are no costs to enter. For the costs related to rate flexibility, Gaz Métro used the evaluation presented in the 2016 Rate Case of $378K.[31] These evaluations will be subject to review annually and in compliance with the Régie's decisions.

After deducting the costs to recover based on volume consumed, there remains $132,103K to allocate based on the seasonal consumption profile.

Given the formula proposed by Gaz Métro to allocate the costs based on the seasonal consumption profile, the rate can be calculated from the overall consumption profile of all the customers. Moreover, as Gaz Métro is proposing to shorten the winter period, all the customer peaks have been recalculated.

[31] R-3879-2014, B-0615, Gaz Métro-103, Document 3, section 1.

For the 2015 Rate Case, the parameters a and P that are used are the real parameters for 2014. As a result, we have an a of 15,864,925 m³/day[32] and a P of 36,352,227 m³/day (December 2013 – February 2014), for a total LF of 43.64%. For the 2015 Rate Case, the global annual volume was 5,702 M m³. Using these components, we can determine the average peak rate for load balancing:

$$\text{Taux moyen de pointe} = \frac{\text{Coût É selon CU}}{\left(\frac{1}{CU_{global}} - 1\right) \times \text{Volume annuel } 2015_{global}}$$

$$= \left[\frac{132\ 103\ \text{k\$}}{(1/43{,}64\% - 1)}\right] \times \frac{1}{5\ 702\ 717\ 295\ m^3} = 1{,}794\ ¢/m^3.$$

This average peak rate can be inserted in the formula to calculate the prices per customer and the average prices. : $\left(\frac{1}{CU} - 1\right) \times 1{,}794\ ¢/m^3$.

Here is the result by rate for the 2015 Rate Case:

Tableau 22

Revenus d'équilibrage proposés (portion profil)

Tarif	A *(m³/jour)*	P *(m³/jour)*	CU *(%)*	Taux *(¢/m³)*	Revenu d'É (selon CU) *(000 $)*
	(1)	(2)	(3)	(4)	(5)
D_1 (<75km³/an)	3 298 836	11 148 699	29,59	4,269	51 402
D_1 75 k+	2 380 100	7 387 396	32,22	3,774	32 788
D_{1RT}	1 203 839	2 897 410	41,55	2,524	11 090
D_3	563 738	843 423	66,84	0,890	1 831
D_4	7 054 720	10 206 802	69,12	0,802	20 640
D_5	1 122 650	3 316 169	33,85	3,505	14 363
Total	**15 623 883**	**35 799 899**	**43,64**	**2,317**	**132 115**

[32] a calculated without modification of parameters for rate D_5 customers.

The gap in the total income result is due to the use of three digits after the decimal point for the average peak rate of 1.794¢/m^3. The use of a non-rounded rate of 1.7938365¢/m^3 would have allowed us to obtain the exact total sought of $132,103K.

Gaz Métro must also calculate a volumetric rate to recover the stranded costs not related to temperature and the costs related to rate flexibility. The division of these costs by total consumption volume forecast allows us to obtain a rate per m^3:

$$\text{Taux moyen autres coûts} = \frac{\text{Total autres coûts de É}}{\text{Volume annuel } 2015_{global}} = \frac{378\ K\$}{5\,702\,717\,295\ m^3} = 0{,}0066\ ¢/m^3$$

By combining this per-volume rate with the rate obtained based on the LF, the rate and total load balancing income are as follows:

Tableau 23

Tarif	A *(m³/jour)*	P *(m³/jour)*	CU *(%)*	Taux CU *(¢/m³)*	Taux Vol *(¢/m³)*	Taux total *(¢/m³)*	Revenu d'équilibrage *(000 $)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
D_1 (<75km^3/an)	3 298 836	11 148 699	29,59	4,269	0,007	4,276	51 486
D_1 75k+	2 380 100	7 387 396	32,22	3,774	0,007	3,781	32 849
D_{1RT}	1 203 839	2 897 410	41,55	2,524	0,007	2,531	11 120
D_3	563 738	843 423	66,84	0,890	0,007	0,897	1 846
D_4	7 054 720	10 206 802	69,12	0,802	0,007	0,809	20 820
D_5	1 122 650	3 316 169	33,85	3,505	0,007	3,512	14 392
Total	**15 623 883**	**35 799 899**	**43,64**	**2,317**	**0,007**	**2,324**	**132 514**

The income obtained can be compared with the income in the 2015 Rate Case:

Tableau 24

Tarif	Revenus d'équilibrage proposés *(000 $)*	Revenus d'équilibrage CT2015 *(000 $)*	Écart *(000 $)*
	(1)	(2)	(3)
D_1 (<75km^3/an)	51 486	55 611	-4 125
D_1 75k+	32 849	37 761	-4 912
D_{1RT}	11 120	12 772	-1 652
D_3	1 846	1 852	-6
D_4	20 820	19 346	1 474
D_5	14 392	2 416	11 976
Total	**132 514**	**129 758**	**2 756**

The load balancing income obtained is slightly higher than in the 2015 Rate Case (increase of 2.1%), but the proposed load balancing income includes the inventory income formerly allocated to supply and transportation. Furthermore, because the new proposal for the interruptible services no longer adjusts the calculation parameters of the load balancing price, these customers are billed much higher load balancing costs than before. This price increase for interruptible customers mainly benefits rate D_1 customers. The interruptible customers will be compensated differently, however. These factors are presented in exhibit Gaz Métro 5, Document 2.

8.3.1 Result of calculation of proposed rates per customer

In load balancing, Gaz Métro's proposal has a different effect based on the specific LF of each customer. Moreover, eliminating the minimum and maximum limits has an additional effect on the load balancing prices.

For customers with less than 75,000 m^3/year invoiced at the average D_1 price, the average price drops from 4.622¢/m^3 in the 2015 Rate Case to 4.269¢/m^3 with the proposed rate, or a drop of about 7.6%.

Gaz Métro also calculated new load balancing prices for customers that consume 75,000 m^3/year and over that have a customized load balancing price.

Tableau 25

Prix d'équilibrage proposé (CT 2015)

Prix É minimum (¢/m^3)	Prix É maximum (¢/m^3)	D_1 (> 75 000 m^3/an) (# clients)	D_{345} (# clients)	Total (# clients)	Total (%)
(1)	(2)	(3)	(4)	(5)	(6)
15	25	0	1	1	0,02
7,638	15	95	3	98	1,65
5	7,638	1 056	5	1 061	17,86
3	5	2 618	33	2 651	44,63
1,5	3	1 213	105	1 318	22,19
0	1,5	441	241	682	11,48
-1,561	0	67	8	75	1,26
-1,794	-1,561	49	5	54	0,91
		5 539	401	5 940	100,00

Most of the D_1 customers with a customized rate have a price between 3¢/m^3 and 5¢/m^3. The D_{345} customers generally have a price between 0¢/m^3 and 3¢/m^3. Only a small proportion of the customers (2.58%) are outside the minimum (-1.561¢/m^3) and maximum (7.638¢/m^3) price limits in effect in the 2015 Rate Case.

Furthermore, the majority of the customers will see their prices decrease in comparison to the actual prices in 2015:

Tableau 26

Variation du prix d'équilibrage (proposé *vs* CT2015)

Variation minimum (¢/m³)	Variation maximum (¢/m³)	D_1 (> 75 000 m³/an) (# clients)	D_{345} (# clients)	Total (# clients)	Total (%)
(1)	(2)	(3)	(4)	(5)	(6)
10	25	0	2	2	0,03
7	10	0	0	0	0,00
4	7	12	5	17	0,29
2	4	21	42	63	1,06
0	2	347	162	509	8,57
-2	0	4 887	188	5 075	85,44
-4	-2	194	2	196	3,30
-10	-4	78	0	78	1,31
		5 539	401	5 940	100,00

Therefore, 90.05% of the customers will see a decrease in their price. Although the majority are the D_1 rate, 47.3% of the D_{345} customers also receive a decrease in their load balancing price.

Two factors are behind the price decreases for certain customers. First, the use of unmodified parameters for rate D_5 increases the rate of customers with an interruptible portion and in general reduces the rate of the other customers. Also, several customers with a peak in November or March benefit from a price drop related to a lower peak in the calculation of their price.

Overall, the price variations per customer in relation to the 2015 Rate Case accurately reflect the changes proposed in this evidence. The load balancing price increases when the customer's LF drops, which is in line with the cost causation: the higher the customer's peak in comparison with their average use, the higher that customer's supply costs.

The majority of the customers will not face a major price change with this proposal. Only customers with an atypical consumption profile will have their load balancing rate fluctuate more significantly, to better reflect the costs or savings related to their specific profile.

9 ADMINISTRATIVE DEADLINES

The proposals put forward in this exhibit and those in exhibits Gaz Métro-5, Documents 2 and 3, will, if approved, require major IT developments.

Given the regulatory process inherent in such rate changes and the fact that the developments will take several months following the Régie's decision, Gaz Métro feels it would be preferable for the proposed changes to come into effect no earlier than October 1, 2018, in the 2019 Rate Case.

Should the Régie wish that these changes be implemented sooner, a decision will have to be taken by December 2016 so the analyses for the 2018 Rate Case (supply plan, demand projections, cost functionalization, etc.) can be carried out in light of these new terms. Gaz Métro also submits that the IT developments should be started before it receives the Régie's decision.

CONCLUSION

The evidence herein allows us to review the basic principles underlying the pricing for the supply, transportation and load balancing services. As a result, an analysis of the cost causation associated with the supply chain was produced, the functionalization rules of the costs among the various services were reviewed and the pricing structures were adapted when required. Gaz Métro also took this opportunity to respond to the follow-up requested by the Régie in recent years that had been put off until this case. Proceeding in this way allowed Gaz Métro to propose a cohesive overall solution.

Therefore, Gaz Métro asks the Régie to:

- Acknowledge the new presentation of the supply costs, which may be used for rate cases following the decision to intervene in the current phase 2.
- Approve the abolishment of the adjustment service related to supply inventory and the processing of these costs in the load balancing service.
- Approve the abolishment of the migration fee to the supply service.

- Approve the average cost method for the annual transportation tools in the functionalization of the costs in the transportation service and the determination of the transportation rate.
- Approve the adaptations to the calculation method for the cost of maintaining the FTLH transportation capacities provided for by the Agreement.
- Approve the proposed allocation method for the seasonal costs related to supply purchase and transportation as well as the costs not related to the consumption profile.
- Approve the new formula used to establish the load balancing price.
- Approve the changes made to articles 11.1.3.2, 11.1.3.3, 11.2.3.4, 13.1.2.2 and 13.1.3.1 of the *Conditions of Service and Tariff*.
- Approve the deletion of section *14. Adjustments related to inventory* and articles 11.1.2.2, 11.1.2.3, 11.2.2.2, 12.1.2.2 and 12.2.2.2 of the *Conditions of Service and Tariff*.

SCHEDULE 1: NEW PRESENTATION OF SUPPLY COSTS

COÜT DES APPROVISIONNEMENTS GAZIERS

No de ligne	Description	Coûts (000$) (1)		Volume 10³m³ (2)	Coût moyen ¢/m³ (3)
1	**FOURNITURE**				
2	Coût du service de fourniture	-	$	-	-
3	Variation de l'écart de prix	-	$		
4	Coût de la variation de l'inventaire	-	$		
5	Transfert vers l'ajustement d'inventaire	-	$		
6	Coût total d'acquisition comptable	-	$		
7					
8	Coût du gaz de réseau au prix uniforme	-	$	-	-
9					
10	**Transfert de l'écart saisonnier vers l'équilibrage**	**-**	**$**		
11					
12	**OUTILS DE TRANSPORT ET D'OPTIMISATION DU TRANSPORT**				(1)/(2)
13	**Outils de transport annuels**				
14	- TCPL LH Zone Est	-	$	-	-
15	- TCPL LH Zone Nord	-	$	-	-
16	- Échange LH Zone Nord	-	$	-	-
17	- Échange LH Zone Est	-	$	-	-
18	- TCPL SH Parkway	-	$	-	-
19	- TCPL SH Dawn	-	$	-	-
20	- Échange SH Dawn	-	$	-	-
21	- Revenus d'optimisation sur transport annuel	-	$	-	-
22		-	$	-	-
23	**Outils de transport saisonnier**				
24	- TCPL SH Service STS	-	$	-	-
25	- Échange LH Zone Est	-	$	-	-
26	- Revenus d'optimisation sur transport saisonnier	-	$		
27		-	$	-	-
28	**Variation d'inventaire :**				
29	- Solde au début	-	$	-	-
30	- Solde à la fin	-	$	-	-
31		-	$	-	-
32	**Outils d'optimisation de transport**				
33	- Usine de LSR	-	$		
34	- Gaz d'entreposage souterrain-PDL	-	$		
35	- Gaz d'entreposage souterrain-St-Flavien	-	$		
36	- Service interruptible	-	$		
37	- Pénalités	-	$		
38		-	$		
39	**Total des coûts d'outils de transport et d'optimisation du transport**	-	$		
40					
41	**AUTRES COÛTS D'ÉQUILIBRAGE**				
42	**Coûts saisonniers de la molécule :**				
43	- Gaz d'entreposage souterrain à Dawn	-	$		
44	- Écart saisonnier de la molécule vers l'équilibrage	-	$		
45	- Coûts d'inventaire et de financement de la molécule				
46		-	$		
47	**Autres frais :**				
48	- Gaz d'appoint concurrence	-	$	-	-
49	- Prime d'achat à d'autres points que la référence	-	$		
50	- Champion Pipeline	-	$		
51	- Frais reportés sur outils de transport et d'entreposage	-	$		
52	- Frais reporté de transport	-	$		
53	- Frais reporté d'équilibrage	-	$		
54	- Gaz utilisé dans les opérations	-	$		
55	- Gaz perdu	-	$		
56		-	$		
57	**Total des autres coûts d'équilibrage**	-	$		
58					
59	**Total des coûts de transport et d'équilibrage**	**-**	**$**		

SCHEDULE 2: AVERAGE AND EXCESS DEMAND METHOD

To fully understand the average and excess demand proposal, Gaz Métro will review herein the general lines of the reasoning behind this method of allocating the costs between the transportation and storage services.

The AMSSS evidence produced in case R-3323-95 on cost allocation explains that the transportation costs must be functionalized based on average demand (100% LF) otherwise, the rate would not be fair. Any excess over average demand is therefore considered to be a load balancing cost. The following example was given:

- For a distributor with two consumption periods in the year, there is only one customer with uniform consumption of 50 units in each period, for a total of 100 units. At a transportation price of $100 per unit, the total cost to deliver the natural gas to this customer is $5,000.
- This same distributor gets a second customer that consumes 0 units in the first period and 100 units in the second period. The distributor must now provide 50 units in the first period and 150 units in the second period. The price of storage from one period to the other is $60 per unit in franchise.
- The distributor's options for delivering the natural gas would therefore be as follows:
  - Purchase 150 transportation units throughout the year for $15,000.
  - Purchase 100 transportation units throughout the year for $10,000 and store 50 units in the first period for $3,000, for a total of $13,000.

In this example, using average demand (equal to 100% LF), 100 units are allocated to transportation costs, for a total of $10,000. Since each customer consumes the same annual quantity, this invoice will be divided in two, i.e. $5,000 for the first customer and $5,000 for the second. The excess over these costs, $3,000, is allocated to load balancing. Based on the rules for allocating load balancing among customers, as the first customer has uniform consumption, none of these costs will be allocated to this customer and, as a result, the second customer will receive a $3,000 load balancing invoice. Any other allocation would not be fair for one of the customers.

In its evidence. the AMSSS also noted that the total transportation capacity contracted from TCPL was higher than the customers' average demand. As such, the cost for the transportation contracted in excess of the average demand is a load balancing cost.

To illustrate this situation, let us go back to the previous example, with one change:

- The supply cannot be stored from one period to another in franchise. As a result, the additional cost of transportation to a non-franchise storage for one period to the other is $50, for a total storage cost of $110 for from one period to the other.
- The distributor's options for delivering the natural gas would therefore be as follows:
    - Purchase 150 transportation units throughout the year for $15,000.
    - Purchase 100 units of transportation throughout the year for $10,000 and store 50 units for the first period for $5,500, for a total of $15,500.

In this modified example, the distributor is in a better position if it buys 150 transportation units throughout the year. Despite a LF of just 66.6%, the distributor will save $500 in comparison to the storage option. In this case, the distributor substitutes storage with additional transportation. Luckily for the first customer, based on average demand, only the equivalent of 100% LF will be charged to transportation, i.e. 100 units for a total of $10,000. This first customer will continue to receive an invoice of $5,000. The excess over the equivalent of 100% LF will be allocated to load balancing, i.e. $5,000, and the second customer will receive an invoice of $10,000 for its use, which is fair. Once again, not only would any other allocation been unfair to the customer but it would also have made a bigger difference between the transportation rate and the market price.

SCHEDULE 3: ANNUAL COST – 2004 ANNUAL REPORT

Société en commandite Gaz Métropolitain

Cause tarifaire 2004, R-3510-2003

Coût annuel du transport, de l'équilibrage et de la distribution pour la période de 12 mois se terminant le 30 septembre 2004

No de ligne	Description	Catégorie	Coûts (000$)
1	**ÉQUILIBRAGE**		
2	**Frais fixes et variables :**		
3	- Gaz d'entreposage souterrain (M-12)	Espace	22 679 $
4	- Usine de LSR	Pointe	5 484 $
5	- Gaz d'entreposage souterrain-Intragaz	Pointe	6 276 $
6	- Gaz d'entreposage souterrain-St-Flavien	Espace	12 345 $
7	- Coenergy	Espace	1 567 $
8			48 351 $
9	**Frais de transport :**		
10	- Service STS - Dawn/Parkway/Montréal	Espace	23 318 $
11	- Service STS nouveau - Dawn/Montréal	Espace	15 661 $
12	- Union C1 (Ojibway/St.Clair/Dawn)	Espace	336 $
13	- T.Q. & M.	Espace	46 $
14			39 361 $
15	**Autres frais :**		
16	- Frais de transport applicable aux achats à Dawn	Espace	(9 707) $
17	**Optimisation des outils d'équilibrage :**		
18	- Revenus d'échange de gaz	Espace	(1 505) $
19	- Frais d'échange de gaz	Espace	- $
20			(1 505) $
21	**Amortissement des frais reportés :**		
22	- Transport gaz coussin	Espace	492 $
23	- Pass-on frais d'entreposage	Espace	(1 663) $
24	- Amortissement frais reportés - Union (Voir Annexe B)		(51) $
25			(1 222) $
26	**Équilibrage**		**75 278 $**
27			
28	Pointe		11 760 $
29	Espace		63 518 $
30	**Équilibrage**		**75 278 $**

Original : 2003.06.26 *SCGM - 8, Document 13*

Révisé : 2003.09.10 *Page 2 de 3*

Coût annuel du transport, de l'équilibrage et de la distribution
pour la période de 12 mois se terminant le 30 septembre 2004

No de ligne	Description	Ratio Espace	Ratio Pointe	Coûts en ,000$ Espace	Coûts en ,000$ Pointe	Coûts en ,000$ Total
		(1)	(2)	(3)	(4)	(5)
1	**ÉQUILIBRAGE**					
2	**Frais fixes et variables :**					
3	- Gaz d'entreposage souterrain à Dawn	61,0%	39,0%	9 182 $	5 870 $	15 052 $
4	- Usine de LSR	0,0%	100,0%	- $	5 484 $	5 484 $
5	- Gaz d'entreposage souterrain-Intragaz	31,6%	68,4%	1 984 $	4 293 $	6 277 $
6	- Gaz d'entreposage souterrain-St-Flavien	100,0%	0,0%	12 346 $	- $	12 346 $
7	- CoEnergy	100,0%	0,0%	1 567 $	- $	1 567 $
8				25 079 $	15 647 $	40 726 $
9	**Frais de transport :**					
10	- Service STS - Dawn/Parkway/Montréal	46,5%	53,5%	13 382 $	15 396 $	28 778 $
11	- Service SH - Dawn/Montréal	100,0%	0,0%	17 826 $	- $	17 826 $
12	- Frais de transport applicable aux achats à Dawn	100,0%	0,0%	(9 707) $	- $	(9 707) $
13	- Union C1 (Ojibway/St.Clair/Dawn)	100,0%	0,0%	336 $	- $	336 $
14	- T.Q. & M.	100,0%	0,0%	46 $	- $	46 $
15				21 883 $	15 396 $	37 279 $
16	**Optimisation des outils d'équilibrage :**					
17	- Revenus d'échange de gaz	100,0%	0,0%	(1 505) $	- $	(1 505) $
18	- Frais d'échange de gaz	100,0%	0,0%	- $	- $	- $
19				(1 505) $	- $	(1 505) $
20	**Amortissement des frais reportés :**					
21	- Transport gaz coussin	100,0%	0,0%	492 $	- $	492 $
22	- Pass-on sur frais d'équilibrage de pointe	0,0%	100,0%	- $	(1 277) $	(1 277) $
23	- Pass-on sur frais d'équilibrage d'espace	100,0%	0,0%	(437) $	- $	(437) $
24				55 $	(1 277) $	(1 222) $
25	**Équilibrage**			**45 512 $**	**29 766 $**	**75 278 $**

SCHEDULE 4: ALLOCATION OF SEASONAL COSTS RELATED TO SUPPLY

As presented in section 2.2.4, the seasonal costs related to supply should be allocated based on the real impact of the variation in consumption and the supply price during the year for each customer.

Although this distribution is theoretically optimal, the allocation of load balancing costs related to supply poses a problem. The real impact of the variation in consumption is hard to measure per customer or group of customers in Gaz Métro's specific context. Since Gaz Métro uses storage both to reduce its supply delivery costs (sites in franchise) and to reduce its seasonal purchasing costs, the cost related to supply includes a fixed portion. Furthermore, transfers between supply and load balancing are one way, i.e. transfers cannot be made only to reduce supply costs, even if the winter prices are lower than the summer prices.[33]

For example, if all purchases were made based on need, then the seasonal cost of a winter purchase in comparison with a purchase in summer would be reflected directly in Gaz Métro's cost. If the price is $3 in summer and $4 in winter, any seasonal purchases in winter above the annual average would generate an additional cost of $1. However, if the price is $3 in summer and winter, Gaz Métro incurs no seasonality cost. In this case, the real impact on the customers would be $0, regardless of their consumption profile. Since the transfers between the supply and load balancing costs are one way, the impact on the customers would also be $0 if the winter prices were lower than the summer prices.

But since Gaz Métro uses storage tools, the real impact on its costs is different from a structure where all purchases are made on the spot market. As a result, when the price is $3 in summer and $4 in winter, the impact is mitigated by the quantities in storage. For every unit stored, the seasonal cost is not $1 but rather the cost of having the storage tool, if it was purchased specifically to reduce seasonal costs. When the storage tool is also required for other reasons, the cost of having the tool to reduce seasonal costs is mitigated.

[33] See decision D-2015-177, paragraphs 90 and 92.

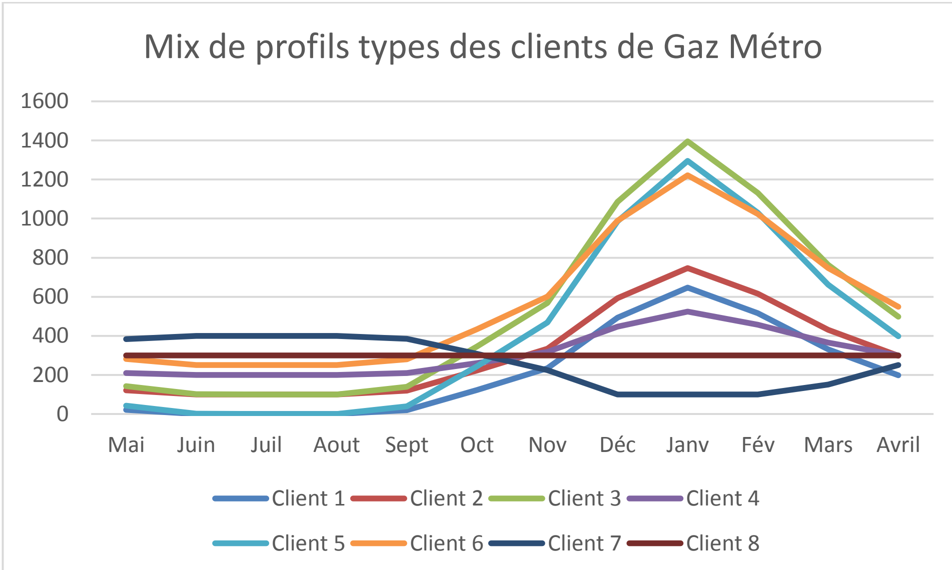
It is therefore hard to calculate the real impact per customer or group of customers on an annual basis, taking into account the impact of the storage tools on the seasonality costs. For the allocation of seasonal costs related to the commodity, no method accurately reflects the impact for Gaz Métro in a given year.

Although the cost causation showed that in the short term (for one year), no specific factor allowed for correctly allocating the costs between customers with different consumption profiles, the reality of Gaz Métro customers is that in general, they have relatively homogeneous consumption profiles, as demonstrated in the paragraphs below. Among the homogeneous profiles, the use of an explanatory profile progression factor allows for a reasonable break down of the costs caused by the entire profile, even if this factor is not specifically related to the cost to be allocated (see section 2.2.2).

Homogeneous consumption profiles are comprised of a basic portion (stable) and a portion affected by the temperature. The seasonality of the supply costs comes from the combination of the higher prices in the winter season and the variation in volume of customers affected by temperature. Degree-days are therefore a decisive explanatory function in Gaz Métro's seasonality costs. Since temperature is behind the higher prices in winter and also the increase in the customers' consumption, an allocation factor based on the LF should allow for a fair distribution of costs as well as sending a good price signal.

If we only consider standard customer profiles, i.e. customers with a relatively stable base and variable consumption based on temperature, the use of the peak factor allows for a representative cost breakdown. To illustrate this, Graphique 45 presents eight typical consumption profiles of customers.

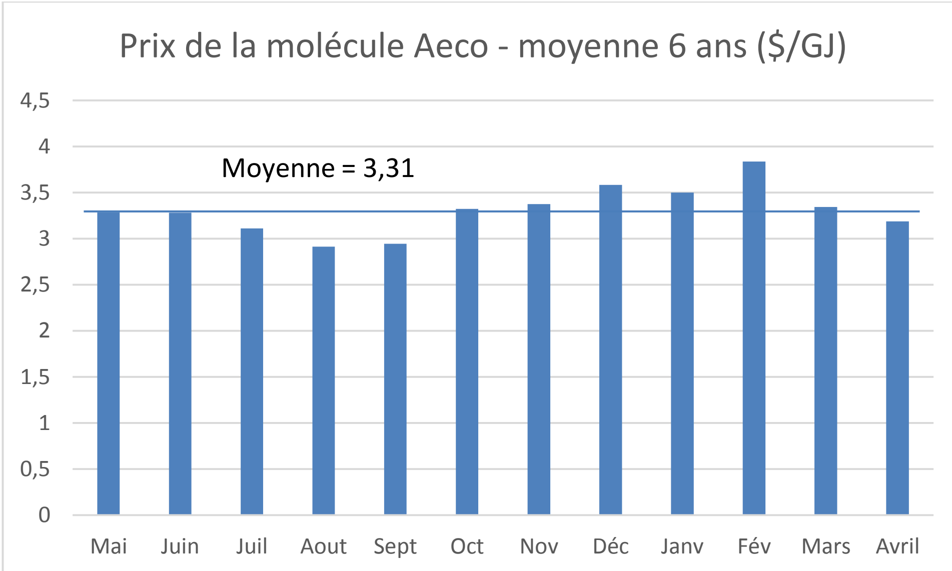
Graphique 45



The mix of customers presented in Graphique 45 includes customers with a roughly higher base consumption as well as a consumption that is more or less related to temperature. There is also one stable customer and one customer that consumes mainly in summer.

To determine the long-term effect of these profiles, Graphique 46 presents the average price per period at AECO over six years, which represents all data available since natural gas prices fell in 2008, after the beginning of shale gas operations. Data prior to the price decrease were not used, in order to provide a price history that is more representative of the current context.

Graphique 46



The data show seasonality between the October-March and April-September periods. The prices are significantly higher from December to February, and significantly lower from July to September.

By cross-referencing these profiles with the prices, we can establish the average cost of supply per customer (based on spot purchases), the total cost per customer and the allocation results:

Tableau 27

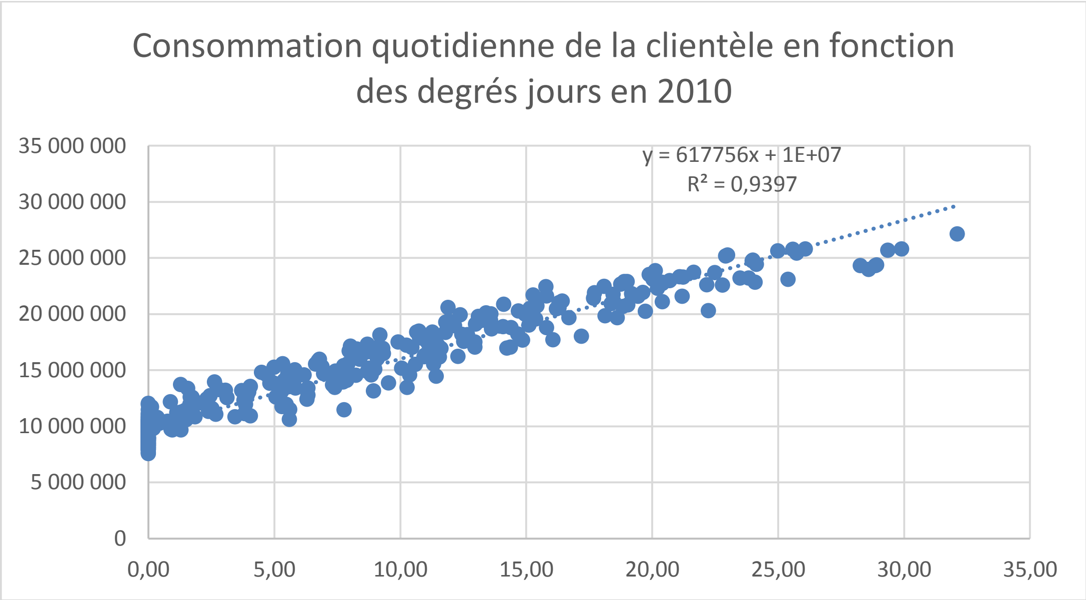
	CU (%)	Coût moyen ($/GJ)	Volume (m³)	Coût total ($)	Allocation selon CU ($)	Écart ($)
	(1)	(2)	(3)	(4)	(5)	(6)
Client 1	33	3,51	2 585	532	520	12
Client 5	33	3,51	5 170	1 065	1 040	24
Client 3	38	3,48	6 370	1 065	1 040	24
Client 2	42	3,45	3 785	532	520	12
Client 6	47	3,42	6 878	799	780	18
Client 4	59	3,38	3 693	266	260	6
Client 8	100	3,31	3 600	0	0	0
Client 7	267	3,22	3 203	-298	-201	-97

For all customers with a relatively stable base profile and increased consumption during cold weather, the allocation based on LF generates a result very close to the cost based on real supply purchases. Furthermore, for all these profiles, the average per-unit cost of supply declines as the LF increases. Over several years, the LF is therefore very representative of the supply costs generated for stable or heating profiles. The use of the LF to allocate these costs allows for adequate cost allocation, even for years when there is no price seasonality. The costs related to seasonal supply are therefore always properly allocated.

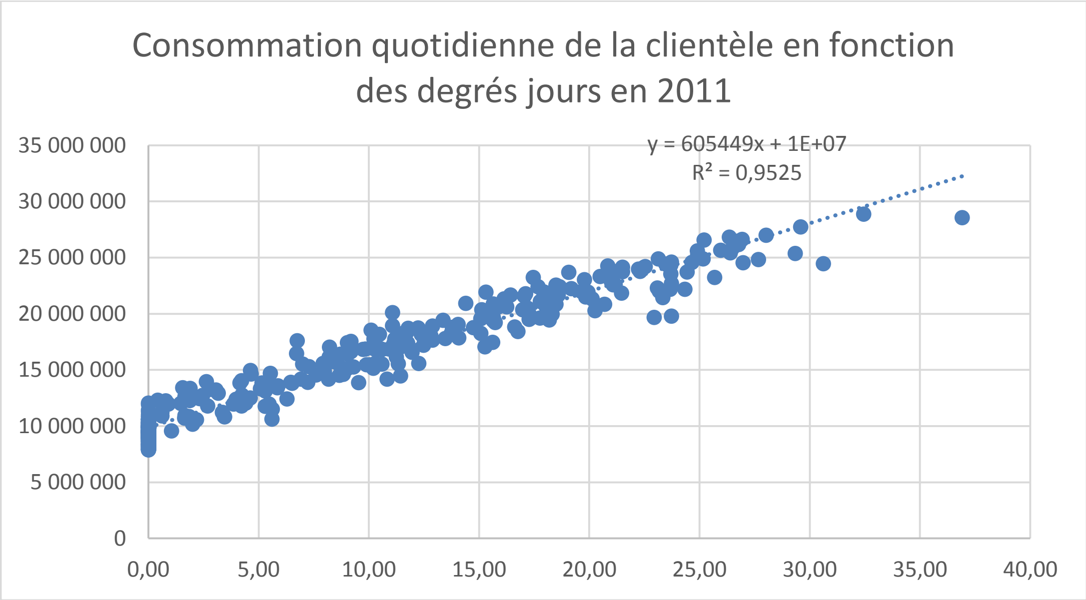
An examination of the real consumption of Gaz Métro's customers between 2010 and 2014 also demonstrates that the entire customer body consumes based on this type of profile, i.e. according to a basic consumption and temperature-based consumption.

The following tables represent the relationship between customer consumption and degree-days (base 13), with no distinction for customer rate, weekday or weekend, or temperature the day before. The correlation between the daily consumption variance and the degree-day variance is very strong, with an R^2 from 0.93 to 0.96 for every year from 2010 to 2014. Therefore, the assumption stating that customers, in general, have a profile defined by relatively stable basic consumption and variable consumption based on temperature is reasonable.

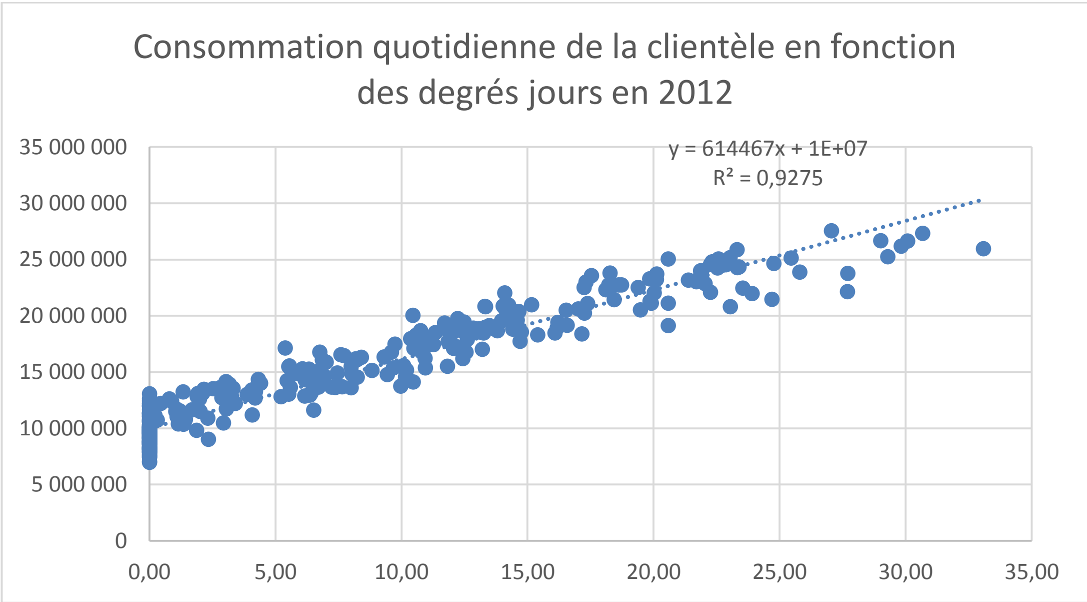
Graph 47



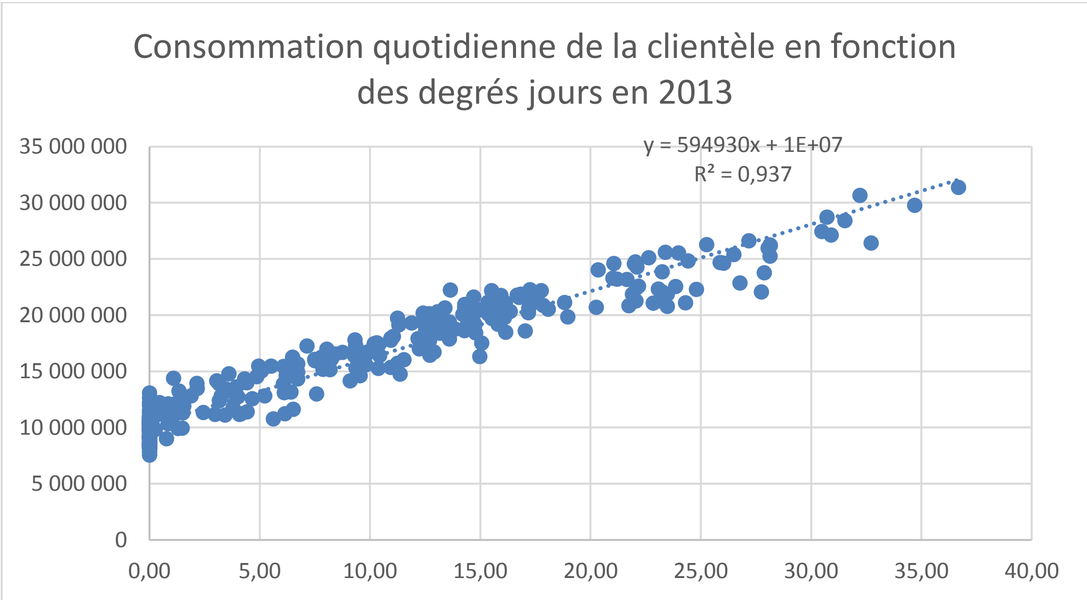
Graph 48



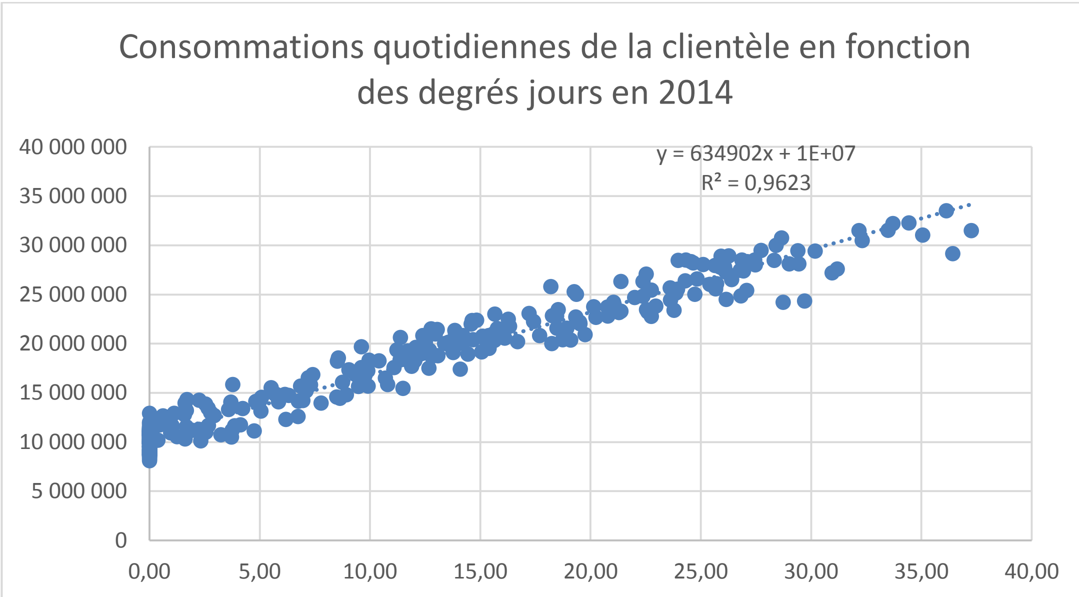
Graphique 49



Graphique 50



Graphique 51



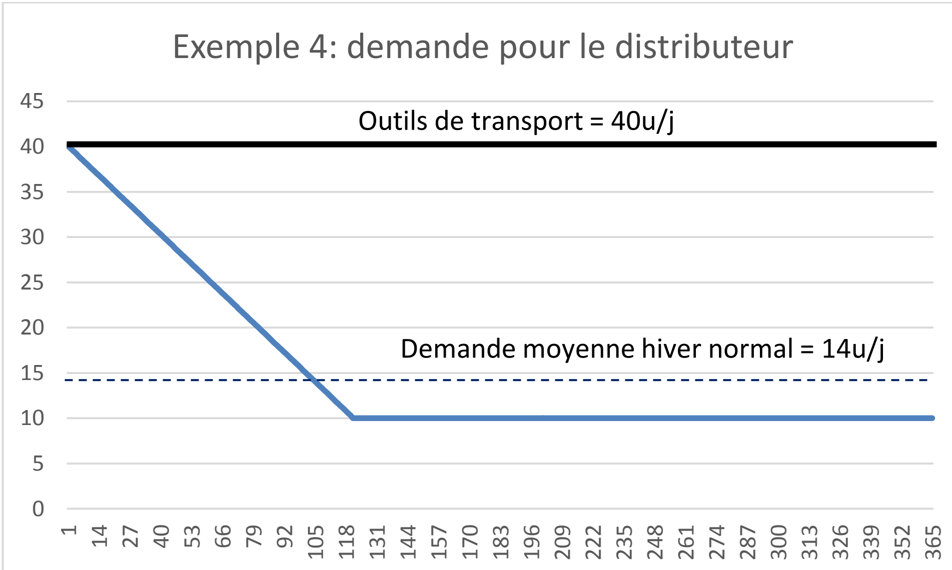
SCHEDULE 5: ANALYSIS OF THE IMPACT OF THE RANKING METHOD ON THE FUNCTIONALIZATION OF COSTS BETWEEN TRANSPORTATION AND LOAD BALANCING

Gaz Métro analyzed the impact of the ranking method on the functionalization of costs between transportation and load balancing. First, before beginning the analysis, Gaz Métro would like to offer a few clarifications:

- In terms of gas supply, the order in which the tools are used cannot necessarily be changed.
- For the purposes of the analysis, Gaz Métro assumes that the tools used in the example are completely interchangeable without restriction. This does not reflect the reality of the tools held by the distributor, but it allows us to determine the impact of using ranking to allocate the costs between stable and seasonal profiles.
- In the current functionalization method, the ranking is based on all available tools, regardless of whether they are annual or seasonal.
- Ranking meets real demand, which contains a stable portion and a seasonable portion.
- The examples were constructed to clearly demonstrate the impact of using the ranking method on the functionalization of costs between transportation and load balancing. Based on the Gaz Métro supply plans, however, this impact is weaker than the results obtained in these examples.

To illustrate the impact of using ranking to functionalize the costs between the stable profile (transportation) and the seasonal profile (load balancing), example 4 (distributor’s demand – section 2.1) presented in the analysis of the supply cost causation is reused.

Graphique 52



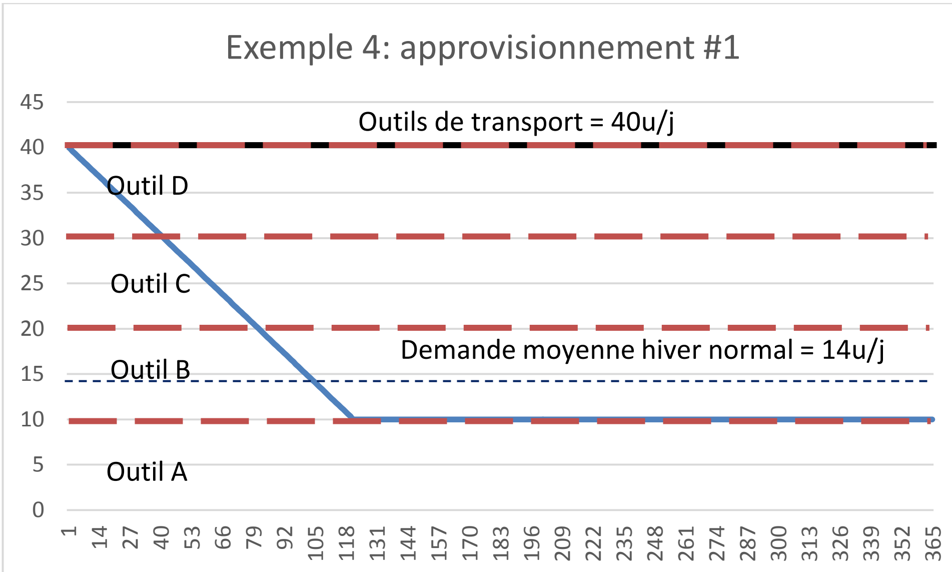
To simplify the explanations, the distributor simply purchases the transportation tools to meet maximum need. To supply the customer, the distributor therefore has to purchase transportation tools for a total of 40 units per day. Let us assume that the distributor has the following transportation tools to supply the customers:

Tableau 28

Outil	Capacité par jour *(unités)*	Coût fixe par unité *($/u)*	Coût total par jour *($)*
A	10	1,00	10
B	10	1,50	15
C	10	2,00	20
D	10	2,50	25
Total	**40**	**1,75**	**70**

Based on this assumption, as the cost is set by the unit, the total cost will be the same, i.e. $70 per day. Since in this example all tools are completely interchangeable, the customers can be supplied based on 24 separate scenarios (for example, A-B-C-D, B-A-C-D, C-A-B-D, etc.). Among the 24 different possible supply scenarios, here are two separate cost scenarios that demonstrate the impact of the ranking method on the allocation of costs between the stable and seasonal profiles:

Graphique 53



If the distributor used these tools successively, then the costs allocated to transportation and load balancing would be as follows:

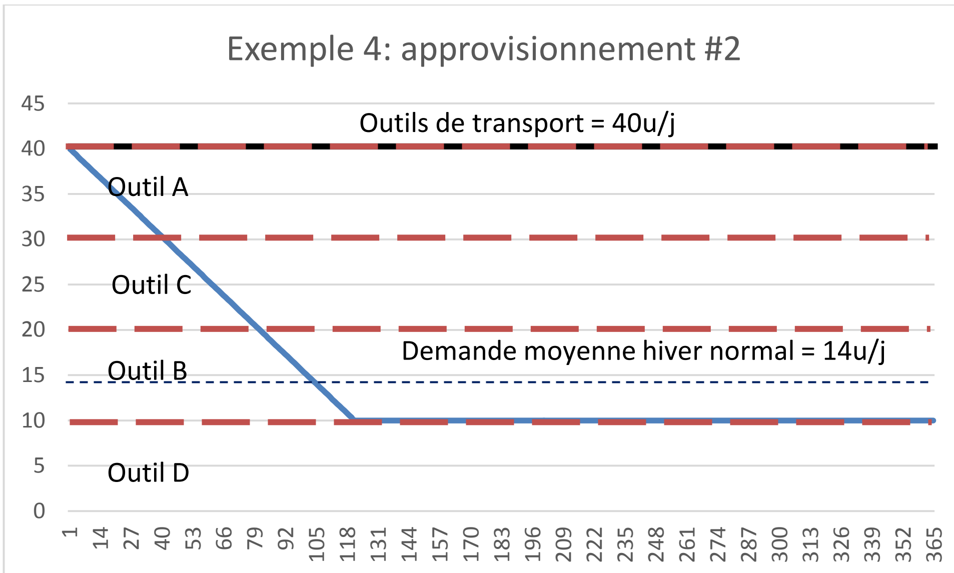
Tableau 29

Outil	Capacité par jour *(unités)*	Coût fixe par unité *($/u)*	Coût total par jour *($)*	Unités de transport *(unités)*	Unités d'équilibrage *(unités)*	Coût de transport *($)*	Coût d'équilibrage *($)*	Coût total *($)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A	10	1,00	10	10	0	10	0	10
B	10	1,50	15	4	6	6	9	15
C	10	2,00	20	0	10	0	20	20
D	10	2,50	25	0	10	0	25	25
Total	**40**	**1,75**	**70**	**14**	**26**	**16**	**54**	**70**

The total transportation cost based on this ranking is $16 per day, which corresponds to a rate of $1.14 per unit.

Compare this cost to a second supply scenario:

Graphique 54



If the distributor used these tools successively, then the costs allocated to transportation and load balancing would be as follows:

Tableau 30

Outil	Capacité par jour *(unités)*	Coût fixe par unité *($/u)*	Coût total par jour *($)*	Unités de transport *(unités)*	Unités d'équilibrage *(unités)*	Coût de transport *($)*	Coût d'équilibrage *($)*	Coût total *($)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A	10	1,00	10	0	10	0	10	10
B	10	1,50	15	4	6	6	9	15
C	10	2,00	20	0	10	0	20	20
D	10	2,50	25	10	0	25	0	25
Total	**40**	**1,75**	**70**	**14**	**26**	**31**	**39**	**70**

The total transportation cost based on this ranking is $31 per day, which corresponds to a rate of $2.21 per unit.

In both scenarios, the total cost is still $70 per day, but the functionalization of the costs based on the ranking method determines which costs are allocated to the stable or seasonal profile. In the first scenario, the proportion allocated to the stable consumption profile is 23% (16/70) of the total costs, while in the second scenario, the proportion increases to 44% (31/70).

Furthermore, in the case where the distributor only has to meet the stable portion of the demand, the tools held by the distributor would not total 40 units per day, but only 14. There are therefore tools among all the tools held that are only required because the distributor must also meet seasonal demand. However, in both scenarios, the tools are chosen to meet the total need, not to meet the specific needs of either profile type.

Therefore, the use of the ranking method to functionalize the costs between the stable and seasonal profiles may have an impact on the costs allocated to each type of profile. The reduction in total supply costs could, for example, based on this method, increase the portion of costs functionalized based on a stable profile (therefore, to the transportation service). Likewise, no matter which ranking is used, it would always impact, in one way or another, the costs functionalized based on the stable and seasonal portions. And yet the functionalization of costs based on stable and seasonal profiles should not be influenced by the short- or long-term optimization of supplying total demand.

SCHEDULE 6: APPLICABILITY OF THE COST FUNCTIONALIZATION METHOD FOR COMMODITY PURCHASE AT A LOCATION OTHER THAN THE REFERENCE POINT IN THE AVERAGE COST FUNCTIONALIZATION METHOD

Since the average cost method requires per-unit rates rather than total costs, Gaz Métro analyzed two specific aspects of the functionalization method for the cost of supply purchase:

- The current supply cost functionalization method, as presented, calculates the total costs applicable to the various services by standardizing the volumes monthly. Is it possible to calculate these costs from annual per-unit costs? (Section 1)
- The supply cost functionalization method calculates the total costs that are added to the costs already functionalized to the different services. In particular, in the case of the transportation service, the purchase costs are added to the total costs already allocated to transportation based on the ranking method. Is it appropriate to add these two costs this way? Furthermore, if the ranking method were replaced by a method based on the average cost, would it be more appropriate to include the commodity purchase costs directly in the calculation of the average transportation cost, rather than to first go through a total cost? (Section 2)

1. Functionalization of supply purchases from annual per-unit costs

The following section shows how supply purchase costs can be functionalized among the supply, transportation and load balancing services by determining the average per-unit costs rather than the total costs evaluated from the uniform distribution of purchase volumes.

1.1 Supply

Based on the principle of uniform delivery, the supply price should be free from load balancing. This price is therefore equal to the price that a customer with a completely stable profile would pay to purchase supply from the reference point.

In the current method, the total supply purchase volume is distributed equally by day, which allows us to find the total cost based on a uniform purchase profile. This can be seen in the 2014 Annual Report, in exhibit R-3916-2014, Gaz Métro-9, Document 3, page 4. Tableau 31 provides an excerpt of the exhibit:

Tableau 31

Rapport annuel 2014 - Fonctionnalisation des achats de fourniture par service

		oct-13	*nov-13*	*déc-13*	*janv-14*	*févr-14*	*mars-14*	*avr-14*	*mai-14*	*juin-14*	*juil-14*	*août-14*	*sept-14*	*TOTAL*
		31	30	31	31	28	31	30	31	30	31	31	30	365
	Achats totaux													
25	Volume d'achats totaux (GJ) (=l.1 + l.4 + l.14)	3 339 499	7 003 579	12 387 576	12 169 587	10 784 941	12 065 604	7 518 405	3 157 505	1 267 325	3 597 400	4 161 790	3 348 080	80 801 291
26	Coûts d'achats fonctionnalisés au F et C ($) (=l.3 + l.8 +l.11 + l.18 +l.21)	9 360 036	23 172 158	42 573 214	48 792 623	50 915 027	73 485 028	38 498 294	15 011 073	5 776 172	16 035 558	16 025 845	13 185 906	352 830 935
27	Coût moyen des achats au F et C ($/GJ) (=l.26 / l.25)	2,803	3,309	3,437	4,009	4,721	6,090	5,121	4,754	4,558	4,458	3,851	3,938	4,367
28	Volumes selon profil d'achats mensuels (GJ)	3 339 499	7 003 579	12 387 576	12 169 587	10 784 941	12 065 604	7 518 405	3 157 505	1 267 325	3 597 400	4 161 790	3 348 080	80 801 291
29	Volumes selon profil d'achats uniformes (GJ)	6 862 575	6 641 202	6 862 575	6 862 575	6 198 455	6 862 575	6 641 202	6 862 575	6 641 202	6 862 575	6 862 575	6 641 202	80 801 291
30	Coûts selon profil d'achats mensuels ($)	9 360 036	23 172 158	42 573 214	48 792 623	50 915 027	73 485 028	38 498 294	15 011 073	5 776 172	16 035 558	16 025 845	13 185 906	352 830 935
31	Coûts selon profil d'achats uniformes ($)	19 234 608	21 973 191	23 585 074	27 514 743	29 262 517	41 796 212	34 006 541	32 625 324	30 269 050	30 590 212	26 425 785	26 155 368	343 438 623
32	**Portion Équilibrage ($)** (= l.30 - l.31)													**9 392 311**
33	**Portion Fourniture ($)** (= - l.32)													**-9 392 311**

Thus, the total cost based on a uniform purchase profile is $343.4M (line 31). By dividing this cost by the total purchase volumes (80,801,291 GJ – line 25), we obtain a price of $4.25/GJ. This price corresponds to the uniform price that the customers have to pay in supply.

The same price could be obtained using only monthly payments, without the uniform distribution of the volumes:

Tableau 32

		oct-13	*nov-13*	*déc-13*	*janv-14*	*févr-14*	*mars-14*	*avr-14*	*mai-14*	*juin-14*	*juil-14*	*août-14*	*sept-14*	*TOTAL*
		31	30	31	31	28	31	30	31	30	31	31	30	365
25	Volume d'achats totaux (GJ) (=l.1 + l.4 + l.14)	3 339 499	7 003 579	12 387 576	12 169 587	10 784 941	12 065 604	7 518 405	3 157 505	1 267 325	3 597 400	4 161 790	3 348 080	80 801 291
26	Coûts d'achats fonctionnalisés au F et C ($) (=l.3 + l.8 +l.11 + l.18 +l.21)	9 360 036	23 172 158	42 573 214	48 792 623	50 915 027	73 485 028	38 498 294	15 011 073	5 776 172	16 035 558	16 025 845	13 185 906	352 830 935
27	Coût moyen des achats au F et C ($/GJ) (=l.26 / l.25)	2,803	3,309	3,437	4,009	4,721	6,090	5,121	4,754	4,558	4,458	3,851	3,938	4,367
	Prix uniforme ($/GJ) (= Σ (l.27 *Nb jours du mois/365))	0,238	0,272	0,292	0,341	0,362	0,517	0,421	0,404	0,375	0,379	0,327	0,324	**4,250**

The seasonality cost to be transferred to load balancing is then evaluated. This is the difference between the total cost for a uniform profile and the total real cost. The result is presented on lines 32 and 33 of Tableau 31.

Once again, this same amount to be transferred could have been calculated directly from the prices, by determining the difference between the actual price of supply and the uniform price:

Tableau 33

1	Prix réel des achats ($/GJ)	4,367
2	Prix uniforme des achats ($/GJ)	4,250
3	Écarts (L1-L2) ($/GJ)	0,116
4	Volumes d'achats totaux (GJ)	80 801 291
5	Portion Fourniture (L2 * L4) ($/GJ)	343 438 623
6	Portion Équilibrage (L3 * L4) ($/GJ)	9 392 311

The following equations allow us to simplify the calculation of the supply cost and the transfer of the supply costs to load balancing (S to L) using per-unit costs:

1) Supply cost = Total purchase volumes * **Uniform** per-unit cost of purchases
2) Transfer from S to L = Total purchase volumes * (**Actual** per-unit cost of purchases – **Uniform** per-unit cost of purchases)

1.2 Transportation

Purchase at a location other than the reference location for the supply price leads to a savings or an additional cost, because the price of the supply is different at every purchase point.

For a uniform purchase at another location made steadily throughout the year, the savings or additional cost in comparison to purchase at the reference point corresponds to a transportation market cost. However, if the purchase is not uniform, the savings or additional cost related to the non-uniform portion of these purchases is considered to be a load balancing cost.

In the current method, as presented in exhibit R-3916-2014, Gaz Métro-9, Document 3, page 5, the uniform distribution of purchase volumes is used to calculate the transportation costs associated with the premium. Tableau 34 provides an excerpt of the exhibit where this calculation is performed for supply purchases at Dawn.

Tableau 34

	Rapport annuel 2014 - Fonctionnalisation des achats de fourniture par service	oct-13	nov-13	déc-13	janv-14	févr-14	mars-14	avr-14	mai-14	juin-14	juil-14	août-14	sept-14	TOTAL
		31	30	31	31	28	31	30	31	30	31	31	30	365
	Achats à Dawn													
34	Volumes d'achats pour la demande (GJ) (=l.4)	0	6 325 000	11 914 000	11 574 000	10 482 040	12 014 050	7 354 560	3 145 000	1 195 000	3 585 000	4 062 000	3 290 000	74 940 650
35	Coûts d'achats fonctionnalisés au T ($) (=l.13)	0	3 300 078	11 775 600	10 673 952	23 813 701	39 065 444	1 524 052	571 077	563 623	-569 561	1 126 986	893 979	92 738 931
36	Coût moyen des achats au T ($/GJ) (=l.35 / l.34)	1,436	0,522	0,988	0,922	2,272	3,252	0,207	0,182	0,472	-0,159	0,277	0,272	1,237
37	Volumes selon profil d'achats mensuels (GJ)	0	6 325 000	11 914 000	11 574 000	10 482 040	12 014 050	7 354 560	3 145 000	1 195 000	3 585 000	4 062 000	3 290 000	74 940 650
38	Volumes selon profil d'achats uniformes (GJ)	6 364 822	6 159 505	6 364 822	6 364 822	5 748 872	6 364 822	6 159 505	6 364 822	6 159 505	6 364 822	6 364 822	6 159 505	74 940 650
39	Coûts selon profil d'achats mensuels ($)	0	3 300 078	11 775 600	10 673 952	23 813 701	39 065 444	1 524 052	571 077	563 623	-569 561	1 126 986	893 979	92 738 931
40	Coûts selon profil d'achats uniformes ($)	9 141 963	3 213 731	6 290 885	5 869 864	13 060 617	20 696 152	1 276 406	1 155 740	2 905 137	-1 011 200	1 765 895	1 673 699	66 038 890
41	**Portion Équilibrage ($)** (= l.39 - l.40)													**26 700 041**
42	**Portion Transport ($)** (= - l.41)													**-26 700 041**

The total transportation cost based on a uniform purchase profile is $66.0 M (line 40). By dividing this cost by the purchase volumes at Dawn (74,940,650 GJ – line 34), we get a price of $0.881/GJ. This price represents the uniform per-unit transportation cost of the premium.

This same uniform transportation cost could also have been calculated using only the monthly price differential:

Tableau 35

		oct-13	nov-13	déc-13	janv-14	févr-14	mars-14	avr-14	mai-14	juin-14	juil-14	août-14	sept-14	TOTAL
		31	30	31	31	28	31	30	31	30	31	31	30	365
	Achats à Dawn													
34	Volumes d'achats pour la demande (GJ) (=l.4)	0	6 325 000	11 914 000	11 574 000	10 482 040	12 014 050	7 354 560	3 145 000	1 195 000	3 585 000	4 062 000	3 290 000	74 940 650
35	Coûts d'achats fonctionnalisés au T ($) (=l.13)	0	3 300 078	11 775 600	10 673 952	23 813 701	39 065 444	1 524 052	571 077	563 623	-569 561	1 126 986	893 979	92 738 931
36	Coût moyen des achats au T ($/GJ) (=l.35 / l.34)	1,436	0,522	0,988	0,922	2,272	3,252	0,207	0,182	0,472	-0,159	0,277	0,272	1,237
	Prix uniforme ($/GJ) (= Σ (l.27 *Nb jours du mois/365))	0,122	0,043	0,084	0,078	0,174	0,276	0,017	0,015	0,039	-0,013	0,024	0,022	**0,881**

Based on the current calculation method, the cost overrun of the location differential related to load balancing is then calculated as the difference between the total cost of the differential and the cost allocated to transportation, based on total monthly costs (lines 41 and 42 of Tableau 34). Once again, these amounts could have been calculated directly from the prices, by evaluating the difference between the actual price and the uniform price of the location differential:

Tableau 36

1	Prix réel du différentiel de lieu ($/GJ)	1,237
2	Prix uniforme du différentiel de lieu ($/GJ)	0,881
3	Écarts (L1-L2) ($/GJ)	0,356
4	Volumes d'achats totaux à Dawn(GJ)	74 940 650
5	Portion Transport (L2 * L4) ($/GJ)	66 038 890
6	Portion Équilibrage (L3 * L4) ($/GJ)	26 700 041

Therefore, for transportation, the following equations based on the annual per-unit price can be used to subdivide the cost of the location differential between transportation and load balancing:

1) Purchase premium (savings) in transportation
= Purchase volume * **Uniform** per-unit cost of the location differential

2) Purchase premium (savings) in load balancing
= Purchase volume * (**Actual** per-unit cost of the location differential – **Uniform** per-unit cost of the location differential)

1.3 Functionalization based on annual per-unit costs

The purchase functionalization method can therefore be calculated from the annual per-unit costs, without using a uniform monthly distribution of purchase volumes.

Thus, the results obtained in the 2014 Annual Report could also have been evaluated using the method presented in Tableau 37.

Tableau 37

COÛT DE FOURNITURE SANS SAISONNALITÉ		
1	Prix réel des achats totaux $ / Gj	4,367
2	Prix uniforme des achats totaux $ / Gj	4,250
3	Écart $ / Gj (L1 - L2)	0,116
4	Volume d'achat totaux GJ	80 801 291
5	Portion Fourniture (L2 * L4) $	**343 438 623**
6	Portion Équilibrage (L3 * L4) $	**9 392 311**
RÉPARTITION DE LA PRIME D'ACHAT À DAWN		
7	Prix réel de la prime $ / Gj	1,237
8	Prix uniforme de la prime $ / Gj	0,881
9	Écart $ / Gj (L7 - L8)	0,356
10	Volume d'achat totaux GJ	74 940 650
11	Portion Transport (L8 * L10) $	**66 038 890**
12	Portion Équilibrage (L9 * L10) $	**26 700 041**
RÉPARTITION DE LA PRIME D'ACHAT EN FRANCHISE		
13	Prix réel de la prime $ / Gj	1,558
14	Prix uniforme de la prime $ / Gj	1,552
15	Écart $ / Gj (L7 - L8)	0,006
16	Volume d'achat totaux GJ	206 400
17	Portion Transport (L8 * L10) $	**320 290**
18	Portion Équilibrage (L9 * L10) $	**1 211**
FONCTIONNLISATION DES COÜTS D'ACHATS PAR SERVICE ($)		
19	Fourniture et Compression (L5) $	**343 438 623**
20	Transport (L11 + L17) $	**66 359 181**
21	Équilibrage (L6 + L12 + L18) $	**36 093 563**
22	Total	**445 891 367**

This way of functionalizing the supply purchase costs would simplify the presentation of the calculations, without changing the results.

2. Cost allocation method (ranking *vs.* average cost) and use of per-unit cost or total costs

The analysis then turned to the way the supply purchase costs functionalized to the transportation service should be added to the costs already functionalized to transportation based on the ranking method or the average cost method.

To do this, two supply scenarios were used to meet the same demand: one scenario based on annual transportation only and one scenario optimized using seasonal transportation.

2.1 Allocation method based on ranking

The functionalization method based on ranking consists of ranking the supply tools and allocating the costs to transportation based on the transportation tools actually used by the distributor to meet overall demand. The following examples show the effect of including the location differential on the costs functionalized to transportation when the ranking method is used.

Example 1: Supply using annual transportation tools + Total costs of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.
- Compression cost, Champion and optimization income excluded to simplify the example.

Tableau 38

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Coût total *($)*	Coût transport *($)*	Coût Équilibrage *($)*
	(1)	(2)	(3)	(4)	(5) (2x4)	(6) (3x4)	(7) (5-6)
LH Empress	Annuel	500	400	2,00	1 000	800	200
SH Dawn	Annuel	1 100	600	1,00	1 100	600	500
Total		1 600	1 000	1,31	2 100	1 400	700

Location differential (premium) added for purchases not made at the reference location.

Tableau 39

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Prime totale *($/unité)*	Prime uniforme *($/unité)*	Coût transport *($)*	Coût Équilibrage *($)*
	(1)	(2)	(3)	(4)	(5)	(6) (3x5)	(7) (4-5) x (3)
SH Dawn	Annuel	1 100	600	1,10	0,90	540	120
Total		1 100	600	1,10	0,90	540	120

By adding the results of Tableau 38 and Tableau 39, we get:

Tableau 40

	Total	
	($)	***($/unité)***
Coût de transport	1 940	1,94
Coût d'équilibrage	820	0,82
Coût approvisionnement	2 760	2,76

The per-unit transportation cost is between the cost of SH Dawn including the uniform transportation premium ($1.90/unit) and the cost of LH Empress transportation ($2.00/unit). This cost is therefore representative.

Furthermore, we can deduce from this example that we would find the same costs by using the per-unit cost of the purchase premium rather than the total cost of the purchase premium,[34] since in the functionalization method based on cost ranking, the total cost is equal to the per-unit cost multiplied by the actual number of units used.

Example 2: Supply optimized using seasonal transportation tools + Total costs of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.
- Compression cost, Champion and optimization income excluded to simplify the example.

[34] [Per-unit LH cost x LH units used] + [(Per-unit SH cost + Uniform premium) x SH units used] = (2.00 x 400) + (1.90 x 600) = $1,940

Tableau 41

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Coût total *($)*	Coût transport *($)*	Coût Équilibrage *($)*
	(1)	(2)	(3)	(4)	(5) (2x4)	(6) (3x4)	(7) (5-6)
LH Empress	Annuel	500	400	2,00	1 000	800	200
SH Dawn	Annuel	500	400	1,00	500	400	100
SH Dawn	Hiver	200	200	2,00	400	400	0
Total		1 200	1 000	1,58	1 900	1 600	300

Location differential (premium) added for purchases not made at the reference location:

Tableau 42

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Prime totale *($/unité)*	Prime uniforme *($/unité)*	Coût transport *($)*	Coût Équilibrage *($)*
	(1)	(2)	(3)	(4)	(5)	(6) (3x5)	(7) (4-5) x (3)
SH Dawn	Annuel	500	400	1,10	0,90	360	80
SH Dawn	Hiver	200	200	1,10	0,90	180	40
Total		700	600	1,10	0,90	540	120

By adding the results of Tableau 41 and Tableau 42, we get:

Tableau 43

	Total *($)*	Total *($/unité)*
Coût de transport	2 140	2,14
Coût d'équilibrage	420	0,42
Coût approvisionnement	2 560	2,56

Unlike the results of scenario 1 and despite the optimization of the total costs ($200 reduction compared to scenario 1), the transportation cost is above the annual SH Dawn cost ($1.90/unit) and the LH Empress cost ($2.00/unit). The difference can be explained by the fact that the per-unit cost of seasonal SH Dawn is applied directly to transportation when it is used and this per-unit cost is higher than the per-unit cost of annual transportation.[35]

However, once again, the use of the per-unit cost or the total cost of the purchase premium gives the same result.[36]

In conclusion, using the per-unit cost or the total cost related to the functionalization of the purchase premium has no impact on the cost allocation method based on tool ranking.

2.2 Allocation method based on average cost

The functionalization method based on the average cost calculates the average cost of the transportation tools from the reference location, based on a LF of 100%. The following examples show the effect of including the location differential in the costs functionalized to transportation when the average cost method is used.

Example 3: Supply using annual transportation tools + Total costs of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.
- Transportation: annual tools only.
- Compression cost, Champion and optimization income excluded to simplify the example.

[35] For more information about the impact of the use of the ranking method to allocate the costs of stable and seasonal profiles, please see Schedule 5.

[36] (2.00 x 400) + (1.90 x 400) + (2.90 x 200) = $2,140

Tableau 44

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Coût transport *($)*
	(1)	(2)	(3)	(4)	(5) (2x4)
LH Empress	Annuel	500	400	2,00	1 000
SH Dawn	Annuel	1 100	600	1,00	1 100
Total		1 600	1 000	1,31	2 100

Location differential (premium) added for purchases not made at the reference location: $540 (600 units x $0.90):

Tableau 45

	Coût moyen uniforme *($/unité)*	1,31	
X			
	Demande annuelle *(unité)*	1 000	
	Coût de transport avant prime *($)*	1 310	
+			
	Prime de transport ($)	540	Coût *($/unité)*
	Coût de transport total *($)*	1 850	1,85
	Coût d'équilibrage total *($)*	910	0,91

The transportation cost is below the SH Dawn cost including the uniform transportation premium ($1.90/unit) and below the LH Empress cost ($2.00/unit). This can be explained by the fact that the average cost before the premium is calculated on a capacity that contains a greater portion of SH Dawn tools (69%) than the actual relative use of SH Dawn (60%). By applying a total cost, the cost allocated to transportation is lower than the theoretical SH Dawn and LH Empress transportation cost.

Example 4: Supply using annual transportation tools + Uniform per-unit cost of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.

- Transportation: annual tools only.
- Compression cost, of Champion and optimization income excluded to simplify the example.

Tableau 46

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Prime uniforme *($/unité)*	Coût uniforme équivalent *($/unité)*	Coût total uniforme *($)*
	(1)	(2)	(3)	(4)	(5)	(6) (4+5)	(7) (2x6)
LH Empress	Annuel	500	400	2,00	0,00	2,00	1 000
SH Dawn	Annuel	1 100	600	1,00	0,90	1,90	2 090
Total		1 600	1 000	1,31	0,62	1,93	3 090

Tableau 47

	Coût moyen uniforme *($/unité)*	1,93	
x			
	Demande annuelle *(unité)*	1 000	Coût *($/unité)*
	Coût de transport total *($)*	1 930	1,93
	Coût d'équilibrage total *($)*	830	0,83

The per-unit transportation cost is between the cost of SH Dawn including the uniform transportation premium ($1.90/unit) and the cost of LH Empress transportation ($2.00/unit). This cost is therefore representative.

In the functionalization method based on average cost, using the total costs and the uniform per-unit cost does not give the same result. Since the average cost is determined based on all annual tools held, and not tools used, using the total costs when purchase costs functionalized to transportation have to be added may result in a transportation cost that is not between the uniform costs of using the various annual transportation tools. Using the uniform per-unit cost gives a result between the SH Dawn cost and the LH Empress cost.

Example 5: Supply optimized using seasonal transportation tools + Total costs of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.
- Transportation: annual tools only.
- Compression cost, Champion and optimization income excluded to simplify the example.

Tableau 48

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Coût transport *($)*
	(1)	(2)	(3)	(4)	(5) (2x4)
LH Empress	Annuel	500	400	2,00	1 000
SH Dawn	Annuel	500	400	1,00	500
Total		1 000	800	1,50	1 500

Location differential (premium) added for purchases not made at the reference location:

Tableau 49

	Coût moyen uniforme *($/unité)*	1,50	
X			
	Demande annuelle *(unité)*	1 000	
	Coût de transport avant prime *($)*	1 500	
+			
	Prime de transport ($)	540	Coût *($/unité)*
	Coût de transport total *($)*	2 040	2,04
	Coût d'équilibrage total *($)*	520	0,52

The transportation cost is higher than the SH Dawn cost ($1.90/unit) and the LH Empress cost ($2.00/unit). This can be explained by the fact that the average cost before the premium is calculated on a capacity that contains a smaller portion of SH Dawn tools (50%) than the actual relative use of SH Dawn (60%). By applying a total cost, the cost allocated to transportation is higher than the theoretical SH Dawn and LH Empress transportation cost.

Example 6: Supply optimized using seasonal transportation tools and uniform per-unit cost of purchase functionalization

- Annual demand = 1,000 units.
- Reference location = Empress.
- Transportation: annual tools only.
- Compression cost, Champion and optimization income excluded to simplify the example.

Tableau 50

Outil 100 % frais fixes	Contrat	Capacité *(unité)*	Utilisation *(unité)*	Coût unitaire *($/unité)*	Prime uniforme *($/unité)*	Coût uniforme équivalent *($/unité)*	Coût total uniforme *($)*
	(1)	(2)	(3)	(4)	(5)	(6) (4+5)	(7) (2x6)
LH Empress	Annuel	500	400	2,00	0,00	2,00	1 000
SH Dawn	Annuel	500	400	1,00	0,90	1,90	950
Total		1 000	800	1,50	0,45	1,95	1 950

Tableau 51

	Coût moyen uniforme *($/unité)*	1,95	
X			
	Demande annuelle *(unité)*	1 000	Coût *($/unité)*
	Coût de transport total *($)*	1 950	1,95
	Coût d'équilibrage total *($)*	610	0,61

The per-unit transportation cost obtained is between the SH Dawn cost ($1.90/unit) and the LH Empress cost ($2.00/unit).

Based on these various examples, we can make the following conclusions:

- The cost functionalization method based on ranking cannot always allows for obtaining a transportation cost between the least and most expensive annual tools, whether we use total costs or per-unit supply purchases functionalized to transportation.
- The same is true for the functionalization method based on average cost when we use the total cost of supply purchases functionalized to transportation.

However, whether or not the supply structure involves seasonal tools, the functionalization method based on average cost combined with the use of the uniform per-unit purchase cost allows for obtaining a transportation cost between the costs of the most and least expensive annual tools. This allows us to establish a rate that is representative of the costs of the annual transportation tools for the distributor.