ÉTUDE D'EXPERT SUR L'ENTREPOSAGE DE GAZ NATUREL

(suivi de la décision D-2014-065)

et

DEMANDE D'APPROBATION DES CARACTERISTIQUES D'UNE ENTENTE AVEC UNION GAS RELATIVE AUX MODALITES D'EXERCICE DES CAPACITES D'ENTREPOSAGE À COMPTER DU 1ER AVRIL 2015

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INTRODUCTION

Considérant l'ampleur des volumes prévus aux contrats venant à échéance au 31 mars 2015, la Régie de l'énergie (« Régie ») a demandé à Société en commandite Gaz Métro (« Gaz Métro ») de déposer une étude d'expert sur l'entreposage (D-2014-065).

> *« [9] (…) L'étude de cet expert sur l'entreposage de gaz naturel devra porter sur les sujets suivants :*
>
> - *la taille optimale de la capacité d'entreposage (10^6m3);*
> - *la capacité de retrait;*
> - *la capacité d'injection.*
>
> *[10] L'expert devra, entre autres, évaluer le gain potentiel espéré du fait d'augmenter ou de diminuer les capacités d'entreposage prévues aux contrats venant à échéance, en considérant le coût espéré d'injection, la valeur espérée des retraits et le coût exigé par Union Gas Limited. L'étude devra également évaluer l'intérêt économique de modifier les capacités de retrait et d'injection. Si des contraintes opérationnelles sont invoquées, les statistiques utilisées devront exclure toute utilisation par des tiers des capacités de retrait ou d'injection. »*

Le présent document vise à répondre à cette demande.

Gaz Métro présentera également ses observations relativement à ce rapport d'expert et ses recommandations.

De plus, dans la décision D-2012-136, la Régie de l'énergie (la « Régie ») demande au distributeur :

> « *[49] […]* ***de présenter pour approbation, avant la signature de toute entente avec Union Gas ou d'autres parties qui offriraient des solutions de remplacement, les caractéristiques des contrats qu'il entend conclure de même que toutes les justifications lui permettant de conclure que les choix retenus sont les meilleurs.***

Gaz Métro propose de renouveler les deux contrats d'entreposage qui viennent à échéance le 31 mars 2015. Ce document présentera les caractéristiques des contrats qu'elle entend conclure auprès d'Union Gas. De plus, en fonction de la présente analyse, Gaz Métro visera à augmenter la capacité totale d'entreposage au cours des prochaines années. Les justifications appuyant sa stratégie relative à l'entreposage seront présentées dans ce document.

1. CARACTÉRISTIQUES D'ENTREPOSAGE

Les caractéristiques des contrats actuellement détenus auprès d'Union Gas sont les suivantes :

Tableau 1

Contrat	Échéance	Capacité totale	Capacité de retrait		Capacité d'injection	
			maximale	si inventaire < 25 % du total	maximale	si inventaire >= 75 % du total
		10^6m^3	10^3m^3/jour	10^3m^3/jour	10^3m^3/jour	10^3m^3/jour
LST 057	31/03/2015	154,4	1 853	1 235	1 158	772
LST 064	31/03/2015	78,5	942	628	589	393
LST 065	31/03/2017	116,1	1 394	929	871	581
LST 068 *	31/03/2019		1 394	929	871	581
Total		**349,0**	**5 582**	**3 721**	**3 489**	**2 326**

* Contrat de DV uniquement

Les capacités de retrait ou d'injection sont définies par l'application des ratios de DV[1] suivants sur la capacité totale d'entreposage, relativement aux contrats comportant une portion espace.

Tableau 2

Capacité de retrait		Capacité d'injection	
maximale	si inventaire < 25 % du total	maximale	si inventaire >= 75 % du total
1,2 %	0,8 %	0,75 %	0,5 %

Le contrat LST 068 a été établi au 1er avril 2013 en remplacement du contrat qui venait à échéance à cette date. Il consiste en un contrat de DV, c'est-à-dire un contrat de capacité de retrait et d'injection sans réservation d'espace, pour des capacités équivalentes à celles qui prenaient fin. Ce contrat a été convenu pour une durée de 6 ans.

Étant donné que les contrats d'entreposage restants avaient une date d'échéance antérieure au 1er avril 2017, Gaz Métro a dû contracter de la capacité d'entreposage pour la période du 1er avril

1 « DV » signifie« Deliverability » pour identifier la notion de capacité de retrait et d'injection

2017 au 31 mars 2019, soit les deux dernières années du contrat de DV, ce dernier devant être rattaché à un contrat d'espace. Gaz Métro avait fait valoir les avantages de contracter un contrat régulier d'entreposage (espace et DV)[2]. Ainsi, un contrat d'entreposage pour une capacité de 116,1 $10^6 m^3$, ayant des caractéristiques similaires au contrat LST 065 présenté au Tableau 1 a été convenu avec Union Gas. Cette stratégie a été approuvée par la Régie dans la décision D-2013-035. D'une certaine façon, ce contrat se substituera au contrat LST 065 qui vient à échéance le 31 mars 2017.

Au 31 mars 2015, deux contrats auprès d'Union Gas viennent à échéance, soit le contrat LST 057 d'une capacité de 154,4 $10^6 m^3$ et le contrat LST 064 d'une capacité de 78,5 $10^6 m^3$, pour un total de 232,9 $10^6 m^3$. Ces contrats représentent 67 % de la capacité totale d'entreposage détenue auprès d'Union Gas. Le prix du contrat LST 057, en vigueur depuis le 1er avril 2009, est de 1,01 $/GJ (3,827 ¢/m³), soit 5,9 M$ par année. Le prix du contrat LST 063, en vigueur depuis le 1er avril 2011, était de 0,80 $/GJ (3,031 ¢/m³) pour les 2 premières années et de 0,82 $/GJ (3,107 ¢/m³) pour les deux dernières, soit 2,4 M$ pour la dernière année. Donc, les capacités venant à échéance au 31 mars 2015 représentent des coûts totaux de 8,3 M$ pour l'année 2014-2015.

2. ÉTUDE D'EXPERT SUR L'ENTREPOSAGE

Gaz Métro a choisi la firme de consultants Sussex Economic Advisors, LLC (« Sussex ») comme expert pour effectuer l'étude sur l'entreposage à Dawn demandée par la Régie. Ce rapport est présenté à l'annexe 1.

Sussex a d'ailleurs assisté Gaz Métro dans l'analyse de la stratégie de gestion de la capacité d'entreposage chez Union Gas, présentée à la Régie dans le cadre de la Cause tarifaire 2014.

3. ÉVALUATION DES BESOINS D'ENTREPOSAGE

[redacted]

2 : R-3809-2012, B-0214, Gaz Métro-1, Document 17

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

4. OBSERVATIONS RELATIVES AUX ANALYSES SUR L'ENTREPOSAGE

En fonction des informations présentées aux sections précédentes et à l'annexe 1, les observations suivantes peuvent être tirées :

Balisage des distributeurs gaziers

En fonction du balisage présenté par Sussex, Gaz Métro détient beaucoup moins d'entreposage que les autres distributeurs gaziers analysés. En effet, les capacités d'entreposage souterrain

(Union Gaz et Intragaz) représentent 9 % de la demande totale[3] de Gaz Métro alors que les autres distributeurs détiennent entre 14 % et 30 % ; la moyenne se situant à 21 %[4]. Ce constat est le même lorsque la capacité d'entreposage de l'usine LSR est incluse dans la comparaison. L'entreposage total de Gaz Métro représente 10 % de la demande totale alors que les autres distributeurs détiennent entre 16 % et 33 % ; la moyenne se situant à 24 %[5].

Pour détenir un niveau de capacité d'entreposage équivalent au minimum observé auprès des autres distributeurs (16,34 %) la capacité totale d'entreposage devrait être de 911,2 10^6m³, comparativement à la capacité de 547,6 10^6m³ actuellement détenue. Ceci représente une hausse de 363,6 10^6m³, plus du double de la capacité d'entreposage actuellement détenue auprès d'Union Gas.

<u>Sensibilité financière des trois scénarios de capacité d'entreposage</u>

[redacted]

[redacted]

[redacted]

[redacted]

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3 La demande totale après interruption excluant les livraisons des clients ayant leur propre service de transport est de 5 615,7 10^6m³ ou 212 777 829 GJ.
4 Table 24 du rapport de Sussex
5 Table 26 du rapport de Sussex

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

6 B-0050, Gaz Métro-7, Document 1, Annexe 12.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Évaluation des besoins opérationnels

[redacted]

[redacted]

[redacted]

[redacted]

5. STRUCTURE D'APPROVISIONNEMENT

Dans la structure d'approvisionnement projetée pour la Cause tarifaire 2015, les sources d'approvisionnement à Dawn pour la période de décembre à mars sont les suivantes :

Tableau 3

Source d'approvisionnement à Dawn (10³m³)					
Mois	**Retrait Union**		**Achats de gaz**		**Total**
déc-14	89 124	36,6%	154 430	63,4%	243 554
janv-15	99 506	33,1%	200 673	66,9%	300 179
févr-15	87 677	32,6%	181 081	67,4%	268 758
mars-15	8 248	4,3%	184 129	95,7%	192 377
Total	**284 555**	**28,3%**	**720 313**	**71,7%**	**1 004 868**

Ces résultats montrent que la majorité des approvisionnements à Dawn sur la période de l'hiver provient des achats à Dawn (72 %). Une situation qui démontre l'importance de la sensibilité à l'écart de prix été/hiver.

La croissance de la demande pour les prochaines années, incluant l'augmentation des livraisons des clients en service de fourniture avec ou sans transfert de propriété (clients en achat direct) fait en sorte que les achats de gaz naturel à Dawn pour les clients au service de fourniture du distributeur (clients en gaz de réseau) seront davantage concentrés sur l'hiver.

À elle seule, cette augmentation projetée de la demande devrait entraîner une augmentation de la capacité d'entreposage détenue par le distributeur pour maintenir une diversité des sources d'approvisionnement et éviter une prépondérance trop importante des achats de gaz naturel à Dawn en hiver.

Comme expliquée en page 9 du rapport de Sussex, une augmentation de la capacité totale d'entreposage permettrait également de cristalliser la valeur des achats de gaz naturel au prix d'été (« physical price hedge ») et en conséquence de mitiger l'impact financier de flambée de prix durant l'hiver, l'un des avantages de détenir de l'entreposage.

D'autre part, lors du dépôt du plan d'approvisionnement 2017-2019 à la Cause tarifaire 2014[7], Gaz Métro avait évalué différentes options d'approvisionnement, considérant le niveau minimum de capacité de transport ferme à détenir entre Empress et son territoire (85 000 TJ/jour). Certaines de ces options consistaient à effectuer des achats de gaz naturel à d'autres points qu'Empress ou Dawn. Par exemple, le point Iroquois pourrait devenir un point d'achat intéressant si le projet de Constitution Pipeline était réalisé. Toutefois, les contreparties approchées demandaient qu'une quantité minimale d'achats soit contractée annuellement. Or, puisque les achats annuels du gaz de réseau sont effectués à Empress et que ceux à Dawn sont concentrés sur l'hiver, il ne peut y avoir de substitution annuellement vers un autre point. Le même constat peut être fait avec le point d'achat de Niagara.

Une augmentation des capacités d'entreposage ferait en sorte de déplacer une partie des achats de gaz de réseau en hiver vers l'été et permettrait alors à Gaz Métro de considérer des achats de gaz naturel à d'autres points que Dawn. Ceci permettrait potentiellement une diversification des sources d'approvisionnement en fonction du contexte gazier.

7 R-3837-2013, B-0291, Gaz Métro-2, Document 40

6. STRATÉGIE D'ENTREPOSAGE

En fonction des observations présentées aux sections précédentes, Gaz Métro considère :

1. qu'elle a toujours besoin de la flexibilité opérationnelle qu'elle détient aujourd'hui avec ses contrats d'entreposage. Elle juge également qu'elle ne peut réduire ses capacités d'entreposage qu'elle détient actuellement. Ainsi, Gaz Métro contractera des capacités d'entreposage pour remplacer celles venant à échéance au 31 mars 2015, soit 232,9 10^6m^3. L'orientation sera de scinder la capacité entre deux contrats, un de 116,1 10^6m^3 et l'autre de 116,8 10^6m^3 ;

2. qu'en fonction du balisage et de l'analyse financière, elle détient un niveau d'entreposage en deçà des niveaux détenus par les autres distributeurs. Gaz Métro contractera un contrat « d'espace seulement » de 116,1 10^6m^3 qui, jumelé au contrat de « DV », constituera l'équivalent d'un contrat régulier d'entreposage. Ce contrat d'espace permettra d'augmenter la capacité totale d'entreposage de 349,0 10^6m^3 (13,2PJ) à 465,2 10^6m^3 (17,6 PJ) mais maintiendra les capacités de retrait et d'injection aux niveaux actuels.

3. qu'une capacité additionnelle d'entreposage devrait être contractée dans le futur pour atteindre, à tout le moins, le niveau minimum de capacité totale détenu par les autres distributeurs, soit 16 % de la demande totale ou 911,2 10^6m^3. Ce niveau serait atteint avec une capacité additionnelle d'entreposage de 247,4 10^6m^3 (9,4 PJ) à celle établie au 1er avril 2015. En supposant que la capacité d'entreposage en franchise demeurerait inchangée, la capacité totale d'entreposage à l'extérieur du territoire de Gaz Métro s'élèverait alors à 712,6 10^6m^3 (27 PJ).

Gaz Métro a considéré cette stratégie dans le cadre de ses négociations avec Union Gas.

7. NÉGOCIATIONS AVEC UNION GAS

Considérant la stratégie d'entreposage présentée à la section précédente, Gaz Métro a demandé à Union Gas de lui présenter une soumission pour répondre aux deux premiers éléments, le remplacement des capacités venant à échéance au 31 mars 2015 et l'ajout d'un contrat d'espace uniquement qui serait lié au contrat de DV actuellement en vigueur (LST 068). Aux fins de négociation, Gaz Métro a également demandé les prix pour des durées contractuelles pouvant aller jusqu'à 8 ans afin d'évaluer différentes stratégies de renouvellement.

La soumission suivante a été présentée à Gaz Métro le 2 octobre 2014.

Contrat no. 1 : Capacité d'entreposage 116,1 10^6m³
Contrat régulier avec capacité de retrait et d'injection indiquée au Tableau 2
Durée de 4 ans : prix années 1 à 3 : [redacted]
prix année 4 : [redacted]
Durée de 6 ans : prix années 1 à 3 : [redacted]
prix années 4 à 6 : [redacted]

Contrat no. 2 : Capacité d'entreposage 116,8 10^6m³
Contrat régulier avec capacité de retrait et d'injection indiquée au Tableau 2
Durée de 5 ans : prix années 1 à 3 : [redacted]
prix années 4 et 5 : [redacted]
Durée de 8 ans : prix années 1 à 3 : [redacted]
prix années 4 à 6 : [redacted]
prix années 7 à 8 : [redacted]

Contrat no. 3 : Capacité d'entreposage 116,1 10^6m³
Contrat d'espace seulement, relié au contrat de DV LST 068
Durée de 4 ans : prix années 1 à 3 : [redacted]
prix année 4 : [redacted]
[redacted]

Union Gas a également précisé à ce moment-là que ces prix étaient garantis jusqu'au 31 octobre 2014. Après cette date, elle se réserve le droit de réviser les prix.

Il est à noter que la formule de prix « Utility-factor », constituée d'une partie variable reflétant la valeur du marché de l'entreposage, convenue pour le contrat prenant effet le 1er avril 2017, n'est plus offerte par Union Gas.

[redacted]

[redacted]

[redacted]

Considérant les hausses de prix soumis par Union Gas dès la quatrième année, Gaz Métro envisage plutôt de contracter les capacités d'entreposage à plus court terme.

Les négociations avec Union Gas ont été conclues comme suit :

Contrat no. 1 : Capacité d'entreposage 116,1 $10^6 m^3$
Contrat régulier avec capacité de retrait et d'injection indiquée au Tableau 2
Durée de 2 ans : prix : [redacted]

Contrat no. 2 : Capacité d'entreposage 116,8 $10^6 m^3$
Contrat régulier avec capacité de retrait et d'injection indiquée au Tableau 2
Durée de 3 ans : prix : [redacted]

Contrat no. 3 : Capacité d'entreposage 116,1 $10^6 m^3$
Contrat d'espace seulement, relié au contrat de DV (LST 068)
Durée de 4 ans : prix : [redacted]

Union Gas a également accepté de garantir ces prix jusqu'au 28 février 2015.

Par ailleurs, les contrats d'entreposage venant à échéance prévoient que les transferts d'inventaire vers de nouveaux contrats sont assujettis à des coûts de compression. Gaz Métro a également obtenu que cette clause ne soit pas appliquée et que les soldes d'inventaire au 31 mars 2015 sous les contrats LST 057 et LST 064 soient transférés vers les nouveaux contrats.

Le tableau suivant présente les coûts annuels des capacités qui seraient contractées auprès d'Union Gas dès le 1er avril 2015.

[redacted]

[redacted]

[redacted]

[redacted]

8. RECOMMANDATION DE GAZ MÉTRO ET ÉTAPES SUBSÉQUENTES

La présente section a pour but de résumer la stratégie retenue par Gaz Métro pour combler les besoins d'entreposage identifiés, incluant les besoins opérationnels, ainsi que de décrire les étapes subséquentes.

8.1. Recommandation

Contrats au 1er avril 2015

En fonction des analyses présentées aux sections précédentes, Gaz Métro demande à la Régie de l'autoriser à :

- **convenir d'un contrat régulier de capacité d'entreposage de 116,1 $10^6 m^3$ pour une durée de deux ans ;**
- **convenir d'un contrat régulier de capacité d'entreposage de 116,8 $10^6 m^3$ pour une durée de trois ans ;**
- **convenir d'un contrat de capacité d'entreposage (espace seulement) de 116,1 $10^6 m^3$, relié au contrat de DV LST 068, pour une durée de quatre ans.**

En fonction de cette recommandation, les caractéristiques des contrats détenus auprès d'Union Gas effectifs au 1er avril 2015 seraient alors les suivantes :

Tableau 4

Contrat	Échéance	Capacité totale	Capacité de retrait		Capacité d'injection	
			maximale	si inventaire < 25 % du total	maximale	si inventaire > = 75 % du total
		$10^6 m^3$	$10^3 m^3$/jour	$10^3 m^3$/jour	$10^3 m^3$/jour	$10^3 m^3$/jour
LST 065	31/03/2017	116,1	1 394	929	871	581
LST 068 *	31/03/2019		1 394	929	871	581
À venir	31/03/2017	116,1	1 394	929	871	581
À venir	31/03/2018	116,8	1 401	934	876	584
À venir **	31/03/2019	116,1				
Total		**465,2**	**5 582**	**3 721**	**3 489**	**2 326**

* Contrat de DV uniquement

** Contrat d'espace uniquement, relié au contrat de DV

Ainsi, la capacité totale de retrait et d'injection demeurerait identique à celle détenue actuellement, et la capacité d'entreposage (l'espace) serait augmentée à 465,1 10^6m³, soit le niveau que Gaz Métro détenait avant le 1er avril 2013.

Il est à noter que le contrat régulier qui est déjà convenu avec Union Gas, pour une capacité d'entreposage de 116,1 10^6m³, sera en vigueur le 1er avril 2017 pour une durée de deux ans. Il n'est pas indiqué au Tableau 4 n'étant pas effectif au 1er avril 2015.

L'annexe 2 présente un schéma de la stratégie de renouvellement qui serait retenue par Gaz Métro [redacted]

Contrats futurs

D'autre part, comme mentionné à la section 6, la stratégie d'entreposage de Gaz Métro pour le futur est d'augmenter ses capacités totales d'entreposage à 911,8 10^6m³ (34,5 PJ) afin de détenir un niveau d'entreposage équivalent au minimum constaté chez les autres distributeurs. Ceci représentant une augmentation additionnelle de 247,4 10^6m³ (9,4 PJ).

Gaz Métro demande à la Régie d'approuver la stratégie d'entreposage pour le futur, soit d'augmenter progressivement ses capacités totales à 911,8 10^6m³ (34,5 PJ)

Si, la Régie approuve cette stratégie, Gaz Métro fera une analyse des options possibles et de la disponibilité d'une telle capacité sur le marché, tant auprès d'Union Gas, qu'auprès d'autres parties pouvant détenir de l'entreposage. Le cas échéant, elle déposera à la Régie les résultats de cette analyse pour approbation des paramètres relatifs aux capacités additionnelles d'entreposage qui seraient potentiellement contractées.

8.2. Étapes subséquentes

Union Gas a accepté de garantir les prix des différents contrats, tels que définis dans sa proposition finale du 8 octobre 2014 et présentés à la section 7, jusqu'au 28 février 2015.

Gaz Métro demande à la Régie une décision avant le 25 février 2015 pour les raisons suivantes :

- confirmer à Union Gas la prise d'effet des contrats d'entreposage effectifs au 1er avril 2015, considérant la date limite de la garantie de prix du 28 février 2015 ;
- permettre de finaliser, le cas échéant, les nouveaux contrats de capacité d'entreposage auprès d'Union Gas, incluant un contrat spécifique d'espace seulement, et de les intégrer dans les systèmes administratifs pour une mise en application au 1er avril 2015 ; et
- permettre à Union Gas de replacer la capacité d'entreposage (espace) non contractée avant le 1er avril 2015, début de la période contractuelle normalement visée par les parties.

ANNEXES

Annexe 1 : Étude de Sussex Economic Advisors

Annexe 2 : Stratégie de renouvellement – Union Gas

Gaz Métro

Gas Storage Quantity Analysis

October 15, 2014

Prepared by

Sussex Economic Advisors, LLC

Introduction

Sussex Economic Advisors, LLC ("Sussex") was retained by Gaz Métro Limited Partnership ("Gaz Métro" or the "Company") to review certain aspects of the natural gas storage contracts between Gaz Métro and Union Gas Limited ("Union"). Specifically, pursuant to Decision D-2014-065 issued on April 23, 2014 by the Régie de l'énergie ("Régie"), Gaz Métro was directed to file an independent report that addressed the following issues related to the natural gas storage contracts with Union:

- The quantity of storage capacity;
- The level of withdrawal capacity; and
- The level of injection capacity.

The Régie also indicated that the independent report should address the benefits and costs associated with increasing or decreasing the contracted storage capacity.

Overview of Sussex and Project Approach

Overview of Sussex

Sussex is a management and economic advisory firm providing consulting services to regulated industries such as natural gas, electricity, water, and thermal energy distribution. The firm's Partners have held senior positions in utility companies, competitive energy suppliers, management consulting firms and business focused academic institutions. Our Consulting Staff, Executive Advisors, and Affiliated Experts have substantial experience and training in matters relating to regulatory strategy and policy development, natural gas infrastructure development and open season processes, gas supply planning and capacity portfolio optimizing, energy market analysis and assessments, financial and economic analysis, retail natural gas transportation and services, rate proceedings and regulatory compliance, due diligence and valuation, and management reviews and audits. Sussex has a substantial list of clients including natural gas distribution companies, electric utilities, combination utilities, electric transmission providers, natural gas transmission/pipeline companies, municipal utilities, state agencies, and non-regulated energy market participants.

In addition, Sussex has previously reviewed certain Gaz Métro storage practices and developed an expert report summarizing our findings, which was submitted to the Régie in Gaz Métro's 2014 rate case.[1]

Project Approach

To assist Gaz Métro comply with the request(s) from the Régie with respect to natural gas storage service from Union, Sussex utilized the following project approach:

1. Review the role of natural gas storage in the typical resource portfolio of a local distribution company ("LDC");
2. Summarize the existing natural gas storage contracts between Gaz Métro and Union;
3. Evaluate the value of various natural gas storage capacity levels and associated withdrawal and injection volumes;
4. Conduct a benchmarking analysis, which compares the Gaz Métro storage quantities to other similarly situated LDCs; and
5. Summarize our observations and conclusions.

To evaluate various natural gas storage quantities associated with the Union natural gas storage contracts, Sussex relied on certain data approaches and sources, including:

- Reviewing Gaz Métro gas supply planning documents, spreadsheets,[2] and certain regulatory submissions and decisions;
- Conference calls with representatives from the Gaz Métro gas supply planning group with overall responsibility for: (i) the development of the gas supply plan; and (ii) the implementation and management of the gas supply plan, including the Union storage contracts;
- Reviewing industry documents regarding natural gas storage;
- Researching and analyzing natural gas pricing information; and
- Researching and reviewing gas supply planning documents and materials from other LDCs.

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1 Please see B-0193, Gaz Métro 2, Document 16.

2 Gaz Métro provided to Sussex the historical daily natural gas demand and weather conditions for the October 2003 to June 2014 time period. In addition, Gaz Métro provided to Sussex the projected prices at the Dawn Hub for the 2015 to 2018 time period, and the forecasted daily natural gas demand and weather conditions, as well as the planned Union storage utilization and natural gas purchases at Dawn under the base case growth and normal weather conditions for the October 2014 to September 2015 planning year.

The Sussex assessment and observations/conclusions regarding the Gaz Métro natural gas storage contracts with Union are based on the analysis discussed herein, the information and data provided by Gaz Métro or developed by Sussex, and the collective gas supply planning experience and judgment of the Sussex project team. The biographies of the Sussex project team are provided in Appendix A.

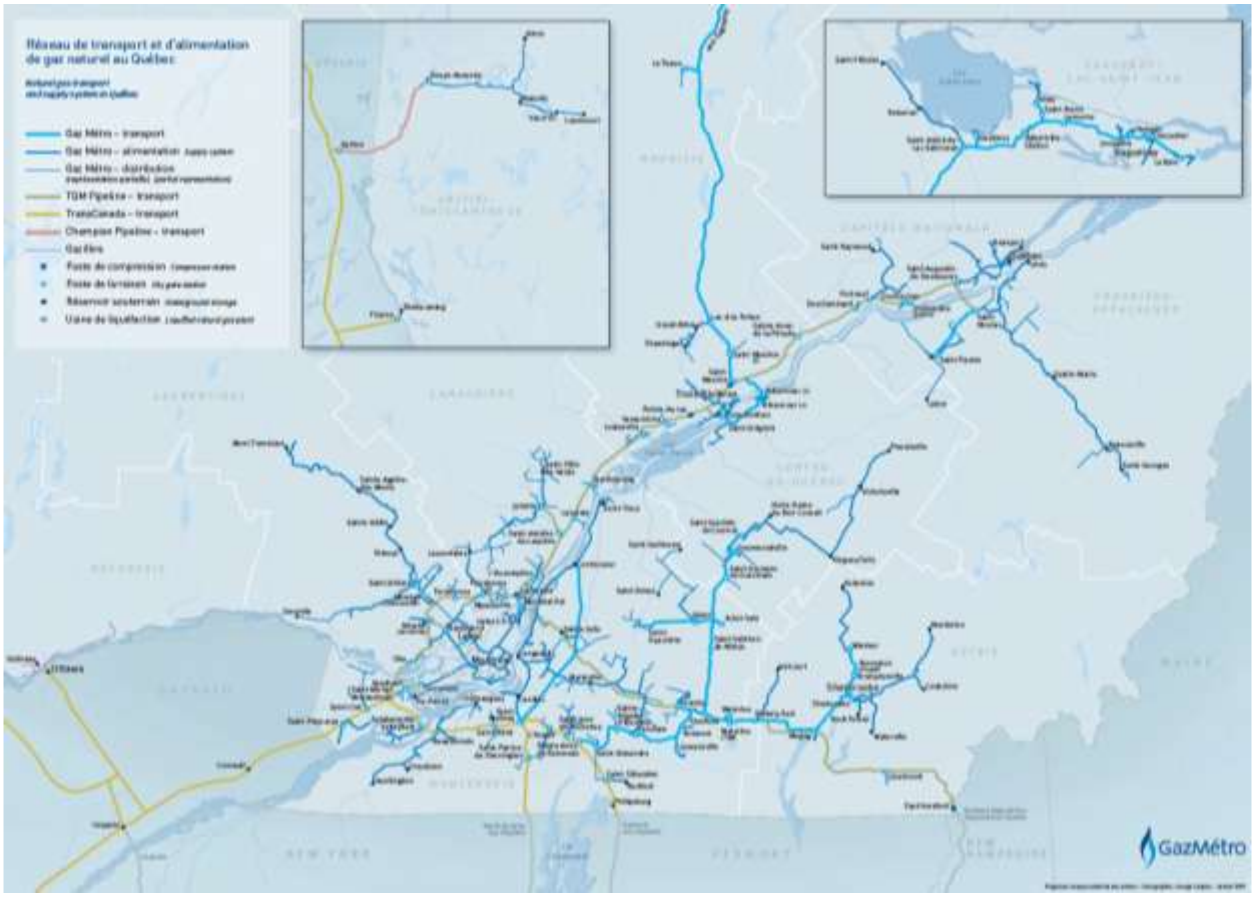
Prior to a review of the Sussex storage quantity analysis, approach, and results, a brief overview of Gaz Métro is provided below.

Gaz Métro Overview

Gaz Métro is the largest natural gas distributor in Québec servicing 97% of the provincial natural gas demand. Gaz Métro provides natural gas service to approximately 190,000 customers in over 300 municipalities utilizing a 10,000 km underground distribution network.[3] The Gaz Métro residential, commercial and industrial segments represent approximately 73%, 23% and 4% of the total customers, respectively. Conversely, the industrial segment throughput of 118 Bcf represents almost 60% of the total Gaz Métro throughput, while the residential and commercial segments represent 10% and 30% of the total throughput, respectively.[4] Figure 1 (below) is a map of the Gaz Métro service area.

[3] Valener Energy Company, “A Solid Investment”, Investor Presentation, July 2014, at 13.
[4] Valener Energy Company, “A Solid Investment”, Investor Presentation, July 2014, at 14.

Figure 1: Gaz Métro Service Area[5]



From a gas supply planning perspective, the Gaz Métro natural gas supply portfolio consists of various assets including, pipeline capacity on the TransCanada PipeLines Limited ("TCPL") Canadian Mainline, natural gas storage contracts with Union, two on-system natural gas storage facilities with Intragaz Limited Partnership (i.e., the Pointe-du-Lac and Saint-Flavien underground storage sites), and its on-system liquefied natural gas ("LNG") peaking facilities.

Sussex Storage Analysis Approach and Results

Task 1 – Overview of Natural Gas Storage

The first task in the Sussex storage quantity analysis is the development of the necessary context regarding natural gas storage and its typical utilization in an LDC portfolio. Specifically, the primary objective of this task is to provide a common understanding and framework from which to view the Sussex natural gas storage quantity analysis.

[5] Gaz Métro, "Natural gas transport and supply system in Quebec", January 26, 2009.

In general, natural gas storage provides an LDC with four primary benefits: (i) winter or peak season source of natural gas supply;[6] (ii) mechanism to balance the intra-day, daily, and inter-month demand fluctuations; (iii) physical price hedge for a certain portion of the natural gas supply portfolio; and (iv) service and supply reliability. Please find below a discussion of each of these attributes.

1. Winter or Peak Season Supply

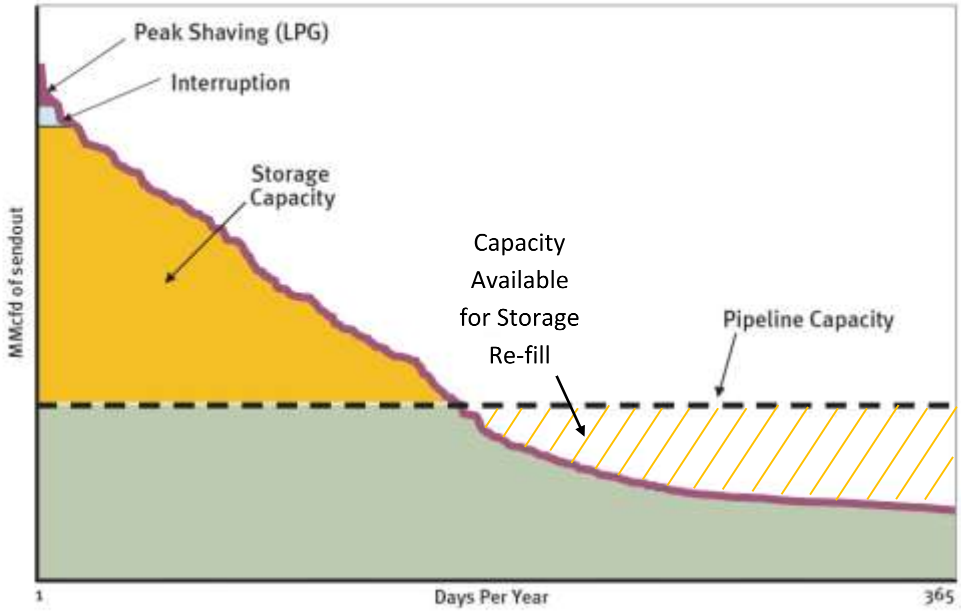
Market area natural gas storage provides winter or peak season natural gas supply, thus allowing an LDC to avoid upstream natural gas pipeline demand charges for a portion of its natural gas transportation portfolio. Specifically, given the typical demand profile of Canadian LDCs (i.e., in general, higher natural gas demand requirements during the winter or peak season), natural gas storage provides a cost effective approach for serving the winter or peak season demand. Stated differently, by entering into a market area natural gas storage contract, the LDC avoids contracting for a certain volume of annual long-haul capacity from a natural gas supply source to the LDC distribution area to serve winter or peak season demand load. As such, the LDC would avoid annual contract charges for capacity that may not be utilized at 100% on an annual basis.

In addition, natural gas storage can also provide diversity with respect to winter or peak season natural gas supplies. Specifically, a contract for natural gas storage can augment the other resources (e.g., long haul or short haul pipeline capacity) in the gas supply portfolio, particularly to serve seasonal demand. This diversity in gas supply resources provides reliability and price stability, which are both discussed in more detail below.

Figure 2 (below) is an illustrative example of how an LDC may construct a supply portfolio to meet its load requirements.

6 Throughout this report, Sussex defines the "peak" or "winter" period as the five months from November to March; the "peak winter" period as the three months of December, January, and February; and the "off-peak" or "summer" period as the seven months from April to October.

Figure 2: Illustrative Load Duration Curve[7]



Source: Based on representative industry data

As illustrated by Figure 2, the LDC demand requirement, which is sorted from highest to lowest volume levels, has peak, seasonal, and year-round demand components. This approach (i.e., sorting daily natural gas demand from highest to lowest volume) is generally described as a load duration curve. The yellow highlighted area under the load duration curve is that part of the LDC demand that is typically served by storage resources. Pipeline capacity is generally contracted to meet year-round demand needs (i.e., the green highlighted area), while peaking resources (e.g., LNG or LPG) are used to meet peaking requirements.

For comparison purposes, Sussex developed load duration curves for the Gaz Métro annual demand consumption for the period 2003/04 through 2013/14.[8] Specifically, in Figure 3 (below), each year is graphed and, although the peak, seasonal, and annual requirements vary by year, all the curves have a similar pattern and shape not only to each other, but also to the illustrative load duration curve in Figure 2.

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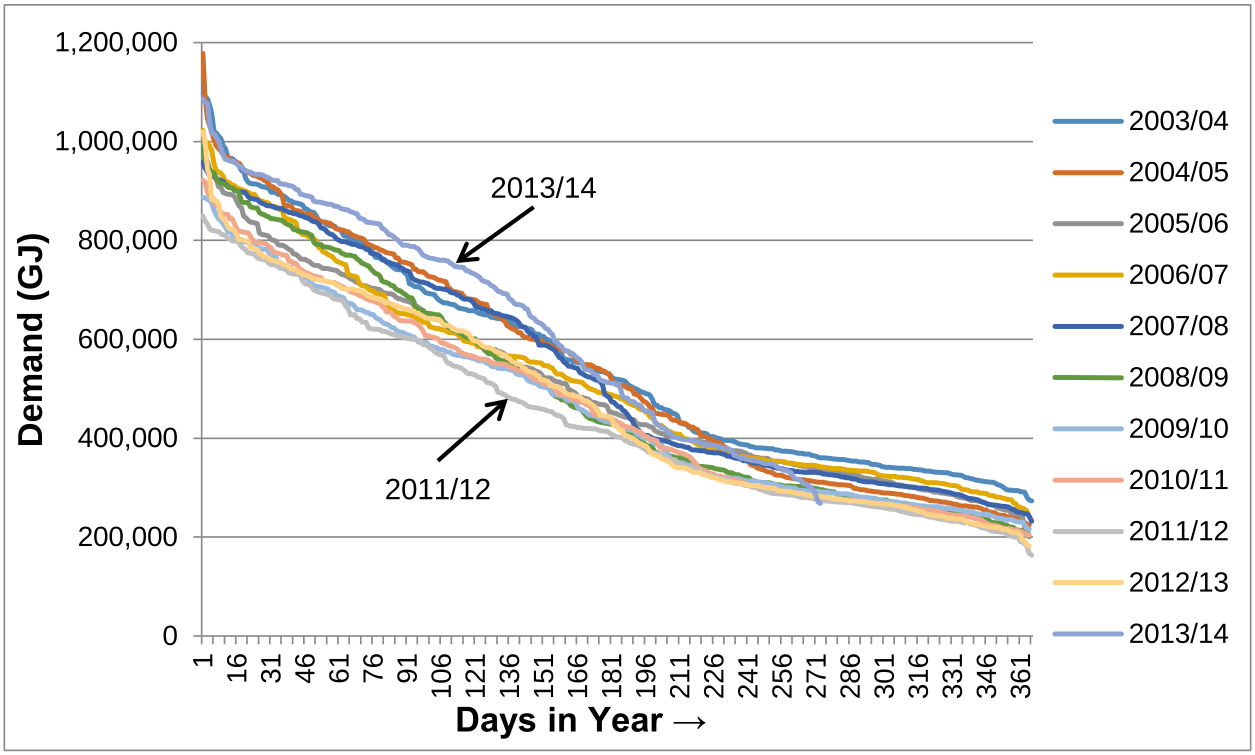
[7] Federal Energy Regulatory Commission, "Current State of and Issues Concerning Underground Natural Gas Storage," Staff Report, Docket No. AD04-11-000, September 30, 2004. Please note that Figure 2 has been modified by Sussex.

[8] For the storage quantity analysis, the Gaz Métro gas supply planning year or "split-year" consists of the twelve months from October to September.

Figure 3: Gaz Métro Load Duration Curves – 2003/04 to 2013/14 Historical Demand[9]

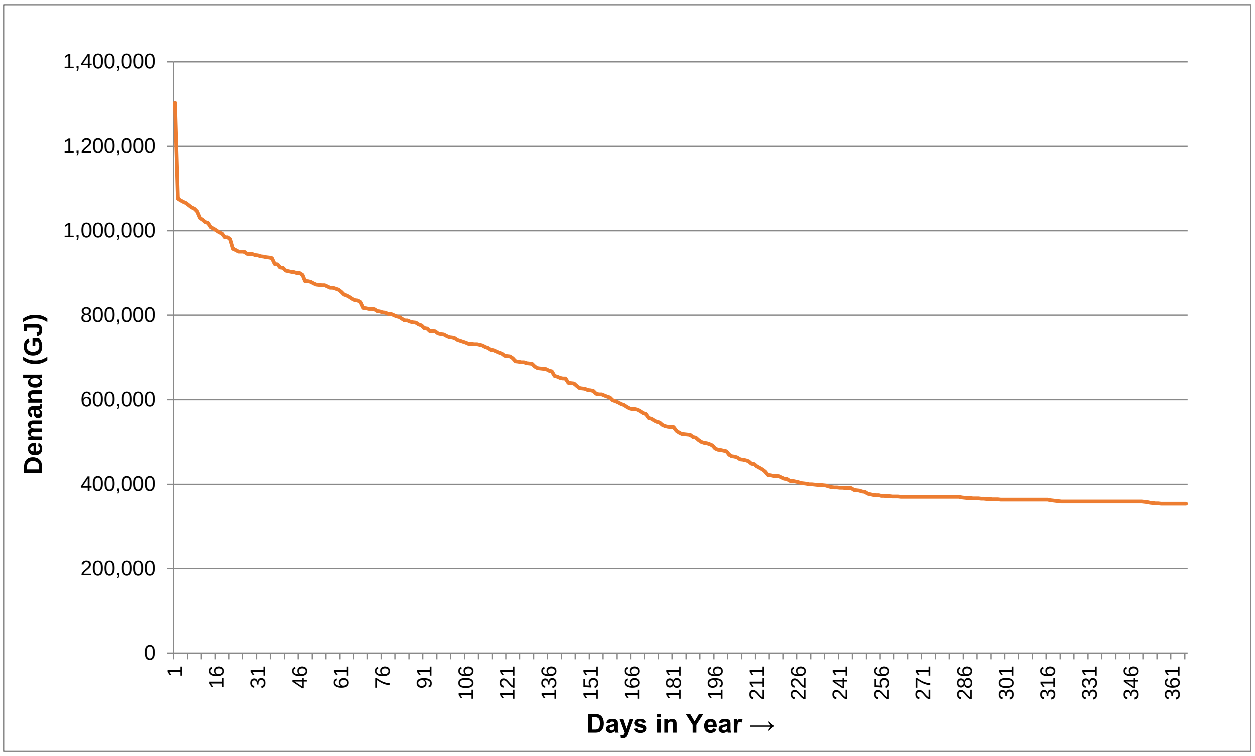


As illustrated by Figure 3, the 2013/14 period has the highest level of demand, while the 2011/12 year has the lowest level of demand, and the remaining years fall within that range.

In addition to our review of the Gaz Métro actual demand, Sussex reviewed the 2014/15 forecasted requirements. As indicated by Figure 4 (below), the Gaz Métro forecasted demand for the 2014/15 year also exhibits a similar pattern (i.e., shape and slope) to the actual demand curves and the illustrative load duration curve.

9 The historical demand presented in Figure 3, and analyzed by Sussex in the storage quantity analysis, represents the total firm and interruptible demand that is served by transport from Gaz Métro.

Figure 4: Gaz Métro Load Duration Curve – 2014/15 Forecasted Demand[10]

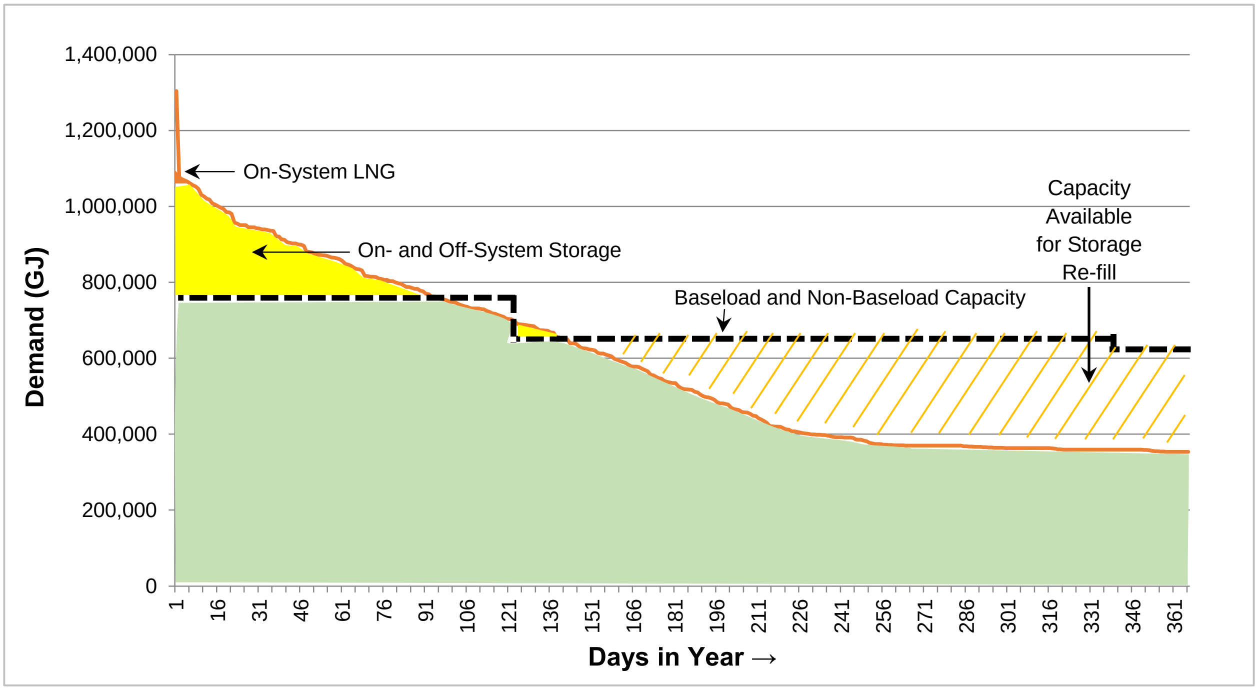


Given the similarity between the 2014/15 load duration curve and the actual load duration curves, storage resources will likely continue to be a significant component of the Gaz Métro gas supply portfolio.

As part of the Sussex review, the Gaz Métro baseload, seasonal and peaking resources, in aggregate, were added to the 2014/15 load duration curve. Please see Figure 5 (below).

10 The forecasted demand presented in Figure 4, and analyzed by Sussex in the storage quantity analysis, represents the total demand after interruptions, and excludes firm demand that is served by transportation from customers.

Figure 5: Gaz Métro 2014/15 Load Duration Curve and Supply Resource Portfolio



As illustrated by Figure 5, the Gaz Métro gas supply portfolio has similar resources as the illustrative load duration curve and gas supply portfolio presented in Figure 2. Specifically, the aggregated baseload and non-baseload capacity is used to meet year-round and seasonal demand, on- and off-system storage provides supply for seasonal requirements, and on-system LNG services the needle peak demand.

2. Demand/Supply Balancing

LDCs not only need to manage seasonal demand, but also the monthly, daily and intra-day fluctuations between forecasted and actual natural gas demand. Specifically, LDCs need to have resources in their natural gas supply portfolio that can respond to changes in natural gas demand across and within days as a result of various factors including actual weather compared to forecasted weather. Natural gas storage provides the LDC with a "shock absorber" asset whereby short-term demand changes (i.e., both increases and decreases in demand) are managed by withdrawing from or injecting into natural gas storage facilities. Absent a natural gas storage asset or a similar type of asset or service, LDCs would likely be more exposed to the daily volatility of natural gas price indices, as well as pipeline balancing costs and penalties. The operational benefits of storage have been previously reviewed and analyzed by Gaz Métro, specifically in R-3809-2012[11] and, as such, are not part of the Sussex analysis. However, Sussex notes that the operational benefits provided by storage (e.g., avoidance of price spikes, intra-day nomination flexibility, and volume variation management) are daily requirements for all LDCs and well supported by a storage asset or contract.

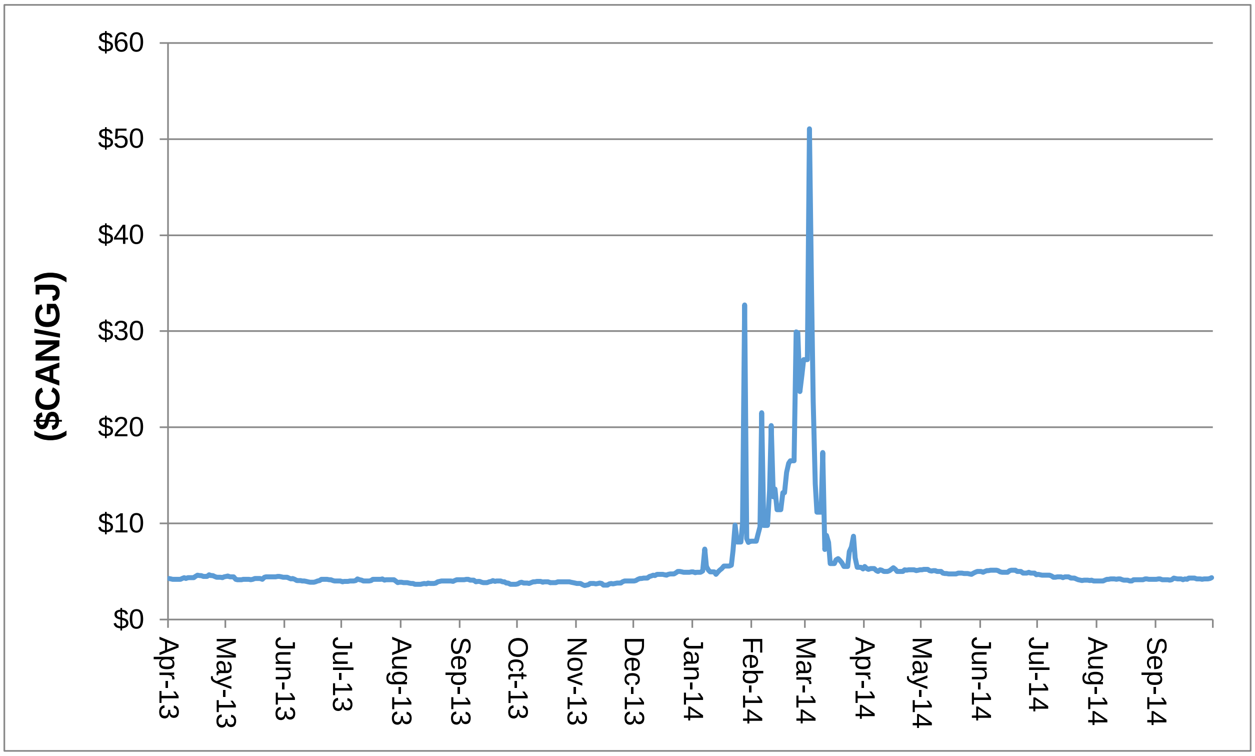
3. Physical Price Hedge

Given the winter peaking nature of most of the North American natural gas market, natural gas prices tend to reflect a seasonal pricing pattern. Specifically, natural gas prices and price indices typically follow a trend whereby a positive price differential (i.e., premium) exists between winter and summer periods. As such, LDCs are able to procure natural gas during the summer period, pay the lower summer price, inject natural gas into storage, and withdraw volumes during the winter period, thus avoiding winter prices for that stored quantity of natural gas. In other words, a natural gas storage contract provides an LDC with the ability to purchase certain natural gas supply during the summer at summer season prices for dispatch during the winter and avoid winter season prices – thus storage provides a physical price hedge.

The 2013/14 natural gas prices at the Dawn Hub provide a very clear example of the value of storage as it relates to a physical price hedge. Specifically, in Figure 6 (below), Sussex charted the daily natural gas prices at the Dawn Hub from April 2013 through September 2014.

[11] Please see B-0214, Gaz Métro 1, Document 17.

Figure 6: Daily Dawn Hub Prices – April 2013 to September 2014[12]



As illustrated by Figure 6, the natural gas prices at the Dawn Hub during this past winter exhibited significant volatility reaching approximately $50.00/GJ on March 3, 2014. These 2013/14 winter prices at the Dawn Hub when compared to the previous summer prices (i.e., April 2013 to September 2013) provide a simple example of the value of storage as a physical price hedge, specifically:

- The daily average of the preceding summer price (i.e., April 2013 to September 2013) at the Dawn Hub was approximately $4.12/GJ.
- The daily average of the 2013/14 peak winter prices (i.e., December 2013, January 2014, and February 2014) was $9.05/GJ.
- The difference between the 2013/14 peak winter and the preceding summer prices was approximately $4.93/GJ.
- Therefore, all else being equal, if an LDC had a storage service in place for the 2013/14 winter season, the value (i.e., the avoided cost of purchasing similar volumes at the Dawn Hub daily price index) would have ranged from $25 million for a 5 PJ storage

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12 Source: SNL Financial.

quantity to $50 million for a 10 PJ storage quantity to $100 million for a 20 PJ storage quantity.

- Finally, after including an estimate for demand charges associated with the various storage volume levels and for carrying costs, the storage contract would still have provided significant value. Specifically, for a 5 PJ, 10 PJ or 20 PJ storage quantity, the net value is estimated to be $19 million, $37 million, and $74 million, respectively.[13]

Another attribute of the physical price hedge value associated with storage is the price diversity it adds to the typical gas supply portfolio of an LDC. Specifically, storage provides an LDC with a price signal that is likely different from the daily or monthly trading price of natural gas at a particular location. Therefore, an LDC with a storage position has diversified its price exposure (i.e., storage pricing is based on the summer prices and not the winter prices at a particular natural gas price index). The value of price stability was evidenced by the 2013/14 winter where the winter natural gas prices at the Dawn Hub averaged $9.05/GJ compared to the average of the summer prices of $4.12/GJ. Thus, the diversity in price (i.e., storage contracts) provides increased price stability for the LDC's customers.

This concept of price diversity is of particular importance for LDCs that may not have access to a variety of gas supply points that are also liquid trading points. By way of example, the TCPL Canadian Mainline traverses Canada and has many interconnects to other pipelines and LDCs; however, the points on the TCPL Canadian Mainline that have price liquidity are limited. Therefore, an LDC that receives service from the TCPL Canadian Mainline may be able to augment purchases at Empress or Dawn with storage withdrawals, thus providing more price diversity and stability.

4. Service Reliability

Finally, market area natural gas storage provides LDCs with an asset to manage a disruption in the production or transmission segments (upstream of storage) of the natural gas delivery chain. Specifically, market area natural gas storage allows the LDC to withdraw natural gas from

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[13] For context purposes, the demand charge for the Union storage contract for the 13.2 PJ of storage capacity was assumed to be approximately $13.8 million as discussed later in this report; thus, Sussex assumed that the demand charge for a storage contract level of 5 PJ, 10 PJ and 20 PJ would be approximately $5.2 million, $10.4 million and $20.9 million, respectively. In addition, Sussex estimated carrying costs based on the storage quantity level, the summer price at the Dawn Hub of $4.12/GJ, and an assumed interest rate of 8%.

storage to replace gas supply that is subject to interruption from a physical failure in natural gas production or transmission equipment. Although natural gas production and transmission equipment failure has historically been a low probability event, nonetheless, it is considered a high impact event as the cost and implications from unserved firm natural gas demand could be significant.

Stated differently, natural gas storage located downstream or in proximity to some or all of an LDC's pipeline transportation contracts, provides the LDC with a gas supply source to meet unplanned or force majeure events and increases the overall reliability of the LDC service to its customers. This is of particular importance during the winter heating season if the LDC has residential and commercial customers (i.e., high priority end users).

Finally, subsequent to the 2013/14 winter period when LDCs in Canada and the eastern United States experienced higher demands as a result of prolonged colder than normal weather, the value of storage, as part of an overall assessment of the 2013/14 winter, was researched by the American Gas Association ("AGA"). Specifically, the AGA published a report in September 2014 on the 2013/14 winter heating season in which it noted that of the LDCs surveyed (i.e., approximately 80 companies), 65 LDCs are keeping their existing storage plans and 14 LDCs are considering increasing storage capacity or availability.[14]

Task 2 – Natural Gas Storage Contracts Between Gaz Métro and Union

One of the primary assumptions in the Sussex analysis of the Union storage contracts is the specific parameters of the storage contracts (e.g., storage or capacity volume, maximum daily withdrawal quantity, and the associated ratchet provisions). Table 1 (below) provides a summary of the Gaz Métro natural gas storage contracts with Union.

[14] American Gas Association, "Promise Delivered: Planning, Preparation and Performance during the 2013-14 Winter Heating Season", September 2014.

Table 1: Gaz Métro – Union Storage Contractual Parameters

	THRESHOLDS				
	MAXIMUM STORAGE BALANCE	RATCHET UP >=75%	RATCHET DOWN < 25%	EARLY STORAGE BALANCE March 31- April 30 <=	LATE STORAGE BALANCE Oct 1st - Nov 1st >=
LST057	5,849,700	4,387,275	1,462,425	2,632,365	4,387,275
LST064	2,974,880	2,231,160	743,720	1,338,696	2,231,160
LST065	4,400,000	3,300,000	1,100,000	1,980,000	3,300,000
LST068					
Total	**13,224,580**	**9,918,435**	**3,306,145**	**5,951,061**	**9,918,435**

	INJECTION			WITHDRAWAL			
	BEFORE RATCHET	AFTER RATCHET		BEFORE RATCHET	AFTER RATCHET		
	Dec 1st - Sept 30	Dec 1st - Sept 30	Oct 1st - Nov 30	June 1st - March 31	June 1st - March 31		April 1st - May 31
	Firm	Firm	Interruptible	Firm	Firm	Interruptible	Interruptible
LST057	43,873	29,249	29,249	70,196	46,798	23,399	70,196
LST064	22,312	14,874	14,874	35,699	23,799	11,900	35,699
LST065	33,000	22,000	22,000	52,800	35,200	17,600	52,800
LST068	33,000	22,000	22,000	52,800	35,200	17,600	52,800
Total	**132,185**	**88,123**	**88,123**	**211,495**	**140,997**	**70,499**	**211,495**

Although Gaz Métro has four natural gas storage contracts with Union, Sussex derived a single storage contract based on the sum of the four underlying contracts, which was then used as a proxy for the storage quantity analysis. Specifically, Sussex assumed one Union storage contract with the following parameters (please see the highlighted total row in Table 1 above):

- Natural gas storage capacity or space of approximately 13,200,000 GJ;
- Injection capability of approximately 132,000 GJ/day declining to 88,000 GJ/day when the inventory level is at or above approximately 9,900,000 GJ;
- Firm injection rights are available between December and September;
- Withdrawal capability of approximately 212,000 GJ/day declining to 141,000 GJ/day when the inventory level is at or below approximately 3,300,000 GJ; and
- Firm withdrawal rights are available between June and March.

Task 3 – Natural Gas Storage Quantity Analysis and Results

To develop the base case scenario for the storage quantity analysis, Sussex analyzed Gaz Métro's forecasted supply plan for the October 2014 to September 2015 planning year (the "2015 Supply Plan"). Specifically, Gaz Métro provided to Sussex the 2015 Supply Plan, which included forecasted daily natural gas demand, planned Union storage utilization, and planned natural gas purchases at Dawn. The daily planned Union storage withdrawals in the 2015 Supply Plan are based on the current storage contract parameters with Union discussed above (e.g., approximately 13.2 PJ of storage space).

Table 2 (below) provides a monthly summary of Gaz Métro's forecasted demand requirements, Union storage withdrawals, and natural gas purchases at Dawn from the 2015 Supply Plan, which was used to develop the baseline scenario (i.e., the "Base Case").

Table 2: Gaz Métro 2015 Supply Plan –

Summary of 2014/15 Forecasted Demand (Base Growth & Normal HDD)[15]

Month	HDD	Total Demand (GJ)	Union Withdrawals (GJ)	Dawn Purchases (GJ)	Union Withdrawals - % of Total Withdrawals	Dawn Purchases - % of Total Purchases
Oct-14	150	14,823,591	591,167	3,348,000	5%	6%
Nov-14	324	20,227,620	558,659	8,520,000	5%	14%
Dec-14	570	25,503,593	3,342,458	5,851,350	29%	10%
Jan-15	685	28,315,556	3,714,955	7,603,496	32%	13%
Feb-15	572	25,042,044	3,059,987	6,930,399	26%	12%
Mar-15	455	23,428,062	309,888	6,976,665	3%	12%
Apr-15	210	17,628,641	0	6,893,294	0%	12%
May-15	46	13,178,826	0	2,138,259	0%	4%
Jun-15	4	10,987,685	0	990,000	0%	2%
Jul-15	0	11,131,867	0	3,472,000	0%	6%
Aug-15	1	11,495,599	0	3,627,000	0%	6%
Sep-15	24	11,014,746	0	3,307,201	0%	6%
Annual Total	**3,041**	**212,777,829**	**11,577,114**	**59,657,663**	**100%**	**100%**
Winter Total	**2,606**	**122,516,875**	**10,985,947**	**35,881,909**	**95%**	**60%**
Peak Winter Total	**1,827**	**78,861,193**	**10,117,400**	**20,385,244**	**87%**	**34%**

As illustrated in Table 2 (above), the forecasted demand for the 2015 Supply Plan year is approximately 212.8 PJ, with approximately 58% of that demand in the winter period (i.e., November through March). If October is included with the winter period (i.e., the period of time when Gaz Métro has withdrawals from Union storage), the total demand is approximately 137.3 PJ. During the peak winter period (i.e., December through February), the forecasted demand is approximately 78.9 PJ, which is approximately 37% of the annual demand. In addition, as shown in Table 2, the Gaz Métro planned withdrawal pattern associated with the Union storage contract is predicated on a significant portion of the storage being dispatched in the peak winter months of December, January and February (i.e., 87% of the total withdrawals from Union storage occur in this period). In terms of purchases at Dawn, the months with the

15 The "Total Demand" presented in Table 2, and analyzed by Sussex in the storage quantity analysis, represents the total demand after interruptions, and excludes firm demand that is served by transportation from customers.

highest planned purchases occur in the winter period (i.e., 60% of the total Dawn purchases occur from November through March).

Finally, during the peak winter period, the planned withdrawals from Union storage of approximately 10.1 PJ represents 13% of the forecasted total demand during that period. Purchases at Dawn during the peak winter period are approximately 20.4 PJ, or 26% of the total demand during that period. Stated differently, the planned withdrawals from Union storage coupled with purchases at Dawn represent 30.5 PJ, or approximately 40% of the forecasted total demand during the December through February time period. This gas supply diversity provides Gaz Métro with a certain level of price stability.

Once Sussex established the Base Case (i.e., 13.2 PJ of storage capacity), Sussex identified alternative storage quantities for evaluation, specifically:

- High Case – Increase storage capacity and injection/withdrawal volume by 50%; and
- Low Case – Decrease storage capacity and injection/withdrawal volume by 50%.

For each of the High and Low Cases, Sussex evaluated the value associated with the storage quantity scenario relative to the baseline. By using this approach (i.e., comparing each scenario to the baseline), Sussex developed a cost/benefit value and therefore a comparison under various price patterns.

<u>High Case – Increase Storage Capacity and Injection/Withdrawal Volume by 50%</u>

In the High Case scenario, the maximum storage balance associated with the Union storage contracts were increased by 50%. Based on this adjustment, the Sussex analyses assumed a revised storage contract with the following parameters:

- Natural gas storage capacity or space of approximately 19,800,000 GJ;
- Injection capability of approximately 198,000 GJ/day declining to 132,000 GJ/day when the inventory level is at or above approximately 14,900,000 GJ;
- Firm injection rights are available between December and September;
- Withdrawal capability of approximately 317,000 GJ/day declining to 212,000 GJ/day when the inventory level is at or below approximately 5,000,000 GJ; and
- Firm withdrawal rights are available between June and March.

Under this High Case scenario, daily demand was served by utilizing additional withdrawals from Union storage in place of a similar volume of natural gas purchases at the Dawn Hub index. Stated differently, the daily planned Union storage withdrawals were increased by 50% (up to the revised storage contract parameters), and the daily planned Dawn purchases were decreased by a similar quantity.

<u>Low Case – Decrease Storage Capacity and Injection/Withdrawal Volume by 50%</u>

In the Low Case scenario, the maximum storage balance associated with the Union storage contracts were decreased by 50%. Based on this adjustment, the Sussex analyses assumed a revised storage contract with the following parameters:

- Natural gas storage capacity or space of approximately 6,600,000 GJ;
- Injection capability of approximately 66,000 GJ/day declining to 44,000 GJ/day when the inventory level is at or above approximately 5,000,000 GJ;
- Firm injection rights are available between December and September;
- Withdrawal capability of approximately 106,000 GJ/day declining to 70,000 GJ/day when the inventory level is at or below approximately 1,700,000 GJ; and
- Firm withdrawal rights are available between June and March.

Under this scenario, daily demand was served by purchasing additional natural gas supplies at the Dawn Hub index in lieu of the planned withdrawals from Union storage. Stated differently, the daily planned withdrawals from Union storage were decreased by 50%, and the quantities of natural gas purchased at the daily Dawn Hub index were increased by a similar quantity.

Table 3 is a summary of the main assumptions underlying the Base, High, and Low Cases.

Table 3: Storage Volume Analysis – Assumptions

	Base Case	High Case	Low Case
Demand	2015 Supply Plan		
Union Storage Capacity	13.2 PJ	19.8 PJ	6.6 PJ
Injection Volume	132,185 GJ	198,276 GJ	66,092 GJ
Injection Volume Post-Ratchet	88,123 GJ	132,185 GJ	44,061 GJ
Withdrawal Volume	211,495 GJ	317,243 GJ	105,747 GJ
Withdrawal Volume Post-Ratchet	140,997 GJ	211,495 GJ	70,499 GJ
Dawn Purchases	2015 Supply Plan	Reduced by higher storage volume	Increased by lower storage volume

As discussed previously, since Gaz Métro has evaluated the value of natural gas storage from an operational perspective, the Sussex analysis focused on the physical hedge attribute or seasonal value of storage. Since the primary driver of seasonal value for storage is the price spread between winter and summer natural gas prices, Sussex reviewed the historical daily natural gas prices at the Dawn Hub over the April 2002 through September 2014 time period.[16] Table 4 (below) summarizes the simple average of the historical daily prices at the Dawn Hub over the analysis period.

Table 4: Historical Natural Gas Prices ($CAN/GJ)[17]

Month	Average Daily Dawn Spot Price ($CAN/GJ)											
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
October	[redacted]	$ 6.26	$ 7.61	$ 14.88	$ 6.42	$ 6.40	$ 7.80	$ 4.46	$ 3.84	$ 3.74	$ 3.38	$ 3.89
November		$ 6.12	$ 7.39	$ 10.99	$ 8.31	$ 6.84	$ 7.98	$ 3.99	$ 4.26	$ 3.81	$ 3.85	$ 3.78
December		$ 7.66	$ 7.87	$ 14.03	$ 7.88	$ 7.18	$ 7.44	$ 5.73	$ 4.47	$ 3.56	$ 3.55	$ 4.64
January		$ 7.50	$ 7.32	$ 9.76	$ 7.28	$ 7.83	$ 6.91	$ 6.01	$ 4.61	$ 3.01	$ 3.40	$ 7.07
February		$ 7.09	$ 7.55	$ 8.40	$ 8.63	$ 8.41	$ 5.88	$ 5.64	$ 4.25	$ 2.81	$ 3.47	$ 15.43
March		$ 7.21	$ 8.41	$ 7.51	$ 8.24	$ 9.37	$ 5.14	$ 4.53	$ 4.14	$ 2.44	$ 4.00	$ 11.66
April	$ 7.76	$ 7.73	$ 8.77	$ 7.87	$ 8.50	$ 10.32	$ 4.54	$ 4.22	$ 4.20	$ 2.18	$ 4.40	$ 5.16
May	$ 7.98	$ 8.64	$ 8.03	$ 6.81	$ 8.29	$ 11.13	$ 4.54	$ 4.47	$ 4.32	$ 2.55	$ 4.34	$ 4.93
June	$ 7.87	$ 8.33	$ 8.53	$ 6.66	$ 7.71	$ 12.39	$ 4.25	$ 5.03	$ 4.51	$ 2.52	$ 4.10	$ 5.00
July	$ 6.89	$ 7.81	$ 8.79	$ 6.43	$ 6.45	$ 11.19	$ 3.84	$ 4.83	$ 4.22	$ 3.00	$ 4.08	$ 4.34
August	$ 6.89	$ 7.10	$ 10.56	$ 7.58	$ 6.31	$ 8.50	$ 3.45	$ 4.61	$ 4.08	$ 2.92	$ 3.87	$ 4.15
September	$ 6.30	$ 6.35	$ 12.90	$ 5.55	$ 5.90	$ 7.59	$ 3.15	$ 4.23	$ 4.05	$ 2.90	$ 3.96	$ 4.23
Winter (Nov-Mar)	[redacted]	$ 7.12	$ 7.71	$ 10.14	$ 8.07	$ 7.93	$ 6.67	$ 5.18	$ 4.35	$ 3.13	$ 3.66	$ 8.52
Peak Winter (Dec-Feb)		$ 7.42	$ 7.58	$ 10.73	$ 7.93	$ 7.81	$ 6.74	$ 5.79	$ 4.45	$ 3.13	$ 3.48	$ 9.05
Summer (Apr-Sept)	$ 7.28	$ 7.66	$ 9.60	$ 6.82	$ 7.19	$ 10.19	$ 3.96	$ 4.56	$ 4.23	$ 2.68	$ 4.12	$ 4.63

16 Source: SNL Financial. Specifically, SNL Financial provides daily spot prices for the Dawn Hub based on its calculation of the volume-weighted average price.

17 Source: SNL Financial.

In terms of the natural gas prices at the Dawn Hub, the following observations are relevant to the storage quantity analysis:

- Winter (i.e., the daily average of November to March) prices at the Dawn Hub ranged from $3.13/GJ to $10.14/GJ, with an 11-year average of $6.59/GJ.
- Peak winter (i.e., the daily average of December to February) prices ranged from $3.13/GJ to $10.73/GJ, with an 11-year average of $6.74/GJ.
- Summer (i.e., the daily average of April to September) prices ranged from $2.68/GJ to $10.19/GJ, with a 12-year average of $6.08/GJ.
- The winter and peak winter, on average, are higher than the off-peak (i.e., summer) prices; although certain individual years do not necessarily follow that pattern.

As discussed above, one of the value attributes of natural gas storage is its use as a physical price hedge; specifically, natural gas is injected in storage during off-peak (i.e., summer) periods when natural gas prices are typically lower, and withdrawn from storage during winter periods to serve demand when natural gas prices are typically higher. Therefore, Sussex reviewed the natural gas price spread between the winter (and peak winter) months and the preceding summer over the 11-year period (i.e., 2003/04 to 2013/14) to evaluate the seasonal spread for each historical year. Please see Table 5 (below).

Table 5: Historical Natural Gas Price Spreads ($CAN/GJ)[18]

Month	Average Daily Dawn Spot Price ($CAN/GJ)										
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Winter - Summer	$ (0.16)	$ 0.05	$ 0.54	$ 1.25	$ 0.73	$ (3.52)	$ 1.21	$ (0.22)	$ (1.11)	$ 0.98	$ 4.39
Peak Winter - Summer	$ 0.14	$ (0.08)	$ 1.13	$ 1.11	$ 0.61	$ (3.44)	$ 1.83	$ (0.12)	$ (1.10)	$ 0.80	$ 4.92

As illustrated in Table 5, there were five years in which the natural gas price spreads for the winter-summer, peak winter-summer, or both were negative (i.e., the winter or peak winter prices were lower than the summer prices). For example, in the 2008/09 split-year, the off-peak (i.e., summer) prices reached a high of $12.36/GJ in June 2008 before declining to $5.14/GJ in March 2009. As a result, the seasonal price is significantly negative (i.e., approximately $3.50/GJ). In addition, in the 2011/12 split-year, the abnormally warmer than normal weather resulted in low winter prices (i.e., $2.44/GJ in March 2012) compared to off-peak (i.e., summer) prices at the $4.00/GJ or higher levels, which yielded a negative seasonal spread of over $1.00/GJ. Finally, in 2003/04 and 2004/05, the price spread was either slightly positive or

[18] Source: SNL Financial.

negative depending on the period reviewed; while the 2010/11 time period had a negative seasonal spread ranging from $0.12/GJ to $0.22/GJ. Since the seasonal spread is negative in those five years (albeit at different levels for various reasons), there is no price spread value associated with the physical hedge attribute of storage.[19] In addition, given the balancing obligations that LDCs must abide by, having storage or an equivalent service/asset may be the only option available to the LDC to meet these requirements. For these reasons, the Sussex storage quantity analysis focused on the years in which there was a positive seasonal price spread (i.e., the highlighted years in Table 5 above). As shown in Table 5 (above), the seasonal price spread in the six highlighted years ranged from $0.54/GJ (in 2005/06) to $4.92/GJ (in 2013/14).

The positive price spread between the winter and summer periods (i.e., winter natural gas prices are higher than summer prices) is the typical expectation of a market that has more winter demand than summer demand. This price expectation was confirmed by a review of the forward prices for the Dawn Hub. Specifically, Sussex reviewed the projected prices at the Dawn Hub for the forward contract months of October 2014 through September 2018.[20] As illustrated in Table 6 (below), there is a positive seasonal price spread, [redacted]

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19 Although there was limited to no value associated with the physical hedge attribute of storage, Sussex understands that the Union storage contract provided operational benefits to Gaz Métro; specifically, the Union storage was needed to balance the intra-day, daily and monthly swings.

20 Gaz Métro provided to Sussex the average of the future prices at the Dawn Hub from February 10, 2014 to February 21, 2014.

Table 6: Forward Dawn Hub Prices and Price Spreads ($CAN/GJ)[21]

[redacted]

The positive natural gas price spread in the forward market is consistent with market fundamentals (i.e., higher winter season demand relative to summer demand and, therefore, higher prices during the winter period).

As discussed previously, in Gaz Métro's 2015 Supply Plan, storage withdrawals associated with the Union storage contract were spread over the October 2014 to March 2015 time period. Therefore, the focus of the Sussex storage quantity analysis is on the October to March time period.[22] The forecasted volumes from the 2015 Supply Plan for this time period are used to develop the Base Case scenario (as presented in Table 7 below).

[21] [redacted]

[22] Given the focus of the analysis, Sussex assumed that Gaz Métro would have sufficient injection volume to refill storage in every scenario.

Table 7: Base Case – Volumes

Month	Total Demand (GJ)	Union Withdrawals (GJ)	Dawn Purchases (GJ)
Oct-14	14,823,591	591,167	3,348,000
Nov-14	20,227,620	558,659	8,520,000
Dec-14	25,503,593	3,342,458	5,851,350
Jan-15	28,315,556	3,714,955	7,603,496
Feb-15	25,042,044	3,059,987	6,930,399
Mar-15	23,428,062	309,888	6,976,665
Oct-Mar Total	**137,340,465**	**11,577,114**	**39,229,909**

As shown in Table 7, total demand over the October to March time period is expected to be 137.3 PJ, with planned withdrawals from Union storage equal to approximately 11.6 PJ (i.e., 90% of the total contracted capacity of 13.2 PJ) and planned purchases at the Dawn Hub equal to approximately 39.2 PJ. In other words, a total of approximately 50.8 PJ, or approximately 40%, of demand over the October to March period is served by either withdrawals from Union storage or supply purchases at Dawn.

As discussed previously and illustrated in Table 8 (below), planned withdrawals associated with the Union storage contract represent, on average, approximately 8%; and Dawn purchases represent, on average, approximately 29% of total demand over the six month period from October to March in the Base Case scenario. During the peak winter months from December to February, Union storage withdrawals account for approximately 13% and Dawn purchases represent approximately 26% of total monthly demand.

Table 8: Base Case – Union Storage Withdrawals and Dawn Purchases

Month	Union Withdrawals - % of Demand	Dawn Purchases - % of Demand
Oct-14	4%	23%
Nov-14	3%	42%
Dec-14	13%	23%
Jan-15	13%	27%
Feb-15	12%	28%
Mar-15	1%	30%
Oct-Mar Avg.	**8%**	**29%**

Based on the volumes in the Base Case scenario (see Table 7 above), Sussex calculated the costs associated with the Union storage contract and planned Dawn purchases. Specifically, to assess the value of storage capacity in the Base Case, Sussex utilized:

- An assumed Union storage contract cost of approximately $13.8 million associated with the 13.2 PJ of storage capacity;[23]
- Daily planned Union storage withdrawals from the Gaz Métro 2015 Supply Plan;
- Storage inventory cost of gas based on the preceding summer average (i.e., April to September) of the daily Dawn Hub spot prices. For example, the average of the daily Dawn Hub prices from April 2005 to September 2005 was used as the inventory cost for the 2005/06 time period;
- Daily planned purchases at the Dawn Hub index from the Gaz Métro 2015 Supply Plan; and
- Daily Dawn Hub spot prices for the six historical periods in which there was a positive seasonal price spread (i.e., winter prices were greater than preceding summer prices).

Using the data described above, Sussex calculated (i) the storage gas cost which is equal to the total Union storage withdrawals multiplied by the storage inventory cost of gas for each year; and (ii) the total purchases at Dawn which is equal to the daily planned purchases multiplied by the daily Dawn Hub spot price for each specific year. Finally, the total costs for each year (i.e., October to March time period) were calculated as the sum of the Union storage contract cost, the associated storage gas costs, and the total cost of purchases at the Dawn Hub index. The results of the Base Case analysis for the six historical years are shown in Table 9 (below).

Table 9: Base Case – Analysis Results – Historical Price Patterns ($ millions)

[redacted]

[redacted]

[23] Estimate of total Union contract cost relied on in Gaz Métro's 2015 rate case.

In addition to analyzing the storage withdrawals and Dawn purchases using the price patterns from the six historical years, Sussex developed daily price patterns based on the projected monthly Dawn Hub forward prices for the October 2014 through September 2018 time period (as shown in Table 6 above). Specifically, in order to develop forecasted daily price patterns, Sussex identified a historical month that had a monthly average close to the forward monthly price and exhibited limited daily volatility. By way of example, the December 2014/15 Dawn Hub forward price of [redacted] is closest to the December 2009/10 price of $5.73/GJ. Using the daily prices for December 2009/10, Sussex decreased each daily price by [redacted] (i.e., the difference between the December 2015 forward price of [redacted] and the average of the daily price for December 2009/10); thereby creating a daily price pattern that, when averaged, is equal to the December 2014/15 forward price. Sussex repeated this process for every forward monthly price.

The results of the Base Case with the estimated daily prices for the 2014/15 through 2017/18 time period are presented in Table 10 (below).

Table 10: Base Case – Analysis Results – Forecasted Price Patterns ($ millions)

[redacted]

[redacted]

Finally, in the Base Case, Sussex assumed an injection capability of approximately 132,000 GJ/day declining to 88,000 GJ/day when the inventory level is at or above approximately 9,900,000 GJ; and firm injection rights are available between December through September. Thus, assuming Gaz Métro could inject the maximum amount of gas into Union storage during the summer period (i.e., 183 days between April and September), it would take approximately 113 days to refill storage to a capacity of 13.2 PJ in the Base Case.

Once the Base Case was developed, Sussex next evaluated the High and Low Cases using the same actual and forward prices analyzed in the Base Case.

As discussed previously, in the High Case scenario, the storage capacity and withdrawal volumes were increased by 50%. Specifically, for the High Case, the total demand was the same as the Base Case (i.e., 137.3 PJ); however, the daily planned Union storage withdrawals were increased by 50% (up to the revised storage contract parameters), and the daily planned Dawn purchases were decreased by a similar quantity. Therefore, the withdrawals from Union storage were increased to 17.4 PJ compared to 11.6 PJ in the Base Case. Conversely, the purchases at the Dawn Hub decreased to 33.4 PJ in the High Case compared to 39.2 PJ in the Base Case. Table 11 is a summary of the High Case volumes.

Table 11: High Case – Volumes

Month	Total Demand (GJ)	Union Withdrawals (GJ)	Dawn Purchases (GJ)
Oct-14	14,823,591	886,750	3,052,417
Nov-14	20,227,620	837,989	8,240,670
Dec-14	25,503,593	5,013,686	4,180,121
Jan-15	28,315,556	5,572,432	5,746,018
Feb-15	25,042,044	4,589,980	5,400,406
Mar-15	23,428,062	464,832	6,821,721
Oct-Mar Total	**137,340,465**	**17,365,670**	**33,441,353**

Once the withdrawals from Union storage and purchases at the Dawn Hub were established for the High Case, Sussex developed the monthly utilization of Union storage and Dawn purchases as summarized in Table 12 (below).

Table 12: High Case – Union Storage Withdrawals and Dawn Purchases

Month	Union Withdrawals - % of Demand	Dawn Purchases - % of Demand
Oct-14	6%	21%
Nov-14	4%	41%
Dec-14	20%	16%
Jan-15	20%	20%
Feb-15	18%	22%
Mar-15	2%	29%
Oct-Mar Avg.	**12%**	**25%**

As illustrated in Table 12, the withdrawals from Union storage represent 12% of the total demand as compared to the Base Case where withdrawals from Union storage averaged 8%. Conversely, in the High Case the purchases at the Dawn Hub represent 25% of the October to March demand compared to 29% in the Base Case. Stated differently, in the High Case scenario, Gaz Métro has more storage quantity and withdrawal volume to meet forecasted demand and, therefore, the Company can reduce purchases at Dawn. In addition, the increase in storage volume allows Gaz Métro more diversity regarding peak winter gas supplies as Union withdrawals and purchases at the Dawn Hub are both approximately 20% of total demand. Thus, the increase in storage volumes in the High Case provides more price diversity in the peak winter period.

The results of the High Case scenario for the actual price patterns are presented in Table 13 (below).

Table 13: High Case – Analysis Results – Historical Price Patterns ($ millions)

[redacted]

[redacted]

[redacted]

Table 14: Comparison of Analysis Results – Historical Price Patterns

Average Costs ($ millions)

[redacted]

[redacted]

[redacted]

Table 15: High Case – Analysis Results – Forecasted Price Patterns ($ millions)

[redacted]

[redacted]

Table 16: Comparison of Analysis Results – Forecasted Price Patterns

Average Costs ($ millions)

[redacted]

[redacted]

Finally, in the High Case, Sussex assumed an injection capability of approximately 198,000 GJ/day declining to 132,000 GJ/day when the inventory level is at or above approximately 14,900,000 GJ; and firm injection rights are available between December through September. Thus, assuming Gaz Métro could inject the maximum amount of gas into Union storage during the summer period (i.e., 183 days between April and September), it would take approximately 113 days to refill storage to a capacity of 19.8 PJ in the High Case.

Next, Sussex evaluated the Low Case, and similar to the Base and High Cases, the total demand is approximately 137.3 PJ; however, the storage capacity and withdrawal volumes were decreased by 50%. Specifically, for the Low Case, the daily planned withdrawals from Union storage were decreased by 50%, and the daily quantities of natural gas purchased at the Dawn Hub were increased by a similar quantity. Therefore, the withdrawals from Union storage are 5.8 PJ compared to a Base Case volume of 11.6 PJ. Conversely, the purchases at Dawn increase to 45.0 PJ compared to 39.2 PJ in the Base Case. Table 17 (below) is a summary of the Low Case volumes.

Table 17: Low Case – Volumes

Month	Total Demand (GJ)	Union Withdrawals (GJ)	Dawn Purchases (GJ)
Oct-14	14,823,591	295,583	3,643,583
Nov-14	20,227,620	279,330	8,799,330
Dec-14	25,503,593	1,671,229	7,522,578
Jan-15	28,315,556	1,857,477	9,460,973
Feb-15	25,042,044	1,529,994	8,460,392
Mar-15	23,428,062	154,944	7,131,608
Oct-Mar Total	**137,340,465**	**5,788,557**	**45,018,465**

Similar to the High Case analysis, once the total demand, withdrawals from Union storage, and purchases at the Dawn Hub were developed for the Low Case, Sussex than reviewed the percentages that the withdrawals and purchases represented of the total demand (i.e., the

October through March time period). Please see Table 18 (below) for a summary of these percentages.

Table 18: Low Case – Union Storage Withdrawals and Dawn Purchases

Month	Union Withdrawals - % of Demand	Dawn Purchases - % of Demand
Oct-14	2%	25%
Nov-14	1%	44%
Dec-14	7%	29%
Jan-15	7%	33%
Feb-15	6%	34%
Mar-15	1%	30%
Oct-Mar Avg.	**4%**	**33%**

As illustrated in the above table, the withdrawals from Union storage represent 4% of the total demand (i.e., October to March time period) as compared to 8% in the Base Case and 12% in the High Case. Conversely, in the Low Case the purchases from Dawn represent 33% of the total demand (i.e., October to March time period) compared to 29% in the Base Case and 25% in the High Case. In other words, in the Low Case, Gaz Métro has less storage quantity and withdrawal capability to meet the forecasted demand, and therefore requires more purchases at Dawn. In addition, during the peak winter period, the Union withdrawals, in the Low Case, represent approximately 7% of total demand, compared to 13% and 20% in the Base and High Cases, respectively, resulting in a decrease in price diversity.

The results of the Low Case analysis using the actual daily price patterns are presented in Table 19 (below).

Table 19: Low Case – Analysis Results – Historical Price Patterns ($ millions)

[redacted]

[redacted]

[redacted]

Table 20: Comparison of Analysis Results – Historical Price Patterns

Average Costs ($ millions)

[redacted]

[redacted]

[redacted]

Table 21: Low Case – Analysis Results – Forecasted Price Patterns ($ millions)

[redacted]

[redacted]

Table 22: Comparison of Analysis Results – Forecasted Price Patterns

Average Costs ($ millions)

[redacted]

[redacted]

Finally, for the Low Case, Sussex assumed an injection capability of approximately 66,000 GJ/day declining to 44,000 GJ/day when the inventory level is at or above approximately 5,000,000 GJ; and firm injection rights are available between December through September. Thus, assuming Gaz Métro could inject the maximum amount of gas into Union storage during the summer period (i.e., 183 days between April and September), it would take approximately 113 days to refill storage to a capacity of 6.6 PJ in the Low Case.

Given the relatively small deviations (i.e., tight range) in the comparison of the results using the average of the actual and forward prices, Sussex compared the Base, High, and Low Cases using each of the historical years where there was a positive seasonal price spread (i.e., the winter period prices were higher than the summer period). Table 23 (below) provides a summary of that review.

Table 23: Comparison of Analysis Results – Historical Price Patterns
Total Costs ($ millions)

[redacted]

[redacted]

[redacted]

[redacted]

Task 4 – Benchmarking Analysis

In addition to the storage quantity analysis just reviewed, Sussex also performed a benchmarking analysis to review to what degree natural gas utilities in northeastern North America utilize storage to meet customers' demand. The analysis focused on three metrics: (i) storage capacity relative to forecast annual volume; (ii) storage capacity relative to forecast winter volume; and (iii) daily storage withdrawal volume relative to forecast peak day load. The following nine utilities were included in the analysis:

- Boston Gas Company and Colonial Gas Company, d/b/a National Grid ("National Grid MA") – Massachusetts;
- NSTAR Gas Company ("NSTAR") – Massachusetts;
- Bay State Gas Company d/b/a Columbia Gas of Massachusetts ("CMA") – Massachusetts;
- Connecticut Natural Gas ("CNG") – Connecticut;
- Southern Connecticut Gas ("SCG") – Connecticut;
- Narragansett Electric Company d/b/a National Grid ("National Grid RI") – Rhode Island;
- Consolidated Edison Company and Orange and Rockland Utilities ("Consolidated Edison") – New York;
- Union Gas Limited ("Union") – Ontario; and
- Enbridge Gas Distribution ("Enbridge") – Ontario.

Sussex developed this benchmarking analysis by reviewing filings associated with integrated resource plans and rate cases, as well as company presentations and memorandums.[24] The first forecast year in each company's most recently available demand forecast from those

[24] The underlying data and data sources relied upon by Sussex are provided as Appendix B.

sources was used to develop the metrics noted above. For National Grid MA, CNG and SCG, that year represented the 2012/2013 forecast year; for NSTAR, CMA, National Grid RI, Consolidated Edison, Union and Enbridge, the first available forecast year was 2013/2014. The demand forecasts (i.e., annual and winter load and peak day load) were used to determine the denominator of each of the metrics.

The numerator of each of the metrics was calculated by summing the annual contract quantities ("ACQ") and maximum daily quantities ("MDQ") of the storage contracts reported by the utilities. The total storage ACQ was divided by the annual or the winter volume to calculate the first two metrics. The total storage MDQ was divided by peak day volume to calculate the third metric.

The results of the benchmarking analysis are provided below; specifically, for each LDC analyzed, Table 24 is a summary of: (i) the underground storage quantity relative to the forecasted annual and winter demand; and (ii) the withdrawal volume relative to the forecasted peak day requirement.

Table 24: Percentage of Underground Storage to Volumes[25,26]

Company	State/Province	Annual	Winter[27]	Peak Day
National Grid MA	Massachusetts	17.10%	24.26%	18.16%
NSTAR Gas Company	Massachusetts	16.12%	23.05%	18.91%
Columbia Gas of MA	Massachusetts	18.14%	26.18%	21.77%
Connecticut Natural Gas	Connecticut	28.46%	41.55%	38.01%
Southern Connecticut Gas	Connecticut	29.98%	45.44%	38.72%
National Grid RI	Rhode Island	13.76%	19.60%	19.35%
Consolidated Edison	New York	17.37%	25.16%	29.73%
Union Gas	Ontario	17.97%	26.02%	37.32%
Enbridge Gas Distribution	Ontario	29.85%	43.22%	56.15%
Average		20.97%	30.50%	30.90%
Median		17.97%	26.02%	29.73%
Highest Observation		29.98%	45.44%	56.15%
Lowest Observation		13.76%	19.60%	18.16%
Gaz Métro Base Case	Quebec	8.75%	15.19%	24.10%
Gaz Métro High Case	Quebec	11.86%	20.59%	32.22%
Gaz Métro Low Case	Quebec	5.64%	9.80%	15.99%

As illustrated in Table 24, for the nine LDCs in the benchmarking analysis, the percentage of underground storage capacity to annual load ranged from 14% to 30%, with an average of approximately 21%. Specifically, there are six LDCs with an Annual metric between 13% and 19%, while the remaining three LDCs have an Annual metric of approximately 29%. The Gaz Métro cases (i.e., Base, High, and Low Cases) are all below the lowest observation for the Annual metric (i.e., in the Gaz Métro High Case the Annual metric is 11.86%, which is below the lowest observation of 13.76%).

The second metric (i.e., the percent storage of winter demand) ranged from 20% to 45%, with an average of approximately 30%. Specifically, there are six LDCs with a Winter metric of approximately 24%, while the remaining three LDCs have a Winter metric of approximately 43%. The Winter metric for the Gaz Métro High Case of 20.59% is above the lowest observation in the range, but below the other eight observations. While the other two Gaz Métro cases (i.e., Base and Low Cases) fall below the lowest observation for the Winter metric (i.e., in

25 The "Average" and "Median" results do not include the percentages for the Gaz Métro Base, High or Low Cases.

26 The Gaz Métro storage volumes include both on- and off-system storage.

27 Winter volumes for Consolidated Edison, Union Gas, and Enbridge Gas Distribution were calculated as the respective annual volumes for each of the companies multiplied by the average ratio of winter volumes to annual volumes of the other companies in the comparable group.

the Gaz Métro Base Case the Winter metric is 15.19%, which is below the lowest observation of 19.60%).

Finally, with respect to the third metric (i.e., the storage withdrawal to peak day), the values ranged from 18% to 56%, with an average of approximately 31%. Specifically, there are four LDCs with a Peak Day metric of approximately 20%, while the other five LDCs have a Peak Day metric between 30% and 56%. With respect to the Peak Day metric, the Gaz Métro Base Case is in the middle part of the range (i.e., above four observations and below five observations). The Gaz Métro High Case is above the average result and also above five observations, while the Gaz Métro Low Case is below the lowest observation in the range.

The results of the underground storage benchmarking imply that Gaz Métro has storage withdrawal volumes that are consistent with the other LDCs reviewed; however, the Gaz Métro storage quantity, as a percent of annual or winter volume, is generally below all of the LDCs in the benchmarking analysis.

Next, Sussex developed similar metrics for LNG storage, which are summarized in Table 25 (below).

Table 25: Percentage of LNG Storage to Volumes[28]

Company	State/Province	Annual	Winter	Peak Day
National Grid MA	Massachusetts	5.04%	7.15%	39.32%
NSTAR Gas Company	Massachusetts	8.88%	12.70%	45.19%
Columbia Gas of MA	Massachusetts	3.44%	4.97%	26.47%
Connecticut Natural Gas	Connecticut	3.09%	4.50%	28.20%
Southern Connecticut Gas	Connecticut	3.27%	4.95%	29.33%
National Grid RI	Rhode Island	2.58%	3.68%	43.03%
Consolidated Edison	New York	0.70%	1.02%	11.13%
Union Gas	Ontario	0.11%	0.16%	2.53%
Enbridge Gas Distribution[29]	Ontario	NA	NA	NA
Average		3.39%	4.89%	28.15%
Median		3.18%	4.73%	28.77%
Highest Observation		8.88%	12.70%	45.19%
Lowest Observation		0.11%	0.16%	2.53%
Gaz Métro[30]	Quebec	1.00%	1.74%	16.65%

As shown in Table 25, the LNG storage quantity as a percent of annual demand is between 0.1% and 8.9% with Gaz Métro on the low end at 1%, which is higher than two observations. With respect to the LNG storage quantity as a percent of winter demand, the range is 0.2% to 12.7% with Gaz Métro again on the low end of the range, but higher than two of the LDCs reviewed. Finally, regarding the LNG vaporization to peak day metric, the range is 2.5% to 45.2% with Gaz Métro on the low end of the range, but higher than two of the observations.

Finally, Sussex combined the underground storage and LNG metrics to develop an integrated comparison of underground storage and LNG space relative to annual and winter demand; and underground storage withdrawal and LNG vaporization volumes relative to peak day requirements. The results of this analysis are summarized in Table 26 (below).

28 The "Average" and "Median" results do not include the percentages for Gaz Métro.
29 Please note that Enbridge Gas Distribution does not utilize LNG storage.
30 Gaz Métro's percentage of LNG storage to volumes are the same under the Base, High, and Low Cases.

Table 26: Percentage of Total Storage to Volumes[31]

Company	State/Province	Annual	Winter	Peak Day
National Grid MA	Massachusetts	22.14%	31.41%	57.47%
NSTAR Gas Company	Massachusetts	25.01%	35.76%	64.10%
Columbia Gas of MA	Massachusetts	21.58%	31.15%	48.25%
Connecticut Natural Gas	Connecticut	31.55%	46.05%	66.22%
Southern Connecticut Gas	Connecticut	33.25%	50.39%	68.05%
National Grid RI	Rhode Island	16.34%	23.28%	62.37%
Consolidated Edison	New York	18.08%	26.18%	40.86%
Union Gas	Ontario	18.08%	26.18%	39.85%
Enbridge Gas Distribution	Ontario	29.85%	43.22%	56.15%
Average		23.99%	34.85%	55.92%
Median		22.14%	31.41%	57.47%
Highest Observation		33.25%	50.39%	68.05%
Lowest Observation		16.34%	23.28%	39.85%
Gaz Métro Base Case	Quebec	9.75%	16.94%	40.75%
Gaz Métro High Case	Quebec	12.86%	22.33%	48.87%
Gaz Métro Low Case	Quebec	6.64%	11.54%	32.64%

On a combined basis, the range of underground storage and LNG space relative to annual demand is 16% to 33%, with the Gaz Métro cases (i.e., Base, High and Low Cases) all falling below the lowest observation of 16.34%. The results of the Winter metric are similar to the Annual Metric (i.e., the Gaz Métro cases (i.e., Base, High and Low Cases) all fall below the lowest observation in the range). Finally, with respect to the Peak Day metric, the Gaz Métro High Case was greater than three of the LDCs reviewed, while the Gaz Métro Base Case was greater than one of the LDCs reviewed.

As illustrated by the benchmarking analysis, the volume of storage or LNG in a specific LDC portfolio can vary. While the natural gas storage and LNG positions in the overall resource portfolio for an LDC are likely the result of the unique circumstances and issues related to the individual LDC, certain factors likely influence the portfolio development, including:

- Customer Composition: The LDC customer base and associated volume profile (e.g., heating vs. process) is a significant factor in the development of the LDC portfolio. For example, an LDC with a high number of industrial customers (i.e., year-round process load) will likely have a higher baseload requirement compared to an LDC with a high concentration of residential and commercial customers, which will have a higher level of

[31] The "Average" and "Median" results do not include the percentages for the Gaz Métro Base, High, or Low Cases.

winter or seasonal demand. Specifically, residential and commercial customers are more heat sensitive than the industrial segment, resulting in greater demand variability (i.e., load is primarily in the winter season and driven by weather conditions); therefore, an LDC that has high seasonal or peaking load will likely have a higher level of seasonal/peaking resources (e.g., natural gas storage, LNG or pipeline services).

- Services Offered: The service offerings of an LDC could also affect the resource portfolio. Specifically, if the larger, high load factor customers have opted to migrate from LDC sales service to transportation service, the load profile of the remaining LDC sales customers may be more seasonal (i.e., require storage or similar service). In addition, the level of service provided to transportation customers (e.g., hourly, daily, seasonal and other balancing services) could affect the portfolio of the LDC.
- Location of the Service Territory: The location of the LDC service territory is another factor that will influence the overall LDC portfolio. Specifically, an LDC that has access to natural gas production basins, supply hubs, and multiple pipelines will likely have a different portfolio than an LDC located at the end of a single pipeline. Similarly, an LDC that has access to a significant amount of on-system storage will likely have a different resource portfolio compared to an LDC that does not have such access. The location of the LDC will influence whether the LDC can negotiate with alternative pipelines/storage providers, develop its own resources (e.g., LNG), or some combination.
- Contiguous vs. Non-Contiguous Service Territory: An LDC that has a non-contiguous (i.e., geographically dispersed) service territory will likely have a different portfolio than a LDC serving contiguous areas. By way of example, an LDC that has non-contiguous service areas may contract on separate pipelines for each service area or may contract for different pipeline services for each specific area. Stated differently, the location of the service territory will influence the resource and contract types entered into by the LDC.
- Regulatory Precedent: The past rulings and findings of federal, provincial and state regulatory agencies, and the LDC interpretation of such rulings and findings, will likely affect the resources in the LDC portfolio. For example, the approved LDC planning standards (e.g., the LDC should plan on a design day weather condition equal to the coldest day in the past 50 years) will influence the size of the resource portfolio and assets/services in the portfolio.
- Natural Gas Pricing Indices and Liquidity: An important aspect of an LDC portfolio is access to price signals that are liquid and transparent. As such, an LDC portfolio may

be developed to ensure access to pricing points that are liquid and have forward price signals. In addition, other portfolio resources (e.g., natural gas storage) may lessen the exposure to a pricing point or index.

Although these factors may influence, to a certain degree, the type and level of resources developed or contracted by the LDC, the LDC portfolio will reflect its unique circumstances and situation.

Task 5 – Observations and Conclusions

Based on the analysis discussed herein, Sussex has the following observations and conclusions:

- Given the similarity between the Company's forecasted 2014/15 load duration curve and the actual load duration curves over the past 11 years (i.e., 2003/04 through 2013/14), storage resources will likely continue to be a significant component of Gaz Métro's supply portfolio.
- The Sussex storage quantity analysis focused on the physical hedge attribute or seasonal value of storage, and was based on an analysis of the historical and forecasted price spreads between winter and summer natural gas prices at the Dawn Hub.
- The Sussex analysis reviewed the value of storage space under various price patterns, and utilized the Company's 2015 Supply Plan, which includes forecasted demand, planned Union storage withdrawals and Dawn purchases, as the Base Case scenario.
- In addition to the Base Case, Sussex developed and analyzed a High Case scenario, which increased the Union storage capacity, withdrawals and injections by 50%, and a Low Case scenario, which decreased the Union storage capacity, withdrawals and injections by 50%.
- In the High Case scenario, the increase in storage volume allows Gaz Métro more balance regarding peak winter (i.e., December, January and February) volumes as Union withdrawals and purchases at the Dawn Hub were both approximately 20% of total demand. Thus, the increase in storage volumes in the High Case provides more price diversity in the peak winter (i.e., December, January and February) period.
- Conversely, in the Low Case scenario, the Union withdrawals represent approximately 7% of total demand during the peak winter period (i.e., December, January and February), compared to 13% and 20% in the Base and High Cases, respectively, resulting in a decrease in price diversity.

- [redacted]
- [redacted]
- As illustrated by the benchmarking analysis, the volume of storage or LNG in a specific LDC portfolio can vary as a result of the unique circumstances and issues related to the individual LDC. The type and level of resources developed or contracted by the LDC is likely influenced by certain factors such as customer composition, end-user service offerings, service territory (e.g., location, contiguous vs. non-contiguous), regulatory precedent, and natural gas price issues (e.g., liquidity).
- Based on a review of the storage positions of other northeastern North America LDCs, Gaz Métro’s storage withdrawal volumes are similar to the comparator group, albeit on the low end of the range, but Gaz Métro’s storage quantity is generally below the lowest observation. Specifically, on an annual basis, the Gaz Métro cases (i.e., Base, High, and Low Cases) not only fall below the average and median results, but the Gaz Métro High Case is also below the lowest observation for the comparator group. Similarly, on a winter basis, the Gaz Métro Base and Low Cases fall below the lowest observation for the comparator group, while the Winter metric for the Gaz Métro High Case is above only one of the observations.
- In addition, according to a survey conducted by the AGA of approximately 80 LDCs, 65 LDCs are keeping their existing storage plans and 14 LDCs are considering increasing storage capacity or availability subsequent to the 2013/14 winter period when LDCs in Canada and the eastern United States experienced higher demands as a result of prolonged colder than normal weather.[32]

[32] American Gas Association, “Promise Delivered: Planning, Preparation and Performance during the 2013-14 Winter Heating Season”, September 2014.

In conclusion, the benchmarking analysis illustrates that Gaz Métro is at or below the low end of the range with respect to storage quantity; and near the low end of the range regarding withdrawal volumes.

In addition, when supply diversity, price stability, and the benefits of the physical price hedge (i.e., the Sussex analysis) are considered, there may be benefits to Gaz Métro by increasing the level of natural gas storage under contract.

Finally, based on the experience and judgment of the Sussex project team, an LDC served by a single pipeline and located at the end of the pipeline (i.e., Gaz Métro) benefits from access to natural gas storage as it provides portfolio diversity, price stability and service reliability.

Gaz Métro should at a minimum not only maintain the existing off-system storage quantity but also consider increasing storage quantities to a level similar to the results of the benchmarking analysis (i.e., Gaz Métro High Case). Additional storage space, given the costs developed and reviewed herein, could be an effective strategy as the increase in annual demand costs could be offset by lower and more stable gas costs.

Sussex Project Team Biographies

James M. Stephens, Partner

Mr. Stephens has twenty-five years of experience in the energy industry and he has held senior management positions at consulting firms, energy marketing companies and natural gas utilities. Most recently, Mr. Stephens served as Senior Vice President for Concentric Energy Advisors, Inc. He has assisted numerous clients with regulatory policy strategy/tactics and energy market analyses/assessments including: the analysis of regional energy market dynamics and the associated drivers for new natural gas infrastructure (e.g., pipeline expansions); the evaluation of new markets/opportunities (e.g., distributed LNG); market entry/exit strategies (e.g., service territory or product/service expansions); market implications of new energy infrastructure (e.g., LNG facilities and pipelines); integrated resource plans (e.g., natural gas demand forecasting and resource portfolio analysis); natural gas supply portfolio evaluation and optimization (e.g., asset management agreements); and management prudence (e.g., implementation of risk management/portfolio strategies). In addition to his consulting experience, Mr. Stephens served as the President of a retail energy marketing firm where he was responsible for all aspects of business unit management including front, mid and back office functions. Mr. Stephens was also responsible for the Gas Supply Procurement and Portfolio Optimization function for a local distribution company. Mr. Stephens holds a B.S. in Management and an M.B.A. with a concentration in Operations Management from Bentley College.

Please find below Mr. Stephens' expert witness appearances:

SPONSOR	DATE	JURISDICTION	DOCKET NO.	SUBJECT
Union Gas	April, 2013	Ontario	Docket No. 2013-0109	Gas Supply Planning
Columbia Gas of Massachusetts	September, 2013	Massachusetts	Docket No. 13-158	Pipeline Capacity Contract
Gaz Métro	October, 2013	Quebec	Cause tarifaire 2014, R-3837-2013	Storage Utilization
Maine Public Utility Commission	February, 2014	Maine	Docket No. 2014-00071	Pipeline Open Season
Liberty Utilities (New England Natural Gas Company)	January, 2015	Massachusetts	Docket No. 14-91	Integrated Resource Plan

<u>Peter Newman, Executive Advisor</u>

Mr. Newman, who is an Executive Advisor with Sussex, has over thirty-five years of experience in various natural gas supply management roles for WE Energies. Specifically, Mr. Newman was responsible for managing all the natural gas supply functions including: long term supply planning and acquisition; natural gas purchasing strategies and execution; capacity portfolio optimization; development and implementation of risk management objectives and policies; and management of the gas control function. In addition, Mr. Newman participated in numerous Federal Energy Regulatory Commission proceedings with respect to natural gas pipeline expansions, rate proceedings, new services and other regulatory issues. Mr. Newman was also a key member of the management team that developed and built the Guardian Pipeline and, in that role, Mr. Newman contributed to a variety of activities, including: market development and project management, developing and implementing the open season process, market assessment, regulatory strategy and proceedings, capacity marketing and tariff development. Mr. Newman is an engineering graduate of the University of Wisconsin-Platteville.

<u>James Voss, Executive Advisor</u>

Mr. Voss, who is an Executive Advisor with Sussex, has twenty-five years of experience in the natural gas industry having held management positions at major Midwestern LDCs as well as unregulated energy marketing firms. He has extensive background and knowledge of gas trading and asset optimization, nominating and scheduling operations, pipeline-LDC system interfaces, gas supply portfolio planning, and related federal and state regulatory oversight. Mr. Voss is a graduate of the University of Wisconsin-Madison with a Masters in Finance from the University of Wisconsin-Milwaukee.

<u>Kim Nguyen, Managing Consultant</u>

Ms. Nguyen has ten years of consulting experience in the energy and utility industries. She has contributed to engagements involving regulatory strategy and market analyses including: the evaluation of regional energy market demand/supply dynamics, energy pricing and basis implications, and the associated drivers for new natural gas infrastructure; the development and evaluation of natural gas demand forecasts; and natural gas supply portfolio evaluation and optimization. Ms. Nguyen has also provided analytical support for expert witness testimony on a variety of issues including: cost of capital and capital structure, marginal costs studies, and expense and operating performance benchmarking. She has extensive experience in database development, researching regulatory and energy market issues, performing statistical analysis, and financial analysis and modeling. Ms. Nguyen holds a B.A. in Economics from Clark University, where she graduated summa cum laude and was a member of the Omicron Delta Epsilon Society.

Supporting Data for Benchmarking Analysis

Company	State / Province	Storage ACQ		Annual Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Boston Gas and Colonial Gas d/b/a National Grid	Massachusetts	6,098,163	20,700,698	121,061,000	MMBTU	Boston Gas Company/Colonial Gas Company, 2012/2013 - 2017/2018 Long-Range Resource and Requirements Plan, Docket No. DPU 13-01 - Table G-14, Table G22-N, Table G-24(A)
NSTAR	Massachusetts	3,650,000	6,624,681	41,088,000	MMBTU	NSTAR Gas Company, 2013/2014 to 2017/2018 Forecast and Supply Plan, Docket No. DPU 14-63 - Appendix 1 - Page 18, 24, 38
Bay State Gas d/b/a Columbia Gas of MA	Massachusetts	1,677,983	8,838,157	48,729,065	MMBTU	Bay State Gas Company d/b/a Columbia Gas of MA, 2013/2014 - 2017/2018 Forecast and Supply Plan, Docket No. DPU 13-161, Appendix 3 - Page 32, 34-35, 49
Connecticut Natural Gas	Connecticut	1,142,100	10,534,861	37,013,374	MMBTU	Connecticut Natural Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-06 - Exhibit S-1 (IV-8), Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18)
Southern Connecticut Gas	Connecticut	1,142,100	10,481,576	34,960,123	MMBTU	Southern Connecticut Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-05 - Exhibit S-1 (IV-8), Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18)
Narragansett Electric Co. d/b/a National Grid	Rhode Island	888,000	4,731,591	34,383,000	MMBTU	Gas Long-Range Resource and Requirements Plan for the Forecast Period 2013/14 to 2022/23, Docket No. 4494 - Chart-IV-C-1, Page 7, 28-29
Consolidated Edison & Orange and Rockland	New York	1,050,000	25,939,000	149,293,620	MMBTU	Docket No. 13-G-0031 - Forecasting Panel - Exhibit_(GFP-1); Gas Operations Panel - Page 82; Testimony of Peter Carnavos - Exhibit_(PTC-1) Schedule 3; Docket No. 08-G-1398 - Forecasting Panel - Exhibit G-3 Schedule 1

Company	State / Province	Storage ACQ		Annual Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Union Gas	Ontario	600,000	100,000,000	556,473,532	GJ	Docket No. EB-2014-0012 Application - Exhibit A Tab 1 Page 12; 2013-14 Gas Supply Plan Memorandum, April 2014 - Page 29; Docket No. EB-2013-0365 Prefiled Evidence - Working Papers, Schedule 5, Page 1-2
Enbridge Gas Distribution	Ontario	NA	126,359,700	423,341,053	GJ	Docket No. EB-2012-0459 Prefiled Evidence - Exhibit D1 Tab 2 Schedule 1 Page 9-10, Exhibit D3 Tab 3 Schedule 5 Page 1
Gaz Métro Base Case	Quebec	2,137,216	18,612,932	212,777,829	GJ	Based on Company provided data
Gaz Métro High Case	Quebec	2,137,216	25,225,222	212,777,829	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis
Gaz Métro Low Case	Quebec	2,137,216	12,000,642	212,777,829	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis

Company	State / Province	Storage ACQ		Winter Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Boston Gas and Colonial Gas d/b/a National Grid	Massachusetts	6,098,163	20,700,698	85,318,000	MMBTU	Boston Gas Company/Colonial Gas Company, 2012/2013 - 2017/2018 Long-Range Resource and Requirements Plan, Docket No. DPU 13-01 - Table G-14, Table G22-N, Table G-24(A)
NSTAR	Massachusetts	3,650,000	6,624,681	28,735,000	MMBTU	NSTAR Gas Company, 2013/2014 to 2017/2018 Forecast and Supply Plan, Docket No. DPU 14-63 - Appendix 1 Page 18, 24
Bay State Gas d/b/a Columbia Gas of MA	Massachusetts	1,677,983	8,838,157	33,758,388	MMBTU	Bay State Gas Company d/b/a Columbia Gas of MA, 2013/2014 - 2017/2018 Forecast and Supply Plan - Docket No. DPU 13-161, Appendix 3 Page 32, 34-35, 49
Connecticut Natural Gas	Connecticut	1,142,100	10,534,861	25,354,940	MMBTU	Connecticut Natural Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-06 - Exhibit S-1 (IV-8), Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18)
Southern Connecticut Gas	Connecticut	1,142,100	10,481,576	23,068,992	MMBTU	Southern Connecticut Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-05 - Exhibit S-1 (IV-8), Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18)
Narragansett Electric Co. d/b/a National Grid	Rhode Island	888,000	4,731,591	24,135,000	MMBTU	Gas Long-Range Resource and Requirements Plan for the Forecast Period 2013/14 to 2022/23, Docket No. 4494 - Chart-IV-C-1, Page 5, 28-29
Consolidated Edison & Orange and Rockland	New York	1,050,000	25,939,000	103,105,027	MMBTU	Docket No. 13-G-0031 - Gas Operations Panel - Page 82; Testimony of Peter Carnavos - Exhibit_(PTC-1) Schedule 3
Union Gas	Ontario	600,000	100,000,000	384,311,255	GJ	2013-14 Gas Supply Plan Memorandum, April 2014 - Page 29; Docket No. EB-2013-0365 Prefiled Evidence - Working Papers, Schedule 5, Page 1-2
Enbridge Gas Distribution	Ontario	NA	126,359,700	292,367,421	GJ	Docket No. EB-2012-0459 Prefiled Evidence - Exhibit D1 Tab 2 Schedule 1 Page 9

Company	State / Province	Storage ACQ		Winter Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Gaz Métro Base Case	Quebec	2,137,216	18,612,932	122,516,875	GJ	Based on Company provided data
Gaz Métro High Case	Quebec	2,137,216	25,225,222	122,516,875	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis
Gaz Métro Low Case	Quebec	2,137,216	12,000,642	122,516,875	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis

Company	State / Province	Storage MDQ		Peak Day Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Boston Gas and Colonial Gas d/b/a National Grid	Massachusetts	518,221	239,291	1,318,000	MMBTU	Boston Gas Company/Colonial Gas Company, 2012/2013 - 2017/2018 Long-Range Resource and Requirements Plan, Docket No. DPU 13-01 - Table G-14, Table G23-D, Table G-24(A)
NSTAR	Massachusetts	210,000	87,889	464,700	MMBTU	NSTAR Gas Company, 2013/2014 to 2017/2018 Forecast and Supply Plan, Docket No. DPU 14-63 - Appendix 1 Page 23-24, 49, Page 92
Bay State Gas d/b/a Columbia Gas of MA	Massachusetts	117,300	96,488	443,128	MMBTU	Bay State Gas Company d/b/a Columbia Gas of MA, 2013/2014 - 2017/2018 Forecast and Supply Plan, Docket No. DPU 13-161 - Appendix 3 Page 32, 34-35, 49
Connecticut Natural Gas	Connecticut	90,500	121,994	320,912	MMBTU	Connecticut Natural Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-06 - Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18), Exhibit S-5 (IV-23)
Southern Connecticut Gas	Connecticut	82,500	108,905	281,255	MMBTU	Southern Connecticut Gas, Forecast of Natural Gas Demand and Supply 2013-2017, Docket No. 12-10-05 - Exhibit S-3.2 (IV-13), Exhibit S-3.4 (IV-18), Exhibit S-5 (IV-23)
Narragansett Electric Co. d/b/a National Grid	Rhode Island	145,000	65,200	337,000	MMBTU	Gas Long-Range Resource and Requirements Plan for the Forecast Period 2013/14 to 2022/23, Docket No. 4494 - Chart-IV-C-1 Page 4, 28-29
Consolidated Edison & Orange and Rockland	New York	166,000	443,224	1,491,000	MMBTU	Docket No. 13-G-0031 - Testimony of Peter Carnavos - Exhibit_(PTC-1) Schedule 3, Exhibit_(PTC-1) Schedule 4, Exhibit_(PTC-1) Schedule 5
Union Gas	Ontario	90,000	1,328,137	3,559,000	GJ	Docket No. EB-2014-0012 Application - Exhibit A Tab 1 Page 12; 2013-14 Gas Supply Plan Memorandum, April 2014 - Page 21-22

Company	State / Province	Storage MDQ		Peak Day Volume	Unit of Measure	Data Source / Page Reference
		LNG	Underground			
Enbridge Gas Distribution	Ontario	NA	2,133,000	3,798,650	GJ	Docket No. EB-2010-0231 Application - Appendix C Page 15; Docket No. EB-2012-0459 Prefiled Evidence - Exhibit D4 Tab 3 Schedule 4 Page 1
Gaz Métro Base Case	Quebec	217,064	314,202	1,303,565	GJ	Based on Company provided data
Gaz Métro High Case	Quebec	217,064	419,950	1,303,565	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis
Gaz Métro Low Case	Quebec	217,064	208,454	1,303,565	GJ	Based on Company provided data and Sussex assumptions underlying the storage quantity analysis

Annexe 2 - Stratégie de renouvellement - Union Gas [redacted]

[redacted]