



OLTHUIS KLEER
TOWNSHEND - LLP

BARRISTERS AND SOLICITORS

Senwung Luk
sluk@oktlaw.com
416.981.9443
416-981-9350
74340

May 6, 2019

The Board of Commissioners of Public Utilities
Ms. G. Cheryl Blundon, Board Secretary
Prince Charles Building
210 - 120 Torbay Road,
St. John's, NL, A1A 2G8

Re: NLH Application re Network Addition Policy – Addendum to Report of Phil Raphals

Dear Ms Blundon,

Please accept the enclosed addendum to the report of Phil Raphals that was originally served on April 25, 2019, served on behalf of the Labrador Interconnected Group.

Should you have any questions, please be sure to contact me.

Respectfully,
Olthuis, Kleer, Townshend LLP
PER:

A handwritten signature in black ink, appearing to read 'Senwung Luk', written over a white background.

SENWUNG LUK
PARTNER

SL/tw



*Une expertise en énergie
au service de l'avenir*

May 6, 2019

Newfoundland and Labrador Hydro's Proposed Network Addition Policy and Transmission Expansion Study — Addendum

submitted to the
NL Public Utilities Board

on behalf of

the Labrador Interconnected Group

by

Philip Raphals
Executive Director
Helios Centre

326, boul. Saint-Joseph Est, bureau 100
Montréal (Québec) Canada H2T 1J2

Téléphone : (514) 849 7900
Télécopieur : (514) 849 6357
sec@centrehelios.org

www.centrehelios.org

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1. INTRODUCTION

I hereby acknowledge that I have a duty to the Public Utilities Board to give evidence that is fair, objective and non-partisan, and that is related only to matters within my expertise. I further acknowledge that my duty to assist the PUB overrides any duties to the Labrador Interconnected communities.

As noted in my report regarding the proposed Network Addition Policy, dated April 25, 2019,¹ the rapid growth of cryptocurrency mining (usually referred to by Hydro as “data centres” has been responsible for creating significant pressure on the Labrador transmission system (both East and West), and, to a large extent, for the circumstances leading to the Board’s decision to require the production of the NAP and the TES. Given this context, the Board’s review of the proposed NAP will likely take into account the degree to which the new policy succeeds in addressing the challenges created by cryptocurrency mining in Labrador, and the extent to which alternate means may be available to address that challenge. I am providing this addendum because of important information on this subject that arose immediately after I submitted my Report.

In section 4.3 of my Report, dedicated to “Cryptocurrency Issues”, I noted that, last year, a lengthy hearing was held before the Quebec Energy Board (the *Régie de l’énergie du Québec*, or “the Régie”) concerning a proposal by Hydro-Québec Distribution to create a block of energy to be reserved for cryptocurrency use and to auctioned off to the highest bidders, and that the Régie had not yet issued its decision in this matter.

The Régie issued its final decision on this matter on April 29, 2019, four days after my Report was filed.² The decision, coming after ten days of public hearings and thousands of pages of

¹ Raphals, P., NL Hydro’s Proposed Network Addition Policy and Transmission Expansion Study, submitted to the NLPUB on April 25, 2019 (the “Report”).

² Decision D-2019-052, “Décision finale, Étape 2” (Final Decision, Step 2) in docket R-4045-2018, Demande de fixation de tarifs et conditions de service pour l’usage cryptographique appliqué aux chaînes de blocs (Application for setting rates and service conditions for cryptographic use applied to blockchains), April 29, 2019.

evidence, addresses in depth many of the issues raised in my Report. To the best of my knowledge, it represents the most exhaustive examination of the issues raised by cryptocurrency mining ever undertaken by an energy regulator – and importantly for this Province, by a regulator of a neighbouring jurisdiction. The purpose of this Addendum is to present the Board the principal elements of that decision, to assist it in its deliberations.

The Régie issues its decisions in French only. While in some proceedings an intervenor has prepared a full translation and chosen to make it public, one cannot presume that this will occur. For this reason, in reviewing the Régie's conclusions in this Addendum, I may err on the side of completeness rather than brevity, given that the information may otherwise be inaccessible to the Board and the other participants. At the same time, it is important to emphasize that this document does not pretend to fully summarize the Decision, a 96-page decision that addresses many specific details of HQD's proposal. Rather, its intent is to point out the elements of that decision that this author considers relevant to the Board's deliberations.

In order to balance readability with precision, I will at times paraphrase the decision and at times quote it. When quoted, the translations are mine. In both cases, I reproduce the Régie's original text in a footnote, in order to allow verification of the translation and/or to give the reader access to nuances that may have escaped my description or translation.

2. CONTEXT

The hearing was held in response to an application by HQD to establish rates and conditions applicable to a new rate class targeting cryptographic use of blockchain technology, filed on June 14, 2018. HQD explained in its application that, since 2017, it has been subject to “sudden, massive and simultaneous requests for electricity to be used for cryptographic usage applied to

blockchains, in particular cryptocurrency mining, total several thousand megawatts.”³ It indicated that it cannot apply the usual practice of “first come, first served”, given the exceptional scale of the requests and their simultaneity.⁴ HQD already serves 158 MW of cryptocurrency load directly, and another 210 MW indirectly through the municipal distributors that it supplies.⁵

HQD’s application was filed following issuance by the Quebec government of an Order-in-Council and a Ministerial Order in June 2018. The stated purpose of Order-in-Council 646-2018, dated May 30, 2018, is to indicate to the Régie the government’s economic, social and environmental concerns with respect to its treatment of the consumers that use electricity for cryptographic purposes using blockchain technology.⁶ The Ministerial Order required HQD to suspend treatment of new service requests by consumers using electricity for cryptographic use applied to blockchains.⁷

As we shall see below, the Régie did not in fact base its decision on either of these two documents, but rather strictly on regulatory principles and the application of its governing legislation.

The process established by the Régie with regard to this application includes several phases. On July 13, 2018, less than one month after the initial application was filed, the Régie issued decision D-2018-084, which provisionally:

³ D-2019-052, para. [11] Le Distributeur indique qu’il fait face, depuis 2017, à des demandes soudaines, massives et simultanées pour l’utilisation de l’électricité dédiée à un usage cryptographique appliqué aux chaînes de blocs, notamment le minage de cryptomonnaies, qui totalisent plusieurs milliers de mégawatts.

⁴ D-2019-052, para. [12] Le Distributeur souligne qu’il ne peut appliquer à ces demandes la règle habituelle du « premier arrivé, premier servi », étant donné leur importance exceptionnelle et leur caractère simultané, et propose donc que la Régie fixe les tarifs et conditions de service auxquels l’électricité est distribuée pour un usage cryptographique appliqué aux chaînes de blocs par un processus de sélection des différentes demandes.

⁵ D-2019-052, para. 123.

⁶ R-4045-2018, doc. B-0004. http://publicsde.regie-enerq2#ie.qc.ca/projets/457/DocPri/R-4045-2018-B-0004-Demande-Piece-2018_06_14.pdf

⁷ Ibid.

- established a new rate class for cryptographic use applied to blockchains;
- suspended treatment of new service applications in this rate class; and
- established a dissuasive rate of 15 cents/kWh for any such use of electricity other than those already approved, including any such use by existing customers (substitution), or any increase in usage by existing blockchain customers.

On August 24, 2018, the Régie issued a procedural decision (D-2018-116), defining the subsequent steps in the proceeding. It accepted intervention requests from 15 entities, including:

- four companies carrying out cryptocurrency mining;
- two groups representing residential consumers;
- two groups representing commercial consumers;
- one group representing industrial consumers;
- one group representing sustainable development interests;
- two First Nations companies interested in pursuing projects including cryptocurrency mining;
- one agricultural organization developing a project including cryptocurrency mining;
- one municipality operating a municipal distributor of electricity; and
- the association of municipal distributors.

Step 2, for which the final decision was issued on April 29 (D-2019-052), included the principle conceptual choices; Step 3 will address the detailed implementation.

In its Step 2 decision, the Régie addressed the following issues, which will be summarized below:

- The creation of a new rate class;
- The definition of the new rate class;
- The size of the block of power reserved for the new rate class;
- The selection process; and
- The applicable rates.

3. THE RÉGIE'S DECISION WITH RESPECT TO CRYPTOGRAPHIC USE OF ELECTRICITY APPLIED TO BLOCKCHAINS

3.1. *The creation and definition of a new rate class*

As noted above, HQD asked the Régie to create a new rate class⁸ to apply to “cryptographic use applied to blockchains”, defined as follows:

The use of electricity for the purpose of operating computer equipment dedicated to cryptographic calculations which, in particular, serve to validate successive transactions made by users of a blockchain.⁹

It argued that this usage presents specific characteristics, creating additional risks flowing from a combination of factors which are associated with the usage rather than with a specific client.¹⁰

Among these characteristics specific to this sector of activity, HQD emphasizes that it is an energy-intensive sector which displays a high load factor, is fractionable, and for which the perennity is uncertain. HQD adds that the technology is evolving rapidly, that it can be used in any location, regardless of the site, and that energy consumption is strongly influenced by the market value of cryptocurrency. Furthermore, this sector requires rapid service connections and rapid scale-up of load. Finally, according to HQD, this rapidity of opening — and reciprocally of closing — of installations creates a risk for network infrastructure and supply that the utility must be able to mitigate.¹¹

⁸ Based on the wording of the *Act concerning the Régie de l'énergie*, the formal term for a rate class is a “class of consumers”.

⁹ HQD, Provisional Rates and Conditions of Service for Cryptographic Use Applied to Blockchains, R-4045-2018, document B-0035, http://publicsde.regie-energie.qc.ca/projets/457/DocPrj/R-4045-2018-B-0035-Demande-Piece-2018_07_17.pdf.

¹⁰ D-2019-052, para. [24] Dans son argumentation, le Distributeur soutient que la demande pour un usage cryptographique appliqué aux chaînes de blocs présente différentes caractéristiques particulières, rendant cette dernière davantage risquée. Il précise que le risque découle d'une combinaison de facteurs et non pas d'un facteur unique et qu'il est associé à l'usage et non pas à un client en particulier.

¹¹ D-2019-052, para. [25] Parmi ces caractéristiques propres à ce secteur d'activité, le Distributeur souligne qu'il s'agit d'un secteur énergivore présentant un facteur d'utilisation élevé, mobile et fractionnable, dont la pérennité est incertaine. Il ajoute que l'on y observe une évolution rapide de la technologie, qui peut d'ailleurs être utilisée dans n'importe quel endroit, sans importance quant au lieu du site, et où la consommation d'électricité est fortement influencée par le cours des cryptomonnaies. De plus, ce secteur d'activité demande des raccordements et des montées en charges rapides. Enfin, selon le Distributeur, cette rapidité de mise en place et, réciproquement de fermeture, engendre un risque lié aux infrastructures de réseau et à l'approvisionnement qu'il doit être en mesure de mitiger.

The Régie summarized the positions of the various intervenors, only a few of which will be mentioned here.

According to Bitfarms¹², rates for cryptocurrency customers should instead be set based on their load profile.¹³

Vogogo, another large cryptocurrency miner, also opposed the proposal:¹⁴

Vogogo submits that ratemaking by end use generally goes against basic ratemaking principles and best practices in the industry. Creating a new rate class is an exceptional measure and should be treated as such. As this measure is discriminatory, since most other consumers are not treated based on their use, it must be limited so as to respond only to the concerns justifying its application.

Vogogo is opposed to the new rate class including customers with an existing service contract, and to the creation of a new rate class whose purpose is to impose more onerous terms on a single industry, without legitimate reasons.

The intervenor argues that the concerns raised by the government in the OIC affect principally requests by new customers. Nothing, in its view, justifies the inclusion of existing customers in the new rate class.

The Canadian Federation of Independent Business (CFIB) called for a more narrow definition:

¹² Bitfarms, a company traded on the Tel Aviv stock exchange with a pending application on the Toronto stock exchange as well, played a very active role in the hearing. It has four installations in Quebec with over 100 employees, consuming 27.5 MW for cryptocurrency operations. Its current development projects would add an additional 135 MW, and it envisages additional projects which would add another 200 to 300 MW.

¹³ D-2019-052, para. [35] Bitfarms est d'avis que le Distributeur devrait plutôt traiter tous les clients associés à l'usage cryptographique en fonction de leur profil de charges. L'intervenante s'attend à être traitée de façon juste, raisonnable et équitable par le Distributeur, ce dernier détenant un monopole exclusif sur le territoire québécois.

¹⁴ D-2019-052, para. [55] Vogogo soumet que la tarification à l'usage va généralement à l'encontre des grands principes tarifaires et des meilleures pratiques de l'industrie. La création d'une nouvelle catégorie de consommateurs est une mesure exceptionnelle qui doit être traitée comme telle. Cette mesure étant discriminatoire, puisque la plupart des autres consommateurs ne sont pas traités sur la base de l'usage, elle doit être encadrée de manière à répondre aux préoccupations justifiant sa mise en place, et pas davantage.

[56] Vogogo s'oppose à ce que la nouvelle catégorie de consommateurs inclut les clients ayant un abonnement existant ou que soit créée une nouvelle catégorie dont la finalité est d'imposer à une industrie des tarifs et conditions plus onéreux, sans motifs légitimes.

[57] L'intervenante soutient que les préoccupations énoncées par le gouvernement dans le Décret touchent principalement la problématique liée aux demandes de nouveaux clients. Rien, à son avis, ne justifie d'inclure dans la définition de la nouvelle catégorie de consommateurs des clients existants.

The CFIB seeks to avoid harming certain applications that are not problematic with respect to energy consumption, noting that the only energy-intensive application [of blockchain technology] is for cryptocurrency mining. It affirms that the only equipment that can be profitably used for this purpose are *Application-Specific Integrated Circuit (ASIC)* designed for this purpose. It recommends limiting the tariff to consumption of more than 50 kW by ASIC designed for cryptocurrency mining.¹⁵

The RNCREQ, a province-wide organization that defends sustainable development¹⁶, emphasized that the purpose of the proceeding was to limit the impacts of a highly energy intensive activity, but that many applications of the cryptography applied to blockchains are not energy intensive. It therefore urged the Régie to focus its definition on cryptocurrency mining.¹⁷

The Régie concluded that the evidence offers indication of the considerable potential demand related to this new industry, making it necessary to establish a framework for it. Echoing HQD's application, it found that this new clientèle has several characteristics in common :

- It is energy intensive, with a high load factor;
- It is mobile and fractionable,
- The technology can be used in any location without regard to the emplacement of the site;
- Its perennity is uncertain, and the technology is evolving rapidly,
- The energy consumption is strongly influenced by the market price of cryptocurrencies, and
- There are requests for rapid service connections and rapid scale-up of load.¹⁸

¹⁵ D-2019-052, para. [45] La FCEI veut éviter de nuire à certaines applications qui ne posent pas d'enjeu du point de vue de la consommation d'énergie, notant que le seul usage énergivore est le minage de cryptomonnaies. Elle affirme que les seuls équipements utilisables de manière rentable pour cette activité sont les équipements *Application-Specific Integrated Circuit (ASIC)* conçus pour cette application. Elle recommande donc de limiter le tarif pour usage cryptographique à une consommation de plus de 50 kW par les appareils ASIC conçus pour le minage de cryptomonnaies.

¹⁶ The undersigned prepared evidence for the RNCREQ in this proceeding.

¹⁷ D-2019-052, para. [47] Le RNCREQ souligne que la raison d'être de la nouvelle catégorie tarifaire est d'encadrer les usages hautement énergivores. Selon lui, tout usage cryptographique appliqué aux chaînes de bloc n'est pas également énergivore, le minage de cryptomonnaies présentant la plus forte consommation énergétique. De l'avis de l'intervenant, la Régie devrait cibler l'activité de minage de cryptomonnaies.

¹⁸ D-2019-052, para. [71] Sans avoir à se prononcer sur le niveau exact des demandes reçues par le Distributeur, ni sur la solidité financière des demandeurs, la Régie juge que la preuve présentée par le Distributeur ainsi que par

It concluded:

[73] The Régie agrees with HQD that it is the combination of these characteristics that makes these loads riskier than that of other clients. In effect, the risk is more tied to the type of usage than to any particular client. ...

[75] According to the Régie, the short life cycle of the equipment, combined with the difficulty of financing these companies, may increase the risk to the perennity of companies in this sector if the gradual decline in the profitability of older equipment, combined with the fluctuations in the market price of cryptocurrencies, does not allow them to generate sufficient liquidity to renew their equipment.¹⁹

The Régie cited HQD's comments with respect to risk:

“Another important characteristic, resulting from the equipment used, is the speed with which new loads can be put in service. It is a situation very different from loads of comparable size in other sectors of the economy, like a mine or a factory. The increase in loads in these examples are predictable and gradual. ... This rapidity of opening — and reciprocally of closing — of installations creates a risk for network infrastructure and supply that the utility must be able to mitigate.”²⁰ (underlining added by the Régie)

plusieurs intervenants offre une indication de l'ampleur considérable de la demande potentielle provenant de cette nouvelle industrie. La Régie considère que l'ampleur de cette demande potentielle suffit à démontrer la nécessité de l'encadrer.

[72] La Régie constate également que cette nouvelle clientèle présente les caractéristiques similaires suivantes :

- secteur énergivore présentant un facteur d'utilisation élevé;
- secteur d'activité mobile et fractionnable;
- technologie utilisée dans n'importe quel endroit et sans égard au lieu du site;
- pérennité incertaine, évolution rapide de la technologie;
- consommation fortement influencée par le cours des cryptomonnaies;
- demandes pour des raccordements et des montées en charge rapides.

¹⁹ D-2019-052, para. [73] La Régie convient, avec le Distributeur, que c'est la combinaison de ces caractéristiques qui rend cette demande plus risquée que celle des autres clients. En effet, le risque est davantage lié à l'usage plutôt qu'à un client en particulier. ...

[75] Selon la Régie, le court cycle de vie des équipements, combiné aux difficultés de financement des entreprises, peut augmenter le risque de pérennité des entreprises du secteur si l'effritement de rentabilité des anciens équipements, combiné aux fluctuations du cours des cryptomonnaies, ne permettent pas de générer les flux monétaires nécessaires pour renouveler le parc d'équipements.

²⁰ D-2019-052, para. [76] Par ailleurs, comme le souligne le Distributeur, les montées en charge très rapides de cette industrie représentent également un risque additionnel :

« Une autre caractéristique importante, découlant toujours de l'équipement utilisé, est la rapidité avec laquelle les charges peuvent être mises en service. Il s'agit d'une situation sans commune mesure avec des charges de taille comparable dans d'autres secteurs de l'économie, comme par exemple une mine ou une usine, dans le domaine

The Régie concludes this section as follows:

[78] In this context, the Régie shares the view of UC [Union des consommateurs] whereby it is essential to establish an appropriate rate structure by creating a new class of consumer, which will allow HQD to manage electricity demand for this particular usage.

[79] While ratemaking based on end use is not among best practices in ratemaking, it may in certain cases be necessary.

[80] The alternative consisting of using an energy density criterion, such as 250 kWh/square foot per year, is difficult to measure and may be circumvented by spreading equipment over a large area. This energy density criterion, adopted in 2014 by the regulator in Chelan County, Washington, to respond to the strong demand from cryptocurrency miners, has since been withdrawn, in the summer of 2018, from the definition proposed by the Chelan County PUD Staff.

[81] The Régie considers that, considering the scope of the potential demand from this new sector of activity and in the absence of any framework allowing it to limit HQD's obligation to serve, HQD could be obliged to issue new tenders for long-term supply of electricity, both for energy and for power.

[82] Considering the risk tied to the perennity of this new sector of activity, the Régie agrees that HQD can have no certainty as to the presence of these loads in the medium and long term, which could eventually lead to substantial surplus purchases. The creation of a new class of consumers for cryptographic use applied to blockchains appears to be necessary in order to limit the supply to be dedicated to this new sector of activity.

[83] It is the Régie's view that, because of the particular context of the Application and the similar consumption characteristics of customers using the technology associated with blockchain, it is appropriate to create a new class of consumers for cryptographic use applied to blockchains.²¹

manufacturier. Les montées en charge de ces exemples sont prévisibles et graduelle contrairement au secteur d'activités faisant l'objet de la présente instance. Cette rapidité de mise en place et, réciproquement, de fermeture, engendre un risque lié aux infrastructures de réseau et à l'approvisionnement que le Distributeur doit être en mesure de mitiger »³². [nous soulignons]

²¹ D-2019-052, para. [78] Dans ce contexte, la Régie partage la position de l'UC selon laquelle il est essentiel de mettre en place un encadrement tarifaire et de créer une nouvelle catégorie de consommateur, permettant ainsi au Distributeur de contrôler les demandes d'électricité pour cet usage particulier.

[79] Bien que la tarification selon l'usage ne fasse pas partie des meilleures pratiques en matière de tarification, elle peut, dans certains cas, s'imposer.

[80] L'alternative consistant à utiliser plutôt un critère de densité énergétique, tel que 250 kWh/pied carré par année, est difficilement mesurable et peut être contourné par un étalement des équipements sur une vaste superficie. Ce critère de densité énergétique, adopté en 2014 par le régulateur du Chelan County dans l'État de Washington pour faire face à la forte demande des mineurs de cryptomonnaies, a d'ailleurs été retiré, à l'été 2018, de la définition proposée par le personnel technique du Chelan County PUD³⁵.

Considering the application of the new rate class to customers that already have service contracts, the Régie wrote as follows:

[111] ... [T]he Régie is of the view that a class that covers a specific end use must include all customers employing that end use, without distinction.

[112] **In consequence, the Régie clarifies that all customers employing cryptographic use applied to blockchains with an installed capacity of at least 50 kW, including customers with an existing service contract as well as those that will eventually be accepted under the selection process, will be included in the new class of consumers.**²²

3.2. Obligation to serve

Under Quebec legislation, HQD has an exclusive right to distribute electricity throughout Quebec, except in the territories of the eight municipal distributors and one existing regional electricity cooperative. The relevant provision reads as follows:

76. The electric power distributor [HQD], municipal electric power systems and the Coopérative régionale d'électricité de Saint-Jean-Baptiste de Rouville are required to distribute electric power to every person who so requests within the territory where their exclusive rights obtain.

The Régie may dispense the electric power distributor, a municipal electric power system or the Coopérative régionale d'électricité de Saint-Jean-Baptiste de Rouville, at the request of a

[81] La Régie estime que, considérant l'ampleur de la demande potentielle provenant de ce nouveau secteur d'activités et en l'absence d'encadrement permettant de limiter l'obligation de desservir du Distributeur, ce dernier pourrait devoir lancer de nouveaux appels d'offres pour des approvisionnements de long terme, tant en énergie qu'en puissance.

[82] Considérant le risque lié à la pérennité de ce nouveau secteur d'activités, la Régie convient que le Distributeur n'a aucune certitude quant à la présence de ces charges à moyen et long terme, ce qui pourrait se traduire par des surplus importants à terme. La création d'une nouvelle catégorie de consommateurs d'électricité pour un usage cryptographique appliqué aux chaînes de blocs paraît donc nécessaire afin de limiter l'offre dédiée à ce nouveau secteur d'activité.

[83] La Régie est d'avis qu'en raison du contexte particulier de la Demande et des caractéristiques de consommation similaires de la clientèle utilisant la technologie associée aux chaînes de blocs, il est approprié de créer une nouvelle catégorie de consommateurs pour un usage cryptographique appliqué aux chaînes de blocs.

²² D-2019-052, para. [111] De plus, la Régie est d'avis qu'une catégorie qui encadre un usage spécifique doit inclure l'ensemble des clients faisant un tel usage, sans distinction.

[112] En conséquence, la Régie précise que tous les clients ayant un usage cryptographique appliqués aux chaînes de blocs dont la puissance installée est d'au moins 50 kW, y compris les clients détenant un abonnement existant ainsi que les clients qui seront retenus au terme du processus de sélection, seront inclus à la nouvelle catégorie de consommateurs.

consumer or at their request, from complying with a request under this section only if the service may be provided in an equivalent manner and under equivalent conditions by another source of energy and if the Régie is of the opinion that the cost of the service requested would not be borne by the consumer.

In its decision, the Régie wrote:

[166] The Régie is of the view that this obligation to serve must be read and interpreted in light of the other provisions of the Act. In applying the principle of internal coherence, the Act must be interpreted such that there are no contradictions, so that each provision may be applied without entering into conflict with another provision: ...

[167] According to the Régie, to consider the obligation to serve set out in the first paragraph of s. 76 of the Act as absolute would be counter to the overall purpose of the Act and to the exclusive jurisdiction conferred on the Régie by the Legislator. In particular, s. 31 of the Act grants the Régie exclusive jurisdiction over rates and conditions of distribution of electricity and to oversee the operations of distribution of electricity in order to ensure that consumers have sufficient supply.

[168] As well, ss. 48 ff. of the Act set out the Régie's responsibilities with respect to ratemaking. ...

[169] to recognize an absolute obligation on the part of HQD to supply electricity would not allow the Régie to fully exercise its powers with regard to ratemaking and to oversight of the operations of distribution of electricity.²³

The Régie continued:

²³ D-2019-052, para. [166] La Régie est d'avis que cette obligation de desservir doit être lue et interprétée à la lumière des autres dispositions de la Loi. En application du principe de cohérence interne, la Loi doit être interprétée pour qu'il n'existe pas de contradictions, de manière à ce que chaque disposition puisse s'appliquer sans entrer en conflit avec une autre: ...

[167] Selon la Régie, qualifier l'obligation de desservir prévue au premier alinéa de l'article 76 de la Loi d'absolue irait à l'encontre de l'objectif général de la Loi ainsi qu'aux compétences exclusives conférées à la Régie par le législateur. Notamment, l'article 31 de la Loi accorde à la Régie une compétence exclusive sur les tarifs, les conditions de distribution d'électricité et la surveillance des opérations de distribution d'électricité afin de s'assurer que les consommateurs aient des approvisionnements suffisants.

[168] De même, les articles 48 et suivants de la Loi édictent les responsabilités de la Régie et ses pouvoirs en matière de tarification. L'article 52.1 de la Loi précise les considérations qui entrent en ligne de compte lors de la fixation d'un tarif de distribution d'électricité et renvoie aux paragraphes 6 à 10 du premier alinéa de l'article 49 de la Loi.

[169] Reconnaître une obligation absolue de la part du Distributeur de fournir l'électricité ne permettrait pas à la Régie d'exercer pleinement ses pouvoirs en matière de tarification et de surveillance des opérations de distribution d'électricité.

[171] According to the Régie, for the reasons set out above, it is justified to limit HQD's obligation to serve by authorizing the creation of a block dedicated to the usage described in this file. Furthermore, the fact of limiting the number of megawatts available to respond to the demand associated with this usage makes it possible to attain a balance between individual and collective needs, in particular given the scale of the demand, the need to proceed to new purchases of capacity and energy to respond to it and the uncertain nature of this new industry. To not impose this limitation on the obligation to serve could have an impact on the availability of supply and the cost of electricity for all customers. ...

3.3. Curtailment during peak periods

In its proposal, HQD proposed an obligatory curtailment for at most 300 hours per year, "in order to take into account the risks inherent in this new customer class". It argued that this would allow it to avoid having to acquire additional capacity to serve this new class, as well as avoiding purchases of energy during peak hours.²⁴ According to HQD:

[129] The interruptibility of this customer class would constitute an efficient means of managing the grid and is not a significant issue for this clientele. It would make it possible to avoid other market purchases or other peak management means that would entail additional costs for the remaining clientele, and would not harm the integrity of the blockchain operations.²⁵

Given the likely temptation of cryptocurrency miners to not curtail when requested, HQD suggests that it is essential that their supply be declared non-firm with a penalty imposed if interruption requests are not respected, rather than requesting voluntary adherence to a demand management program, to mitigate their impacts on the utility's capacity and energy balances.

²⁴ D-2019-052, para. [127] En plus d'une limitation des quantités d'électricité disponible pour la nouvelle catégorie de consommateurs d'électricité ayant un usage cryptographique appliqué aux chaînes de blocs, le Distributeur propose une obligation d'effacement en pointe, à sa demande, pour 300 heures par année, afin de prendre en compte les risques inhérents à cette nouvelle catégorie de consommateurs.

[128] À cet égard, le Distributeur soumet que l'effacement de 300 heures par année permettrait d'éviter le besoin pour un approvisionnement supplémentaire en puissance ainsi que des achats d'énergie aux heures les plus chargées. Il précise d'ailleurs ne pas avoir la capacité d'accepter, dans de courts délais, ces charges sur son réseau si ces dernières ne sont pas en mesure de s'effacer au besoin.

²⁵ D-2019-052, para. [129] Selon le Distributeur, l'interruptibilité de cette catégorie de consommateurs constituerait un moyen de gestion efficace du réseau et ne représente pas un enjeu pour cette clientèle. Elle permettrait d'éviter des achats sur les marchés ou autres moyens de gestion pouvant engendrer des coûts additionnels pour le reste de la clientèle, sans nuire à l'intégrité des opérations de la chaîne de blocs.

Furthermore, in a voluntary program, it would be necessary to remunerate the participating customers, which would create additional upward pressure on rates for the clientele as a whole.²⁶

HQD also notes that the municipal distributors share this point of view, as they have also included provisions requiring obligatory curtailment without compensation in their agreements with their existing blockchain customers.²⁷ (A copy of one such agreement was attached to my Report as Appendix A.)

Finally, HQD also points out that it has offers other rates that are non-firm and require curtailment under certain circumstances, including a promotional rate for re-industrialization and a backup rate for self-generators using forest biomass.²⁸

The Régie accepted HQD's proposal to require all blockchain customers to curtail their usage for up to 300 hours per year, at HQD's discretion:

[173] According to the Régie, it is just and reasonable that the risks inherent in the cryptocurrency mining industry be compensated globally by a limitation in the amount of electricity available for this usage and, individually, by the fact that the cost of infrastructures to interconnect be borne by the customer *as well by as the obligation to curtail during a maximum of 300 hours during system peak.*

[174] Consequently, the Régie judges that it is prudent to limit, in the context of the present file, the energy dedicated to cryptographic use applied to blockchains to 668

²⁶ D-2019-052, para. [130] Compte tenu de la nature importante de ces charges et du fait que ces clients pourraient être enclins à ne pas s'effacer pour tirer parti des activités de minage, le Distributeur juge qu'une alimentation non ferme prévoyant une pénalité en cas de non-respect de la demande d'interruption, plutôt qu'une adhésion volontaire aux programmes de gestion de la demande en puissance, serait essentielle aux fins de mitiger les impacts sur ses bilans en puissance et en énergie.

[131] Par ailleurs, dans le cas d'une adhésion obligatoire à un programme de gestion de la demande en puissance, des coûts supplémentaires pourraient être encourus par le Distributeur pour rémunérer ces clients, ce qui pourrait occasionner une pression à la hausse sur les tarifs de l'ensemble de la clientèle.

²⁷ D-2019-052, para. [132] Le Distributeur note que les réseaux municipaux partagent la même vision du marché, puisqu'ils ont également inclus dans les ententes avec des clients de ce secteur des clauses de délestage sans rémunération, leur permettant ainsi de gérer leur facture.

²⁸ D-2019-052, para. [133] Enfin, le Distributeur soumet que ce moyen de gestion est utilisé dans d'autres tarifs. Par exemple, il offre un service non ferme aux clients qui adhèrent à l'option d'électricité additionnelle ou au tarif de relance industrielle. Ces clients sont tenus de réduire leur consommation en période de restriction, sans compensation, à sa propre demande. Le Distributeur offre aussi le tarif LD sur une base non ferme aux producteurs autonomes ayant une source d'énergie électrique produite à partir de biomasse forestière.

MW. This represents a considerable quantity of energy. The Régie points out that it is more than twice as large as the amount of power expected to be required from HQD by the 34 data centres in Quebec, estimated to require 334 MW at maturity.

[175] The creation of a dedicated block will make it possible, in limiting it to 300 MW and in requiring curtailment during 300 hours, to avoid the need to acquire additional capacity or energy purchases during peak hours. In so doing, the proposal makes it possible to limit the impact on supply costs for HQD and its clientele, while maintaining an adequate safety margin to respond to load growth from other sectors, all the while respecting criteria for energy reliability. ...

[177] For these reasons, the Régie authorizes the creation, for the customer class of cryptographic use applied to blockchains, of a dedicated block of 300 MW (plus or minus 10%) with non-firm service, including an obligation of curtailment at peak for 300 hours per year at the request of HQD. ²⁹ *(italics added)*

3.4. The selection process

Much of the hearing and the decision are dedicated to the procedure for allocating the 300 MW block among applicants. HQD had proposed a sort of auction, whereby each applicant would

²⁹ D-2019-052, para. [171] Selon la Régie, pour les motifs qui précèdent, il est justifié de limiter l'obligation de desservir du Distributeur en autorisant la création d'un bloc dédié pour l'usage visé, au présent dossier. De plus, le fait de limiter la quantité de mégawatts disponibles pour répondre à la demande liée à cet usage permet d'atteindre un équilibre entre les besoins individuels et collectifs, notamment en raison de l'importance de la demande, de la nécessité de procéder à de nouveaux achats en énergie et en puissance pour y répondre et de la nature incertaine de cette nouvelle industrie. Ne pas imposer cette limitation à l'obligation de desservir pourrait avoir un impact sur la disponibilité des approvisionnements et les coûts de l'électricité pour l'ensemble des consommateurs. ...

[173] Selon la Régie, il est juste et raisonnable que les risques inhérents à l'industrie du minage de cryptomonnaies soient compensés globalement par la limitation des quantités d'électricité disponible pour cet usage et, individuellement, par le fait que le coût de raccordement des infrastructures soit à la charge du client ainsi que par l'obligation d'effacement en pointe pour un maximum de 300 heures.

[174] Par conséquent, la Régie juge qu'il est prudent de limiter, dans le cadre du présent dossier, l'énergie dédiée à l'usage cryptographique appliqué aux chaînes de blocs à 668 MW. Cela représente déjà une quantité d'énergie considérable. La Régie tient à préciser qu'il s'agit d'une quantité deux fois plus importante que l'appel de puissance attendu par le Distributeur pour l'ensemble des 34 centres de données installés au Québec, estimé à 334 MW à maturité.

[175] La création d'un bloc dédié permet, en le limitant à 300 MW et en prévoyant un effacement de 300 heures, d'éviter le besoin pour un approvisionnement supplémentaire en puissance ainsi que des achats d'énergie aux heures les plus chargées. Ce faisant, cette proposition permet de limiter l'impact sur les coûts d'approvisionnement du Distributeur et de sa clientèle, tout en conservant une marge de manoeuvre suffisante pour répondre à la croissance de la demande attribuable aux autres secteurs d'activités, le tout dans le respect du critère de fiabilité en énergie. ...

[177] Pour ces motifs, la Régie autorise la création, pour la catégorie de consommateurs d'électricité pour un usage cryptographique appliqué aux chaînes de blocs, d'un bloc dédié de 300 MW en service non ferme, avec une marge de plus ou moins 10 %, comprenant une obligation d'effacement en pointe pour 300 heures par année à la demande du Distributeur.

propose an energy rate that had to be at least 1¢/kWh greater than the regular energy rate. This “bid” would be attributed a 70% weighting in the selection process. The remaining points were equally divided between:

- Number of direct jobs in Quebec per MW,
- Total wages for direct employment in Quebec per MW, and
- Investment in Quebec/MW.

This proposal was apparently inspired by s. 3 of the OIC, which states that:

It is therefore ordered, on recommendation of the Minister of Energy and Natural Resources:

That be indicated to the Régie de l'énergie the following economic, social and environmental concerns relative to the consumption of electricity for cryptographic use applied to blockchains: ...

The consumers of this class should have access to innovative rate solutions intended to: ...

c) allow for the maximization of Hydro-Quebec's revenues.³⁰

However, the Régie found that, with respect to the government's concerns with relation to maximizing Hydro-Quebec's revenues, “it is necessary to interpret the Order-in-Council such that it is in conformity with the Act”, which gives the Régie exclusive jurisdiction to set rates and obliges it to ensure that consumers have sufficient supply and that rates are just and reasonable.³¹

³⁰ Order-in-Council 646-2018.

Il est ordonné, en conséquence, sur la recommandation du ministre de l'Énergie et des Ressources naturelles :
Que soient indiquées à la Régie de l'énergie les préoccupations économiques, sociales et environnementales suivantes relatives à l'encadrement des consommateurs d'électricité pour un usage cryptographique appliqué aux chaînes de blocs :

Les consommateurs de cette catégorie devraient avoir accès à des solutions tarifaires innovantes visant à : ...

c) permettre la maximisation des revenus d'Hydro-Québec;

³¹ D-2019-052, para. [277] La Régie partage l'avis de plusieurs intervenants selon lequel elle doit interpréter le Décret de manière à ce qu'il soit conforme à sa Loi. Ainsi, en ce qui a trait à la préoccupation du gouvernement relative à la maximisation des revenus d'Hydro-Québec, la Régie est d'avis qu'il y a lieu d'interpréter cette préoccupation de manière à ce qu'elle soit conforme à la Loi. Cette dernière accorde à la Régie la compétence exclusive de fixer les tarifs de distribution d'électricité et l'oblige à s'assurer que les consommateurs aient des approvisionnements suffisants et que les tarifs soient justes et raisonnables.

It concluded:

[280] The Régie is also of the view that the rate auction proposed by HQD, whereby customers would be subject to the rate set out in their proposals, is counter to good ratemaking practice, it would create a discriminatory situation, without reasonable justification, not only between different customers using cryptography applied to blockchains, but also between different classes of customers. In effect, the customers participating in this auction would be the only customers whose rates would be set based on a rate auction.

[281] Consequently, the Régie considers the minimal increase of 1¢/kWh based solely on maximization of revenues for HQD from this clientele to be unreasonable. ...³²

With respect to financial securities, the Régie found that the requirement to produce a letter of credit corresponding to \$10/kW and a guarantee equivalent to one year's consumption at 1¢/kWh (approximately two months' billings) was reasonable, given that the customer must also pay "the totality of the associated connection costs for the transmission and distribution systems, before work begins."³³ (underlining added)

Intervenors made a number of other recommendations regarding the criteria to use in the selection process, only one of which was retained by the Régie: the extent to which the heat

³² D-2019-052, para. [280] La Régie est également d'avis que l'encan tarifaire proposé par le Distributeur, au terme duquel les clients seraient assujettis au tarif indiqué dans leur proposition, va à l'encontre des bonnes pratiques tarifaires en créant une situation discriminatoire, sans motifs raisonnables, entre les différents clients faisant un usage cryptographique appliqué aux chaînes de blocs, mais également entre les différentes catégories de consommateurs. En effet, les clients visés seraient les seuls dont les tarifs seraient fixés à la suite des résultats obtenus dans le cadre d'un encan tarifaire.

[281] Conséquemment, la Régie considère que la majoration minimale de 1 ¢/kWh sur la seule base de la maximisation de revenus pour le Distributeur auprès de cette clientèle est déraisonnable. ...

³³ D-2019-052, para. [289] La Régie juge que la clause de garantie équivalente à un an de consommation à 1 ¢/kWh, laquelle représente environ deux mois de facturation est raisonnable, considérant que les soumissionnaires n'auront que peu ou pas d'historique financier requis à l'établissement d'une cote de crédit, puisqu'il s'agit d'une nouvelle industrie.

[290] Selon la Régie, les garanties financières faisant parties des exigences minimales, à savoir, une garantie de soumission prenant la forme d'une lettre de crédit correspondant à 10 ¢/kW et une garantie équivalente à un an de consommation à 1 ¢/kWh, devraient permettre de couvrir les éventuelles pénalités pour non-respect des engagements de la part d'un client.

[291] La Régie convient que ces garanties et conditions, incluant le fait que la totalité des coûts associés aux travaux de raccordement aux réseaux de transport et de distribution seront à la charge du client et perçus avant la réalisation des travaux, sont suffisantes et justifient l'absence de critère basé sur la capacité financière dans la grille de sélection proposée. (underlining added)

given off by the cryptographic use of electricity is recovered to displace other heating requirements. The Régie's final weighting of criteria is 30% for each of the three criteria mentioned in the first paragraph of section 3.4 on page 16, above, plus 10% for the heat recovery criterion.³⁴

3.5. Dissuasive rate

The Régie also approved the dissuasive rate of 15 cents/kWh for any use of electricity for cryptographic use applied to blockchains, other than usage authorized under the new rate class.³⁵

As noted on page 15 of my Report, according to testimony presented by a large bitcoin company at the Régie hearing, bitcoin mining produces revenues of about 14¢ per kWh consumed³⁶. As these revenues must cover all other business costs and a profit margin as well, bitcoin mining would clearly be uneconomic at 15¢/kWh. It is therefore to be expected that, of the thousands of MW of service applications and expressions of interest received by HQD, all but the 300 MW that obtain contracts under the forthcoming selection process will have to look elsewhere for their power needs.

As noted on pp. 47-48 of my Report, in the event that the Board establishes a process whereby transmission upgrades would be undertaken to meet new cryptocurrency mining loads and the upfront costs to new users were not prohibitively high, it would not be surprising if some of these companies were to turn their attention to Labrador.

³⁴ D-2019-052, Tableau 4, page 81.

³⁵ D-2019-052, para. [379] Pour ces motifs, la Régie fixe à 15 ¢/kWh la consommation de la composante énergie pour toute consommation non autorisée dans le cadre de l'octroi du bloc d'énergie de 300 MW, ou non autorisée dans le cadre des abonnements existants du Distributeur et des réseaux municipaux, ainsi que pour toute substitution d'usage ou accroissement de puissance pour usage cryptographique appliqué aux chaînes de blocs au-delà des charges autorisées. (bold in original)

³⁶ Based on then-current market prices of around CA\$8,000.

4. CONCLUSIONS

4.1. Discussion

The Decision tends to support a number of issues raised in my Report, including:

- the nature of the cryptocurrency mining industry, and its implications for electric utility;
- the sensitivity of cryptocurrency mining demand to the market price of bitcoin; and
- the desirability of creating a distinct rate class for these customers, and of including obligatory curtailment during peak periods in its conditions of service.

That said, the Decision applies only to the Province of Québec. While there are many similarities between Quebec and Labrador — both being jurisdictions with very low electricity rates — there are also important differences.

First, unlike Labrador, Quebec is not faced with dramatic transmission constraints. While it is of course possible that, depending where they are located, new cryptocurrency customers could create the need for upgrades on the Quebec transmission system, there is no indication that these upgrades would be on the scale of those envisaged in Labrador — especially when seen in relation to the overall size of the transmission system. In addition, the HQ transmission system already has a network addition policy in place, based on the FERC network upgrade policy discussed in 2.6 and 4.4 of my Report. Furthermore, as noted above on page 18, the Régie decision specifies (as proposed by HQD) that the new cryptocurrency customer must also pay “the totality of the associated connection costs for the transmission and distribution systems, before work begins” (para. 291). Thus, the situation that led to Hydro’s filing an NAP — the possibility, raised in the context of the debates over the MFHVI, that new “data centre” customers would oblige Hydro to undertake major additions to the Labrador transmission system, the costs of which would be borne largely by existing customers — does not exist in Quebec, thanks to the pre-existing FERC-based network addition policy.

Rather, the driving concern behind the Quebec proceeding was the possibility that large new cryptocurrency loads would require HQD to acquire expensive new long-term energy and

capacity resources, the cost of which would be borne in large part by other customers. While this concern is also present in Newfoundland and Labrador, the situations are still somewhat different.

While HQD's energy balance is usually described as a "surplus", it does not consist of an exportable surplus of energy that HQD has acquired. Rather, it consists of an unexercised option to buy additional "heritage pool" electricity from HQ Production, at a legislated price of around 3¢/kWh.³⁷ During those hours when HQD does not use its full entitlement of heritage pool power, additional sales to cryptocurrency customers at regular prices would produce downward pressure on rates to other customers. However, during hours when HQD does use its full entitlement of heritage pool power and in addition must buy energy in the US market, additional sales to cryptocurrency customers would instead create upward pressure on rates.

Given this context, additional sales to cryptocurrency miners will tend to use up the unused heritage pool electricity, creating downward pressure on rates. The policy of obligatory curtailment means that the new customers will not add to energy imports during system peak. However, if the block made available to cryptocurrency miners is so large as to result in exceeding the heritage pool quota during other hours, it will create a need for additional imports, thus increasing overall power supply costs. From the perspective of reducing the rate burden to other customers, the challenge is thus to properly size the quota, in order to benefit from using up the surplus of cheap heritage pool power without creating the need to increase purchases of expensive imported power.

This context bears some similarities to — and, again, some differences from — Hydro's situation (pre-LIL). Like HQD, Hydro (pre-LIL) has a surplus of low-cost power in Labrador that, unlike HQD, it can export. Its average export price, while low (estimated at 3.5¢/kWh on

³⁷ Since HQD also holds contracts to purchase substantial amounts of energy from wind generators and other IPPs, the fact that the heritage power option is not fully used — by more than 11 TWh/yr since 2015 — has the effect of increasing electricity rates.

average), is far higher than its cost for recall power, so these exports are profitable for the parent company. Since supply costs of recall power are flowed through to Labrador consumers, no profit is earned on the electricity sold to regulated customers. Thus, reducing the exportable surplus of recall power represents a net loss to Hydro's parent company. That said, additional sales in Labrador do result in spreading the fixed costs of the transmission and distribution systems over a larger number of kilowatthours, so such sales do create downward pressure on Labrador rates — as long as no transmission or distribution upgrades are required which are not fully paid by the new customer.

Once the LIL is in full commercial operation, however, the situation will change substantially. Instead of bringing Nalcor export revenue, recall power unused in Labrador will instead reduce Hydro's supply costs on the Island. Since those costs are on average much greater than the export revenues, the losses associated with serving new cryptocurrency customers in Labrador will instead be borne by regulated Island customers.

Furthermore, once the recall power is exhausted, Hydro will be in a very similar situation to HQD – needing to commit to expensive new long-term power and energy resources to meet additional demand in Labrador.

4.2. Summary

In the Decision, the Régie:

- established a separate, usage-based rate class for “cryptographic use of electricity applied to blockchains”. Its focus in establishing this rate class was clearly cryptocurrency mining, though the definition is broad enough to include other activities as well;
- established a quota of power and energy available to customers in this new rate class;
- included existing customers in the new rate class, insofar as they meet the definition thereof; and
- established specific conditions of service for this new rate class, including requiring obligatory curtailment during 300 hours per year at the utility's option (non-firm service).

In each case, it reviewed relevant legislation and regulatory principles and found the actions taken to be lawful and in the public interest. Whether or not similar regulatory actions could be

taken by the Board would of course require a similar review of applicable legislation in the Province. Whether these actions — or a different group of actions — would be in the public interest in Newfoundland and Labrador would of course also require a thorough review.

With regard to the matter at hand, the Decision is relevant to and provides support to the following recommendations in my Report:

It is recommended that the NAP apply to “data centre” and industrial loads, but not to other rural loads. (page 57) The Decision provides support to the approach of establishing distinct service conditions for “data centre” loads.

It is recommended that the NAP require that the Customer Contribution be paid in full before any transmission upgrade works are initiated, and that no commitments on Hydro’s part be binding until that time. (page 57) The Decision makes clear that, in Quebec, customer contributions covering all upgrade costs for transmission and distribution infrastructure are charged to the new customer and must be paid in full before any transmission upgrade works are initiated.

It is recommended that the provisions of the NAP regarding expansion cost and acceleration cost be adopted provisionally.

It is further recommended that the Board order Hydro to continue work, in collaboration with stakeholders, in order to explore possible modification to the “advancement” approach retained by Hydro, or the possible application of the approach underlying the FERC network upgrade policy whereby a new customer covered by the policy must take full cost responsibility for the network additions required to provide service. (page 61) The Decision demonstrates that the FERC approach, in place in Quebec, relieves concerns that the costs of transmission and distribution upgrades required to serve new cryptocurrency customers will be borne by other customers.

Recommendation: The Board should undertake, on its own initiative, an examination of whether it can and should create a distinct rate class for cryptocurrency mining in

Labrador, and, if so, what constraints should be imposed on services offered to that rate class. (page 68) The Decision demonstrates the importance of carrying out this exercise based on the legislative and regulatory instruments in place.