Newfoundland and Labrador System Operator
Methodology for the Development of Rates for Transmission Service

February 5, 2018

A Report to the Board of Commissioners of Public Utilities
# Table of contents

1.0 Introduction .................................................................................................................................................. 1

2.0 The Structure for the Open Access Transmission Regime .............................................................................. 1

  2.1 The NLSO .................................................................................................................................................. 1

  2.2 Transmission Owners .............................................................................................................................. 2

  2.3 Transmission Customers ......................................................................................................................... 2

3.0 Rate Making Principles for the Transmission Tariffs ..................................................................................... 3

  3.1 Evolution of Transmission Tariffs within the Eastern Interconnection ..................................................... 3

  3.2 FERC Transmission Pricing Policy .......................................................................................................... 4

4.0 Transmission Services .................................................................................................................................... 6

  4.1 Transmission-Related Services .................................................................................................................. 6

  4.2 Ancillary Services ...................................................................................................................................... 8

  4.3 Postage Stamp Rate .................................................................................................................................. 9

  4.4 Billing Determinants ................................................................................................................................... 9

5.0 Transmission Service Cost Allocation and Rate Design .................................................................................. 10

  5.1 Overview .................................................................................................................................................. 10

  5.2 Transmission Revenue Requirement ......................................................................................................... 11

  5.3 Cost Allocation Process .............................................................................................................................. 17

    5.3.1 Services Defined in the Tariff ............................................................................................................... 17

    5.3.2 Transmission Functions ....................................................................................................................... 17

    5.3.3 Functional Allocation of Costs ........................................................................................................... 19

    5.3.4 Forecast Billing Determinants ............................................................................................................. 20

    5.3.5 Allocation of Revenue Requirement to Services .................................................................................. 22

6.0 Ancillary Services ............................................................................................................................................. 26

  6.1 Capacity-Based Ancillary Services ............................................................................................................ 26

    6.1.1 Requirements of Capacity Based Services .......................................................................................... 27

    6.1.2 Regulation and Frequency Response .................................................................................................. 28

    6.1.3 Operating Reserves ............................................................................................................................. 28

    6.1.4 Capacity Based Service Rates ............................................................................................................. 29

    6.1.5 Out of Order Dispatch ......................................................................................................................... 30

    6.1.6 Non-Capacity Based Ancillary Services ............................................................................................... 31

    6.2.1 Reactive Supply and Voltage Control Service ...................................................................................... 32

    6.2.2 Energy Imbalance .................................................................................................................................. 33

7.0 True-up .......................................................................................................................................................... 34

8.0 Summary ......................................................................................................................................................... 34
1.0 Introduction

Sanctioning the Muskrat Falls Project (MF) and associated interconnection of the Newfoundland and Labrador (NL) Island Interconnected System with Labrador by way of the Labrador Island Link (LIL), and to Nova Scotia through the Maritime Link (ML), has precipitated the implementation of an open access transmission regime in NL. This transmission regime will open the NL Transmission System¹ to all users under consistent non-discriminatory terms and conditions with rates based on the cost of providing transmission service. The Newfoundland and Labrador System Operator (NLSO), established as a functionally separate division of Hydro has developed and will maintain a comprehensive set of transmission rates and associated operating policies and procedures designed to be consistent with the reciprocity requirements set out in the United States Federal Energy Regulatory Commission (FERC) Order 888. In addition, OC2017-380 directs the Board of Commissioners of Public Utilities (PUB) to approve, on an interim basis, the pro-forma Transmission Service Agreements with attached rates and rate methodology, Transmission Policies and Procedures and a Code of Conduct for transmission system operations (collectively, the transmission tariff).

This document provides the underlying methodology used to calculate the NLSO transmission rates.

2.0 The Structure for the Open Access Transmission Regime

2.1 The NLSO

The NLSO is a functionally separate division of Hydro which is responsible for the safe and reliable operation of the NL Transmission System, including the administration and provision of transmission service. The NLSO assumes operational control of all assets comprising the NL Transmission System.

¹ Under the transmission tariff, the NL Transmission System is defined as “The transmission facilities located in NL, operating at a voltage level of 230 kV or higher, including, without limitation, the LIL, the LTA and the Island Interconnected System, but excluding the high-voltage direct current portion of the Maritime Link transmission line owned by NSP Maritime Link Incorporated.”
Transmission System, administers a system wide transmission tariff applicable to all potential customers, and maintains system reliability. The NLSO operates the NL Transmission System to provide non-discriminatory transmission services including Network Integration Transmission Services and Point-to-Point Transmission Services. In carrying out this responsibility, the NLSO will perform the following functions:

- Act as transmission provider and system operator for the NL Transmission System;
- Maintain the NLSO Open Access Same-Time Information System (OASIS);
- Receive and act on all applications for transmission service;
- Conduct system impact and facilities studies as required;
- Schedule transactions;
- Direct re-dispatch, curtailment and interruptions; and
- Account for revenue collections and disbursements to owners of assets included in the NL Transmission System (Transmission Owners) including transmission funding credits.

2.2 Transmission Owners

The NLSO, which does not own any transmission assets, is able to accomplish its mandate as a result of the owners of the assets that comprise the NL Transmission System granting operational control of these assets to the NLSO. Figure 2, contained in Section 5.2, identifies the specific transmission facilities that comprise the NL Transmission System.

2.3 Transmission Customers

There are two types of customers that will receive service under the NLSO open access transmission regime (Transmission Customers):

- Network Customers – entities receiving transmission service pursuant to the terms of a Transmission Service Agreement for Network Integration Transmission Service; and
- Point-to-Point Transmission Customers – entities receiving transmission service pursuant to the Service Agreement for Point-to-Point Transmission Service.
3.0 Rate Making Principles for the Transmission Tariffs

Transmission Service is defined as the delivery of energy and capacity on a network or point-to-point basis. It includes all the ancillary services that are necessary to make such delivery possible. The generally accepted approach of transmission rate design is based on a cost of service methodology where customers are grouped in classes and costs are functionalized, classified and allocated based on the cost of each portion of the system that is “used and useful” for a given customer class being ultimately allocated to that class (cost causation). This follows the principle of fairness and equity so each customer class is allocated the cost of specific service(s) it is provided, resulting in rates which are just and reasonable, without unduly subsidizing another class. These are the principles that guide the formation of the NLSO transmission rates.

3.1 Evolution of Transmission Tariffs within the Eastern Interconnection

Rate making principles for transmission tariffs is a relatively new concept for NL and is driven by the pending interconnection with the North American grid. The rate making principles in the Eastern Interconnection have been guided mainly by FERC which is empowered to regulate the American Federal Power Act (FPA).

In 1992, amendments to the FPA provided for competition in the United States electricity supply and demand at the wholesale level. Since then FERC has influenced transmission rate design with the issuance of both the Transmission Pricing Policy Statement (1994) and Order 888 (1996).

While FERC has no direct jurisdiction within NL, its principles influence policy makers in this region, including other jurisdictions in Canada. This is equally true in NL, as Hydro and its affiliates hold transmission rights in jurisdictions that are governed by FERC, and the agreements that grant these rights come with an obligation that comparable service be

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2 The Eastern Interconnection reaches from Central Canada eastward to the Atlantic coast (excluding Québec), south to Florida, and west to the foot of the Rockies (excluding most of Texas).
provided on assets owned by Hydro and its affiliates. Therefore, it is necessary that the
transmission service offered by Hydro and its affiliates, who own all those assets that comprise
the NL Transmission System, be compliant with FERC requirements. The following sections
further outline FERC influence and recommendations that are applicable for NL.

3.2 FERC Transmission Pricing Policy

The Transmission Tariff Policy Statement\(^3\) issued by FERC (Section III), specifies five principles
governing the rates charged for transmission services. Rather than promoting a particular
approach to rate design, the policy statement provides flexibility for transmission providers
when developing transmission pricing. FERC recognized that there are varied pricing methods
that could meet the requirements of fairness, practicality and economic efficiency.

FERC stated that transmission pricing must “be just and reasonable and not unduly
discriminatory or preferential”\(^4\) and elected to allow utilities flexibility to file innovative pricing
strategies that satisfy the following pricing principles:

- Transmission Pricing Must Meet the Traditional Revenue Requirement:

  First, a utility must determine its total company revenue requirement, the
capital component of which traditionally has been measured by
embedded (depreciated original) cost. Second, a utility must allocate
among individual customers or classes of customers that portion of the
total revenue requirement that is attributable to providing transmission
services, in a manner which appropriately reflects the costs of providing
transmission service to such customers or classes of customers. Finally,
the utility must design rates to recover those allocated costs from each

\(^3\) Inquiry concerning the Commission’s pricing policy for transmission services provided by Public Utilities under
policy-for-transmission-services-provided-by-public).

\(^4\) FERC Transmission Pricing Statement, Section III.
customer class. Different customers may pay different rates if they use
the system in different ways;\textsuperscript{5}

- Transmission Pricing Must Reflect Comparability:
  
  This principle requires that “[a]n open access tariff that is not unduly
discriminatory or anticompetitive should offer third parties access on the
same or comparable basis and under the same or comparable terms and
conditions, as the transmission provider’s uses of its system;\textsuperscript{6}

- Transmission Pricing Should Promote Economic Efficiency:
  
  FERC specifies that transmission pricing should promote good decision-
making and foster:
  
  - Efficient expansion of transmission capacity;
  - Efficient location of new generators and new load;
  - Efficient use of existing transmission facilities, including the efficient
    allocation of constrained capacity through appropriate market
    clearing mechanisms; and
  - Efficient dispatch of existing generating resources;\textsuperscript{7}

- Transmission Pricing Should Promote Fairness:
  
  As a general matter, transmission pricing should be fair and equitable. ...  
  Similarly, we do not believe that third-party transmission customers
should subsidize existing customers. The major purpose of transmission
pricing reform should be to provide more efficient price signals,
particularly for new transmission uses, and not simply to reallocate sunk
costs;\textsuperscript{8} and

- Transmission Pricing Should Be Practical:

\textsuperscript{5} FERC Transmission Pricing Statement, Section III (1).
\textsuperscript{6} FERC Transmission Pricing Statement, Section III (2).
\textsuperscript{7} FERC Transmission Pricing Statement, Section III (3).
\textsuperscript{8} FERC Transmission Pricing Statement, Section III (4).
Transmission pricing should be practical and as easy to administer as appropriate given the other pricing principles.\textsuperscript{9}

FERC pricing proposals are traditionally based on the first two principles above. However, innovative proposals that tend to deviate from the traditional revenue requirement principle (such as a marginal cost approach) were considered acceptable if such proposals met the “just and reasonable and not unduly discriminatory or preferential” governing principle. Currently, there is an overriding preference toward pricing proposals that recover the revenue requirement based on embedded cost.

4.0 Transmission Services

4.1 Transmission-Related Services

There are a number of transmission-related services for which the NLSO calculates rates and charges. All services are independent of the voltage level at which they are provided. This is consistent with North American standards for unbundled transmission services. There are two main reasons for this approach:

- Offering different prices for service at different voltage levels would lead customers to request the lower priced service potentially causing the NLSO to incur additional costs and hence potentially shift the burden of costs to other customer classes; and
- The NLSO’s mandate to maintain a reliable system may lead to situations where it is preferable to serve a particular load at a specific voltage level. For areas where FERC has jurisdiction, they have deemed that the entire transmission system operate as a single integrated network and FERC have mandated a fully rolled-in approach without voltage differentiation.

The following types of service will be offered by the NLSO:

\textsuperscript{9} FERC Transmission Pricing Statement, Section III (5).
• Firm Point-to-Point Transmission Service—Transmission Service that is reserved and/or scheduled between specified Point(s) of Receipt and Point(s) of Delivery on a firm basis, provided pursuant to the terms and conditions set forth in the Transmission Service Agreement for Point-to-Point Transmission Service. An example would be a reservation for transmission capacity from the Hydro Québec interconnection to the Nova Scotia interconnection. Such service is primarily used for wholesale transactions between systems rather than for direct supply of load within the system;

• Non-Firm Point-to-Point Transmission Service—Point-to-Point Transmission Service that is reserved and scheduled on an as-available basis for periods ranging from one hour to one month, provided pursuant to the terms and conditions set forth in the Umbrella Transmission Service Agreement for Non-Firm Point-to-Point Transmission Service. Non-firm service is the first to be curtailed in the event of system operating conditions, and it is also subject to interruption due to economic reasons. The terms and conditions governing Non-Firm Point-to-Point Transmission Service are also governed by the Transmission Service Agreement for Non-Firm Point-to-Point Transmission Service; and

• Network Integration Transmission Service—Service over the NL Transmission System that allows for integrated and economic dispatch of energy and capacity from a Network Customer’s designated network resources to meet such Network Customer’s designated network load, provided pursuant to the terms and conditions set forth in the Transmission Service Agreement for Network Integration Transmission Service. Network Integration Transmission Service is, by definition, firm transmission service for the delivery of both capacity and energy of the Transmission Customer and is designed to supply the load within the NL Transmission System.

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10 Firm Point-to-Point Service is ranked equivalent to Network Integration Transmission Service which are granted priority over non-firm service, and is therefore subject to curtailment only after all non-firm service is curtailed.
4.2 Ancillary Services

Ancillary Services are the services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the NL Transmission System.

The NLSO is required to provide, and the Transmission Customer is required to take and pay for the following Ancillary Services:

- Scheduling, System Control and Dispatch – the scheduling and dispatch of energy and capacity into, out of, through or within the NL Transmission System; and
- Reactive Supply and Voltage Control from Generation or Other Sources Service – the NLSO will operate generating facilities to produce reactive power as required to maintain transmission voltages within acceptable limits.

In addition to the Ancillary Services listed above, the NLSO is required to offer the following Ancillary Services to Transmission Customers. Transmission Customers may elect to procure these services, as required, from the NLSO, from other providers, or through self-supply:

- Regulation and Frequency Response – committing on-line generation whose output is increased or lowered as necessary to follow the moment-to-moment changes in load;
- Energy Imbalance – supplies or withdraws the energy that is needed to reconcile any mismatch between the Transmission Customer’s actual and scheduled energy supplied to or withdrawn from the NL Transmission System; and
- Operating Reserves – generation capability above system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection to ensure the reliable supply of power and energy within the NL Transmission System. Operating Reserves are comprised of Spinning and Supplemental (Non-spinning) reserves.
4.3 Postage Stamp Rate

The NLSO will apply a postage stamp rate structure for both Network Integration Transmission Service and Point-to-Point Transmission Service. The Platt’s Glossary defines a postage stamp rate as:

A rate for electric transmission that does not vary according to distance from the source of the power supply. So-called because postage stamps for letters are typically at a fixed price, regardless of destination.¹¹

The underlying principle guiding the rate design is to initially allocate the prospective revenue requirement to customer classes based on their respective contribution to the transmission system peak load. The postage stamp rate is then determined by dividing the relevant revenue requirement ($/year) by the applicable peak load (MW) to arrive at the annual rate ($/MW-year). While this method appears clear, there can be significant issues as to what constitutes the relevant revenue requirement for each type of service as well as the peak loads that are used as billing determinants.

4.4 Billing Determinants

In order to determine the price that will be charged to users of a particular service the measurement on which a bill is calculated, also referred to as a billing determinant, must be defined. Some of the commonly used billing determinants in the electric power industry are customer charge, MW of demand, and MWh of energy.

In defining the billing determinant one must consider issues such as measurability, simplicity, and fairness. Transmission costs should be allocated to users based on the committed capacity. In the case of long-term Point-to-Point Transmission Customers, the forecast of reserved MWs define the committed capacity and is readily used as the billing determinant. In the case of

Network Integration Customers, committed capacity is defined as a function of the 12 monthly net coincident peak demands and, as such, has been selected as the billing determinant for use by the NLSO.  

5.0 Transmission Service Cost Allocation and Rate Design

5.1 Overview

The NLSO transmission tariff defines the terms, conditions and rates under which a Transmission Customer is provided transmission service over the NL Transmission System. Although the methodology of developing efficient and equitable transmission rates is a complex undertaking, it can be broadly summarized in the three-step process illustrated in Figure 1 below. The NLSO has followed the underlying principles of Hydro’s Cost of Service Study that have previously been reviewed and approved by the PUB, in developing the proposed rates.

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Energy delivered can be considered as a billing determinant for a Network Customer’s transmission usage but this approach does not follow the principle of cost causation. A customer with a very low load factor (a low quantity of energy delivered relative to the peak demand) would pay very little for transmission even though the transmission system must be designed, built and operated to meet the customer’s peak demand. Such an approach would lead to cross subsidization for transmission services of low load factor customers by other customers.
5.2 Transmission Revenue Requirement

The initial step taken in designing the transmission rates was to extract the high-voltage transmission revenue requirement from Hydro’s total transmission revenue requirement. To accomplish this, the PUB approved methodology for asset functionalization is deployed. The process begins with a definition of the assets that are used to provide the respective high-voltage transmission services.
For Hydro’s transmission assets, the NLSO applied the existing approach of determining if any of the high-voltage transmission assets were either functionalized as a generator lead or specifically assigned. However, the addition of TL-269 from Granite Canal to Bottom Brook to support the import and export of energy over the Maritime Link requires a change to the functionalization of Hydro’s TL-234 and TL-263 from generator leads to common high-voltage transmission. Only Hydro’s common transmission assets are included in the transmission revenue requirement for rate development.

For LIL and the Labrador Transmission Assets (LTA), it is anticipated there will be a decision in the upcoming Cost of Service Methodology Hearing on the portion that should be functionalized as transmission and what portion should be functionalized as generation. For the purpose of developing the interim rates to be in place in advance of full commissioning of the MF Project, the NLSO has treated the LIL and LTA as transmission assets. Therefore 100% of the cost incurred for the use of the LIL and LTA are included in the interim transmission rates.¹⁴

Figure 2 below highlights the assets that are included in the NLSO transmission tariff. The highlighted transmission assets (those operated at 230 kV or higher) and the associated terminal station equipment, form the basis for the transmission tariff.¹⁵ High-voltage transmission assets that serve the function of connecting generating units to the shared transmission system or are used specifically for the benefit of a single customer or customer class are functionalized as Specific Function Transmission Assets and hence do not contribute to the revenue requirement included in the transmission rates.

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¹³ TL-269 is owned by NSP Maritime Link Incorporated, operated by the NLSO and deemed as a zero rated revenue requirement.

¹⁴ Until full commissioning of the Muskrat Falls Project, including generation at Muskrat Falls, the only costs to be incurred for use of the associated transmission assets are the operating and maintenance costs.

¹⁵ Only the Labrador portion of lines L7051, L7052 and L7053 are included in the NL Transmission System.
In addition to the transmission and terminal equipment, other equipment used to provide specific Ancillary Services, such as excitation, capacitor banks, battery banks, etc. are also coded in a manner to allow downstream cost allocation. The prospective revenue requirement forecast for assets owned by Hydro affiliates are determined using practices consistent with Hydro’s Cost of Service Study.

The total revenue requirement for Hydro’s high-voltage transmission assets included in the transmission tariff has been determined to be $46.6 million for the period prior to the LIL and LTA being accepted for commercial operations, (the Pre LIL / LTA period) and includes all costs (asset amortization costs, operating, maintenance and administration costs, purchases of transmission service(s), interest and financing charges) plus Hydro’s approved regulated rate of return on equity.\(^\text{16}\) The revenue requirement captures costs relating to all transmission and terminal station assets included in the tariff, functionalized in a manner consistent with Hydro’s 2018 Cost of Service Study as filed November 2017 with the asset adjustment noted above (regarding TL-234 and TL-263). Hydro’s total revenue requirement after LIL and LTA are accepted for commercial operations, (the Post LIL / LTA period) increases to $47.0 million.\(^\text{17}\)

\(^\text{16}\) During the Pre LIL / LTA period, only Hydro owned transmission assets on the Island Interconnected System are included in the tariff.

\(^\text{17}\) During the Post LIL / LTA period, Hydro’s 230 kV assets in Labrador are also included in the tariff.
Next, the revenue requirement for assets of Hydro’s affiliates was considered. The revenue requirement of assets not related to the MF Project were included in Hydro’s High-Voltage assets cost, as their revenue requirement is billed directly to Hydro under the associated PPAs. In the case of the Exploits assets, the majority of the transmission assets are below 230 kV and TL-235 is considered a generator lead. Therefore, no revenue requirement related to these assets is included in the Network Integration Transmission Service or Point-to-Point Transmission Service rates. These assets do, however, provide necessary Ancillary Service support and contribute to the rate design under their respective Ancillary Service classes.

The Nalcor Power Supply revenue requirement represents the 2018 annualized forecast of operating and maintenance costs to be billed by Nalcor Power Supply to Hydro prior to full commissioning of the Muskrat Falls Project. As stated previously, 100% of these costs are attributed to transmission in advance of full commissioning of the MF Project. After full commissioning, it is anticipated that the PUB will decide the portion of Nalcor Power Supply revenue requirement allocated through Hydro’s Cost of Service Study to be included in transmission rates with the remainder recovered directly from Hydro customers as generation costs.

Further, a provision has been made to cover the Churchill Falls (Labrador) Corporation (CF(L)Co) revenue requirement as a result of the interconnection with Labrador thus creating a single NL Transmission System.\(^\text{18}\)

Tables 1 and 2 below provide a summary of the major transmission revenue requirement components by entity and also show the cost assigned to the NLSO Scheduling, System Control and Dispatch.

\(^{18}\) The 735 kV lines from the Churchill Falls Generating Station to the border with Québec are anticipated to be included in the NL Transmission System after the LIL is placed in-service.
**Table 1**
(2018 Pre LIL / LTA)

<table>
<thead>
<tr>
<th>High-voltage Transmission Revenue Requirement by Entity</th>
<th>NLSO Scheduling, Control &amp; Dispatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro High-voltage Transmission</td>
<td>Nalcor Power Supply Transmission</td>
</tr>
<tr>
<td>Operating and Maintenance</td>
<td>8.7</td>
</tr>
<tr>
<td>Depreciation</td>
<td>12.5</td>
</tr>
<tr>
<td>Return on Debt</td>
<td>18.4</td>
</tr>
<tr>
<td>Return on Equity</td>
<td>7.0</td>
</tr>
<tr>
<td>Expense Credits</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Total Revenue Requirement</td>
<td>46.6</td>
</tr>
</tbody>
</table>

**Table 2**
(2018 Post LIL / LTA)

<table>
<thead>
<tr>
<th>High-voltage Transmission Revenue Requirement by Entity</th>
<th>NLSO Scheduling, Control &amp; Dispatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro High-voltage Transmission</td>
<td>Nalcor Power Supply Transmission</td>
</tr>
<tr>
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</tr>
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<td>Depreciation</td>
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<td>Return on Equity</td>
<td>7.0</td>
</tr>
<tr>
<td>Expense Credits</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Total Revenue Requirement</td>
<td>47.0</td>
</tr>
</tbody>
</table>
5.3 Cost Allocation Process

After determining the revenue requirement, it is necessary to allocate the revenue requirement associated with transmission assets to the appropriate services. This involves the following key initiatives:

- Define the transmission services to be provided;
- Define the basic functions of the transmission system;
- Allocate the transmission revenue requirement to the different functional uses of the system;
- Determine the system usage by service; and
- Allocate the functional costs to the transmission services.

5.3.1 Services Defined in the Tariff

The NLSO transmission tariff defines the two primary services that are consistent with the FERC Pro Forma Tariff; Network Integration Transmission Service and Point-to-Point Transmission Service. In addition, there are a number of Ancillary Services that are required to ensure reliable operation of the NL Transmission System, as listed below, and further defined in Section 4.2:

- Scheduling, System Control and Dispatch;
- Reactive Supply and Voltage Control from Generation or Other Sources;
- Regulation and Frequency Response;
- Energy Imbalance; and
- Operating Reserves.

5.3.2 Transmission Functions

Transmission functions help to identify which assets are used to provide which services. For the purposes of the NLSO transmission rate calculations, assets have been grouped into four main functional groups as follows:

- High-voltage Transmission Assets (which are used to provide the following services):
• Network Integration Transmission Service; and
• Point-to-Point Transmission Service;
• NLSO Energy Control Center Assets;
• Specific Function Transmission Assets; and
• Hydro Owned Low-voltage Transmission Assets.

High-voltage Transmission Assets are the basis for the portion of the NL Transmission System that serves multiple functions, including Network Integration Transmission Service and Point-to-Point Transmission Service, and the revenue requirement associated with these assets form the basis for the transmission rates.

NLSO Energy Control Center Assets are those that support the overall operation of the NL Transmission System. The cost associated with these assets is based on an assessment of the usage of Hydro Place, the computer systems required and all other related equipment required for the system operator functions. The costs associated with these assets are included in the Scheduling, System Control and Dispatch portion of the transmission tariff and collected through the Ancillary Service Schedule 1.

Specific Function Transmission Assets include assets that primarily serve to connect generating units to the transmission system as well as radial lines and associated terminal station equipment. Traditionally, these assets (often classed as generator leads) consist of generator step up transformers, a portion of the associated terminal station assets, and the transmission line(s) having a primary purpose of connecting the generator to the shared transmission system. The generator leads are easily identified as they are directly connected to the low voltage output of the generator and tie to the shared transmission system. FERC has ruled that they should be assigned as 100% generation. The remaining generator lead allocations become somewhat more controversial because of the inherent difficulty in defining the clear division
point between the Specific Function Transmission Assets and the High-voltage Transmission Assets. Some terminal stations, for example, are allocated to the generator lead function on the basis that each generator requires a synchronizing breaker position in order to be able to synchronize and connect to the system. In addition to generator leads, Specific Function Transmission Assets include radial lines and associated terminal station equipment that are specifically assigned to serve one customer or customer class. The NLSO has reviewed the entire network to ensure that assets are coded appropriately and, where applicable, included in the Specific Function Transmission Assets grouping. The Specific Function Transmission Assets and the associated revenue requirement are recovered from either the generation function or as a specifically assigned charge, and not collected in the transmission rates. This is consistent with FERC approved practices, in which they are defined as direct assignment facilities.

Hydro Owned Low-voltage Transmission Assets are not a part of the NL Transmission System as they operate at less than 230 kV. The costs associated with this portion of the system are coded as Hydro Owned Low-voltage Transmission Assets and functionalized with Hydro’s transmission demand cost.

5.3.3 Functional Allocation of Costs

The detailed Cost of Service Study functionalizes all transmission assets to determine the revenue requirement of $46.6 million Pre LIL / LTA and $100.6 million Post LIL / LTA for the 2018 Test Year. The important issues arising from the functional allocation is to determine the level of costs to be collected through each component of the transmission. This allocation is more often influenced by provincial regulation rather than market forces or FERC.

The split between Specific Function Transmission Assets and High-voltage Transmission Assets is governed by the primary function of the asset, the customer(s) that use them and the voltage level. Multipurpose assets are often allocated among functional classes based on a load ratio.
share method.\textsuperscript{19} In all cases, the NLSO Energy Control Centre costs are allocated directly to the Scheduling, System Control and Dispatch Ancillary Service.

The costs associated with each of the two main functional groups are allocated as follows:

- The total High-voltage Transmission Assets are considered the common use portion of the transmission system and their costs are allocated to, and collected from, the respective transmission services under the tariff by using a load ratio share between Network Integration Transmission Service and Point-to-Point Transmission Service; and
- The NLSO Energy Control Center costs are allocated to the Scheduling, System Control and Dispatch Ancillary Service and are collected through rates for that service.

5.3.4 Forecast Billing Determinants

FERC Order 888 prescribes a cost allocation process for Network Integration as well as Point-to-Point Transmission Services. This approach is based on the principle that average monthly coincident peak load is a fair measure upon which to allocate the revenue requirement of the transmission system. Coincidental peak load is defined as the sum of two or more peak demands that occur in the same time interval.\textsuperscript{20} The use of twelve monthly coincident peaks better balance the “cost causation” and “used and useful” principles of transmission rate design.

The FERC approach is incorporated in Section 34.3 of the \textit{Pro Forma Tariff} (Determination of transmission provider’s Monthly Transmission System Load) which states:

\begin{quote}
\textit{The Transmission Provider’s monthly Transmission System load is the Transmission Provider’s Monthly Transmission System Peak minus the coincident peak usage of all Firm Point-To-Point Transmission Service customers pursuant}\end{quote}

\textsuperscript{19} Load ratio share is defined as the ratio of a specific functional load to the total transmission asset capacity.
\textsuperscript{20} Energy Information Administration (EIA) Glossary, (http://www.eia.doe.gov/cneaf/electricity/page/glossary.html).
to Part II of this Tariff plus the Reserved Capacity of all Firm Point-To-Point Transmission Service Customers.\textsuperscript{21}

By substituting the point-to-point reservations for actual use, we recognize that the NLSO is fully committing the reserved capacity on a long-term firm basis. The NLSO must ensure the system is designed to meet the full use of the reserved capacity at any time, including the system peak. No allowance for diversity can be made.

The forecast of average monthly Point-to-Point reservations for 2018 is 55 MW which is determined to be the firm export capability of the Maritime Link upon its commissioning\textsuperscript{22} and will be held by Hydro. No Point-to-Point reservation is forecast for imports on the Maritime Link during that period as these will be accommodated through the Network Integration Transmission Service. Likewise, no Point-to-Point reservations are forecast for exports or imports in Labrador because any excess Recapture energy that is exported is transacted at the border (intersect point) and Network Integration Transmission Service will accommodate potential imports.

Further, Hydro’s March 2017 GRA load forecast provides the average network service load forecast for the 2018 Test Year. Prior to the commercial operation of the LIL and LTA, the Network load is forecast to be the average monthly coincident peak on the Island Interconnected System. Subsequent to the commercial operation of the LIL and LTA, the Network load is forecast to be the average monthly coincident peak on the Island and Labrador Interconnected systems combined. To derive the coincident peak for the combined Island and Labrador Interconnected Systems, a coincidence factor of 90.8\% was used.\textsuperscript{23} The forecast billing

\textsuperscript{21} FERC Order 888, Attachment D, the Pro Forma Tariff Terms and Conditions.
\textsuperscript{22} This capability is expected to increase upon commissioning of other assets, including the LIL, LTA and the Muskrat Falls Generating Station.
\textsuperscript{23} The median Labrador winter peak coincident factor for the period 2006 to 2013 is used to determine a combined coincident peak.
determinants for the transmission rate calculations for the Pre LIL / LTA and Post LIL / LTA are summarized in Table 3 below:

Table 3

<table>
<thead>
<tr>
<th>Rate Class</th>
<th>Pre LIL / LTA Quantity (MW)</th>
<th>Post LIL / LTA Quantity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Integration Transmission Service</td>
<td>1,137</td>
<td>1,440</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>1,192</td>
<td>1,495</td>
</tr>
</tbody>
</table>

5.3.5 Allocation of Revenue Requirement to Services
The final step in the NLSO cost of service process is to apportion the total transmission costs to the services that are offered under the tariff based on billing determinants. The annual transmission revenue requirement for Network Integration Transmission Service and Point-to-Point Transmission service including the NLSO System Control, Scheduling and Dispatch has been determined to be $46.6 million for the Pre LIL / LTA period and $100.6 million for 2018 Post LIL / LTA period. The revenue requirement is allocated to the main transmission services using their respective load ratio share. Tables 4 and 5 show the breakdown of revenue requirement by service:

Table 4 (Pre LIL / LTA)
Transmission Services Revenue Requirement

<table>
<thead>
<tr>
<th>Service</th>
<th>Usage (MW)</th>
<th>Revenue Requirement</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Integration Transmission Service</td>
<td>1,137</td>
<td>44,400,804</td>
<td>95.4%</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>55</td>
<td>2,147,254</td>
<td>4.6%</td>
</tr>
<tr>
<td>System Control, Scheduling and Dispatch Total MW usage is used to recover the System Control, Scheduling and Dispatch</td>
<td></td>
<td>9,395,016</td>
<td></td>
</tr>
<tr>
<td>Total High-voltage Transmission Revenue Requirement</td>
<td>1,192</td>
<td>55,943,074</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

1 Total MW usage is used to recover the System Control, Scheduling and Dispatch

Newfoundland and Labrador System Operator
Table 5 (Post LIL / LTA)

Transmission Services Revenue Requirement

<table>
<thead>
<tr>
<th>Service</th>
<th>Usage (MW)</th>
<th>Revenue Requirement</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Integration Transmission Service</td>
<td>1,440</td>
<td>96,848,798</td>
<td>96.3%</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>55</td>
<td>3,700,213</td>
<td>3.7%</td>
</tr>
<tr>
<td>System Control, Scheduling and Dispatch</td>
<td></td>
<td>9,395,107</td>
<td></td>
</tr>
<tr>
<td>Total High-voltage Transmission Revenue</td>
<td>1,495</td>
<td>109,944,118</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

1 Total MW usage is used to recover the System Control, Scheduling and Dispatch

With the costs allocated to specific transmission services, the next step is to calculate rates to recover these costs. The revenue requirement expressed on a per unit basis for each service is shown in Tables 6 and 7.

Table 6 (Pre LIL / LTA)

Per Unit Transmission Services Revenue Requirement

<table>
<thead>
<tr>
<th>Service</th>
<th>Revenue Requirement</th>
<th>Billing Determinants (kW)</th>
<th>Per Unit Rate ($/kW-year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Integration Transmission Service</td>
<td>44,400,804</td>
<td>1,137,287</td>
<td>39.041</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>2,147,254</td>
<td>55,000</td>
<td>39.041</td>
</tr>
<tr>
<td>System Control, Scheduling and Dispatch</td>
<td>9,395,016</td>
<td>1,192,287</td>
<td>7.880</td>
</tr>
</tbody>
</table>
Table 7 (Post LIL / LTA)

Per Unit Transmission Services Revenue Requirement

<table>
<thead>
<tr>
<th>Service</th>
<th>Revenue Requirement</th>
<th>Billing Determinants (kW)</th>
<th>Per Unit Rate ($/kW-year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Integration Transmission Service</td>
<td>96,848,798</td>
<td>1,439,561</td>
<td>67.277</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>3,700,213</td>
<td>55,000</td>
<td>67.277</td>
</tr>
<tr>
<td>System Control, Scheduling and Dispatch</td>
<td>9,395,107</td>
<td>1,494,561</td>
<td>6.286</td>
</tr>
</tbody>
</table>

For transmission service, it is commonplace in North American electric utilities to apply the following standard pricing approach to define various short term rates:

1. Yearly Nominal Rate
2. Monthly Rate Yearly Rate / 12
3. Weekly Rate Yearly Rate / 52
4. On-Peak Daily Rate Weekly Rate / 5
5. Off-Peak Daily Rate Yearly Rate / 365
6. On-Peak Hourly Rate On-Peak Daily Rate / 16
7. Off-Peak Hourly Rate Yearly Rate / 8760

This approach has been approved by FERC and used in Nova Scotia, New Brunswick, Manitoba, Saskatchewan, and, with minor modifications, in Québec. The rationale behind the On-Peak Daily and Hourly rates is that there is a difference between short-term services used to meet peak load and those that are taking advantage of economically profitable opportunities. On-Peak days for this service are defined as Monday to Friday. On-Peak hours for this service are defined as the sixteen (16) hour period from but excluding 07:00 a.m. to and including 11:00 p.m. (Atlantic Prevailing Time).²⁴

²⁴ Atlantic Time is used to allow for the beginning of scheduled transactions in any hour to occur simultaneously (on the hour) in neighbouring jurisdictions. Use of the word “prevailing” allows for appropriate consideration of the transition to and from daylight savings.
The rates proposed by the NLSO for 2018 (shown in Tables 8 and 9) are based on the computations shown above. This approach helps ensure adequate collection of revenues for services provided, while facilitating the use of the transmission capacity in the off-peak hours.

### Table 8 (Pre LIL / LTA)
**Summary of Transmission Services Rates**

<table>
<thead>
<tr>
<th>Service</th>
<th>Units</th>
<th>Transmission Service</th>
<th>NLSO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Network Integration</td>
<td>Scheduling, System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Point-to-Point</td>
<td>Control &amp; Dispatch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmission</td>
<td></td>
</tr>
<tr>
<td>Yearly</td>
<td>$/MW-year</td>
<td>39,040.98</td>
<td>7,879.83</td>
</tr>
<tr>
<td>Monthly</td>
<td>$/MW-month</td>
<td>3,253.42</td>
<td>656.65</td>
</tr>
<tr>
<td>Weekly</td>
<td>$/MW-week</td>
<td>750.79</td>
<td>151.54</td>
</tr>
<tr>
<td>On-Peak Daily</td>
<td>$/MW-day</td>
<td>150.16</td>
<td>30.31</td>
</tr>
<tr>
<td>Off-Peak Daily</td>
<td>$/MW-day</td>
<td>106.96</td>
<td>21.59</td>
</tr>
<tr>
<td>On-Peak Hourly</td>
<td>$/MW-hour</td>
<td>9.38</td>
<td>1.89</td>
</tr>
<tr>
<td>Off-Peak Hourly</td>
<td>$/MW-hour</td>
<td>4.46</td>
<td>0.90</td>
</tr>
</tbody>
</table>

### Table 9 (Post LIL / LTA)
**Summary of Transmission Services Rates**

<table>
<thead>
<tr>
<th>Service</th>
<th>Units</th>
<th>Transmission Service</th>
<th>NLSO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Network Integration</td>
<td>Scheduling, System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Point-to-Point</td>
<td>Control &amp; Dispatch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmission</td>
<td></td>
</tr>
<tr>
<td>Yearly</td>
<td>$/MW-year</td>
<td>67,276.61</td>
<td>6,286.20</td>
</tr>
<tr>
<td>Monthly</td>
<td>$/MW-month</td>
<td>5,606.38</td>
<td>523.85</td>
</tr>
<tr>
<td>Weekly</td>
<td>$/MW-week</td>
<td>1,293.78</td>
<td>120.89</td>
</tr>
<tr>
<td>On-Peak Daily</td>
<td>$/MW-day</td>
<td>258.76</td>
<td>24.18</td>
</tr>
<tr>
<td>Off-Peak Daily</td>
<td>$/MW-day</td>
<td>184.32</td>
<td>17.22</td>
</tr>
<tr>
<td>On-Peak Hourly</td>
<td>$/MW-hour</td>
<td>16.17</td>
<td>1.51</td>
</tr>
<tr>
<td>Off-Peak Hourly</td>
<td>$/MW-hour</td>
<td>7.68</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Network Integration Transmission Service is reserved, and billed for, on terms of at least one month.
6.0 Ancillary Services

Ancillary Services are the support services that are required to enable the transmission system to operate reliably. They range from actions necessary to balance the transfer of power and energy between the NLSO and the Transmission Customer to services that are necessary to maintain the integrity of the transmission system.

This section addresses the rate design for all Ancillary Services that are provided primarily by generators and other related equipment under the control of the NLSO. The services provided by generators are grouped into two main categories. Capacity-based services are provided from generation capacity that must be committed during the provision of that service and, as such cannot be used at the same time for other purposes. Non-capacity based services do not require commitment of generating capacity in order to provide the service.

6.1 Capacity-Based Ancillary Services

The capacity based Ancillary Services, as defined, are consistent with those in the FERC Pro Forma Tariff. These services include:

- Regulation and Frequency Response Service [Schedule 3 of the rate schedules],
- Operating Reserves – Spinning Reserve Service [Schedule 5 of the rate schedules],
- Operating Reserves – Supplemental Reserve Service [Schedule 6 of the rate schedules],

composed of:

- Supplemental (10-minute); and
- Supplemental (30 minute).

The revenue requirement for capacity based services is determined by allocating an appropriate portion of the total embedded cost of selected generators responsible for

---

26 Scheduling, System Control and Dispatch Service is an Ancillary Service supplied directly by the NLSO as discussed in Section 5.
providing the Ancillary Service capacity required to deliver the service. With the revenue requirement determined and allocated to the services, the rates are set in a manner similar to that used for the two primary transmission services.

The guiding principles for selecting specific generating units to forecast the revenue requirement for the service are the technical capability of the facility to provide the requirements for the service and simplicity of modelling.

Regulation, Frequency Response, and Operating Reserve – Spinning are commonly referred to as on-line capacity based services because they can only be provided by generation that is operating and connected to the system. As such the total forecast revenue requirement of the selected generators that would normally supply the on-line Ancillary Services forms the basis for that service and allocated based on the ratio of capacity required to total capacity. On-line generating units meet system load with a portion of its capacity while providing on-line capacity based Ancillary Services with the remainder.

Operating Reserve – Supplemental Reserve Services are commonly referred to as off-line capacity based services because the resources that provide these services are not required to be operating and connected to the system. For off-line capacity based Ancillary Services (Schedule 6 of the rate schedules) selected generators that would normally supply the off-line Ancillary Services are included. Such units could sit off-line most of the time and provide its full capacity as off-line Ancillary Services. Gas turbine assets, for example, which have a lower capital investment, are more economical to provide such off-line reserve services.

6.1.1 Requirements of Capacity Based Services

The NLSO, as operator of the NL Transmission System, will ensure that sufficient generating capacity is secured in order to provide the necessary Ancillary Services to reliably operate the
network. Transmission Customers can purchase each of the Ancillary Services from the NLSO whether they are taking Network Integration Transmission Service or Point-to-Point Transmission Service; therefore, the Ancillary Services are priced for both.

Transmission Customers can choose to self-supply the capacity-based Ancillary Services, or purchase them from either the NLSO or a third party. In fact, even when a load is located outside the NL Transmission System, it may not be technically feasible for a customer to self-supply these services and hence will purchase the services from the NLSO. The NLSO system requirements for Regulation and Frequency Response and Operating Reserves are outlined below.

6.1.2 Regulation and Frequency Response

Regulation and frequency response services are necessary for the continuous balancing of resources (generation and NL Transmission System interchange) with load, and to assist in maintaining scheduled interconnection frequency at 60 Hz. This service is accomplished by committing Generators whose output or demand is raised or lowered (predominately using Automatic Generation Control (AGC)) as necessary to follow moment-by-moment changes in load. The service is in addition to operating reserve services required for system contingency purposes. The NLSO offers regulation and frequency response services to serve Load within NL.

The forecast requirement for regulation and frequency response is 70 MW. The revenue requirement for the selected generators that share in the provision of this service contribute to the rate for this service.

6.1.3 Operating Reserves

Operating reserves are a function of the reliability criteria required within the NL Transmission System with the level of each type of reserve depending on the size of contingencies and the
load being served. Interconnected control area utilities are required to meet their respective
reserve requirements. Current practice within NL are aligned with the Northeastern Power
Coordinating Council (NPCC)\(^{27}\) requirement for sufficient Contingency Reserves (10-Minute
Spinning and 10-Minute Supplemental)\(^{28}\) to cover 100% of the largest single contingency and
30-Minute Reserve to cover 50% of the second largest contingency. Transmission Customers
share the revenue requirement obligations for each of the reserve services based on a load
ratio share.

The initial rate for operating reserves is designed to provide a total of 240 MW of which 170
MW are considered spinning. The revenue requirement for the selected generators that share
in the provision of this service contribute to the rate for this service.

6.1.4 Capacity Based Service Rates

The total annual revenue requirement for each service is spread over the forecast usage to
determine the annual rate as $/MW-year. Rates for periods less than one year are determined
in the same manner as the primary transmission rates (see the accompanying Schedules). The
resulting annual rates produced are summarized in Tables 10 and 11.

\(^{27}\) This is provided for reference only; the NPCC have no jurisdiction in NL.
\(^{28}\) A minimum of 25% of the 10-minute reserves must be spinning.
Table 10 (Pre LIL / LTA)
Capacity Based Services Rates

<table>
<thead>
<tr>
<th>Services</th>
<th>Revenue Requirement</th>
<th>Usage (kW)</th>
<th>Rates ($/MW-year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation and Frequency Response</td>
<td>$17,539,995</td>
<td>1,192,287</td>
<td>14,711.22</td>
</tr>
<tr>
<td>Spinning (10-Minute)</td>
<td>$17,539,995</td>
<td>1,192,287</td>
<td>26,258.80</td>
</tr>
<tr>
<td>Supplemental (30-Minute)</td>
<td>12,127,737</td>
<td>1,192,287</td>
<td>10,171.83</td>
</tr>
</tbody>
</table>

Table 11 (Post LIL / LTA)
Capacity Based Services Rates

<table>
<thead>
<tr>
<th>Services</th>
<th>Revenue Requirement</th>
<th>Usage (kW)</th>
<th>Rates ($/MW-year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation and Frequency Response</td>
<td>$17,616,567</td>
<td>1,494,561</td>
<td>11,787.12</td>
</tr>
<tr>
<td>Spinning (10-Minute)</td>
<td>$17,616,567</td>
<td>1,494,561</td>
<td>20,982.22</td>
</tr>
<tr>
<td>Supplemental (30-Minute)</td>
<td>12,147,064</td>
<td>1,494,561</td>
<td>8,127.51</td>
</tr>
</tbody>
</table>

6.1.5 Out of Order Dispatch

The forecast unit pricing approach places an appropriate value on the capacity used to provide capacity based Ancillary Services. It fails, however, to address the issue of out-of-order dispatch costs since it would allow Point-to-Point Transmission Customers to make opportunistic choices as to when they choose to buy from the NLSO as opposed to self-supply or purchase from a third party. Out-of-order dispatch costs paid to the generator tends to ensure that adequate service levels are maintained.

The following are examples of when out-of-order dispatches can occur:

- When a hydraulic unit is below its economic dispatch point to provide an Ancillary Service; and
- When a hydraulic unit is dispatched during a spill situation to provide an Ancillary Service.
To determine out-of-order dispatch costs, one must compare the commitment schedule with and without the provision of Ancillary Services. The following process will be used to determine out-of-order dispatch costs:

- The NLSO will release a day ahead forecast of obligations for Ancillary Services;
- Generators will then issue their day ahead generation plans to meet the hourly obligations;
- Generators will submit a second day ahead proposal to meet the Ancillary Service requirements; and
- The NLSO will then make an assessment of the resources available to provide the forecast level of Ancillary Services and will select the lowest cost option. The NLSO must have access to the following information in order to make an evaluation of least cost:
  - The generator cost information (or bids in the case of a third party provider that prefers confidentiality);
  - An estimate of the market price; and
  - The forecast start-up costs as provided by the generator (or a price in the case of a generator that prefers confidentiality).

The NLSO will collect the out-of-order dispatch costs from Transmission Customers as they occur and pass the related revenue back to the provider(s) of the service. Should any additional investments be required to avoid out-of-order dispatch costs, they will be included up to the level of the out-of-order dispatch costs that would otherwise have been attributed to Ancillary Services.

6.2 Non-Capacity Based Ancillary Services

The non-capacity based Ancillary Services consist of the following:

- Scheduling, System Control and Dispatch [Schedule 1];
- Reactive Supply and Voltage Control Service [Schedule 2]; and
Methodology for the Development of Rates for Transmission Service

• Energy Imbalance Service [Schedule 4].

Rates for Scheduling, System Control and Dispatch were determined from the total transmission revenue requirements and shown in Table 1 and 2.

6.2.1 Reactive Supply and Voltage Control Service

Rates for Reactive Supply and Voltage Control [Schedule 2] are determined using costs of units that would normally supply the service in the quantities required. The total system requirement for this service from generators on the system is based on the MVAR output of the In-Provence generators at the time of system peak plus the additional MVAR capability held in reserve to ensure dynamic system security.

All customers, including Network Customers and Point-to-Point Transmission Customers use this service. Therefore, the revenue requirement, net of any charges associated with providing short-term firm and non-firm point-to-point transmission service, is the same for the two main types of use.

The rate design is patterned on the design used for Network Integration Transmission Service and Point-to-Point Transmission Services. Tables 12 and 13 summarize the resulting rates for these services.

<table>
<thead>
<tr>
<th>Service</th>
<th>Units</th>
<th>Revenue Requirement</th>
<th>Usage (kW)</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly</td>
<td>$/MW-year</td>
<td>3,507,837</td>
<td>1,192,287</td>
<td>2,942.11</td>
</tr>
<tr>
<td>Monthly</td>
<td>$/MW-month</td>
<td></td>
<td></td>
<td>245.18</td>
</tr>
<tr>
<td>Weekly</td>
<td>$/MW-week</td>
<td></td>
<td></td>
<td>56.58</td>
</tr>
</tbody>
</table>
### Table 13 (Post LIL / LTA)

**Reactive Supply and Voltage Control Service Rates**

<table>
<thead>
<tr>
<th>Service</th>
<th>Units</th>
<th>Revenue Requirement</th>
<th>Usage (kW)</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly</td>
<td>$/MW-year</td>
<td>14,401,564</td>
<td>1,494,561</td>
<td>9,635.98</td>
</tr>
<tr>
<td>Monthly</td>
<td>$/MW-month</td>
<td></td>
<td></td>
<td>803.00</td>
</tr>
<tr>
<td>Weekly</td>
<td>$/MW-week</td>
<td></td>
<td></td>
<td>185.31</td>
</tr>
</tbody>
</table>

### 6.2.2 Energy Imbalance

Quantities for energy imbalance cannot be accurately forecast and the cost of providing the service fluctuates in real time with production cost. For these reasons this service is discussed separately and is priced uniquely.

The difficulty of forecasting hourly load coupled with the difficulty of controlling generator output and taking into consideration the potential incentives for arbitrage makes energy imbalance inevitable. Energy imbalance has a significant potential for cost shifting between suppliers.

Average embedded cost pricing is normally shunned because it could provide a substantial opportunity for users to profit from the use of this service by controlling their usage of the energy imbalance service. The two common approaches used in the industry to overcome this issue are spot market pricing if available or pricing that both protects suppliers and discourages use. The challenge in designing this service is to find the appropriate balance between protecting the suppliers of the balancing service while allowing a degree of tolerance for imbalances so as to promote market participation. The NLSO has priced energy imbalance initially at the avoided thermal cost and going forward will price at a combination of spot market price and the then available thermal cost. The rate is $ 196.86 /MWh during the Pre LIL / LTA period and $ 200.93 /MWh during the Post LIL / LTA period.
7.0 True-up

From time to time, the NLSO will either make application for a revision to the existing rates based on prospective calendar year costs that shall include a true-up for prior year(s). True-up costs are determined based on the variance of actual costs from that included in the underlying transmission rates. The true-up amount including the proportionate shares for each rate class shall be determined using the cost of service methodology described in this report. Such costs shall be reflected in the prospective Cost of Service Study.

8.0 Summary

A summary of all services is listed in Table 14 which identifies the appropriate schedule to reference for further details.

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29 During the interim period between implementation of initial transmission rates and prior to a full hearing before the PUB, the NLSO proposes to maintain the interim rates as filed.
### Table 14

**Summary of NLSO Service**

<table>
<thead>
<tr>
<th>Service</th>
<th>Schedule Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduling, System Control and Dispatch</td>
<td>Schedule 1</td>
</tr>
<tr>
<td>Reactive Supply and Voltage Control</td>
<td>Schedule 2</td>
</tr>
<tr>
<td>Regulation and Frequency Response</td>
<td>Schedule 3</td>
</tr>
<tr>
<td>Energy Imbalance Service</td>
<td>Schedule 4</td>
</tr>
<tr>
<td>Operating Reserve – Spinning</td>
<td>Schedule 5</td>
</tr>
<tr>
<td>Operating Reserve – Supplemental (10 –Minute)</td>
<td>Schedule 6</td>
</tr>
<tr>
<td>Operating Reserve – Supplemental (30 –Minute)</td>
<td>Schedule 6</td>
</tr>
<tr>
<td>Point-to-Point Transmission Service</td>
<td>Schedule 7</td>
</tr>
<tr>
<td>Non-Firm Point-to-Point Transmission Service</td>
<td>Schedule 8</td>
</tr>
<tr>
<td>Network Integration Transmission Service</td>
<td>Schedule 9</td>
</tr>
<tr>
<td>Transmission Losses</td>
<td>Schedule 10</td>
</tr>
</tbody>
</table>