

1 **Reference: Tab 2.1: 2023 Substation Refurbishment and Modernization**

2

3 **Q. Please provide the most recent update to the Substation Refurbishment and**

4 **Modernization Plan originally submitted with Newfoundland Power's 2007**

5 **capital budget application**

6

7 A. Newfoundland Power owns and operates 131 substations. Substations are critical to the

8 provision of reliable service to customers, as an unplanned substation outage can result

9 in loss of service to a thousand or more customers. The likelihood of a substation

10 outage is higher for substations with deteriorated infrastructure and obsolete equipment

11 that lacks the functionality of modern protection and control systems.

12

13 Newfoundland Power's *Substation Refurbishment and Modernization Plan* is an element

14 of the *Substation Strategic Plan* (the "Plan") included in Newfoundland Power's *2007*

15 *Capital Budget Application*.<sup>1</sup> The Plan changed the way substation capital projects were

16 planned and executed at Newfoundland Power.

17

18 Prior to establishing this Plan, the Company executed substation work on a component-

19 by-component basis. For example, in the 1990s the Company had a program to replace

20 all two-piece insulators in substations. Following an assessment of all substations, in

21 2007 the Company shifted its approach to focus on the overall condition of individual

22 substations. Under this plan, individual refurbishment and modernization projects are

23 coordinated with the maintenance cycle for major substation equipment. This

24 coordination provides reliability and productivity benefits for customers.<sup>2</sup>

25

26 In accordance with the Plan, the condition of individual substations is assessed based on

27 various criteria, including:

- 28
- 29 (i) Oil sampling and analysis to determine the condition and need to replace
- 30 transformers;
- 31 (ii) Components that are identified as deteriorated or prone to failure, such as
- 32 switches that are over 30 years old;
- 33 (iii) The condition of physical infrastructure, such as wood poles experiencing
- 34 deterioration and steel structures experiencing corrosion;
- 35 (iv) The presence of obsolete equipment, such as electromechanical relays; and
- 36 (v) Requirements for varmint proofing to prevent outages caused by small animals
- 37 and birds.

38

39 The scope of individual *Substation Refurbishment and Modernization* projects have

40 increased since 2007 based on the condition of the Company's substations as

---

<sup>1</sup> See the *2007 Capital Budget Application*, report 2.1 *Substation Strategic Plan*, page 3.

<sup>2</sup> For example, there have been eight *Additions Due to Load Growth* capital projects that have been combined with *Substation Refurbishment and Modernization* capital projects since 2007. Coordinating *PCB Bushing Phase-out* projects with *Substation Refurbishment and Modernization* projects has occurred 10 times. Further, there have been 28 instances where the capital project was aligned with power transformer maintenance, which required the installation of a portable substation. The typical cost to install a portable substation is approximately \$55,000. Avoiding the installation of portable substations in 28 instances reduces costs to customers by approximately \$1.5 million (28 x \$55,000 = \$1.5 million).

1 determined through annual inspections.<sup>3</sup> A review of Newfoundland Power’s substation  
 2 assets completed in 2022 confirmed that continued implementation of the Plan is  
 3 appropriate given the age and condition of the Company’s substation assets.<sup>4</sup>  
 4

5 The Company reviews the Plan each year as part of the annual capital planning process.  
 6 The primary purpose of the annual review is to prioritize substation refurbishment and  
 7 modernization projects based on the methodology outlined in the Plan and to reflect the  
 8 results of the Company’s substation inspections, which occur eight times annually.  
 9

10 At year-end 2021, 50 substations have undergone refurbishment and modernization in  
 11 accordance with the Plan. There are two substations undergoing refurbishment and  
 12 modernization in 2022, and two substations proposed for refurbishment and  
 13 modernization in 2023.  
 14

15 Table 1 provides the latest update of the *Substation Refurbishment and Modernization*  
 16 *Plan*.<sup>5</sup>

Table 1 Substation Refurbishment and Modernization Plan 2023-2027				
2023	2024	2025	2026	2027
WAL	GAM	BLA	BLK	GOU
MOL	LOK	BCV	DLK	LAU
	MOP	BOT	GBY	PHR
	MUN	ISL	GFS	SMV
		LLK	HWD	
		OPL	MRP	
			PBD	
			SLA	

<sup>3</sup> Additionally, in the past the scopes of these projects were expanded to include new requirements for items such as substation monitoring, security and ground grids. In the *2023 Capital Budget Application*, the Company reorganized the components of its *Substation Refurbishment and Modernization* projects to align with the Provisional Guidelines. As a result, *Substation Protection and Control Replacements* and *Substation Ground Grid Upgrades* have been included as separate projects in the Renewal and Service Enhancement classifications, respectively.

<sup>4</sup> For the results of this review, see the *2023 Capital Budget Application*, report 2.1 *2023 Substation Refurbishment and Modernization*, Section 2.2 *Substation Asset Assessment*.

<sup>5</sup> For cost details associated with the five-year *Substation Refurbishment and Modernization Plan*, see the *2023 Capital Budget Application*, report 2.1 *2023 Substation Refurbishment and Modernization*, Section 2.1 *Substation Refurbishment and Modernization Plan*.

Requests for Information

---

1           There are currently 24 substations identified for refurbishment and modernization over  
2           the next five years. The refurbishment and modernization projects outlined for 2024 to  
3           2027 reflects the age and condition of the Company's substation assets. Specific  
4           requirements to refurbish and modernize these substations will undergo further  
5           engineering reviews prior to being proposed for Board approval.