

## OPERATIONS OM&A

### 1.0 INTRODUCTION

The Operations function coordinates and dispatches crews to restore power as required, schedules and coordinates planned outages and provides customer notifications, and monitors and reports on the performance of the distribution electricity system. Operations OM&A investments are required to support this function.

The OGCC is the operating authority for Hydro One Distribution's 44/27/13 kV systems (i.e., from the transformer supply station to the distribution supply station). Under the current operating environment, the OGCC monitors the distribution system at the transformer supply stations for correct voltage levels, power quality, equipment loading, and equipment alarms. This operating environment is evolving quickly due to the impact of Smart Grid and Distributed Generation, but the major impacts of this evolution during the short term will be confined to Operations Capital as discussed in Exhibit D1, Tab 3, Schedule 4.

### 2.0 DISCUSSION

Distribution System Operations activities are carried out centrally at the Ontario Grid Control Centre ("OGCC") using modern technology and systems. OGCC is a shared facility which allows central operations of the distribution and transmission systems and is backed up by facilities located at a separate site. This centralized approach has been in place since 2003 when the Hydro One Distribution's Operations Management Centre was consolidated with Hydro One Transmission's real-time operation of the transmission system at the OGCC. The cost assigned to Hydro One Distribution for Distribution

1 Operations at OGCC is based on the “Rudden” cost allocation study discussed in Exhibit  
2 C1, Tab 5, Schedule 1.

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4 To operate the distribution system from the OGCC, a suite of systems and tools is  
5 required to facilitate system monitoring, planning, and maintenance. The primary systems  
6 supported by Operations OM&A are as follows:

7

8 • The **Outage Response Management System (“ORMS”)** is the distribution outage  
9 management tool that automatically analyzes no-power calls received at the customer  
10 call centre and pinpoints the location of outages, identifies all affected customers and  
11 facilitates optimal dispatch of field crews.

12 • The **Interactive Voice Response (“IVR”)** system is the tool used to advise  
13 customers of the status of an outage affecting them. The IVR is set automatically by  
14 the ORMS after it has determined all affected customers for an outage location. This  
15 significantly reduces the call volumes that agents need to handle at the Customer Call  
16 Centre.

17 • The **OGCC Integrated Voice System (“IVS”)** is designed to allow OGCC  
18 Operations to effectively manage voice communications with the IESO, major  
19 customers and field staff. This system provides the interface to multiple  
20 communication media, such as the public telephone network, public cell phone  
21 network and Hydro One’s provincial mobile radio system.

22 • The **Provincial Mobile Radio System** is the means by which both the OGCC and the  
23 field operations centres maintain continuous contact with field crews. It is designed to  
24 be reliable in the event of a widespread blackout and capable of accessing all remote  
25 locations where field crews would be dispatched.

26 • The **Network Management System (“NMS”)** is the network monitoring and control  
27 tool which performs data acquisition and supervisory control of the distribution  
28 system. It provides monitoring of the real time voltage and loading as well as

1 monitoring and control of the status of the switches and breakers. The NMS is  
2 gradually being extended to provide additional visibility to the distribution system in  
3 unison with smart grid initiatives and distributed generation connections.

- 4 • **Operations Support Tools** provide outage management, utility work protection code  
5 and electronic logging functions, each of which is described below:
  - 6 • **Network Outage Management System (“NOMS”)** is the transmission  
7 outage management tool that is used for planning, scheduling, assessing and  
8 executing transmission outages and for transmitting outage requests, via a  
9 direct communication link, to the Independent Electricity System Operator  
10 (“IESO”) for approval.
  - 11 • The **Utility Work Protection Code System** is used by all Hydro One  
12 personnel requiring the establishment of guaranteed ‘safe’ conditions for  
13 work. This system contains the necessary information to support the  
14 development of Work Protection packages.
  - 15 • **Electronic Logging** is the system of record for control room operations using  
16 the NMS, including operator actions such as opening and closing breakers,  
17 and system telemetry. Electronic logging provides system data for asset  
18 management and system planning.
  - 19 • The **Distribution and Station Operating Diagrams** are used by field crews and,  
20 to a lesser extent, by the OGCC to provide detailed information on the  
21 configuration of the distribution system along with, the connectivity of the  
22 distribution station and generation equipment and facilities. This information is  
23 essential in ensuring the safe and reliable operation of the transmission system.
  - 24 • The **OGCC Weather System** provides real-time weather information that is  
25 critical to managing the distribution system, especially storm systems, icing  
26 conditions and lightning strikes. The information is used to predict and anticipate  
27 outage conditions, and is displayed on the dispatcher’s computers as well as the  
28 Control Room wallboard.

- 1       • The **Emergency Services Information System** provides verified up-to-date  
2       contact numbers for all emergency response services (e.g. police, fire, ambulance,  
3       ministry of environment, gas utilities, etc.) across the Province. This system is  
4       designed to enable OGCC and field staff to efficiently contact emergency  
5       personnel. Access to ESIS is provided across Hydro One.
- 6       • The **Control Room Wallboards and Displays** are used to display real-time  
7       information provided by OGCC systems and tools. Some systems such as  
8       Weather, ORMS and NMS are displayed on the wallboard, which spans the length  
9       of the Control Room. The wallboard provides enhanced situational awareness and  
10      provides an overview of the overall system condition. Other systems are available  
11      on dispatchers' displays only.
- 12      • **Media Notifications** provide electronic document distribution and management  
13      for critical functions. Media Notifications provides local media and civic  
14      authorities with notifications regarding unplanned outage events and restoration  
15      efforts, especially during storms. Media notifications can be distributed according  
16      to various local Hydro areas. This system is considered critical to maintain Hydro  
17      One's customer satisfaction rating.

18

### 19   **3.0   PROGRAMS**

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21   Distribution Operations is divided into two programs, Operations and Operating Support,  
22   with the funding for 2008 and the spending levels for the bridge and historic years  
23   provided in Table 1.

24

**Table 1**  
**Operations OM&A**  
**(\$ Millions)**

Description	Historic			Bridge	Test	
	2006	2007	2008	2009	2010	2011
Operations	10.8	8.5	8.7	9.7	12.4	12.8
Operating Support	4.1	4.1	3.7	2.9	4.3	4.8
<b>Total</b>	<b>14.9</b>	<b>12.6</b>	<b>12.4</b>	<b>12.6</b>	<b>16.7</b>	<b>17.6</b>

### 3.1 Operations

The Operations program funds the real time distribution operating functions, staff training, and ensuring that the various systems and tools are kept current and functioning as required.

Specific functions include managing planned and unplanned outages, coordinating emergency response and monitoring system performance. These activities are described in greater detail below.

3.1.1 Managing and implementing planned outages: planned outages on the distribution system are managed at the OGCC, typically accounting for between 5% and 15% of the duration of all Hydro One Distribution customer outages. Applications for planned outages are coordinated to capture efficiencies and mitigate impacts on customers. This involves:

- Assessing all equipment involved in the outage to determine appropriate limits and control actions.
- Identifying and notifying customers of upcoming outages using means such as auto-dialer, phone, fax, newspapers, flyers, radio, and door to door visits.

- 1 • Addressing customer concerns regarding outages by moving, where possible, the  
2 outage times and dates, transferring customers to other distribution sources, or  
3 providing a back up source.
- 4 • Applying the Utility Work Protection Code to all outages to ensure all safety barriers  
5 are established.

6

7 3.1.2 Responding to and managing unplanned outages: equipment failures, tree and  
8 vegetation contact, road accidents, severe weather, and lightning result in interruptions to  
9 the distribution system and cause unplanned outages. Unplanned outages typically  
10 account for in excess of 85% of Hydro One Distribution total customer outage durations.  
11 Historically, real-time monitoring and control of the Hydro One distribution has been  
12 cost prohibitive due to wide-area rural telecommunications and monitoring and control  
13 equipment. As a result Hydro One Distribution has historically relied on “no-power”  
14 phone calls from customers to detect and locate distribution system outages. (With the  
15 implementation of smart meters, this will change as discussed in Operations Capital,  
16 Exhibit D1, Tab 3, Schedule 4 although it will take at least 1 to 2 years for suppliers to  
17 deliver the required functionality to Hydro One Distribution.) All restoration measures  
18 depend on field crews responding to the location of the outage. Once the location of the  
19 faulted equipment is determined, the OGCC dispatches repair crews. The OGCC tracks  
20 all crews that have been dispatched to effect repairs and is able to manage response times  
21 by following repair status. Affected customers are kept advised of the interruption status  
22 through the use of an interactive voice response (“IVR”) system, which informs callers  
23 that the problem is known and that crews have been dispatched, as well as providing an  
24 estimated time of power restoration if known.

25

26 3.1.3 Emergency response coordination: when the Hydro One Distribution system  
27 experiences widespread interruptions due to weather impacts, an emergency response  
28 system is implemented. The level of response varies according to the area(s) and number

1 of customers affected and the expected duration of the problem. The OGCC will  
2 dispatch crews normally until a decision is made, based on volume of power-off calls, to  
3 move to "Field Operations Center Dispatch" mode. In this mode, customer power-off  
4 calls are spread out over the field operations centers to allow supervisors to dispatch  
5 crews at a more local level and manage their resources efficiently. If the emergency is  
6 significantly widespread, incident command centers ("ICCs") and forward command  
7 posts ("FCPs") are established to centralize a command structure to address resources,  
8 equipment needs, and restoration activities. The OGCC provides media notifications to  
9 keep Hydro One Distribution customers advised and it provides municipalities and  
10 agencies with outage progress updates.

11  
12 3.1.4 Acquire system performance information, internal reporting and performance  
13 monitoring: Reliability information is needed to support sustainment and development  
14 decisions, respond to emerging problems, and report on system performance to the  
15 Ontario Energy Board, customers and other stakeholders. Data required to calculate the  
16 standard reliability indices such as System Average Interruption Duration Index  
17 ("SAIDI"), System Average Interruption Frequency Index ("SAIFI"), and Customer  
18 Average Interruption Duration Index ("CAIDI") is acquired at the OGCC. Outage  
19 inquiries from customers are reviewed and the data extracted from the various systems to  
20 advise customers what has been done as well as establish additional plans.

21  
22 All of the aforementioned Operations functions will be impacted by smart grid and  
23 distributed generation influences. These influences are necessitating greater operational  
24 visibility and control of the Distribution system. In the short term, existing processes and  
25 systems will be leveraged (e.g. extension of NMS to capture generation connections) and  
26 increasing numbers of OGCC staff focusing on Distribution elements will be used to  
27 manage the requirements. As discussed in Operations Capital Exhibit D1, Tab 3,  
28 Schedule 4, proposed capital expenditures during 2010 and 2011 on projects such as the

1 Distribution Management System and the ORMS Upgrade will fully examine the longer  
2 term requirements associated with smart grid and distributed generation. These projects  
3 will influence processes and tools at the OGCC and will result in greater impacts beyond  
4 2011. This timeframe coincides with when smart grid technologies and large numbers of  
5 generators are expected to be on the distribution system.

### 6 7 3.1.5 Summary

8  
9 The 2010 and 2011 spending requirements for this program are \$12.4 and \$12.8 million.  
10 Operating costs can vary from one year to the next based on factors such as storm activity  
11 and planned outage quantities. The figures for 2010 and 2011 are greater than amounts in  
12 historic years as a result increased focus on Distribution elements in alignment with  
13 distributed generation, smart meter, and smart grid influences.

14  
15 Distribution operations is an essential activity for the safe and reliable supply of power.  
16 Any funding reductions in this program would negatively impact customer reliability,  
17 efficiency of power restoration, and the safe operation of the distribution system.

## 18 19 **3.2 Operating Support**

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21 As highlighted under the Discussion portion of this Schedule, Operations relies on a  
22 number of systems and tools to manage and operate the distribution system, as well as a  
23 Back-Up Operating Facility. Operating Support funding is related to these systems and  
24 tools and includes expenditures for ongoing updates to the NMS to provide additional  
25 monitoring and control, support costs for ORMS, updates to the distribution operating  
26 maps and station diagrams, emergency preparedness, and the allocated portion of the  
27 maintenance and upkeep of operating facilities at the OGCC and the back-up operating  
28 facility. Greater numbers of distributed generation connections will significantly

1 influence the requirements for support (e.g. changes to station and operating diagrams,  
2 NMS extensions).

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4 The 2010 and 2011 spending requirements for this program are \$4.3 and \$4.8 million  
5 respectively. These amounts are greater than historic expenditures as a result of  
6 additional updates and support for tools associated with generation connections.

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8 Reduced funding for this program would result in deterioration in the performance of  
9 ORMS and control room facilities to unacceptable levels, reduction in the accuracy of  
10 operating maps (which increases the safety risk to workers), and non-compliance with  
11 emergency preparedness obligations.