

SHARED SERVICES - INFORMATION TECHNOLOGY

1.0 INTRODUCTION

Information Technology (“IT”) refers to computer systems (hardware, software and applications) that support business processes used by employees throughout Hydro One. IT infrastructure includes the voice and data telecommunication networks; data centre installations; and computer equipment (servers, computers, data storage devices, and printers). Staff access software applications and systems from offices and field locations using Hydro One’s wide area network, local area networks or through Hydro One’s virtual private network.

IT capital expenditures include hardware and software expenditures for projects and programs that each in total cost more than \$2 million. IT investments are made in accordance with approved business strategies, follow the IT Governance process described in Exhibit C1, Tab 2, Schedule 9, and are subject to a formal review process.

2.0 IT Capital Expenditures

**Table 2
 Total IT Capital Expenditures (\$ Millions)**

Description	Historic			Bridge	Test		DX Allocation	
	2006	2007	2008	2009	2010	2011	2010	2011
Software Refresh & Maintenance	8.6	11.9	9.3	9.3	8.0	7.9	3.5	3.5
Minor Fixed Asset Program*	13.2	14.4	9.3	7.4	20.5	17.8	11.7	10.1
Development Programs	12.5	5.4	0.5	7.3	10.5	8.8	4.8	3.9
Total	34.3	31.6	19.1	24.1	39.0	34.5	20.0	17.5

* Cornerstone capital is shown in Exhibit D1, Tab 3, Schedule 7

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Capital IT expenditures are undertaken as projects or programs to meet business requirements.
Capital expenditures fall into 3 categories:

- Software Refresh and Maintenance programs ensure continued operations of the installed IT application infrastructure, and include costs related to upgrading existing operating systems
- Minor Assets (MFA) programs ensure the continued operations of the installed IT hardware infrastructure. Expenses in this category address equipment needs generated by the growth in demand for IT services, capacity limitations and the replacement of end-of-life equipment in the IT and in the Telecom network. MFA includes desktop computing equipment, field tablet computers, mainframe and storage devices, servers, and peripherals and telecommunication infrastructure including switches, computer-telephony interfaces etc. 20102010 incremental costs are needed for: server and mainframe lifecycle refreshes; voice and data network device lifecycle refreshes; and growth in telecom infrastructure to accommodate the ramp up of additional personnel to support the capital work program.
- Development Programs ensure the replacement and/or upgrade of older and end-of-life applications and include investments in new applications. Replacement of applications occurs when the applications have become inadequate for current functional needs or where the version is no longer supported by the vendor. Upgrades or enhancements are undertaken to address legislative changes or market driven initiatives or to modify or configure the application to better support a new or existing business process. New applications are added to address business needs and to support existing or new business processes which in 2009 and 2010 will include Mobile IT, Bar Coding for Warehouse Inventory Management, eCustomer Self-Service web site enhancements and Enterprise

1 GIS foundational enhancements. These items represent the majority of the increase in
2 expenditures in this category over these years.

3
4 Hydro One has established general architecture principles for all of its applications. These are:

- 5
- 6 • Applications will be “off the shelf” and will be maintained in a vendor supported version.
7 Existing custom applications will be migrated to “off the shelf” solutions wherever
8 possible
 - 9 • The system architecture will be on an open standards platform allowing systems to run on
10 any hardware platform.
 - 11 • There will be fewer applications rather than more
 - 12 • Middleware, such as Oracle’s BEA enterprise service bus, will be used as appropriate to
13 facilitate application interconnectivity. Hydro One has already invested in creating this
14 middleware or Service Oriented Architecture (“SOA”) to enable data integration within
15 applications such as WEP, the OMS systems, SAP and Smart Meter technologies
 - 16 • Systems architecture and chosen applications will be:
 - 17 a. robust (generally understood to mean unlikely to fail, but rapid response if it does)
 - 18 b. secure (generally understood to mean 3-tiered, fire-walled and password protected)
 - 19 c. flexible service oriented architecture (generally accepted as the most appropriate and
20 efficient IT strategy).
 - 21 • System hardware will be upgraded as required to support new applications and will be
22 vendor supported.
 - 23 • Costs will be managed on a total cost of operations basis.
- 24

25 IT has also developed and is implementing an Enterprise Strategy to replace the existing best of
26 breed and customized enterprise applications which are approaching end of life. The strategy

1 envisions an integrated suite of applications which allow for interconnectivity and interflow of
2 financial and operations data (Cornerstone) which can then be used by the business to support
3 work processes. Applications will be implemented “off the shelf” and applications will be
4 maintained up to date to allow the business to make use of vendor enhancements and
5 improvements. New applications will wherever practical interface with the Enterprise systems to
6 allow for the transfer of data and to ensure cross-corporate data visibility.

7
8 The major planned IT capital projects which will be funded in 2009, 2010 and 2011 are
9 described below.

10
11 2.1 Software Maintenance and Refresh Programs

12
13 **Table 3**
14 **Software Refresh and Maintenance Program Capital Expenditures**
15 **(\$ Millions)**
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Description	Historic			Bridge	Test		DX Allocation	
	2006	2007	2008	2009	2010	2011	2010	2011
Software Refresh & Maintenance	1.0	11.9	9.3	9.3	8.0	7.9	3.5	3.5
Windows (O/S)	7.6	-	-	-	-	-	-	-
Total	8.6	11.9	9.3	9.3	8.0	7.9	3.5	3.5

17
18 Hydro One utilizes just over 620 commercial software programs and 60 custom applications in
19 order to equip its employees with the required technologies to perform their tasks efficiently and
20 safely. The software refresh and maintenance program provides the needed software vendors’
21 releases, periodic version upgrades, and replacements of activity-focused applications that meet

1 the total capital threshold of \$2 million aggregated. Included in these costs are applications and
2 operating systems that support integrated enterprise systems such as OMS, WEP, SAP, etc.

3
4 Applications are replaced or upgraded with the line of business involvement to ensure
5 applications remain compatible with current IT platforms and other interfacing applications. In
6 this manner, vendor support is maintained to help fix breakdowns or other issues that may occur
7 with the application. Funding decisions are made based on software lifecycles, vendor
8 schedules, reliability requirements, and experience with similar initiatives/projects.

9
10 Included in 2009 are the enhancement of enterprise content management and collaboration tools,
11 security programs and improvements to the disaster recovery platform. In 2010, planned costs
12 include: IT security additions to centralized logging and event management; expansion of event
13 detection capabilities; addition of email encryption; compliance tracking software; further
14 investment in BEA middleware components for integration of SAP and smart metering
15 applications. In 2011, costs are identified for application/database consolidation, further IT
16 security access control and monitoring capabilities and work towards upgrading the PC operating
17 system to Windows 7.

18 19 2.2 Minor Fixed Assets

20
21 Minor Fixed Asset investments are for IT hardware and include specific programs to refresh
22 aging hardware such as personal computers, servers and mainframes. Equipment is refreshed
23 based on its age and the nature of the applications running on the hardware. Equipment may be
24 upgraded, or improvements may be made to extend hardware functionality. Hydro One's
25 strategy is to minimize the costs of ownership, ensure operations risk is kept at an acceptable

1 level, and to maintain functionality and security. Planned funding is based on equipment
 2 lifecycles. This work is broken down into the categories shown in Table 4 below.

3
 4 **Table 4**
 5 **Minor Fixed Asset Program Capital Expenditures**
 6 **(\$ Millions)**
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Description	Historic			Bridge	Test		DX Allocation	
	2006	2007	2008	2009	2010	2011	2010	2011
IT Mainframe, Servers and Storage	4.7	8.4	1.6	1.8	6.2	4.2	3.5	2.4
IT Desktops, Laptops, Tablets, Printers and Plotters	5.9	4.8	5.2	2.7	6.3	6.2	3.6	3.5
Telecom Networks and PBX/Voicemail	2.5	1.2	2.5	3.0	8.0	7.4	4.6	4.2
Total	13.2	14.4	9.3	7.4	20.5	17.8	11.7	10.1

8
 9 **a) MFA: IT Mainframe, Servers and Storage Sustainment program**

10
 11 This investment is required to respond to and manage annual growth in demand for additional IT
 12 processing and storage capacity and to address end of life issues with the existing Unix and
 13 Wintel servers.

14
 15 Infrastructure servers are used to run business applications, networks, web services and email.
 16 Data storage devices are used by business applications and email to store and retrieve data.
 17 Servers and storage devices reach capacity over time and reach their vendor's end-of-support-life
 18 at which time they require upgrading or replacement to increase capacity or to ensure cost
 19 efficient maintenance that minimizes or eliminates down time. In determining when systems

1 require replacement, the functionality and operating and maintenance costs are assessed.
2 Hardware upgrades are needed to maintain reliable service for business applications.
3

4 The funding for the mainframe, servers and storage refresh program varies year to year
5 depending upon hardware lifecycles and business requirements for increased processing
6 capacity.
7

8 In 2010, to accommodate the typical lifecycle refresh of end of life servers, an estimated 25% of
9 Wintel servers will be required to be refreshed along with an estimated 15% of Unix servers. The
10 lifecycle refresh continues in 2011 with an additional 25% of Wintel servers and an estimated
11 15% of Unix servers.
12

13 The mainframe server that houses the customer service and billing system will require a lifecycle
14 upgrade in 2010. Also included in 2010 is the necessary infrastructure growth to accommodate
15 the additional headcount increase required for the capital work program in support of the *Green*
16 *Energy and Green Economy Act, 2009.*
17

18 **b) MFA: IT Desktops, Laptops, Tablets, Printers, and Plotters Sustainment program**
19

20 Desktop and laptop computers are used by most Hydro One staff for office productivity
21 applications such as email, word processing, spreadsheet, presentation, and personal databases,
22 and for business applications. Rugged tablet computers are used by field staff. Tablets are used
23 with Geospatial Information Systems (“GIS”) applications for undertaking systems design work
24 and for asset condition assessments. Plotters are used by Hydro One engineering and operations
25 staff for design work and to plot systems maps.
26

1 Hardware upgrades are required to accommodate new software requirements, to replace end of
2 life equipment, to address warranty considerations and to maintain hardware reliability. Personal
3 computer purchases also reflect projected increases in headcount.

4
5 Properly planned equipment refresh can maintain or reduce maintenance costs. Hardware costs
6 tend to increase with age, especially when the hardware is no longer supported under vendor
7 warranty. Hydro One's policy is to replace desktop computers every four years, laptops every
8 three years, and printers and plotters every four to five years. The renewal policy is consistent
9 with industry practice as identified by Gartner industry benchmarking studies. In practice,
10 however, the refresh cycle has been slightly longer but has been consistent with maintaining
11 functionality and minimizing maintenance costs.

12
13 Technology and support service pricing combinations for hardware are regularly compared in the
14 market and when major purchases are undertaken in line with corporate procurement policies.

15
16 The funding for desktops, laptops, tablets, printers, and plotters varies year to year depending
17 upon hardware lifecycles, business needs and forecasted headcount increases. 2010 and 2011
18 costs also include increased hardware requirements to accommodate the planned computer
19 operating system upgrade to Microsoft Windows 7.

20
21 **c) MFA: Telecom Networks and PBX/Voicemail Sustainment program**

22
23 The telecom assets of Hydro One are many, are varied and have a large variety of install dates,
24 lifecycle dates and capacity dates. The business telecom network is used to transmit data
25 required to run business applications, for email, and for web sites. Voice or data network
26 improvements or replacements are undertaken as part of an ongoing network management

1 program. The objective is to improve network efficiency and to ensure equipment is current and
2 supported by third party vendors.

3
4 Voice and data communications are used by the business daily to plan and carryout work and are
5 especially important during storm periods. Projects regularly undertaken include rewiring local
6 area networks (“LAN”), replacing end of life data network switches and routers, upgrading
7 telephone Private Branch Exchange (“PBX”) switches, replacing un-interruptible power source
8 (“UPS”) system, and upgrading the security solutions for external interfaces.

9
10 PBX/Voicemail hardware includes PBX and key set telephone switches, and voice mail
11 equipment used to provide business telephone services to Hydro One employees at central and
12 field locations throughout the province. Investments vary depending on the opening, closing or
13 consolidation of offices.

14
15 Within the Hydro One voice and data network there are more than 800 routers/switches and hubs
16 that connect to 74 PBX’s and 35 smaller multi-line office sets that support more than 155
17 locations across the province. A majority of the routers/switches and hubs are reaching end of
18 life.

19
20 The investment in Networks and PBX/Voicemail is undertaken to replace end-of-life assets and
21 to maintain service reliability and security. The strategy is again to replace equipment that is no
22 longer supported by vendors. For network equipment the refresh occurs about every five years
23 and about every ten years for PBX/Voicemail equipment.

24
25 The funding for Networks and PBX/Voicemail varies year to year depending upon hardware
26 lifecycles, business needs for increased bandwidth and available market resources. Changes to

1 business applications and work methodologies may require the upgrades to occur more
 2 frequently.

3
 4 2010 planned costs include: growth in the telecom infrastructure to accommodate the ramp up of
 5 additional headcount needed to support the capital work program; initiation of a 4 year voice
 6 system upgrade which includes migration of 25% of the end of life Meridian Mails systems to
 7 Call Pilot; local area network wireless expansion; branch office router upgrades; Telecom
 8 Disaster/Recovery enhancements; and GTA network upgrades. 2011 costs represent a
 9 continuation of these upgrade programs along with the commencement of a corporate local area
 10 network 4-year refresh program.

11
 12 **2.3 Development Projects**

13
 14 As previously noted, development projects include the cost for new applications or the
 15 replacement of end of life applications. Costs for IT development projects are detailed in Table
 16 5 below.

17
 18 **Table 5**
 19 **IT Development Projects Capital Expenditures**
 20 **(\$ Millions)**
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Description	Historic			Bridge	Test		DX Allocation	
	2006	2007	2008	2009	2010	2011	2010	2011
CIS/CSS Hybrid Upgrades/CRM	0.4	2.9	0.3	-	-	-	-	-
CTI Upgrades	3.3	0.7	(0.3)*	-	-	-	-	-
APCI/WEP	8.0	0.9	-0.01	-	-	-	-	-
IREIS	-	-		0.2	-	-	-	-
Mobile IT	-	-		1.0	3.0	2.9	1.3	1.3
Asset Mgmt & Data Collection	0.8	0.9	-	-	-	-	-	-

Description	Historic			Bridge	Test		DX Allocation	
	2006	2007	2008	2009	2010	2011	2010	2011
Warehouse Bar Coding	-	-	0.04	2.0	1.0	-	0.4	-
eCustomer Self-Service Web Site	-	-	-	3.4	-	-	-	-
Enterprise GIS Program	-	-	-	-	6.0	5.9	2.7	2.6
DX Asset Information System	-	-	0.5	0.7	0.4	-	0.4	-
Total	12.5	5.4	0.5	7.3	10.5	8.8	4.8	3.9

* represents vendor credit

a) Mobile IT

Mobile IT (total of \$7 million to be spent over 2009 through 2011) is intended to equip field staff with the tools required to access current asset data applications including SAP, GIS and work order dispatch applications. This project supports the Company's response to staff and vehicle location safety needs, Smart Grid and Smart Metering initiatives and supports the implementation of "off the shelf" data collection tools for SAP and other enterprise systems which require data to be collected and reported from the field.

Hydro One intends to implement a mobile software application which will be the enterprise mobile tool for data collection and work status reporting and also interface with the GIS and SAP systems. The applications will work in a connected (real time) or disconnected mode depending on the nature of the work being performed. The intent is to be able to make this information available to the enterprise systems for record updating and further analysis. The application will be selected in 2009 and system as well as business process integration will span 2009 through 2011 in manageable phases. The first phase will include enabling Stations Maintenance crews to

1 collect their inspection data and load it into SAP to enable reliability-centered maintenance.
2 Enablement within Customer Operations will follow to support their ongoing asset management
3 and data collection.

4
5 **b) Warehouse Bar Coding**

6
7 This investment is required to provide an enterprise wide solution for automating the data
8 collection activities for the Barrie warehouse, central maintenance shop and the meter shop to
9 ensure accuracy of data collection and reduction in manual data entry. Improvements in
10 accuracy and timeliness of entry are required for more accurate inventory records, and fewer
11 inventory adjustments.

12
13 Hydro One's inventory management sites hold Hydro One's day to day inventory for operations,
14 consumable inventory, strategic spare parts and high level operating spare units. When
15 equipment fails in the field, parts and/or spares are immediately deployed from one of the
16 inventory management sites. The ability to quickly identify and deploy parts and/or spares is
17 integral to achieving lowest possible restoration time – thus maximizing reliability. Day to day
18 inventory requires significant handling, shipping, material movement, and counting as part of
19 normal operations. The bar code system will be populated and feed the SAP Warehouse
20 Management System for overall improved asset management.

21
22 **c) eCustomer Self Service Web Site**

23
24 This investment will improve and enhance the existing custom self service web site applications
25 including the ability for customers to: sign-up for pre-authorized payments in accordance with
26 the Canadian Payments Association new regulations; make payment arrangements when in

1 arrears; sign-up for pre-authorized payments; complete high bill enquiry walkthroughs; connect
2 directly to an Agent for further assistance; receive a callback via the Virtual Hold function.

3
4 This electronic communication channel enables customers to serve themselves with usage
5 increasing when electricity usage data becomes available on a daily basis with the
6 implementation of automated meter reading and time of use (“TOU”) billing. This investment
7 will allow for the alignment of smart metering and TOU requirements using a solution that is
8 seamless to the end user.

9
10 **d) Enterprise GIS Program**

11
12 Geospatial technology is a key infrastructure that enables a variety of business processes
13 including design, transmission and distribution planning, outage management, work
14 management, real estate and others. Geospatial technology and the underlying connected
15 network model is also a key component required to support the benefits achieved from smart
16 metering and smart grid initiatives.

17
18 This program will lead to achieving a single system of record comprising the location and
19 connectivity of both transmission and distribution assets (GIS is the only technology that fully
20 supports both logical connectivity and physical location of assets) as well as properties. It will:
21 facilitate planning and outage management; support mobile workforce management through
22 intelligent crew routing and automated vehicle location (“AVL”); manage real estate records
23 and Hydro One property; and provide the underpinnings of smart grid applications such as
24 FLISR (fault location, isolation and service restoration, which minimizes the outage impact to
25 customers) and VVO (voltage optimization, which provides a consistent quality of service while
26 achieving efficiency through voltage reduction).

1
2 It will also enable a web portal and integration to other critical business systems such as SAP.
3 The program will create a consolidated system of record for spatial data and publish it to
4 consumers as needed either via integration with distribution planning with CYME, outage
5 management with ORMS, or next-generation DMS, or via a published web portal. This will
6 entail completing the conversion of Dx asset data, reconciling the data and business processes,
7 publishing a spatial data web portal, and completing integration with SAP and other enterprise
8 applications. This investment provides for updates to GIS infrastructure, particularly software
9 applications as well.

10

11 **e) DX Asset Information System**

12

13 The objective of this investment is to establish technology and infrastructure allowing for
14 collection of the data related to DX Assets, migration of this data to the GIS environment and
15 post-migration editing of the data in order to build connectivity, populate missing attributes and
16 verify reliability of the data. This is a multi-year process, the purpose of which is to create a
17 complete and reliable spatial dataset supporting crucial business initiatives such as Outage
18 Management, Work Program Planning, etc.