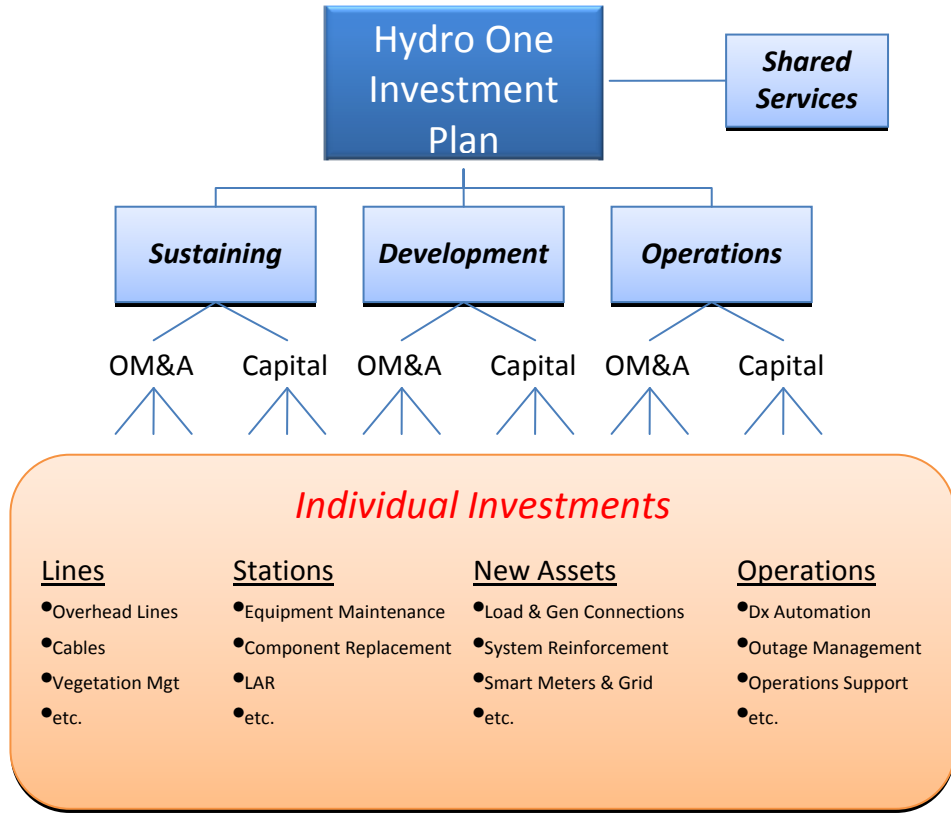


1

Figure 1: Investment Plan Process



2

3 As discussed in Exhibit A, Tab 14, Schedule 1, the Investment Plan Process is part of
 4 Hydro One Distribution’s corporate business planning process. During the Investment
 5 Planning Process, information is collected, needs are assessed, and potential investments
 6 are identified for the four major investment categories. The individual investments are
 7 then evaluated taking into consideration the other investments within a category. The
 8 proposed levels of investment for each category are submitted for further evaluation
 9 against all other investments proposed by the Company using the prioritization process
 10 described in Exhibit A, Tab 14, Schedule 6.

11

12 The prioritization process results in a portfolio of individual investments across all work
 13 categories that together make up a preliminary Investment Plan for the Company. The

1 preliminary Investment Plan is then reviewed by Senior Management who may further
2 modify it based on consideration of the impact on customer rates, the ability to
3 accomplish all of the proposed work in light of known constraints (e.g. labour, material,
4 engineering resources), the financial health of the company, and the impact of changes in
5 investment levels on residual risk to business objectives.

6

7 The end result of this process is a prioritized Investment Plan proposal that effectively
8 meets the Company’s business objectives and represents a balance among customer and
9 distribution system needs, costs, and risks. The proposed Investment Plan is then
10 recommended to the Hydro One Board of Directors for approval as part of the
11 Corporation’s business plan.

12

13 The individual investments that make up the Investment Plan are generally developed
14 using the common process illustrated in Figure 2 below. This common process is then
15 tailored at the lower level to suit each category of work.

16

17 **Figure 2: Investments - Common Development Steps**

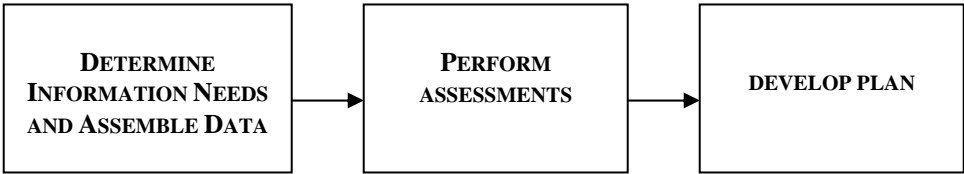
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29

Sections 2.0, 3.0 and 4.0 respectively, detail the processes for developing particular investments for each of the Sustaining, Development and Operations categories of work. Some investments for Shared Services are developed using a process similar to that shown in Figure 2, taking into account the requirements of Hydro One Inc. and its subsidiaries, which include the transmission and distribution businesses. Other Shared Services are received from affiliate companies and the cost of services to and from affiliate companies are covered by Service Level Agreements, which are described in

1 Exhibit A, Tab 8, Schedule 3. Shared Services investments are incorporated into the
2 proposed investment plan for review by Senior Management in finalizing the Investment
3 Plan.

4 5 **2.0 SUSTAINING ASSET INVESTMENTS**

6
7 Sustaining asset investments are grouped into three major subsets:

- 8 • Stations, which funds the work required to maintain, refurbish or replace existing
9 assets located within distribution stations;
- 10 • Lines, which funds the work required to maintain, refurbish or replace distribution
11 line components. Trouble calls and customer-driven service response activities
12 are also included in this category; and
- 13 • Vegetation Management, which funds the work required to manage clearances to
14 energized equipment to maintain an acceptable and sustainable level of reliability.

15
16 For each subset of sustaining work, the common process shown in Figure 2 is applied as
17 described below.

18 19 *1. Determine Information Needs and Assemble Data*

20
21 A variety of information and data sets are required to develop sustaining investments.
22 Asset condition data is a key input to the assessment of possible investments since assets
23 deteriorate over the course of their active duty. The scope of data collected depends on
24 the priority (i.e. value and risk) of the asset category. Data is collected in various ways,
25 such as visual inspection by field maintenance crews, results from various testing
26 procedures on assets (e.g. pole tests, submarine cable tests), and monitored reliability
27 performance. Other information related to regulatory (e.g. Distribution System Code
28 requirements) and legislative (e.g. new PCB regulations) requirements is also required for
29 assessing the investment needs. In some cases (e.g. demand investments) historical

1 information is used as a basis for future forecasts. The data is compiled for each specific
2 asset and may be grouped with the data of other assets of the same asset family for the
3 purpose of developing investments. Data is verified and validated for accuracy.
4

5 *2. Perform Assessment(s)*
6

7 The assessment process focuses on risk mitigation and the two components that make up
8 risk: Probability of Failure/Event Occurrence; and, Consequence of Failure/Event
9 Occurrence.
10

11 ***Probability of Failure***

12 The probability of failure, or of a particular unacceptable event occurring, is determined
13 through:
14

- 15 • Asset Condition Assessments (“ACA”): These are proactive condition
16 assessments specific to the various asset classes and result in condition ratings for
17 each asset class. The condition ratings are leading indicators of the likelihood that
18 a failure or an unacceptable event will occur and are used to assess the need for
19 mitigating action in the form of revised maintenance procedures or asset
20 replacement.
21
- 22 • Assessing the asset demographics: Assets entering mid or end-of-life stages are
23 expected to require increased attention to maintain satisfactory level of
24 performance and minimize the probability of failure. Maintenance costs of an
25 asset in these periods can increase significantly (e.g. submarine cables testing)
26 and the likelihood of needing to refurbish or replace the asset will increase as well
27 (e.g. wood poles).
28

- 1 • Evaluating component performance and reliability: Equipment failure rates are
2 lagging measures which Hydro One Distribution monitors as critical signals of
3 asset deterioration. These measures are used to validate the condition ratings and
4 identify the need for immediate corrective action. Poor performance of a
5 particular component will also be assessed to determine if there is a need to be
6 concerned about the health of other like units in the system.
7
- 8 • Equipment Utilization: The usage of a component can also affect its performance
9 and probability of failure. Assets wear out more quickly if operated repeatedly,
10 near or above their normal ratings, or in a manner that places excessive stress on
11 their components. Thus utilization assessment(s) are done on specific assets
12 where there is a risk that usage will have affected the life of the equipment.
13
- 14 • Historical Demand: For demand investments, the probability of events occurring
15 is based on history and trending information.
16

17 ***Consequence of Failure***

18 The second aspect that is assessed is the consequence of a failure or particular
19 unacceptable event. Consequences that are considered include:

- 20 • public and employee safety hazards
21 • reliability of the distribution system
22 • security concerns
23 • environmental impacts
24 • regulatory or legislative compliance penalties
25

1 Events that may lead to significant adverse consequences are identified and considered in
2 conjunction with the probability or likelihood of occurrence. High risk events, defined
3 as those with high probability, high consequence or both, are mitigated before lower risk
4 events.

5
6 *3. Develop Plan*
7

8 Developing the plan for individual projects or programs involves the initial step of
9 developing a recommended action, either a maintenance or capital investment, for each
10 asset based on the assessment discussed above. Initial individual investments are
11 developed and prioritized based on criteria aligned with corporate objectives and business
12 values. Various levels of sustainment effort are defined for each asset, and the cost and
13 risk is determined for each level of investment.

14
15 The planning process also involves reviewing the potential investments and “bundling”
16 work where there are synergies to be realized and it is practical to do so. For example,
17 there may be a situation where transformers need to be replaced at a particular
18 distribution station (“DS”) and there is also work to be done on the reclosers at the same
19 DS. This work would be bundled together if there are efficiencies to be realized with
20 respect to mobilization of crews to do the work and timing of outages that need to be
21 taken. In some cases, it may also be efficient to advance other sustainment work (e.g.
22 PCB testing) at the same DS, in order to make better use of resources and outage
23 windows already planned for the DS.

24
25 *Example – Wood Structure Replacement*
26

27 The three step process described above is essentially the same for most sustaining capital
28 and OM&A investments. The Wood Structure Replacement investment is provided
29 below as a good example of the process.

1

2 The development of the Wood Structure Replacement investment begins with asset
3 condition assessment data that includes condition information for all poles assessed and
4 in particular those found to be in poor condition and at end-of-life. In addition to this
5 data, pole demographics data, reliability data, and information on previous replacement
6 accomplishments is gathered.

7

8 The number of poles found to be at end-of-life form the basis of the Wood Structure
9 Replacement investment. This number is examined relative to historic and expected
10 figures, pole demographics, and historic failure rates. In particular, analysis of condition
11 findings compared to pole age is conducted to better understand current condition
12 findings and to project future pole conditions. Reliability performance is analyzed to
13 yield trends in pole failures that are impacting the distribution system. These trends are
14 viewed in light of historic replacement quantities and trends in overall pole plant
15 condition.

16

17 Once all available information is analyzed, the replacement plan is developed. The plan
18 is typically based on the number of in-service poles that have been identified as being at
19 end-of-life less a provision for poles that will be replaced as part of other programs. The
20 number of poles to be replaced may be adjusted depending on indications from reliability,
21 failure, and demographic assessments conducted. The final wood pole replacement plan
22 is then included in the Hydro One Investment Plan for prioritization against all the other
23 investments proposed by the Company.

24

25 Details on all sustaining investments developed and included in the Investment Plan can
26 be found in:

27

- Exhibit D1, Tab 2, Schedule 1, Asset Condition Assessment & Analysis

28

- Exhibit D1, Tab 3, Schedule 2, Sustaining Capital

- 1 • Exhibit C1, Tab 2, Schedule 2, Sustaining OM&A

2
3 **3.0 DEVELOPMENT ASSET INVESTMENTS**

4
5 Development asset investments consist of spending on Development OM&A and
6 Development Capital. This spending can be subdivided into the following subsets of
7 work:

- 8 • Research & Development and Standards (OM&A), which identifies and
9 investigates the use of new technologies or processes that may be utilized by
10 Hydro One Distribution and if proven beneficial included in standards;
- 11 • Engineering and Technical Services (OM&A), which funds data collection,
12 modeling, and assessment of distribution system loading conditions;
- 13 • New Connections and Service Upgrades (Capital), which connects new customers
14 onto Hydro One Distribution's system and accommodates upgrades customer
15 services;
- 16 • System Capability Reinforcement (Capital), which funds upgrades to the
17 distribution system in response to load growth and performance issues;
- 18 • Distribution Generation Connections & Enhancements (Capital), which funds the
19 work required to connect generators onto the distribution system and to
20 implement the necessary expansion and enabling infrastructure (e.g. protection
21 and control) to accommodate these connections;
- 22 • Smart Grid (Capital), which is an initiative to innovate, test, assess, and
23 implement emerging technologies and new solutions on Hydro One Distribution's
24 system.

25
26 Although the nature of the above work is in some cases very different, the investments
27 for each are developed using the common process shown in Figure 2. Details on the
28 application of the process for Development investments are provided below.

1

2 1. Determine Information Needs and Assemble Data

3

4 Depending on the nature of the investment, information inputs into the development
5 process vary. For R&D and Standards, the primary input to the development process is
6 prospective R&D projects and Standards requests submitted from various departments
7 within the organization. For New Connections & Service Upgrades, the primary inputs
8 are historical accomplishment data and economic factors (e.g. GDP, housing starts) that
9 can be assessed and used to forecast future demand. For System Capability
10 Reinforcement, the primary inputs are feeder loading, protection, and configuration
11 information along with future load growth forecasts. For Generation Connections and
12 Enhancements, the primary inputs are the number and location of connection proponents
13 and the results of engineering and technical studies on the impact of anticipated
14 generation connections. For Smart Grid, the primary inputs are information about new
15 technologies that have potential applications on Hydro One Distribution's system.

16

17 2. Perform Assessments

18

19 Assessments are performed for each subset of Development work using a risk based
20 approach that recognizes Hydro One Distribution's strategic objectives and business
21 values (e.g. safety, reliability, regulatory and legal compliance). In the case of
22 assessments related to Distributed Generation and Smart Grid investments, consideration
23 is also given to the direction provided in the *Green Energy and Green Economy Act,*
24 *2009*. These assessments are applied in a manner that is consistent with the work's
25 nature. For example, assessments of potential R&D and Standards work focuses on the
26 impact to the business if the work is not undertaken (e.g. not undertaking a standards
27 project may lead to inefficiencies for field design work). These assessments then lead to
28 the identification a prioritized list of prudent projects based on relative benefits (i.e. risks
29 mitigated) to the corporation.

1

2 For New Connections and Service Upgrades, the assessments are based on econometric
3 analyses and forecasting models. The data assembled (e.g. economic factors, historical
4 accomplishments, load growth forecasts) in the first step of the investment development
5 process is used in the assessments to help predict the numbers of New Connection and
6 Service Upgrades that can be expected in future years. The assessment results in a
7 forecast that is then considered in relation to pertinent risks (e.g. Customer, Reputational,
8 Regulatory).

9

10 For System Capability Reinforcement and Generation Connection and Enhancements,
11 assessments involve engineering and technical studies that model feeder loading and
12 growth. These studies identify unacceptable conditions (e.g. high short-circuit levels,
13 phase imbalances, low voltages) that increase risks in areas such as safety, system
14 reliability, or Hydro One Distribution's ability to connect load customers or generators.
15 After unacceptable conditions and generation connection needs are identified, the
16 assessments then move on to developing alternatives for addressing the conditions in a
17 cost-effective manner.

18

19 3. Develop Plans

20

21 Developing the plan is the final step in the process and is guided by the results from
22 assessments that were conducted. For example, the prioritized list of R&D and Standards
23 is included in the plan as is the investment required to connect the forecast New
24 Connections and Service Upgrades. For System Capability Reinforcement cost-effective
25 alternatives to address unacceptable loading and system conditions are included the plan.
26 For Generation Connection and Enhancement work, investments required to facilitate the
27 timely connection of increasing amounts of renewable distributed generation are
28 identified.

29

1 Similar to the process followed for Sustaining investments, the planning process for
2 Development investments involves reviewing potential investments in a holistic manner
3 and “bundling” complimentary work where synergies exist. For example, a large number
4 of generation connection applications in a particular area will drive proactive Generation
5 Enhancement work.

6
7 *Example – System Capability Reinforcement*

8
9 The three step process described above for Development investments can be illustrated in
10 greater depth using an example.

11
12 System Capability Reinforcement funds system capacity and performance improvement
13 projects to ensure that load growth is prudently managed. The first step in the
14 Development Process for this subset of work is to gather loading information for
15 particular stations and feeders. This includes expected load growth conditions in future
16 years (i.e. typically over a 5 year period). In addition, information about protections and
17 settings, and individual feeder configurations is collected.

18
19 The information collected is utilized in technical assessments of loading and system
20 conditions. These assessments include:

- 21 • Feeder Studies – The modeling of distribution feeders to examine the impact of
22 load growth and identify various system needs (e.g. high losses, protection
23 issues). These studies are conducted on a cyclical (i.e. 6 year) basis.
- 24 • Area Studies – The assessment of various areas (i.e. multiple stations and feeders)
25 on the distribution system that have high growth or known loading or reliability
26 issues. Area studies are generally performed when numerous system issues in a
27 geographic area have the potential to be resolved using an integrated solution.
- 28 • System Impact Assessments – These are conducted when larger new customers

1 (e.g. 167 kVA single phase or 500 kVA three phase) request connections onto the
2 distribution system. The outcomes are typically the identification of needed
3 investments to address major increases in load.

- 4 • Other Studies – These studies are typically conducted with very specific issues
5 arise that generally have limited alternatives and do not require any of the
6 aforementioned assessments to be conducted. An example of such a situation
7 would be a DS capacity issue that can be easily alleviated by upgrading a
8 transformer.

9

10 Based on assessment findings, investment alternatives are developed to address the
11 system reinforcement needs that were identified. For example, a particular voltage issue
12 may be addressed by either installing a capacitor, installing a regulator, or re-
13 conducting a distribution line. The appropriate alternative is selected based on its
14 ability to address the need in the most cost-effective manner possible. Once developed,
15 selected, and evaluated against other possible Development capital investments, the
16 investment is included in the Hydro One Investment Plan for prioritization against all the
17 other investments proposed by the Company.

18

19 Details on investments developed and included in the Investment Plan can be found in:

- 20 • Exhibit D1, Tab 3, Schedule 3, Development Capital
- 21 • Exhibit C1, Tab 2, Schedule 3, Development OM&A

22

23 **4.0 OPERATIONS ASSET INVESTMENTS**

24

25 The Operations function manages Hydro One Distribution’s assets from central facilities
26 at the Ontario Grid Control Centre (“OGCC”). These facilities rely heavily on
27 information systems and tools that enable monitoring and control of distribution assets, as
28 well as outage management systems that are used to dispatch and restore power

1 interruptions. The very nature of these tools (i.e. computer hardware and software)
2 makes them unlike the majority of Hydro One Distribution's assets, due to their short life
3 spans.

4
5 Asset investments in the Operations area may be either OM&A or Capital in nature.
6 Capital investments are required to implement major enhancements to existing facilities
7 and to make major investments for long-term (information) system improvements.
8 OM&A asset investments are required to maintain the operational readiness of facilities
9 and to support, manage and make minor modifications to existing facilities. For both
10 OM&A and Capital Operations investments, the common development process is applied
11 as described below.

12
13 *1. Determine Information Needs and Assemble Data*

14
15 The Development Process begins by gathering information related to specific operating
16 needs. The information about operating needs is typically related to corporate and
17 operating strategies, asset condition information, business objectives, or process, market,
18 and regulatory requirements. Given the nature of the Operations function, most needs are
19 related to information system software and hardware components. Examples of specific
20 needs that have been identified are:

- 21 • Improve restoration efforts and customer service by building and maintaining
22 systems that leverage smart meter data to provide real-time outage data.
- 23 • Improve operating processes and tools to prepare for greater quantities of
24 distributed generation and to enhance monitoring and control of the distribution
25 system.
- 26 • Develop real-time system analysis tools to provide reliability assessments for real-
27 time dispatch of the distribution.

1 2. Perform Assessments

2
3 Once information about operating needs is gathered, assessments of each need are
4 conducted to:

- 5 1) Determine the value (e.g. mitigation of risks, improvement in service) associated
6 with addressing the need.
- 7 2) Identify and examine potential alternatives for addressing the need, which
8 depending on the specific need, may include:
- 9 • Extending existing applications and systems to take advantage of
10 enhanced capabilities that are already inherent in the existing tool set.
 - 11 • Purchasing commercial “off-the-shelf” software or more elaborate tools
12 that may be considered either “best-in-breed” or specifically designed for
13 electric utilities.
 - 14 • Making better use of existing data or adjusting existing processes to
15 achieve a desired goal.
 - 16 • Replacing or upgrading hardware or software in anticipation of its end-of-
17 life (e.g. withdrawal of vendor support).
- 18

19 The results of the assessment in terms of both value and potential alternatives to
20 addressing a need are then used to develop the plan.

21
22 3. Develop Plans

23
24 Once assessments are complete, detailed plans are developed in order to determine the
25 scope, timing, and investments required to address needs. The investments are prioritized
26 based on their value along with other factors such as the ability to strike a balance
27 between sustaining existing operating facilities and developing new facilities. Depending
28 on the nature of the investments, they will be categorized as one of Operations Capital or
29 Operations OM&A. For example, replacement or major upgrades of information systems

1 are considered Capital, while changes to processes or expanded utilization of an existing
2 system are considered OM&A. Once developed, the investments are included in the
3 Investment Plan.

4
5 *Example – Distribution Management System*

6
7 The three step process described above for Operations investments can be illustrated in
8 greater depth using an example.

9
10 The first step of the investment development process is the assembly of information
11 related to Operations needs. During this step, the need for an enhanced suite of tools
12 linked to SCADA (Supervisory Control and Data Acquisition) telemetry that can be used
13 to monitor and control was identified. This need became known as the need for a
14 Distribution Management System (“DMS”) and was driven by the increases in distributed
15 generation connections and planned smart grid initiatives.

16
17 After being identified, the DMS need was assessed. The first step in the assessment
18 involved an evaluation of value. Generation connection forecasts and the planned smart
19 grid initiatives indicated that operational visibility and control would be required down to
20 the lowest level of the distribution system. Currently, operating tools only provide
21 visibility to feeders emanating from transmission stations and do not provide visibility
22 beyond distribution stations. It became obvious that DMS functionality would be
23 required to enable both generation connections and the smart grid. Without a DMS,
24 corporate strategies and their objectives (e.g. improved reliability, increased efficiencies,
25 regulatory compliance) could not be implemented.

26
27 After determining that the DMS was valuable and worth moving forward, the assessment
28 turned its focus to potential implementation alternatives. As with many Operations needs
29 that are assessed, the first alternative was to leverage existing facilities and tools. In the

1 case of the DMS, a natural alternative was to expand the existing NMS (Network
2 Management System) that is predominantly used for monitoring and control of the
3 Transmission system. This alternative was assessed using forecasts for generation
4 connections and it was determined that in the short-term (i.e. 2 year period), this
5 alternative was feasible. Over the long term, capacity issues, the number of telemetry
6 points required, functionality restrictions, and the need to tailor a system for Distribution
7 system made the expansion of the existing NMS undesirable. The alternative was to
8 develop a dedicated DMS that can be tailored to monitoring and control of the
9 Distribution system.

10
11 After the assessment was completed, a plan was developed that included the expansion of
12 the NMS to accommodate generation connections in the short term. Over the longer
13 term, a DMS would be required. To accomplish this, funding to develop DMS
14 requirements was included in the plan over a two year period. This funding would focus
15 on defining system requirements, scoping and sizing needs (e.g. number of feeders,
16 number of monitoring points), conducting product reviews, searching for vendors, and
17 conducting product demonstrations. The objective being to select a commercial product
18 that can meet Hydro One Distribution's operating needs. This investment was then
19 included in the Hydro One Investment Plan for prioritization against all the other
20 investments proposed by the Company.

21
22 Details on investments developed and included in the Investment Plan can be found in:

- 23 • Operations Capital, Exhibit D1, Tab 3, Schedule 4.
- 24 • Operations OM&A, Exhibit C1, Tab 2, Schedule 4.