

March 2, 2026

VIA RESS

Mr. Ritchie Murray
Acting Registrar
Ontario Energy Board
2300 Yonge Street
27th Floor, Box 2319
Toronto, ON M4P 1E4
Email: registrar@oeb.ca

Dear Mr. Murray;

RE: OEB File No. EB-2025-0252, Alectra Utilities Corporation (“Alectra Utilities”) 2027-2031 Custom Rate Application for Electricity Distribution Rates and Charges (the “Application”) – Disclosure of Documents in accordance with the OEB’s Decision and Order on Confidentiality

Alectra Utilities requested certain information in the above referenced application and related pre-filed evidence to be treated as confidential, pursuant to Rule 10.01 of the OEB’s *Rules of Practice and Procedure* and the OEB’s 2021 *Practice Direction on Confidential Filings*.

On February 25, 2026, the OEB released its Decision and Order on Confidentiality (“Confidentiality Decision”). In accordance with the Confidentiality Decision, Alectra Utilities has removed all redactions from, and is refiling, the evidence listed in Table 1 below:

Table 1: Refiled Evidence where all redactions were removed

Exhibit	Pages Unredacted
Exhibit 2A, Tab 1, Schedule 1, Distribution System Plan, Chapter 5 – Section 5.3.3	p. 259
Exhibit 2A, Tab 1, Schedule 1, Distribution System Plan, Appendix O	p. 3 p. 6-7
Exhibit 4, Tab 2, Schedule 8, Attachment 4-5 (the “Gartner IT Report”)	p. 4 p. 8 p. 41-43 p. 63-65 p. 67 p. 78-82

Table 2 indicates the evidence where Alectra Utilities has modified the redactions, and is refiling the evidence, in accordance with the Confidentiality Decision.

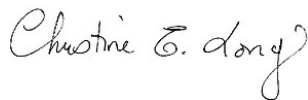
Table 2: Refiled Evidence with partial redactions remaining

Exhibit	Pages with Redactions Remaining
Exhibit 2A, Tab 1, Schedule 1, Distribution System Plan, Appendix B07	p. 277 p. 282-283 p. 286
Exhibit 2A, Tab 1, Schedule 1, Distribution System Plan, Appendix B09	p. 346-347 p. 362-363 p. 367 p. 369-370 p. 374 p. 379 p. 388
Exhibit 2A, Tab 1, Schedule 1, Distribution System Plan, Appendix C, Copperleaf Value Framework Definition Document ("Copperleaf VFDD")	p. 27-28 p. 30-34 p. 36-46 p. 48-57 p. 59-60 p. 62-63 p. 65-71 p. 75-79 p. 81-85 p. 87 p. 91 p. 93

Please note that although the Confidentiality Decision did not address the redactions to Appendix B09 on pages 380 and 386, Alectra has removed the redactions to those pages as it does not have concerns with the information being on the public record and agrees with OEB Staff's submission that it should not be redacted.

Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,



Christine E. Long
Senior Vice-President Regulatory Affairs & Privacy Officer
Christine.Long@alecrautilities.com

cc: Charles Keizer and Arlen Sternberg, Torys LLP
All parties in EB-2025-0252

5.3.3

Asset Lifecycle Optimization Policies and Practices

5.3.3 Asset Lifecycle Optimization Policies and Practices

Alectra Utilities manages its station, distribution system and revenue metering assets throughout their lifecycle to optimize asset performance and useful life, while delivering maximum value to customers with due regard to system reliability, safety, regulatory requirements, cost, customer service requirements, and environmental considerations. This section describes Alectra Utilities' asset sustainment practices and lifecycle optimization methodologies that support the Asset Management Process in identifying investment needs, sustaining in-service assets, and planning system renewals.

- **Section 5.3.3.1** provides an overview of the asset sustainment practices, including the maintenance, replacement, and refurbishment strategies of station, distribution and metering assets.
- **Section 5.3.3.2** details the maintenance practices that support optimal lifecycle management and aim to extend the useful life of an asset where possible.
- **Section 5.3.3.3** describes planned asset replacement practices, key decision drivers, and how capital investment planning is customized for each specific asset class.
- **Section 5.3.3.4** describes refurbishment practices for comprehensive assessment and asset rebuilding opportunities to extend the useful life of major assets.
- **Section 5.3.3.5** explains how system renewal and expansion investments impact the overall maintenance requirements of Alectra Utilities' assets.
- **Section 5.3.3.6** explains Alectra Utilities' asset lifecycle management approach and use of Copperleaf's Predictive Analytics (PA) in optimizing the quantity and pacing of distribution asset classes like poles, transformers, switches, and switchgear.

Lifecycle optimization practices for general plant assets (e.g. fleet and information technology) are discussed in a separate section of this DSP, in *Chapter 5.4.2 2027-2031 Investment Overview*.

5.3.3.1 Overview of Alectra Utilities' Lifecycle Optimization Practices

In managing the station and distribution system, Alectra Utilities' main objective is to optimize asset performance with due regard for system reliability, safety, cost, customer service

requirements, and environmental considerations, while maximizing long-term value through risk-informed decision-making, regulatory compliance, and sustainable asset lifecycle management. This is referred to as Alectra Utilities' Asset Sustainment Practices. More specifically, the company's Asset Sustainment Practices aim to optimize total cost of asset ownership in a sustainable manner through maintenance, replacement, and refurbishment activities. *Section 5.3.3.2, Section 5.3.3.3 and Section 5.3.3.4* describe the evaluation of whether assets should remain in service or undergo maintenance, replacement, or refurbishment. In making these determinations, Alectra Utilities considers a multitude of factors including asset condition, failure risk, functionality, safety, environmental impacts, loading, and compliance with current standards.

Figure 5.3.3 - 1 provides an overview of Alectra Utilities' Asset Sustainment practices.

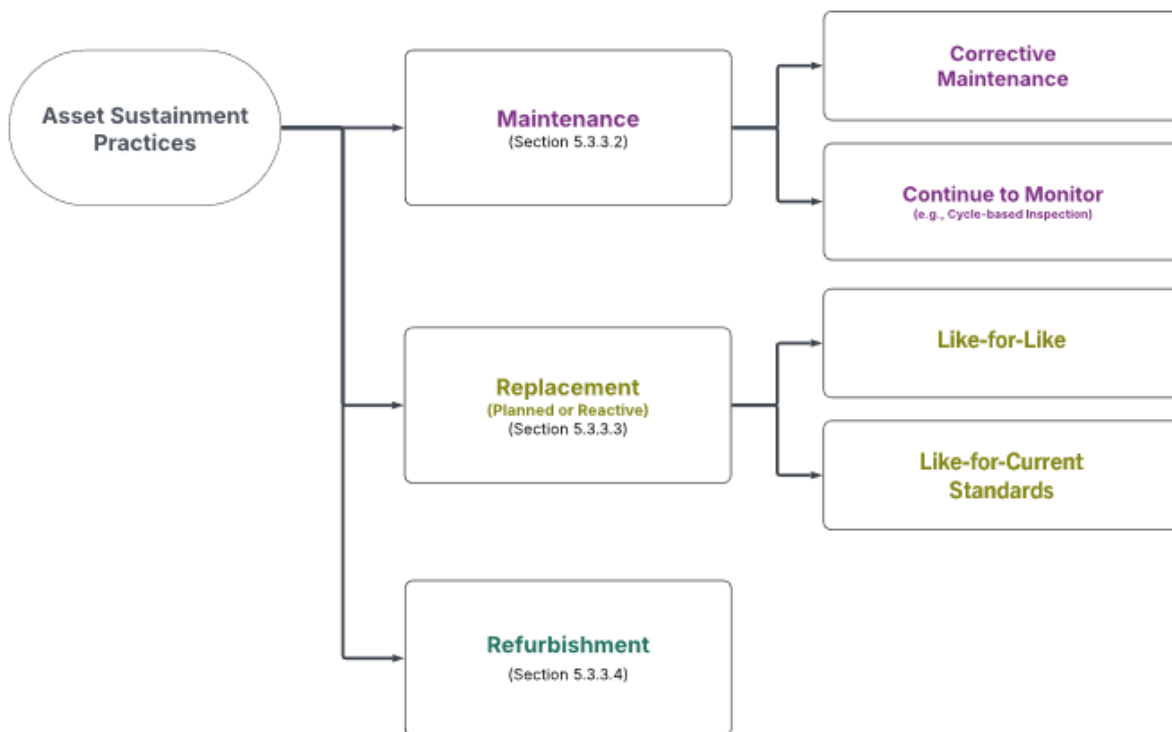


Figure 5.3.3 - 1 Sustainment Practices

The integrated practices that underpin Alectra Utilities' asset sustainment practices involve fixed or variable cycles of inspection, testing, maintenance activities, and other defect or failure capturing processes (as discussed in *Section 5.3.3.2*). These practices result in asset renewals, refurbishment of major assets, where applicable, corrective maintenance for in-service repairs, or continued monitoring to assess asset condition. Capital investment planning from business case development and optimization are detailed in *Chapter 5.3.1 Asset Management Process Overview* and *Chapter 5.4.1 Capital Expenditure Summary*. Through its effective inspection, testing, and maintenance programs, Alectra Utilities captures information on signs of asset deterioration and defective components to properly assess and prioritize mentioned interventions while balancing operational maintenance costs and risks. At a high level, these programs include the following, with details on type of activity and cycles mentioned in Table 5.3.3 - 2:

- Overhead distribution system inspections for transformers, poles, insulators, switches, arrestors, and hardware attachments (e.g. guy wires, cross arms, and ground wires).
- Underground distribution system inspections for transformers, bushings, elbows, civil chambers, and pad-mounted switchgear. It also includes detailed inspections of high voltage electrical rooms (i.e. vaults) containing components such as transformers, switches, cabling, doors, ceilings, drains, and internal lights.
- Station asset inspections including the wholesale meter installations, with testing and maintenance activities.

Results from inspection, testing, and maintenance programs are used as inputs to Alectra Utilities' Asset Condition Assessment (ACA) process¹. ACA establishes Health Index (HI) values for eleven major asset groups. These HI values provide an indication of asset condition across the HI spectrum from "Very Poor" to "Very Good". Health Index classifications are as described in Figure 5.3.2 - 19 in *Chapter 5.3.2 (Section 5.3.2.2 A)*.

¹ Refer to *Appendix E Asset Condition Assessment - 2023*

Asset groups with HI scores covered in the ACA are shown in Table 5.3.3 - 1.

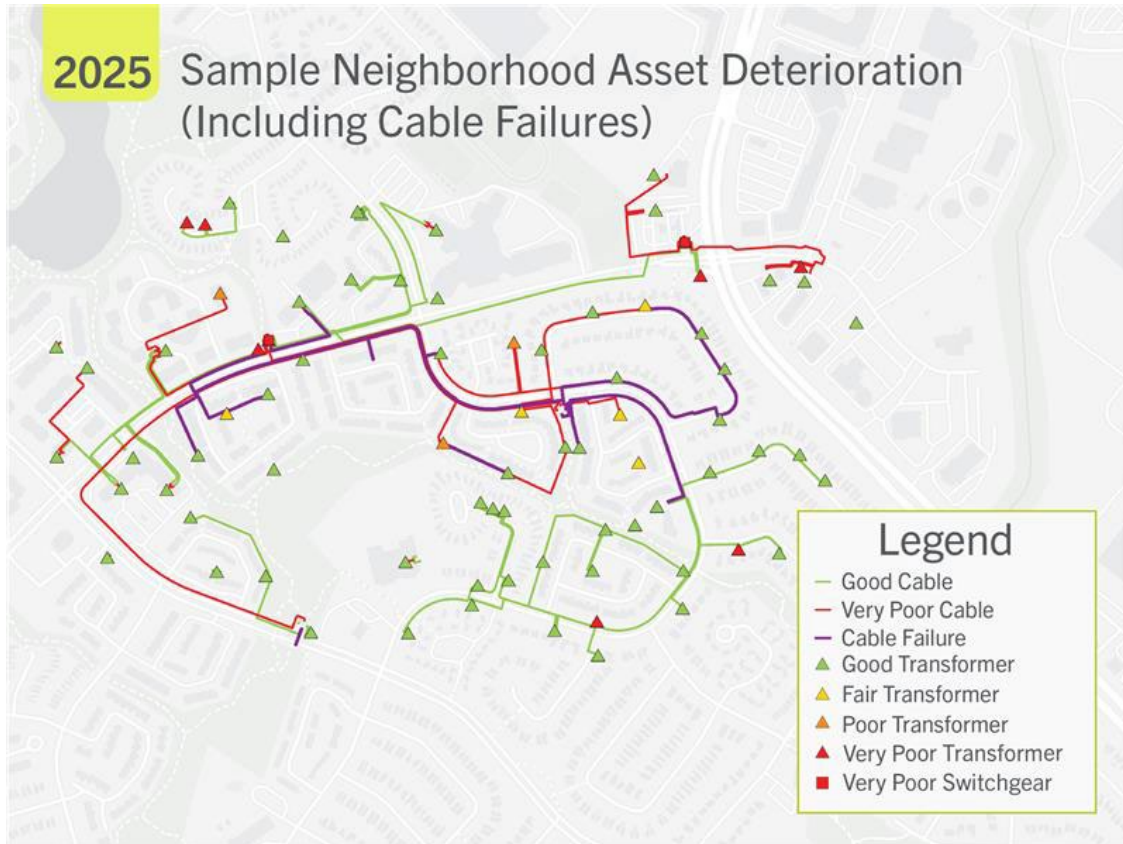
Table 5.3.3 - 1 Asset Groups Covered in ACA Process

Distribution Underground & Vaults	Distribution Overhead	Station
- Pad-mounted Transformers - Vault Type Transformers - Underground Cables - Pad-mounted Switchgear	- Pole-mounted Transformers - Load Interrupting Switches - Wood Poles - Concrete Poles - Overhead Conductors	- Power Transformers - Circuit Breakers - Station Switchgear

The overhead and underground distribution assets and station assets are inspected and evaluated against pre-set criteria and the results are recorded electronically using computer tablets. Inspection records for distribution assets are tied to unique asset records in Alectra Utilities' GIS system, which provides a centralized location for validated inspection records that can be extracted for ACA purposes. This ensures that Alectra Utilities uses the most accurate asset data when planning its asset lifecycle optimization approach. Station inspection results, as well as maintenance and repair activities and test results, are stored in Cascade, a Computerized Maintenance Management System (CMMS). Annual condition surveys are also conducted for station assets.

Alectra Utilities leverages the ACA results to generate detailed HI maps overlaid with the failure data for each distribution asset. These specialized maps enable integration of lagging asset performance indicators in a given neighborhood and aid in the identification of geographic clusters of deteriorated assets (e.g. "Poor" or "Very Poor" condition from ACA). Using an overlay mapping methodology, Alectra Utilities can view multiple asset types with their corresponding HI values to support engineering analysis. This approach enables subject matter experts (SMEs) to focus on and assess locations where rebuild options can be designed and executed more efficiently than via individual spot replacements. Figure 5.3.3 - 2 provides an excerpt from an overlay map. This map excerpt highlights underground cable segments in "Very Poor" condition (red line), documented cable failures, and "Very Poor" condition distribution transformers and switchgear (red triangles and red squares, respectively) identified through the ACA process. The analysis enabled by the overlay map supported the decision to proceed with a coordinated rebuild project in this area, where multiple deteriorated assets require replacement. The proposed rebuild offers

- 1 greater logistical efficiency and minimizes customer disruption compared to executing discrete
2 projects for each asset type.



3
4 **Figure 5.3.3 - 2 Overlay Map Identifying Very Poor Condition Assets Including Cable Failures**

- 5 Through planned asset replacement strategies, Alectra Utilities aims to mitigate failure risks that
6 have significant impact to public or employee safety, financial cost, system reliability, customer
7 service interruption, environmental impact, and regulatory consequences. The decision to
8 replace an asset is typically driven by asset deterioration and failure risk, failure rate, functional
9 obsolescence, historical performance, alignment with applicable standards, and planning and
10 execution efficiencies, and refurbishment is not feasible. In areas with a high concentration of
11 assets in deteriorated condition and past or nearing end-of-life, Alectra Utilities prioritizes planned
12 rebuild projects rather than spot replacements. In this regard, Alectra Utilities uses condition data,
13 asset age, and failure rates for an asset class to establish long-term failure projections.
- 14 Alectra Utilities uses asset condition, age, and failure data to develop long-term asset
15 replacement projections using Copperleaf Asset, for major distribution asset classes of poles,

transformers, switchgear, and switches. Copperleaf Asset applies predictive analytics to model asset population behaviour (via Predictive Analytics tool) and determines the timing and quantities of replacements that deliver the greatest value across reliability, safety, environmental, and financial measures. Input data includes asset demographics, loading information, replacement costs, and equipment failure information. Based on this information, Copperleaf's Predictive Analytics (PA) tool generates renewal plans on the aggregate of optimal replacement timing of individual assets. These renewal quantities are further modified according to Alectra Utilities' pacing strategies; Accelerated, Moderate, and Reduced. The results are used to inform business cases in Copperleaf Portfolio and to support both current and future DSP planning periods for mentioned asset classes. This process allows Alectra Utilities to maintain a long-term view of asset demographics to reduce variability in investment needs, avoid sudden rate impact and limit rate volatility for customers, and improve the alignment of resources with system renewal requirements.

Figure 5.3.3 - 3 illustrates that, based on Alectra Utilities' ability to execute and in consideration of customer rate impacts, the DSP plan for asset renewal investments cannot address all system renewal needs over the 2027-2031 period. The system renewal needs analysis which involves major distribution asset classes, such as poles, underground cable, switchgear, transformers, and overhead switches, but does not include station and metering asset classes, involves examining remaining backlog year after year. This examination considers the current backlog, the forecasted quantity of deteriorated assets, the planned replacements, and the estimated yearly outage events based on historical reliability data and ACA results. The DSP plan nears addressing the level of system needs by 2031, but with a shortfall. Despite the use of condition and risk-based prioritization, the current plan for system investments does not fully address projected renewal needs, largely due to practical aspects of the logistical ramp-up required in terms of resources.

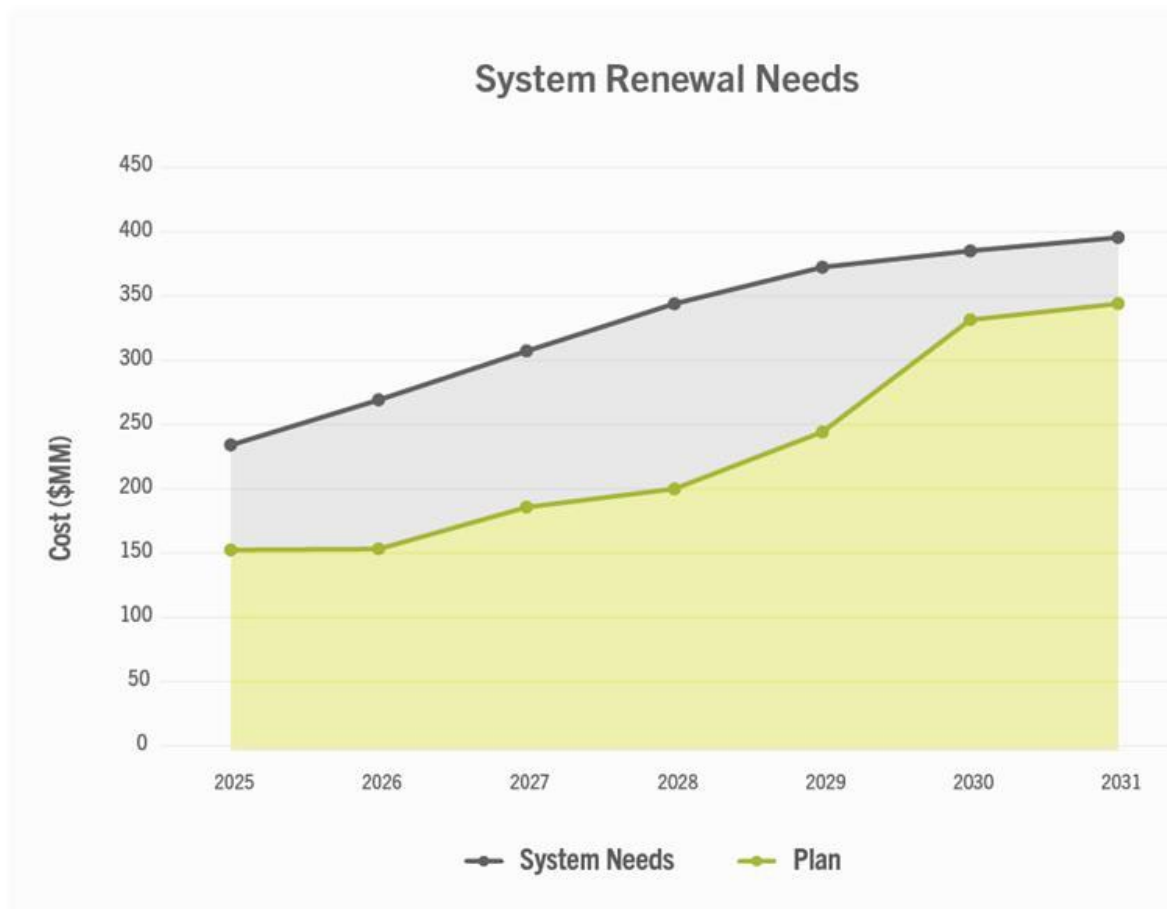


Figure 5.3.3 - 3 System Renewal Needs (Excludes Station and Metering)

Pacing and prioritization of asset replacements follow different approaches depending on the asset type. Pacing is time based, while prioritization is based on relevant drivers such as severity of asset deterioration, obsolescence, and level of reliability, safety, and environmental risks. The determination of both pacing and prioritization are key parts of the lifecycle optimization policies and practices.

Planned asset replacements are organized into projects and programs which are paced to optimize resource allocation, minimize customer outages, minimize the need for reactive capital work, avoid sudden increases in renewal investment, and accommodate major procurement efforts. Compared with reactive work, planned renewal projects make more efficient use of resources and scheduled outages, providing a more economical and less disruptive approach. Alectra Utilities identifies longer-term planned asset replacement needs (i.e. two years or more) through the ACA process. Shorter term asset replacement needs are identified through ongoing

1 inspecting, testing, and maintenance activities which flag assets in deteriorated condition
2 requiring replacement or refurbishment within the next year to sustain performance, protect public
3 safety, and reduce environmental risk. Alectra Utilities undertakes repair or maintenance
4 activities where they are feasible, sustainable, and economical.

5 While the ACA is a primary input to Alectra Utilities' asset management process, a broader set of
6 internal and external drivers also informs asset sustainment plans² as part of the Identification of
7 Investment Needs as discussed in *Chapter 5.3.1 Asset Management Process Overview*. SME
8 evaluate distribution and station asset ACA results, and other internal and external drivers, to
9 determine system renewal needs and to frame technical solutions and develop investment
10 business cases. Business cases are documented in the Copperleaf Portfolio, which facilitates
11 the optimal allocation and pacing of the utility's investments across all categories. The
12 optimization process accounts for the risks and benefits of investments in conjunction with their
13 present value. As a proven portfolio optimization solution, Copperleaf Portfolio anchors a uniform
14 approach to Alectra Utilities' analysis and verification of many capital projects with a significant
15 annual spend across all operating zones. More specifically, it allows a myriad of scenarios
16 spanning multiple years to be modelled to inform the development of an optimal capital portfolio
17 that balances financial and resource constraints, as well as investment benefits and risks. The
18 Copperleaf Portfolio application also provides a single repository for all capital investment
19 information which can be updated to reflect new information.

20 **5.3.3.2 Asset Maintenance Practices**

21 Sustaining the condition of an asset through structured maintenance programs is a central tenet
22 of prudent asset lifecycle management. Maintenance practices allow for regular condition
23 monitoring and timely servicing and repairs to extend the life of a given asset. Alectra Utilities
24 performs the following activities related to distribution and station assets to maximize asset value
25 in alignment with optimal lifecycle management:

² "Sustainment" is considered a form of renewal where options exist other than replacement (e.g. targeted repairs on distribution switchgear) other than outright replacement of an asset.

- 1 • **Inspection and Testing:** Assessing the current operating condition and
- 2 functionality of an asset to inform appropriate interventions
- 3 • **Maintenance:** Sustaining the condition of the asset through regular preventative
- 4 and ACA-informed maintenance activities (e.g. dry ice cleaning)
- 5 • **Corrective Maintenance:** Performing minor repairs to enhance the current
- 6 condition and extend the life of an asset

7 To enhance access to asset condition data and streamline inspection record collection and
8 validation, Alectra Utilities completed a GIS convergence project in 2021. This initiative
9 consolidated four legacy Utilities' asset datasets and related workflows into a single standardized
10 GIS platform. Legacy Guelph Hydro's GIS system remains separated as of 2025 and is expected
11 to converge with the Alectra Utilities' harmonized GIS system within the 2027-2031 period. The
12 GIS system supports MobileViewer Advantage (MVA), a mobile asset inspection tool. MVA is
13 directly integrated with the GIS system, thereby providing mobile access to centralized and
14 validated distribution asset inspection records.

15 Inspection and testing activities are vital for continuously identifying the condition of assets in the
16 field. Alectra Utilities collects standardized inspection attributes for each major distribution asset
17 class according to manufacturer recommendations or condition factors used to establish a Health
18 Index in the ACA. Inspection frequency is determined based on regulatory requirements and
19 utility best practice. Intervals may be shortened for an asset where age or condition signals
20 elevated risk to identify defects prior to premature failure of a critical asset, which is key to optimal
21 lifecycle management.

22 In addition to inspection and testing programs, Alectra Utilities employs other internal and external
23 processes to capture deficiencies. Figure 5.3.3 - 4 describes the input processes involved in
24 deficiency capturing and the associated asset sustainment interventions.

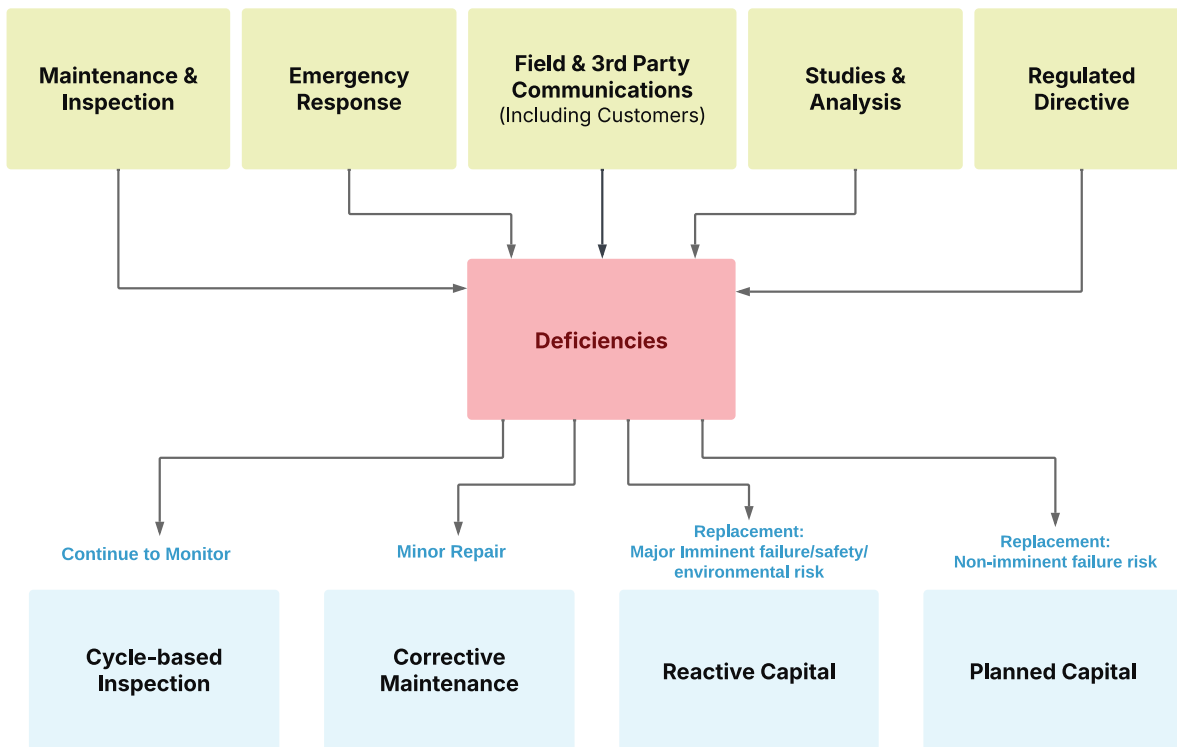


Figure 5.3.3 - 4 Deficiency Capturing Process

Maintenance activities sustain the current condition of the asset and are performed on a cyclical basis for both distribution and station assets. Maintenance intervals and procedures follow utility best practice and manufacturer recommendations. Where practicable, an inspection is performed during the maintenance activity, with results integrated into the ACA process. Corrective maintenance is deployed to improve and extend the condition of the asset and are executed when needed based on the findings and outcomes of the inspection and maintenance activities. Corrective maintenance activities include the repair or replacement of asset components that are found to be defective, inoperable, failing, or have already failed. Where feasible, to avoid public safety and reliability risks, corrective maintenance is completed on the spot when a deficiency is identified during inspections. For example, metal patches may be applied immediately to external cabinets of pad-mounted equipment to cover small holes caused by minor rusting identified during the inspection. Deteriorating assets for which corrective maintenance is not economically feasible are flagged for planned replacement. If immediate safety or reliability risk is identified, the asset is escalated to system control so that timely reactive replacement can be executed.

1 The inspection, testing, and maintenance programs contribute to reducing unplanned outages
2 and extending asset life. These programs are necessary for understanding the lifecycle
3 degradation of the asset and collecting condition factors for the ACA, which is a fundamental
4 analytical component for identifying renewal investments. Table 5.3.3 - 2 provides an overview
5 of the inspection, testing, and maintenance activities by asset type. Inspection, testing, and
6 maintenance cycles may be shortened for an asset with increased safety, environmental, or
7 reliability risks.

1

Table 5.3.3 - 2 Overview of Inspection, Testing, And Maintenance Practices

System	Asset	Activity	Current Cycle	Changes Since Last DSP
Overhead	Poles	Visual Inspection	Every 3 years	
		Wood Pole Testing	Every 3 years, for wood poles over 15 years old ⁷⁶	Previously for every 7 years until age 49, then every 5 years after. The frequency was revised to every 3 years, targeting only poles older than 15 years old
Overhead	Conductors and Line Hardware	Visual Inspection	Every 3 years	
		Vegetation Management	Every 3 years (at a minimum)	Operational Area Dependent, ranging 3-4 years
		Infrared (IR) Scanning	Every 3 years (at a minimum)	
		Insulator Washing	As required by condition	
Overhead	Switches	Visual	Every 3 years	
		Infrared (IR) Scanning	Every 3 years (at a minimum)	
		Load Interrupter Switch (LIS) Maintenance	Every 6 years	
Overhead	Pole-mounted Transformers	Visual Inspection	Every 3 years	
		Infrared (IR) Scanning	Every 3 years (at a minimum)	
Underground	Pad-mounted Transformers	Visual Inspection	Every 3 years	

⁷⁶ Based on the Climate Study and Alectra's custom analysis, certain poles are operating beyond their design capacity given the current Alectra Standards and the ongoing structural deterioration of said existing poles. Alectra will strengthen the overhead system by identifying and reinforcing poles at risk through more frequent testing. The pole testing cycle is standardized to a three-year interval across all regions. Every wood pole older than 15 years must have a valid test result within the past six years. Once this baseline is achieved, Alectra may re-evaluate testing frequency.

System	Asset	Activity	Current Cycle	Changes Since Last DSP
Underground	Submersible and Vault Transformers	Visual Inspection	Every 3 years	
Underground	Cable Accessories	Visual Inspection	Co-occurring with associated equipment.	
Underground	Switches	Visual Inspection	Every 3 years	
Underground	Switchgear	Visual Inspection	Every 3 years	
		Dry Ice Cleaning	Every 6 years for 13.8kV or less, Every 3 years for 27.6kV	
Underground	Civil Structures	Visual Inspection	Every 3 years	
Station	Power Transformers	Visual Inspection	Monthly	
		Oil Testing	Yearly	
		Infrared (IR) Scanning	Yearly	
		Doble	Every 6 years (at a minimum)	Changed from operational area dependent to every 6 years
		Tap Changer	Every 6 years	Changed from yearly to every 6 years
Station	Station Protection Relays	Visual Inspection	Monthly	
		Maintenance	Electromechanical every 6 years. Solid State and Microprocessor-based every 10 years	Previously operational area dependent
Station	Battery and Charger	Visual Inspection	Monthly	
		Testing	Yearly	

System	Asset	Activity	Current Cycle	Changes Since Last DSP
Station	Circuit Breaker	Visual Inspection	Monthly	
		Maintenance	Every six years	Previously operational area dependent
Station	Switchgear	Visual Inspection	Monthly	
		Maintenance	Every six years	
Metering	Wholesale Revenue Meters	Remote Performance Verification	Every 18 months	
		Reverification Testing	As per Measurement Canada testing requirements	
Metering	Wholesale Meter Instrumentation	Visual Inspection	Aligned with schedule for Measurement Canada testing requirements	
Metering	Retail Revenue Meters	Sample Reverification Testing	As per Measurement Canada testing requirements	

A *Distribution Assets*

The following section details the inspection, testing, and maintenance practices for distribution assets.

A.1 *Pad-Mounted Transformers*

Alectra Utilities inspects pad-mounted transformers on a 3-year minimum inspection cycle, which is aligned with OEB Appendix C Minimum Inspection Requirements with respect to urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies. The inspection includes checking for signs of oil leaks and corrosion. In addition, Alectra Utilities also performs corrective maintenance at the time of inspection, where feasible. This includes shifting cabinets back on the foundation, clearing vegetation, replacing locks, stickers, and nomenclature, patching holes, regrading, and repairing connections. Where corrective maintenance is not economically feasible or if the transformer is identified to be posing an immediate safety and reliability risk, Alectra Utilities will replace the transformer according to Figure 5.3.3 - 6.

A.2 *Submersible and Vault Transformers*

Alectra Utilities inspects submersible and vault transformers on a 3-year minimum inspection cycle, which is aligned with OEB's minimum inspection requirements with respect to urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies. In addition, Alectra Utilities performs corrective maintenance at the time of inspection. This includes unclogging drains and replacing locks, caution labels, and nomenclature. Corrective maintenance related to the transformer room infrastructure are identified to the customer to take necessary action.

A.3 *Pole-Mounted Transformers*

Alectra Utilities inspects pole-mounted transformers on a 3-year minimum inspection cycle, which is aligned with OEB's minimum inspection requirements with respect to urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies.

Alectra Utilities also targets a minimum of one-third of the overhead distribution plant for Infrared (IR) Scanning. Where warranted, a full system scan will be performed in addition to targeted scans on critical feeders or at critical points in the system, such as feeder egress from the station. IR scanning, also known as thermography, is on-condition monitoring of electrical equipment to identify anomalies and predict asset performance. Using IR radiometers, crews can visualize and quantify thermal anomalies associated with component deficiencies and predict equipment failure modes. More specifically, IR scanning reveals temperature variances (caused by excessive heat) in the equipment that can indicate an overloading issue, a bad connection, overheated or defective component. IR scanning covers all primary overhead lines (3 phase and 1 phase main lines and laterals), including all related components along the line (i.e. aerial transformers and associated equipment, insulators, load break disconnect switches, fused and solid blade disconnects, potheads, terminations, pothead switches, and reclosers). Table 5.3.3 - 3 illustrates the criticality and response time associated with the resulting temperature increase (compared to a particular reference point).

Table 5.3.3 - 3 IR Result and Recommended Response

Temp Difference	Criticality (to be listed on report)	Sub Cause Listing	Contractor Action	Type of Equipment	Internal Alectra Utilities Action
> 50 °C	Urgent (1)	Major heating anomaly; repair immediately	Call Alectra Utilities contact (Lines) and Document	Critical	Immediate repair
				Non-critical (secondary or fused)	Repair within one month
> 20 to 50 °C	Major (2)	Indicates deficiency; repair when time permits	Document	Critical	Repair within one month
				Non-critical (secondary or fused)	Repair within one year of detection
> 10 to 20 °C	Moderate (3)	Indicates probable deficiency; repair when time permits	Document		Repair within one year of detection
1 to 10 °C	Minor (4)	Possible deficiency; warrants investigation	Document		Investigate/ monitor. Compare with next cycle for deficiencies

1 A.4 Switchgear

2 Alectra Utilities inspects pad-mounted switchgear on a 3-year minimum inspection cycle, which
3 is aligned with OEB's minimum inspection requirements with respect to urban infrastructure.
4 Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system
5 sustainment strategies. In addition, Alectra Utilities also performs corrective maintenance at the
6 time of inspection. This includes shifting cabinets back on the foundation, regrading, and
7 replacing locks, stickers, and nomenclature.

8 Alectra Utilities also performs dry ice cleaning on a 6-year cycle for air-insulated switchgear on
9 the 13.8kV and lower voltage systems, and on a 3-year cycle for air-insulated switchgear on the
10 27.6kV system because air-insulated components on the 27.6kV voltage level have a higher
11 susceptibility to tracking and flashover events. Air-insulated switchgear are prone to tracking and
12 failure due to the accumulation of contamination on insulating surfaces. Like insulators on
13 overhead systems, it is best utility practice to clean the device to ensure continued life and
14 operation. Dry ice cleaning is proven to be effective in removing contamination (such as salt and
15 dirt) that contributes to tracking and flashover. Where warranted, targeted dry ice cleaning will be
16 performed on vault room equipment if the need was identified from a visual inspection. During
17 the dry ice cleaning process, a detailed inspection will also be carried out, which provides Alectra
18 Utilities with condition data to conduct an ACA.

19 A.5 Overhead Switches

20 Alectra Utilities inspects overhead switches on a 3-year minimum inspection cycle, which is
21 aligned with OEB's minimum inspection requirements with respect to urban infrastructure. Asset
22 inspections provide Alectra Utilities with condition data to conduct an ACA to inform system
23 sustainment strategies. In addition, Alectra Utilities also performs corrective maintenance at the
24 time of inspection. This includes replacing missing or damaged nomenclature.

25 Alectra Utilities has also initiated a maintenance program involving the cleaning and replacement
26 of components that will prolong the life of LIS switches. LIS Maintenance is considered a best
27 utility practice due to the crucial function these switches provide in system operating flexibility and
28 reliable power delivery to customers. The failure of an LIS to operate can lead to additional
29 resource hours (i.e. due to the inability to operate the switch), and/or extended outage minutes

1 to customers. During the LIS Maintenance process, a detailed inspection will also be carried out,
2 which provides Alectra Utilities with condition data to conduct an ACA.

3 Alectra Utilities also targets a minimum of one-third of the overhead distribution plant for IR
4 scanning (refer to *Section 5.3.3.2 A.3* for additional details).

5 *A.6 Conductors and Line Hardware*

6 Alectra Utilities inspects conductors and line hardware on a 3-year minimum inspection cycle,
7 which is aligned with OEB's minimum inspection requirements with respect to urban
8 infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA
9 to inform system sustainment strategies.

10 Alectra Utilities also trims vegetation encroaching to overhead conductors to maintain necessary
11 clearance requirements. The vegetation management cycle will be harmonized to 3-year cycle
12 across all regions for the DSP period. The program ensures a minimum horizontal and vertical
13 clearance of three metres is maintained around overhead high-voltage primary lines wherever
14 practical, while a one-metre clearance is enforced around overhead equipment and secondary
15 infrastructure. In addition to proactive tree trimming, Alectra Utilities ensures that any dead,
16 defective, or structurally weak tree branches with a reasonable risk of contacting overhead power
17 lines are promptly removed. Hazard trees are reactively identified and removed to avoid
18 unplanned outages due to tree contacts and risk of tree falling on overhead lines during adverse
19 weather conditions.

20 Alectra Utilities also targets a minimum of one-third of the overhead distribution plant for IR
21 scanning each year (refer to *Section 5.3.3.2 A.3* for additional details).

22 Alectra Utilities also performs insulator washing to prevent failures caused by tracking on high
23 voltage overhead porcelain insulators. Overhead porcelain insulators are prone to contamination,
24 especially due to road salt or other airborne contaminants which can result in tracking leading to
25 pole fires and consequently to power interruptions. Alectra Utilities follows a condition-based
26 approach based on field conditions to establish where insulator washing is required. Periodically,
27 crews will inspect known high contamination locations to determine the level of contamination and
28 trigger insulator washing requirements, where appropriate. In addition, insulator washing is
29 completed if a need is identified through the visual inspection and maintenance activities for a

particular area. Repeated failures due to insulator tracking or pole fires may also trigger spot insulator washing.

A.7 Poles

Alectra Utilities inspects poles on a 3-year minimum inspection cycle, which is aligned with OEB's minimum inspection requirements for urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies. If required, Alectra Utilities also performs corrective maintenance at the time of inspection. Corrective maintenance activities include replacing missing or damaged cable guards, guy guards, ground wires, and nomenclature.

Alectra Utilities also performs wood pole testing every 3 years for poles older than 15 years. Wood poles will be tested to determine remaining strength and the extent of pole degradation. The testing used for remaining strength is the resistograph test. The resistograph test involves four drill tests on each pole. The first drill is parallel to the ground at waist height and is used to measure the diameter of the pole. The second, third, and fourth drill tests are done at a 30-degree angle downward from the base of the pole and 120 degrees apart from each other, to measure the amount of decay and cavities inside the pole below ground level. Resistograph tests estimate the percentage of remaining strength of a wood pole. The percentage of remaining strength values are used in the ACA model in establishing the Health Index.

A.8 Cable Accessories

Alectra Utilities inspects cable accessories above ground, such as separable connectors (e.g. elbows) and cable terminations, on a 3-year minimum inspection cycle (e.g. pad-mounted switchgear) or where possible during inspections of other underground equipment on as needed based on risk (e.g. pad-mounted transformers). Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies. If required, Alectra Utilities also performs repairs as part of corrective maintenance at the time of inspection. Corrective maintenance pertaining to cable connectors or terminations includes replacing damaged cable connections, as well as repairing broken neutral and ground wires.

A.9 *Underground Switches*

Alectra Utilities inspects underground switches (for example, junction cubicles) on a 3-year minimum inspection cycle, which is aligned with OEB's minimum inspection requirements with respect to urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies.

A.10 *Cable Chambers*

Alectra Utilities inspects cable chambers on a 3-year minimum inspection cycle, which is aligned with OEB's minimum inspection requirements with respect to urban infrastructure. Asset inspections provide Alectra Utilities with condition data to conduct an ACA to inform system sustainment strategies. The inspection includes reviewing the condition of the vault cover for trip hazards and signs of deterioration and condition of the concrete walls and ceilings.

Other civil assets, including hand holes, splice pits, and secondary pedestals, are not included within the minimum 3-year inspection cycle.

B *Station Assets*

Alectra Utilities conducts monthly patrol inspections of every transformer and municipal station. This meets or exceeds OEB Appendix C Minimum Inspection Requirements which dictate that the maximum intervals are one month, six months, or one year, depending on the station configuration and location. Maintenance intervals are summarized in Table 5.3.3 - 2. The following section details the inspection, testing, and maintenance practices for station assets.

B.1 *Power Transformers*

Stations staff conduct in-depth visual inspections during monthly station patrols of all in-service power transformers, including their cooling system, bushings, and tap changer. Corrective maintenance for executing repairs is scheduled to address issues identified during these inspections. Power transformer planned maintenance activities are based on manufacturer's instructions and include the following activities: Oil testing, infrared scanning, Doble testing of the transformer and bushings, and tap changer maintenance. Activities associated with each are described in more detail.

1 **Oil Testing:** Power transformers undergo annual oil testing which includes Dissolved Gas
2 Analysis (DGA) and oil quality analysis. Testing is done in accordance with IEEE 62-1995 IEEE
3 Guide for Diagnostic Field Testing of Electric Power Apparatus Part 1: Oil-Filled Power
4 Transformers, Regulators, and Reactors. Both DGA and oil quality are important diagnostic tools
5 that are used to monitor the condition of the transformer. These tests detect insulation
6 breakdown, water in the oil, stressing of the coils, and localized overheating and arcing that can
7 lead to failure of the transformer. Currently, Alectra Utilities uses a third-party laboratory to carry
8 out testing of oil samples. Laboratory analysis includes a comparison of results of previous
9 transformer oil samples and detailed recommendations for the transformer.

10 DGA is also performed using portable equipment as well as through DGA online monitoring on
11 some transformers. Online DGA equipment is used for continuous monitoring of transformer gas
12 concentrations and can be used to send alerts at specific gas concentration thresholds. DGA
13 data and alerts are transmitted through Supervisory Control and Data Acquisition (SCADA). DGA
14 and oil quality tests identify abnormalities within the transformer and provide detailed information
15 to support decision-making with respect to the future operation and maintenance of the
16 transformer.

17 **Doble Testing:** Doble testing is typically conducted every 6 years and is used to assess the
18 overall power factor, winding turns ratio, leakage reactance, and excitation current of the
19 transformer. Doble testing is conducted in accordance with the Doble transformer maintenance
20 and test guide. These tests detect moisture in the oil or insulation, detect contamination in the
21 transformer bushing, determine the electrical insulation quality, and locate bad connections and
22 winding movement. The Doble equipment provides test results in relation to expected values and
23 thresholds. Doble testing may also be conducted following a transformer's exposure to high
24 currents during fault conditions.

25 DGA testing, and oil quality analysis complement each other to provide a clear indication of the
26 overall health of the transformer.

27 **IR Scanning:** IR scanning at stations is typically conducted yearly and twice a year at some
28 stations. Like the IR scanning of distribution assets, the scanning of components within a station
29 assist in identifying components with temperature rise above normal. This alerts staff to
30 components operating above normal values and flags an action item.

1 **Tap Changer Maintenance:** Planned oil-filled tap changer maintenance is typically conducted
2 every six years. Planned maintenance activities include the following: Inspecting physical and
3 mechanical condition, verifying proper operation, performing tests recommended by the
4 manufacturer, and making any necessary adjustments or repairs.

5 *B.2 Circuit Breakers*

6 Stations staff conduct in-depth visual inspections of all in-service circuit breakers during monthly
7 station patrols. Corrective maintenance is scheduled to address issues identified during these
8 inspections. Planned circuit breaker maintenance is based on the manufacturer's
9 recommendation and is typically scheduled every six years. Planned maintenance includes the
10 following work: lubricate, clean, adjust, and align control mechanism, contact resistance
11 measurement, and test tripping and closing circuits.

12 *B.3 Switchgear*

13 Stations staff conduct in-depth visual inspections of all in-service station switchgear during
14 monthly station patrols. Corrective maintenance is scheduled to address issues identified during
15 these inspections. Planned station switchgear maintenance is based on the manufacturer's
16 recommendation and is typically scheduled every six years. Planned maintenance consists of
17 the following work: busbar, enclosure, and insulator maintenance, checking and tightening
18 connections, and checking and cleaning the enclosure.

19 *B.4 Station Protection Relays*

20 Stations staff conduct in-depth visual inspections of all in-service station protection relays during
21 monthly station patrols. Corrective maintenance is scheduled to address issues identified during
22 these inspections. Three types of protection relays are used to clear faults that occur in the
23 distribution grid: electromechanical, solid state, and microprocessor-based. Maintenance
24 performed on each type of relay and maintenance intervals are as follows:

25 **Electromechanical Relays:** Every six years, secondary injection tests are performed to verify
26 the tripping time accuracy, and any necessary adjustments are made. Any required mechanical
27 adjustments are also made.

1 **Solid State Relays:** Every ten years, secondary injection tests are performed to verify the tripping
2 time accuracy, and any required adjustments are made. Since these electronic relays have no
3 moving parts, there is no physical wear due to usage.

4 **Microprocessor-based Relays:** Every ten years, secondary injection tests are performed to
5 verify the tripping time accuracy of the relays. Adjustment is typically not required since these
6 relays do not drift. Since these electronic relays have no moving parts, there is no physical wear
7 due to usage.

8 **B.5 Batteries and Chargers**

9 Stations staff conduct visual inspections of all in-service station batteries and chargers during
10 monthly station patrols. Corrective maintenance is scheduled to address issues identified during
11 these inspections. Annual battery and battery charger maintenance and testing consist of
12 measuring and recording each battery unit voltage, measuring the charging current, and battery
13 impedance testing. Impedance testing detects potential equipment failure by measuring the
14 chemical and electrical effects that would indicate deterioration of the battery blocks. Readings
15 outside of tolerance values indicate a potential failure which could result in a loss of station
16 equipment control.

17 **C Metering Assets**

18 Alectra Utilities' activities related to wholesale revenue meters and retail revenue meters are
19 described more broadly in the Network Metering program in *Appendix B06 - Network Metering*
20 (*Section 3.1.1*) and (*Section 3.1.2*).

21 Meters are complex electronic devices that are primarily assessed by their age as compared to
22 the manufacturer's recommended service life and trending of the asset failure rates. Alectra
23 Utilities has more than one million meters throughout its service territory, and inspection is
24 typically impractical due to the number of assets. Furthermore, the meters are sealed, and the
25 process of individual assessment would be prohibitively expensive including: Cost of the removal
26 of the meter in the field; shipping; testing and assessment in a Measurement Canada approved
27 laboratory; repair if required and feasible; re-sealing as per regulations; re-shipping; and re-
28 deployment.

Alectra Utilities adheres to regulations that govern the condition and accuracy of its revenue meters, including the *Electricity and Gas Inspection Act*⁷⁷, *Weights and Measures Act*⁷⁸, and the *IESO Market Rules*⁷⁹. As per regulation, revenue meters must be maintained in good working condition and tested for accuracy on a schedule set by Measurement Canada for that specific meter form. Alectra Utilities maintains a Measurement Canada certified Meter Laboratory for the testing of its single-phase and polyphase retail meters and wholesale revenue meters.

5.3.3.3 Asset Replacement Practices

Alectra Utilities evaluates asset replacement needs through comprehensive assessment of failure events, failure risk from deterioration, functional obsolescence, and asset performance trends. Asset replacement practices ensure alignment with applicable standards, system capacity requirements, and accommodation of third-party requests, such as those for roadway improvements. Alectra Utilities' replacement strategies also need to reflect the overall risk profile of its diverse asset base and account for changing asset demographics.

Planned replacement is required when indicators, such as condition and failure rate or asset criticality, necessitate a proactive replacement before total failure occurs. For example, wood poles that exhibit major degradation undergo proactive replacement to prevent potentially catastrophic pole-down incidents, and underground primary feeders receive scheduled renewal to avoid unplanned disruptions that can impact reliability to unacceptable levels and costs more than planned replacements. Planned projects with like-for-current standards replacement options deliver additional benefits for meeting capacity upgrade needs and standardization. For example, Alectra Utilities has standardized the sizing of residential transformers to 100kVA to support growing Electric Vehicles (EV) proliferation and avoid premature failure (or needed replacement) of undersized transformers in future.

In contrast, Alectra Utilities employs a reactive replacement strategy to address assets that have failed or pose a risk of imminent failure, safety, or environmental concerns. The decision to run to failure and address replacement reactively also considers reliability impact and availability of spare units or components. Reactive replacements occur outside the utility's control and often

⁷⁷ Electricity and Gas Inspection Act R.S.C., 1985, c. E-4

⁷⁸ Weights and Measures Act R.S.C., 1985, c. W-6

⁷⁹ Market Rules for the Ontario Electricity Market, May 1 2025

require crew mobilization at overtime or premium rates when performed outside of normal business hours. As a result, reactive work can be more expensive than planned replacements for certain categories of assets. Furthermore, due to lack of integrated planning and scheduling of work execution, reactive replacements can take longer to coordinate and complete. The extended duration of restoration further increases costs and impact to customers. For more details on reactive capital investment drivers and portfolio strategy, refer to *Appendix B05 - Reactive Capital*.

Table 5.3.3 - 4 summarizes Alectra Utilities' asset renewal strategies for each asset class.

Table 5.3.3 - 4 Summary of Asset Renewal Strategies for 2027 to 2031 DSP Period

Asset Class	Primary Renewal Strategy	Comments
Distribution-Class Pad-Mount, Pole Mount and Vault Transformers	Planned and Reactive	Alectra Utilities follows a planned replacement strategy to manage the at-risk transformer population to avoid public safety risks, environmental risks (e.g. PCB contamination in the event of an oil leak), and prolonged customer interruption risks. However, Alectra Utilities reactively replaces units when they fail, leak oil, or pose an immediate safety risk. Refer to <i>Section 5.3.3.3 A.1</i> .
Pad-Mounted Switchgear	Planned and Reactive	Alectra Utilities targets air-insulated switchgear and first-generation solid-dielectric switchgear for planned replacement due to a known risk of flash-over events leading to failure. In addition, Alectra Utilities will replace leaking SF ₆ and oil-insulated switchgear that pose risks to safety and/or the environment. Refer to <i>Section 5.3.3.3 A.2</i> .
Overhead Load Interrupter Switches (LIS)	Planned and Reactive	Alectra Utilities manages replacement of overhead LIS switches through proactive and reactive replacement. Switches will be replaced in a planned manner based on condition. Refer to <i>Section 5.3.3.3 A.3</i> .
Overhead Primary Conductors	Planned	Alectra Utilities targets #6 and smaller overhead primary conductor for planned replacements due to historical failures associated with this conductor type. The replacement of other primary conductors takes place in conjunction with line rebuild investments. Refer to <i>Section 5.3.3.3 A.4</i> .

Asset Class	Primary Renewal Strategy	Comments
Wood and Concrete Poles	Planned	Alectra Utilities' strategy for pole replacement is driven primarily by pole condition. Prioritization of pole replacements is based on risk and criticality, in compliance with CSA requirements. Refer to Section 5.3.3.3 A.5.
Underground Cables and Accessories – Primary Paper Insulated, Lead Covered (PILC) Cables	Planned and Reactive	PILC cable that is determined to be in 'Very Poor' condition (e.g. exceeds End of Useful Life of 70 years) and is critical to the reliability of the system, will be replaced proactively with ethylene propylene rubber-insulated (EPR) cable. Similarly, in the event of failure, PILC cables will be removed and replaced with EPR cable. Refer to Section 5.3.3.3 A.6.1.
Underground Cables and Accessories – Primary Ethylene Propylene Rubber-Insulated (EPR) Cables	Reactive	Alectra Utilities' population of EPR cables is relatively new, with none exceeding 15 years in age. Alectra Utilities' current practice is to repair or replace EPR cables reactively upon failure. Refer to Section 5.3.3.3 A.6.2.
Underground Cables and Accessories – Primary Cross-Linked Polyethylene (XLPE) Cables	Planned and Reactive	Alectra Utilities implements two types of strategies in managing its XLPE cable population: (i) cables that are deteriorated will undergo planned replacement; and (ii) cables which are less than 35 years of age will be considered for cable rehabilitation. However, the population of cables that can be injected is decreasing such that it is not viable to continue this strategy beyond 2029. If a cable fails while in service, Alectra Utilities will repair the cable by splicing out the faulted segment. Refer to Section 5.3.3.3 A.6.3.
Utility Chambers and Equipment Foundation Vaults	Planned	Alectra Utilities undertakes the planned replacement or refurbishment of utility chambers and equipment foundations based on relevant condition information (as determined through inspections). If material asset degradation is identified, Alectra Utilities will execute refurbishment or replacement depending on the extent of the deterioration. Refer to Section 5.3.3.3 A.7.1.

Asset Class	Primary Renewal Strategy	Comments
Fault Indicators	Planned and Reactive	Alectra Utilities plans to: (i) Install new fault indicators in parts of the distribution system where fault indication is lacking. (ii) Replace older fault indicators that are technologically obsolete and prone to malfunction. Refer to <i>section 5.3.3.3 A.7.2.</i>
Insulators	Planned	Insulator replacements are targeted at replacing legacy porcelain and first-generation polymer insulators in the distribution system. Refer to <i>Section 5.3.3.3 A.7.3.</i>
Low Voltage Secondary Cables (Overhead and Underground)	Planned and Reactive	The replacement of low voltage secondary cables and conductors is bundled as part of planned rebuild projects. Upon failure, these cables and conductors are replaced or repaired reactively. Refer to <i>Section 5.3.3.3 A.7.4.</i>
Submersible Load Break Device (LBD) Switches	Reactive	Alectra Utilities primarily manages its submersible LBD switches through reactive replacement. However, units that are no longer functioning as intended and no longer receive vendor support (e.g. VACpac units) will be targeted for planned replacement. Refer to <i>Section 5.3.3.3 A.7.5.</i>
Power Transformers	Planned	Alectra Utilities plans its power transformer replacements based on HI assessment (i.e. oil quality, dissolved gas analysis, and other condition-related information), input from stations SMEs, and integrated planning considerations. Refer to <i>Section 5.3.3.3 B.1.</i>
Station Circuit Breakers	Planned	Alectra Utilities plans its circuit breaker replacements based on HI assessment, incorporating condition-based information, input from stations SMEs, and integrated planning considerations. Refer to <i>Section 5.3.3.3 B.2.</i>
Station Switchgear	Planned	Alectra Utilities plans its switchgear replacements based on HI assessment, incorporating condition-based information, input from stations SMEs, and integrated planning considerations. Refer to <i>Section 5.3.3.3 B.3.</i>

Asset Class	Primary Renewal Strategy	Comments
Protection and Control Systems	Planned	Alectra Utilities plans its protection and control systems replacements either in coordination with replacements of other station assets or as independent investments. Independent investments that are driven by condition, as determined by failure, maintenance, and repair history, are categorized as Substation Renewal investments. Those investments that are driven by a need for additional functionality or to support other systems are categorized as System Service investments. Refer to Section 5.3.3.3 B.4.
Retail Revenue Metering	Reactive, Planned	To ensure accurate customer billing, Alectra Utilities must replace its retail revenue meters reactively as they fail. When the asset failure rates trend beyond what can be practically and cost effectively managed reactively, retail meters are planned for replacement as a network. Alectra Utilities' retail revenue failure rates and planned replacement strategy are provided in <i>Appendix B06 – Network Metering (Section 3.1.4) and (Section 3.1.5)</i> .
Wholesale Revenue Metering	Planned Reactive	Alectra Utilities uses largely planned replacement approach for the replacement of its wholesale revenue meters, based primarily on the age of the asset. The strategy is secondarily driven by regulatory compliance with the IESO Market Rules and Measurement Canada regulations. Wholesale revenue meters are replaced reactively where measurement inaccuracies are identified or when a total failure occurs. For more information, refer to <i>Appendix B06 – Network Metering (Section 3.1.1)</i> .

A Distribution Assets

The following subsections detail Alectra Utilities' asset renewal drivers and the applicable practices across the following distribution asset classes:

- Distribution transformers
- Distribution switchgear
- Overhead switches
- Overhead conductors

- Poles (Wood and Concrete)
- Underground primary cables

The ACA relies on the findings from the distribution inspection, testing, and maintenance activities detailed in *Section 5.3.3.2 A*.

A.1 Transformer Renewal

Distribution transformers are a vital component to servicing customers from the distribution system at various utilization voltages. Distribution transformers consist of three main installation types: Pad-mounted, pole-mounted, or housed within a vault (e.g. submersible transformers).

Alectra Utilities' asset management strategy for distribution-class transformers follows a planned approach. Alectra Utilities will pursue planned replacement if there is risk of the following:

- Public injury:** A deteriorated transformer (i.e. categorized as "Poor" or "Very Poor" in the ACA), as summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.1)*, posing a risk to public or employee safety (e.g. corroded or damaged physical structure and compromised enclosure of energized components). Refer to Figure 5.3.3 - 5 for an example of a compromised enclosure.



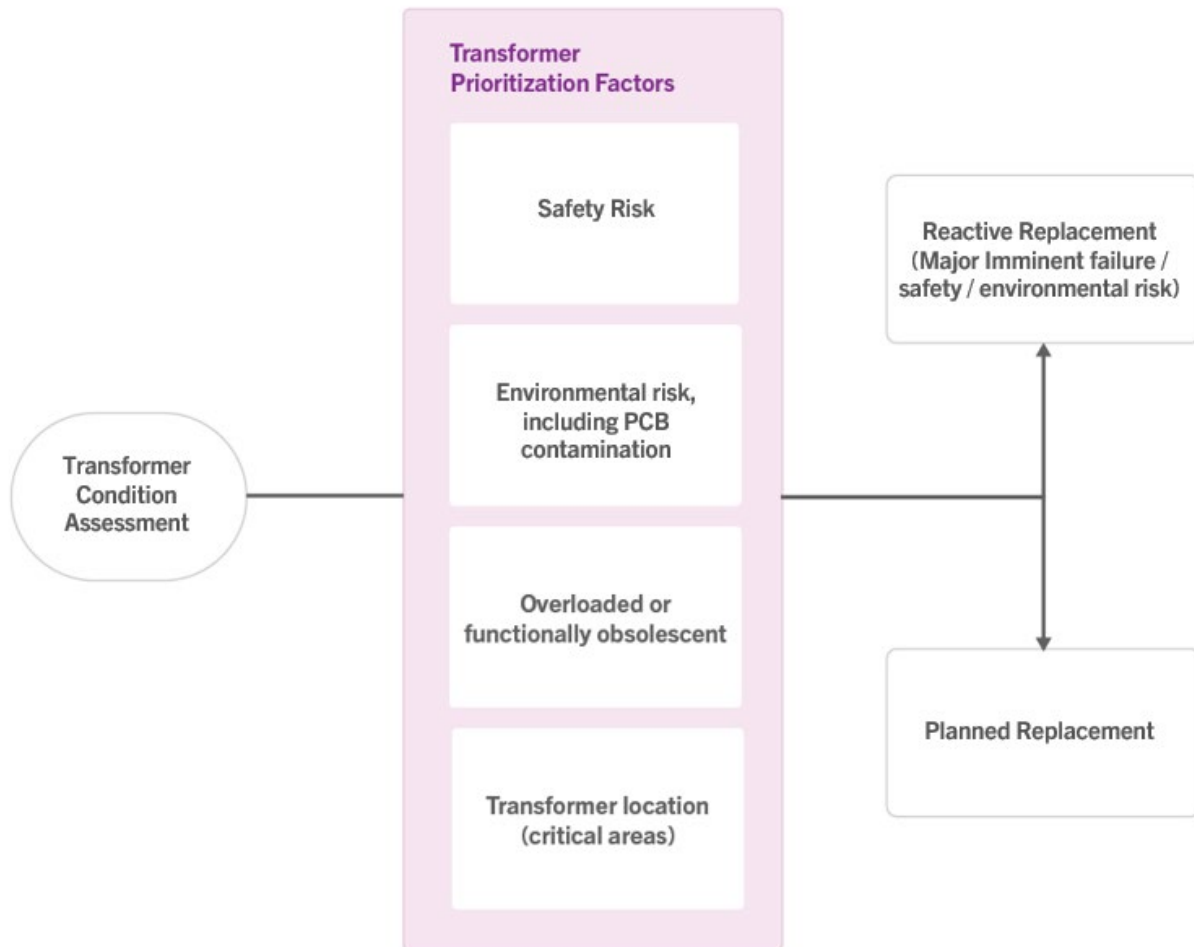
Figure 5.3.3 - 5 Compromised Transformer Enclosure Posing Public Safety Risk

- 1 ii. **Environmental contamination:** A deteriorated transformer is at risk of environmental
2 contamination and remediation (e.g. showing signs of leaking oil). From 2021 to 2024,
3 the average environmental remediation cost due to leaking oil was \$50,000 per site.
4 Replacing deteriorated transformers using a planned strategy will avoid the
5 environmental risk of oil contamination and avoid environmental remediation costs
6 associated with reactive capital replacement. Transformers that contain known PCB
7 concentrations of 2 parts per million (ppm) or more, or unknown concentrations but
8 manufactured prior to 1984 (i.e. at-risk of containing more than 2 ppm PCB) are also
9 targeted for planned replacement⁸⁰. Leaking PCBs in the environment can lead to
10 bioaccumulation, presenting serious health risks for humans and wildlife. Under the
11 PCB Regulations (SOR/2008-273), Alectra Utilities is required to report any spills
12 involving more than one gram of PCB into the environment and complete a full
13 environmental remediation.
- 14 iii. **Customer interruption:** A transformer that poses a high risk of failure or prolonged
15 outage due to their condition, functional obsolescence (e.g. overloaded transformers
16 that are undersized for the customer's demand), or location (e.g. inaccessible and
17 complex installations).

18 As part of Alectra Utilities' inspection and maintenance program, where possible, corrective
19 maintenance is performed to address concerns and extend the useful life of the transformers, as
20 detailed in *Section 5.3.3.2*.

⁸⁰ Any transformer identified with a PCB concentration of 50 ppm or greater is replaced by Alectra Utilities by the end of the calendar year in which it is identified. All such units will be removed from service no later than December 31, 2025, in accordance with the PCB Regulations (SOR/2008-273).

1 Figure 5.3.3 - 6 demonstrates Alectra Utilities' general approach for prioritizing deteriorated
2 transformers, including transformers posing a prolonged customer interruption risk.



3
4 **Figure 5.3.3 - 6 Transformer Sustainment Priority Action**

5 Figure 5.3.3 - 6 demonstrates that Alectra Utilities' priority is addressing deteriorated transformers
6 for planned replacement. This includes units that are showing signs of an oil leak, contain PCB,
7 or are compromised (e.g. due to corrosion), posing safety risks to the public. Oil leaks, especially
8 when the oil leak is active, risk spilling onto the road or into waterways (e.g. catch basins or
9 ditches). It is imperative that these types of situations, including assets with immediate safety or
10 asset failure risks, are addressed reactively to avoid environmental contamination and
11 remediation, undue safety hazards, and prolonged outages.

Another source of planned replacements for transformers stems from Alectra Utilities' assessment of transformers that are frequently subjected to loading beyond their nominal rating. Alectra Utilities routinely performs transformer loading analysis to identify these overloaded units as potential replacement candidates. Alectra Utilities also considers a unit's condition and physical location (i.e. in terms of potential access restrictions). For example, if a transformer is in a difficult-to-reach location (e.g. rear-lot configuration) such that its failure would result in a lengthy repair process and customer outage, then the unit is more likely to warrant planned replacement. In addition, if through inspections and normal operating activities, Alectra Utilities identifies obsolete transformers that are no longer supported by standard inventories, then those transformers will be evaluated for planned replacement. Failure of larger three-phase distribution transformers supplying commercial or industrial customers can lead to significant service reliability impacts, potentially halting customer production capability. Alectra Utilities plans such transformer replacement as the transformer approaches end-of-life or where frequent overloading is identified. For transformers where overloading is the driver for intervention, the replacement transformer would be sized accordingly.

The replacement practices described above help minimize long term costs and risks to Alectra Utilities' customers. Transformer investment pacing options are discussed in *Appendix B03 - Transformer Renewal*.

A.2 Switchgear Renewal

Distribution-class pad-mounted switchgear are used in the underground distribution system to facilitate the connection of local distribution circuits to main line underground feeder cable systems as well as interconnecting main line feeder circuits. Switchgear are critical components in the distribution system that help reduce the impact of an outage or maintenance activity and improve service reliability. Switchgear units are used for isolating, sectionalizing, and fusing for laterals, as well as for reconfiguring cable loops for maintenance, restoration, and other operating requirements. They enable providing service to residential subdivisions and commercial/industrial customers via fused connections to main feeder cable systems. A single switchgear can impact as many as 5,000 customers.

Alectra Utilities' asset management strategy for distribution-class pad-mounted switchgear follows a proactive approach due to the significant impact a switchgear failure has on safety,

reliability, and the environment. Alectra Utilities' replacement strategy for pad-mounted switchgear focuses on the following four key aspects:

- i. **Safety risk:** A switchgear is showing major degradation (i.e. categorized as "Poor" or "Very Poor" in the ACA), as summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.2)*, posing a risk to public or employee safety (e.g. exposed energized parts due to corrosion or risk of fire)
- ii. **Premature failure risk:** 25kV air-insulated "live front" switchgear and first-generation solid-dielectric switchgear
- iii. **Environmental risk:** Oil-leak (i.e. specific to oil-insulated units) and SF₆ leaks (i.e. specific to gas-insulated switchgear)
- iv. **System design reconfiguration:** When switchgear requires replacement, units located within the scope of planned projects (e.g. rebuilds) will be assessed to determine whether they can be eliminated from the system altogether via design re-configuration. If this is not a feasible option, the switchgear replacement may be scheduled as part of the execution of the planned project.

As part of Alectra Utilities' inspection and maintenance program, where possible, corrective maintenance is performed to address concerns and extend the useful life of the distribution switchgear, as detailed in *Section 5.3.3.2*. In some cases, pad-mounted switchgear units are found to contain defects that affect a specific component within the unit and that do not compromise the entire unit. Based on an evaluation of the defects and associated cost-benefit analysis, Alectra Utilities determines whether targeted repair is appropriate. Typical defects that can be addressed through repair (rather than asset replacement) include damaged fuse holders, barriers boards affected by prolonged corona exposure, and cracked support insulators in air-insulated switchgear.

Alectra Utilities has identified two groups of switchgear (25kV air-insulated "live front" switchgear and first-generation solid-dielectric switchgear) that are prone to premature failure, posing significant safety and reliability risks due to their condition, design, and installation practices:

- 25kV air-insulated "live front" switchgear: The useful life of air-insulated pad-mounted switchgear is between 20-45 years, with a typical useful life of 35 years

1 when operating within a normal continuous rated operating voltage of 25kV.⁸¹ Air-
2 insulated switchgear uses porcelain insulators and air to insulate live components
3 from ground. Air-insulated switchgear units have been failing prematurely due to
4 the operating requirements of Alectra Utilities' underground distribution system.
5 The air insulated switchgear units were manufactured to specification of normal
6 continuous rated operating voltage of 25kV and tested to operate as high as 28kV
7 to ensure operation at 27.6kV distribution voltage. These tests consider
8 operational voltage of 28kV, but they do not consider the long-term lifecycle
9 impacts of operating the asset at higher voltages in external environments with the
10 presence of moisture and contamination. Environmental factors in southern
11 Ontario have also led to earlier failure of these switchgear. While these units
12 function relatively well in dry environment jurisdictions, the southern Ontario
13 environment presents many challenges that cause units to fail. High humidity,
14 condensation from changing temperatures and water in the below-grade
15 foundations, when mixed with dirt and road dust, contribute to the formation of
16 conductive paths on the insulating components. Over time, this ultimately reduces
17 the insulating properties and leads to flashover and failure of the switchgear.

- 18 • First-generation solid-dielectric switchgear: While solid-dielectric switchgear is
19 relatively new (started to adopt at scale approximately 12 years ago), Alectra
20 Utilities has noticed issues with several manufacturers' first-generation versions of
21 this switchgear. While current generation solid-dielectric switchgear has resolved
22 these design issues, Alectra Utilities continues to experience premature failures
23 with first generation units since the manufacturer defects impact the long-term life
24 expectancy of the units.

25 Alectra Utilities has identified two groups of switchgear (oil-insulated switchgear and SF₆-
26 insulated switchgear) that are prone to oil and gas leaks, posing significant safety and
27 environmental risks. According to the 2023 ACA, nearly one-third of the switchgear asset base
28 fall under these two groups, as illustrated in Figure 5.3.3 - 7. Further details on asset inventory
29 are described in *Chapter 5.3.2 (Section 5.3.2.2 A.1.2)*.

⁸¹ Kinectrics Inc., "Asset Depreciation Study for Use by Electricity Distributors" (EB-2010-0178), July 8, 2010.

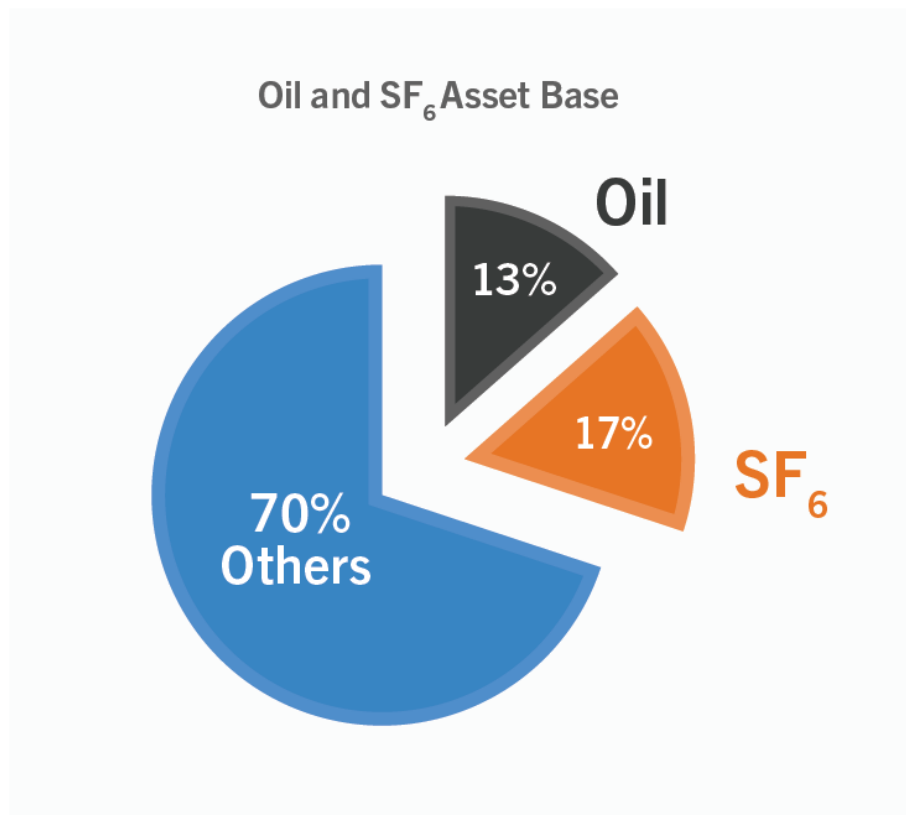


Figure 5.3.3 - 7 Breakdown of Oil-Insulated and Gas-Insulated Switchgear

- Oil-insulated switchgear: Alectra Utilities has 465 oil-insulated switchgear in its underground distribution system. As the name suggests, these units are filled with oil (over 1,500 liters in a typical unit), which operates as the switchgear's insulating medium. When these units fail, the oil can ignite and cause a fire, creating public and workers' safety risk. Figure 5.3.3 - 8 shows the result of a typical failure of an oil-filled switchgear. Many of these units are installed in public places and adjacent to customers' homes. Although the switchgear's oil tanks are sealed, condensation of water vapor can lead to contamination of the oil (which occurs over time) and can eventually lead to failure. In addition to the public and worker safety risks posed by potential oil ignition and fire, oil leaks and environmental cleanup may be required and can be costly to remediate.



Figure 5.3.3 - 8 Failed Oil-Filled Switchgear

- SF₆-insulated switchgear: Alectra Utilities has 571 SF₆-insulated switchgear in its underground distribution system. In the context of greenhouse gas emissions, SF₆ has an equivalent effect of 23,500⁸² times that of carbon dioxide (CO₂); one kilogram of SF₆ has the same greenhouse effect of 23.5 tons of CO₂. While SF₆ is non-toxic in its pure form, gas leaks in large quantities in an enclosed space can displace oxygen, becoming a suffocation risk. Alectra Utilities replaces leaking SF₆-insulated switchgear on a reactive basis. Leaks or suspected leaks may be found through inspection, during operating procedures, or through SCADA where remote monitoring is available. Distribution switchgear manufacturers provide field service, which involves inspecting the unit and topping up the unit with SF₆ gas if the unit is verified to not be leaking. If a unit is confirmed to be low on gas and leaking, Alectra Utilities will replace the switchgear and send the removed unit for refurbishment, if eligible.

Based on the above areas of focus, Alectra Utilities' switchgear replacement strategy includes the elimination of all "Poor" and "Very Poor" assets (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.2))*, 27.6kV air-insulated switchgear, first-generation solid-dielectric switchgear, and oil-

⁸² IPCC AR5

insulated switchgear. Alectra Utilities will proceed with a replacement strategy based on the system operating voltage, as explained below.

- For switchgear operating at 27.6kV, units will be replaced with standard 38kV rated solid-dielectric unit or units insulated with sulfur hexafluoride (SF₆)
 - Alectra Utilities plans to install solid-dielectric switchgear where possible instead of SF₆ insulated units. SF₆ units will still be required due to fault rating limitations of solid-dielectric switchgear (i.e. solid-dielectric supports a max fault rating of 12.5kA).
- For switchgear operating at 15kV or lower, Alectra Utilities will utilize 27.6kV rated air-insulated units for replacements, which are expected to perform reliably when operated at 15kV or lower.

Switchgear investment pacing options are discussed in *Appendix B02 - Underground Asset Renewal*.

A.3 Overhead Switch Renewal

Overhead switches serve as the primary method for switching loads for system operation and to restore customers after an outage. Overhead switches also enable Alectra Utilities to sectionalize and isolate parts of the distribution system as required. The main switch types in Alectra Utilities' distribution system include SF₆, solid-dielectric insulated units with vacuum interrupters and air-insulated load interrupters. These types of switches are referred to as Load Interrupter Switches (LIS).

Alectra Utilities' asset sustainment strategy for overhead switches is a proactive approach due to the significant impact an overhead switch has on reliability. Alectra Utilities replaces overhead switches identified to be in "Poor" or "Very Poor" condition (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.3)*) according to the ACA. An example of a deteriorated switch is shown in Figure 5.3.3 - 9. When evaluating replacement options and timing, Alectra Utilities considers other factors, such as the location of the switch in relation to overhead rebuild initiatives and road authority requests for asset relocations. Certain minor defects can be repaired at relatively low costs to extend the life of the switch, as outlined in *Section 5.3.3.2*. Examples of repairs include missing rain caps, pitted contacts, faulty arc suppressors, misaligned switch blades, and binding linkages.

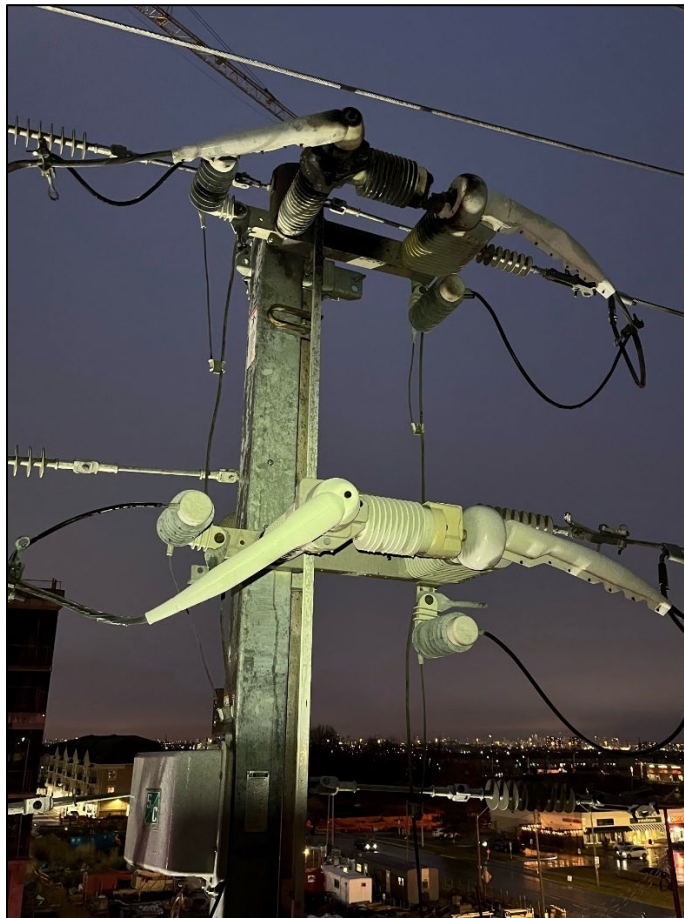


Figure 5.3.3 - 9 Mississauga – Melted Contacts on Switch

In addition to replacing deteriorated switches, Alectra Utilities also targets switches that are not fit for operation, either because they are functionally obsolete, no longer operable, or otherwise incapable of interrupting the load current (which is the primary function of a switch).

In numerous cases, the new switch will be capable of remote operation and automation, which will have the benefit of reducing outage times for customers. Alectra Utilities may replace overhead LIS units with automated high-speed circuit reclosures, depending on the location of the LIS in relation to normal system open points. Switch locations with high operating counts will also be considered for automation to improve switching response time and reduce the requirement to dispatch a crew to operate a switch. Normal system open points are identified pursuant to control room processes and are positioned to balance the loading on feeder circuits. This approach enables load transfer from one circuit to the opposite circuit at the normally-open

point if one circuit experiences loss of power. Automation of switches at these normal open points will reduce service restoration response time and minimize the requirement to dispatch a crew to operate the switch at the open point.

Detailed discussions regarding the options analysis and pacing of the switch replacement investment is provided in *Appendix B01 - Overhead Asset Renewal*.

A.4 Overhead Conductor Renewal

Alectra Utilities' distribution system contains overhead conductors that exist in many various sizes and vintages. Certain sized legacy conductor types have demonstrated an elevated risk of failure, and experienced failures that led to dangerous "wire-down" incidents. The conductor types involved include vintage #6 wire gauge or smaller. These conductors typically remain in-service from older, lower voltage primary systems (e.g. 4.16kV and 8.32kV) and are currently considered undersized when compared to present-day standards. Due to the physical properties of this conductor type and the cyclic nature of loading, these conductors become brittle over time and can fail at junctions where conductors are supported or terminated. Due to their overhead configuration, these conductors are exposed to weather events such as wind and ice loading, which further increase their probability of failure.

Alectra Utilities proactively replaces deteriorated and undersized overhead conductors (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.4)*). Undersized primary conductors (i.e. #6 or smaller) represent a significant risk to the public and Alectra Utilities' crews. Most undersized conductor replacements will be carried out in conjunction with planned conversions of vintage 4.16kV and 8.32kV systems, which contain most of these conductor types. Alectra Utilities pursues targeted replacement of undersized conductors at locations that are outside the scope of near-term voltage conversion projects. Failure to replace deteriorated overhead conductors may lead to wire-down events, posing significant safety risks to the public. Figure 5.3.3 - 10 shows a broken wire due to undersized conductor. Undersized overhead conductors, such as #6 copper, has also been identified as a public safety risk by the Electrical Safety Authority (ESA) (refer to *Appendix B01 - Overhead Asset Renewal* for details).



Figure 5.3.3 - 10 Hamilton – Fallen Undersized Wire

A.5 Pole Renewal

Wood and concrete poles support Alectra Utilities' overhead distribution plant, including 18,463 kilometers of primary conductors (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.5)*), transformers, switches, streetlights, and telecommunication attachments, and are critical to enable the delivery of electricity to customers. The combination of severe weather, along with reduced strength (identified during field testing and visual inspection), can lead to failure scenarios where multiple poles lose their structural integrity and fail, likely falling to the ground. Restoring power to customers in this scenario may take up to 12 to 24 hours, depending on severity of the event. It is imperative that Alectra Utilities monitors and assesses the condition of the poles to avoid significant safety and reliability risks with prolonged outages.

Alectra Utilities' asset sustainment strategy for wood and concrete poles follows a proactive approach due to the significant impact a pole failure has on safety and reliability. Alectra Utilities' replacement strategy for poles focuses on the following three aspects:

- **Safety:** A pole indicating major degradation (i.e. categorized as "Poor" or "Very Poor" in the ACA), as summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.5)*, posing a significant risk to public or employee safety (e.g. severe ground line rot or failed pole remaining strength test), where the pole may fall to the ground if not replaced. Alectra Utilities collects condition attributes that contribute to the Health Index. The

condition attributes are captured from visual inspections (applicable to wood and concrete poles) or pole testing (applicable to wood poles). Pole testing is completed using a resistograph test to assess the remaining wood fibre strength. According to Canadian Standards Association (CSA) Standard C22.3 No. 1-10, “when the strength of a wood pole structure has deteriorated to 60% of the required design capacity, the structure shall be reinforced or replaced”⁸³. Replacing fallen poles is a complex and time-intensive process, requiring crew members to safely remove debris and install new poles and conductors. Proactively replacing these at-risk poles leads to a more cost-efficient remediation process than reactive replacement, with less impact to customers and the public.

- **Storm hardening:** Adverse weather has been a significant contributor to sustained outages. Conditions such as high winds, heavy rain and snowstorms can damage overhead infrastructure, leading to prolonged outages. Alectra completed a Climate Risk and Vulnerability Assessment, which is discussed in *Chapter 5.3.2 (Section 5.3.2.1 C)*. Climate projections indicate that high wind events will increase in frequency, severity and intensity across Alectra Utilities’ service territory. As a result, both the climate-vulnerability status of each pole, and the locational wind severity risk (informed by the climate vulnerability study detailed in *Chapter 5.3.2 (Section 5.3.2.1 C)* are used to further prioritize replacement of deteriorated poles. Alectra Utilities must mitigate public safety risks, maintain system reliability, and account for customer preferences (refer to *Exhibit 1, Tab 5, Schedule 2 Application-Specific Customer Engagement*) to ensure that the distribution system is resilient to adverse environmental events. Replacing poles in susceptible and vulnerable areas (e.g. rear-lot configurations) with current standards will improve resilience to adverse weather and avoid the risk of pole failure due to high wind events. This methodology is in keeping with the OEB’s Vulnerability and Storm Hardening (VASH) project, whereby Alectra Utilities has targeted poles deemed most at-risk due to climate perils identified through the climate study.
- **Location and equipment attachments:** Poles located in proximity to highways, railways, and river crossings, as well as poles that are currently supporting

⁸³ “Overhead Systems”, CSA C22.3 No. 1-10, Clause 8.3.1.3, Canadian Standards Association.

transformers, switches, or telecommunication equipment, are prioritized for replacement due to the impact the pole failure will have on the system as well as potentially more complex replacement conditions involved due to these locations.

Figure 5.3.3 - 11 illustrates Alectra Utilities' approach for prioritizing deteriorated poles.

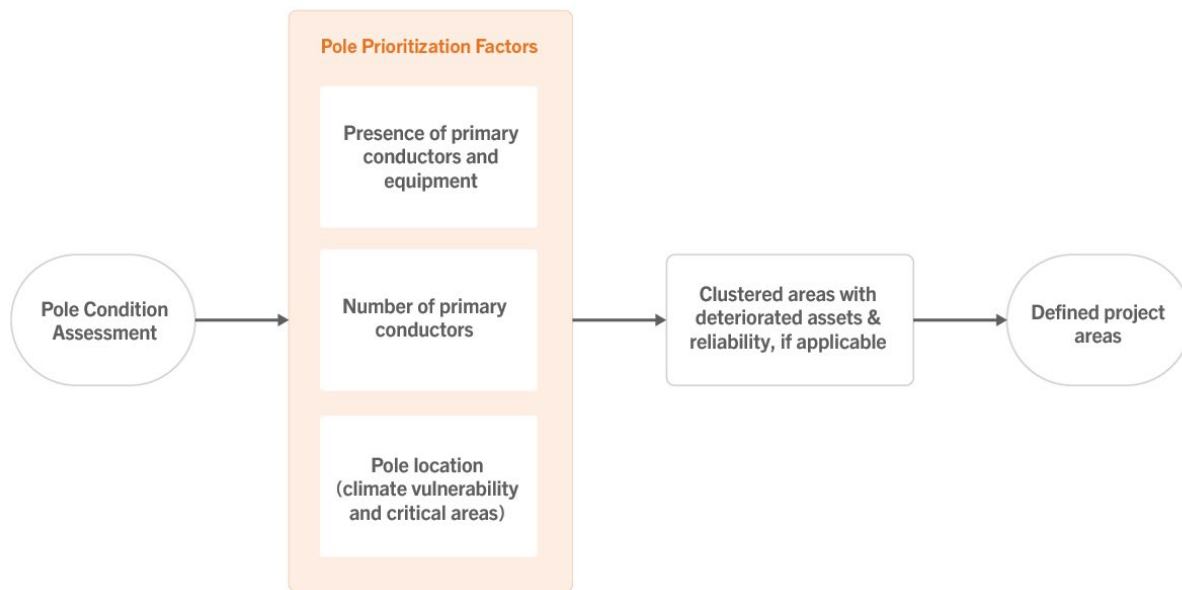


Figure 5.3.3 - 11 Pole Replacement Prioritization Factors

Using HI and considering other key aspects, such as pole location and its climate vulnerability, enables Alectra Utilities to target critical areas to avoid public safety and reliability risks. Detailed discussions regarding the options analysis and pacing of the Pole Renewal investments are provided in *Appendix B01 - Overhead Asset Renewal*.

A.6 Underground Cable Renewal

Alectra Utilities owns and operates 23,694 kilometers of underground primary cable, as summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.6)*, including paper-insulated lead-covered (PILC) cable, ethylene propylene rubber-insulated (EPR), and cross-linked polyethylene (XLPE) cable. XLPE cables are categorized by the following types:

- Non-Tree-Retardant Cables (NON-TR)
- Tree-Retardant Direct-Buried Cables (TR-DB)

- Tree-Retardant or Strand-Blocked In-Duct Cables (TR-ID)

Primary underground cables are critical to the delivery of electrical service across Alectra Utilities' service territory. Underground distribution cables are commonly utilized in urban areas, where it is beneficial over overhead infrastructure for increased reliability and safety considerations. Insulation failure is a primary cause of faults on these cables. Faults on primary underground cables are usually caused by insulation failure within a localized area. Cable faults, especially in urban areas, are commonly found in challenging locations (e.g. under customer driveways or under decks in customer backyards), leading to prolonged outages to repair the cable.

To manage the lifecycle of underground primary cable, Alectra Utilities uses cable performance data (e.g. failure rates and customer outage impacts) in conjunction with cable Health Index results (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.6)*) to identify risk and accordingly plan cable renewal investments. Alectra Utilities completed an ACA for primary underground cable using HI models configured for each cable type. The risks and cable renewal strategies are discussed in *Section 5.3.3.3 A.6.1* to *Section 5.3.3.3 A.6.3*.

A.6.1 PILC Cable

PILC represents 2% of Alectra Utilities' primary cable population. PILC cables are hermetically sealed with a lead sheath, protecting the cable from humidity and outside elements. These cables can be constructed with a single conductor or multiple conductors. In Alectra Utilities' service territory, a majority of the PILC cables contain three conductors and are typically installed in a 3.5-inch duct. Long term degradation mechanisms of PILC cables include corrosion of the lead sheath and dielectric degradation of the oil impregnated paper insulation, leading to insulation breakdown and localized failures. When PILC cable fails, the faulted portion is removed, and the remaining functional cables are spliced through and returned to service.

Due to obsolescence, operational challenges with installation and reactive repair, and high renewal cost with limited suppliers available, Alectra Utilities replaces PILC cables with EPR. Alectra Utilities' current practice is to repair PILC cables reactively upon failure. When replacing failed PILC cables (part of a planned project), Alectra Utilities replaces the faulted cable segment with three equivalently rated EPR cables in existing duct, provided that the existing duct has minimum diameter of 3.5 inches. Where this minimum diameter cannot be met, or if the duct is no longer useable (e.g. collapsed or damaged), the entire duct and utility chamber system will be

rebuilt and the end-of-life PILC cables will be replaced with the larger diameter standard XLPE cable. The challenge associated with this reactive replacement approach is lack of public right-of-way space where the PILC cables are currently installed (e.g. along congested streets in the western part of Alectra Utilities' service territory). Hence, Alectra Utilities will continue to monitor PILC cable failures to inform future planned replacement for this cable type.

PILC cable will be proactively replaced with EPR cable as a by-product of certain project coordination efforts. For example, Alectra Utilities plans to remove PILC cable during the Light Rail Transit (LRT) project in Hamilton's downtown core and during voltage conversion projects across Alectra West. Furthermore, PILC cable that is determined to be in 'Very Poor' condition and is critical to the reliability of the system, will be replaced proactively. For example, Alectra Utilities has a multi-year project in 2029 and 2030 to replace deteriorated PILC cable between Beach Transformer Station (TS) and Ottawa Municipal Station (MS) in Hamilton. The renewal plan for PILC cable will be reviewed during this DSP period.

A.6.2 EPR Cable

EPR cables make up the smallest population of underground primary cables in Alectra Utilities' system, representing less than 1% of the total population. While costlier than XLPE, EPR insulation is recognized for its superior flexibility and smaller diameter than equivalent XLPE cable. As mentioned in the previous subsection on PILC, Alectra Utilities' practice is to use EPR cables as replacement option for reactive and planned PILC replacements. Due to the smaller diameter, three EPR cables can be bundled together and fit within existing 3.5-inch ducts. For EPR cables, long term degradation can occur due to mechanical damage, overheating, or the impact of moisture ingress and chemical deterioration.

Due to the small population of EPR cables, Alectra Utilities' current practice is to repair (e.g. splicing) or replace EPR cables reactively upon failure. Furthermore, the condition of existing EPR cable does not support a need for planned replacement over this DSP period. The utility will reassess the need for planned replacement for the next DSP period.

A.6.3 XLPE Cable

Alectra's distribution system has 23,106KM of primary underground XLPE cable, as detailed in *Chapter 5.3.2 (Section 5.3.2.2 A.1.6.3)*. XLPE cables are categorized by type, as described

below. Each type has a different expected useful life, based on industry averages and Alectra's experience.

- **Non-Tree-Retardant cables (NON-TR):**
 - Vintage 1988 or older; TUL 30 years; EUL 40 years
- **Tree-Retardant Direct-Buried cables (TR-DB):**
 - Vintage 1989-1993; TUL 35 years; EUL 45 years
- **Tree-Retardant or Strand-Blocked In-Duct cables (TR-ID):**
 - Vintage 1994 or newer; TUL 40 years; EUL 55 years

Cable manufacturers introduced the first-generation XLPE cables in the late 1960s. These cables are susceptible to moisture ingress (i.e. water treeing) and localized failures, especially if installed direct-buried or with terminations and splices susceptible to insulation breakdown. The Non-Tree Retardant cables have inherent problems due to the technology and capability of the manufacturing processes available at the time, which led to the ingress of impurities into the insulating medium. These impurities can become triggers for the creation of water trees (i.e. small conductive paths in the insulation), which eventually become electrical trees. This issue causes insulation failures, resulting in faults on primary underground cables. The susceptibility of these cables to water and electrical treeing ultimately contributes to the partial discharge and eventual failure of the cable. As such, legacy XLPE cables introduce significant reliability concerns for Alectra Utilities. The breakdown of Alectra Utilities' cable population by cable type is detailed in Figure 5.3.2 – 57 in *Chapter 5.3.2 (Section 5.3.2.2 A.1.6)*.

Compounding the issue is that these first-generation cables were originally installed in excavated trenches on a direct-buried basis, with little or no separation between cables, and without any additional mechanical protection that would be offered by a ducted installation. For this reason, these cables are difficult to replace or repair when they fail. Unlike failed cables installed in ducts, which typically can be entirely removed and replaced with brand new cable segments, failed direct-buried cables can only be excavated and repaired via cable splicing in a reactive situation. Such cable splices may introduce a potential failure point. Figure 5.3.3 - 12 and Figure 5.3.3 - 13 show examples of cable failure locations leading to disruptive outages experienced by customers. These complex outage locations may require specialized equipment, additional labour, and coordination with property owners to excavate and access the faulted cable. For customers, this

1 means extended disruptions, inconsistent access to reliable power, and invasive repairs. As
2 these failures become more frequent, customers will face increasing frustration over Alectra
3 Utilities' ability to manage deteriorating cable in their neighbourhood.



Figure 5.3.3 - 12 Cable Under Backyard Deck



Figure 5.3.3 - 13 Cable Under Driveway

4 Manufacturing improvements and development of tree-retardant XLPE cables in the late 1980s
5 have reduced the rate of insulation deterioration due to treeing effects. However, while tree-
6 retardant cables are expected to last longer than their first-generation counterpart, the installation
7 standards used at the time had yet to improve, as these cables were also direct buried and
8 therefore similarly exposed to environmental factors. Further improvements in cable
9 manufacturing in the early 1990s led to the development of strand-blocked XLPE cables, which
10 are no longer susceptible to moisture ingress into the conductor. In addition, Alectra Utilities
11 began installing primary underground cables in ducts in the early 1990s. As such, the life of the
12 tree-retardant or strand-blocked in-duct cable is expected to be longer than the tree-retardant
13 direct-buried cables.

Alectra Utilities’ asset management strategy for XLPE cable follows a proactive approach and includes cable injection and cable replacement. Where feasible, Alectra Utilities performs cable injection as a lower cost solution that provides life extension benefits to existing XLPE and TR-XLPE (non-strand-filled) cables without excavation and replacement work. However, by 2029, Alectra Utilities will have no remaining feasible candidates for cable injection due to the amount of deteriorated aging in non-strand-filled cable. Many of the cables installed in the early 1990s are “strand-filled” and therefore not eligible for injection. When these cables begin to deteriorate, replacement is the only feasible option.

Figure 5.3.3 - 14 illustrates Alectra Utilities’ general approach for prioritizing deteriorated XLPE cable.

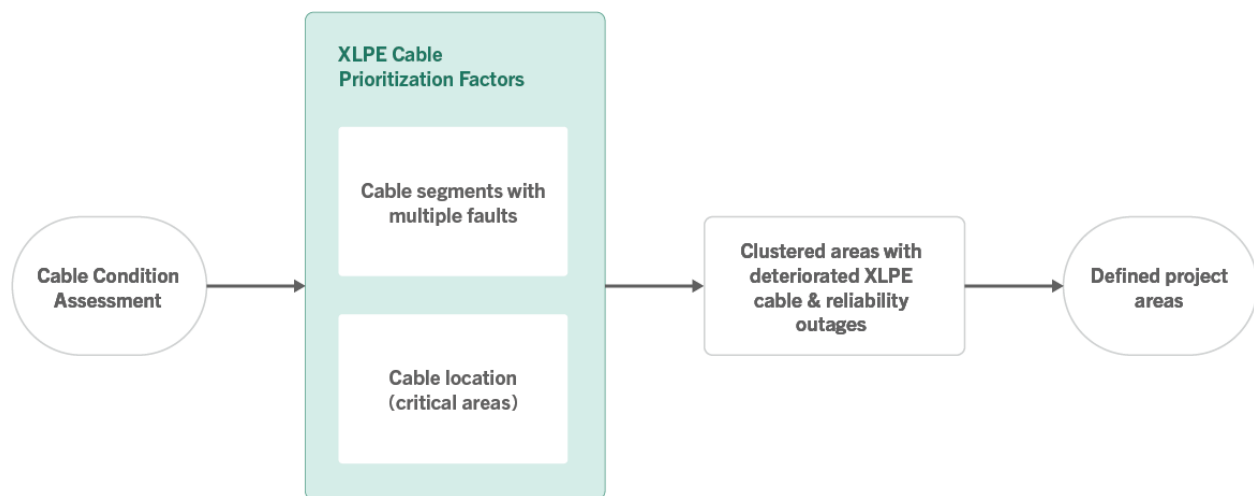


Figure 5.3.3 - 14 XLPE Cable Replacement Prioritization Steps

Alectra Utilities executes cable proactive remediation projects by geographical area to seek opportunities for efficiency savings (e.g. reduced logistical costs). In some cases, cable segments are targeted for remediation based on individual performance or consequence of failure. Cable accessories that are also of first-generation construction would be replaced along with the cable. As illustrated in Figure 5.3.3 - 14, defined project areas consider the following:

- Health Index: “Poor” and “Very Poor” cable segments (summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.6.3)*) according to the Cable ACA and adjacent cable segments
- Cable Faults: Cable segments with multiple faults that are susceptible to failure

- Reliability: Areas experiencing declining reliability due to XLPE cable faults
- Location: Deteriorated cable feeding critical infrastructure or located in an area where a cable failure will lead to a prolonged outage

Detailed discussion regarding options analysis and pacing of the cable replacement investment are provided in *Appendix B02 - Underground Asset Renewal (Section 2.4)*.

A.7 Other Distribution Assets

Alectra Utilities also proactively replaces the following distribution assets to avoid safety and reliability risks:

- Cable Chambers
- Fault Indicators
- Insulators
- Low Voltage Cables (Overhead and Underground)
- Submersible Load Break Device (LBD) Switches

These asset classes are not included in the ACA and are identified for remediation during inspection and maintenance activities (detailed in *Section 5.3.3.2*) in conjunction with reliability trends.

A.7.1 Cable Chambers

Utility chambers are below-grade concrete structures designed to facilitate the installation of underground cables and associated electrical distribution devices. These chambers can be located under roadways, parking lots, and boulevards, where they are frequently exposed to vehicle loading. It is imperative that they are maintained in sound condition, suitable for their continued application. Road salts, water run-off, and impact of vehicle loading can cause degradation of the concrete structure, thus jeopardizing the integrity of the chamber. Figure 5.3.3 - 15 illustrates a roof collapse of a cable chamber in downtown Hamilton. The entry neck section (chimney), upper roof slabs, and a small section of the load bearing walls are the areas that are most commonly impacted by this deterioration. Through regular inspections, Alectra Utilities identifies and evaluates signs of chamber structural deterioration.

1 The renewal of cable chambers includes full replacement (i.e. rebuild) and refurbishment
2 concerning only the chamber opening or roof. Where feasible, the upper deck of the chamber is
3 refurbished while leaving the remaining portion of the chamber intact. Where the chamber neck
4 uses layers of brick to adjust the manhole to final grade, these bricks can deteriorate and may
5 require either parging of the brick, or replacement of the chamber neck with a preformed concrete
6 neck. The renewal plan, including ACA, for cable chambers will be reviewed during this DSP
7 period.



8
9 **Figure 5.3.3 - 15 Hamilton – Cable Chamber Roof Collapse**

10 A.7.2 Fault Indicators

11 Fault indicators are a crucial component of the distribution system in terms of locating faults,
12 thereby improving outage response and reducing outage restoration times. They support the
13 sustainment of reliable system performance and customer service, as well as the attainment of
14 operational efficiency gains. Alectra Utilities' distribution system includes various types of fault
15 indicators, which were installed by Alectra Utilities' predecessor utilities pursuant to different
16 practices in effect at the time. Some geographical areas of Alectra Utilities' service territory have
17 a large number of fault indicators, while others have a smaller population or no-fault indicators at
18 all. Alectra Utilities plans to:

- i. Install new fault indicators in parts of the distribution system where fault indication is lacking
- ii. Replace older fault indicators that are technologically obsolete and prone to malfunction

A.7.3 Insulators

Alectra Utilities' overhead distribution system contains many insulators, including a population of legacy porcelain insulators and first-generation polymeric insulators⁸⁴. The design of these insulator types has led to safety issues for Alectra Utilities' crews and reliability issues for the overhead distribution system. The identified insulators have displayed a susceptibility to the accumulation of contaminants to the degree where their insulating properties are reduced, resulting in tracking leading to flashover events. Flashovers have resulted in pole fires taking place and have caused reliability and safety risks to field crews and Alectra Utilities' customers. Figure 5.3.3 - 16 and Figure 5.3.3 - 17 show the loss of pole structure and pole failures caused by tracking insulators and resulting pole fires. Insulator replacements are targeted at replacing legacy porcelain and first-generation polymer insulators from the distribution system. Alectra Utilities has planned to continue replacing these assets to avoid insulator failure and the risks related to pole fires associated with these insulator types.

⁸⁴ Referred to as "non-K-Line" insulators



Figure 5.3.3 - 16 Pole Fire Due to Insulator Tracking

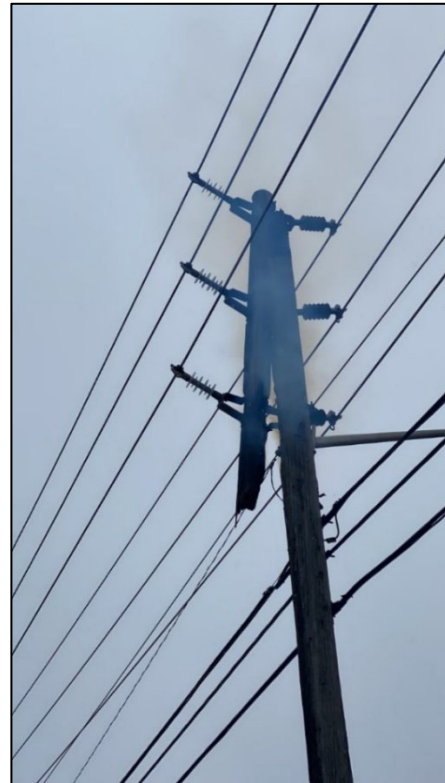


Figure 5.3.3 - 17 Active Pole Fire Event, 2023

Detailed discussions regarding options analysis and pacing of the insulator replacement investment are provided in *Appendix B01 - Overhead Asset Renewal*.

A.7.4 Low Voltage Secondary Cable (Overhead and Underground)

Alectra Utilities bundles the replacement of overhead main line secondary or service lateral conductors, or underground secondary and service cables as part of rebuild projects. Upon failure, these cables and conductors are replaced or repaired reactively.

A.7.5 Submersible Load Break Devices (LBD)

Alectra Utilities primarily manages its submersible LBD switches through reactive replacement. However, units that are vulnerable to flooding, no longer functioning as intended, or are obsolete (e.g. VACpac units) will be targeted for planned replacement. Figure 5.3.3 - 18 below shows a submersible switchgear corroded from repeated vault floods leading to unsafe operating conditions.



Figure 5.3.3 - 18 Corroded Submersible LBD Due to Flooding

B Station Assets

Alectra Utilities' station infrastructure is critical to the transformation of high-voltage supply from the bulk transmission system to distribution voltage supply. Station asset failure can lead to lengthy interruptions to many customers. Alectra Utilities owns and operates 14 Transformer Stations (TSs) and 149 Municipal Stations (MSs). These TSs are supplied from the Hydro One Network Inc.'s (HONI) high-voltage transmission grid at 115kV or 230kV, while the MSs are supplied from the low side of HONI's or Alectra Utilities' TSs at 44kV, 27.6kV, or 13.8kV.

The ACA assesses the following three major station asset classes:

- Power transformers
- Circuit breakers
- Station switchgear

Alectra Utilities' assessment of station assets also covers primary switches, station protection relays, station service transformers, and other ancillary equipment. Such assessments rely on the findings from stations' inspection and maintenance activities.

B.1 Power Transformers

Station power transformers are used to step down transmission or sub-transmission voltage to distribution voltage levels. The two general classifications of station power transformers are TS transformers and MS transformers. TS transformers are supplied from the high-voltage transmission grid at either 230kV or 115kV and step voltage down to 44kV, 27.6kV, or 13.8kV. MS transformers are supplied from the medium-voltage distribution system at 44kV, 27.6kV, or 13.8kV, and step voltage down to 27.6kV, 13.8kV, 8.32kV, or 4.16kV. TS transformers owned and operated by Alectra have fully cooled ratings of 50MVA, 83.3MVA, and 125MVA, and MS transformer ratings typically have base Oil Natural Air Natural (ONAN) ratings ranging from 3MVA to 22MVA.

Power transformers employ many different design configurations, but they are typically made up of the following main components: Primary and secondary windings, laminated iron core, internal insulating mediums, main tank, bushings, cooling system (including radiators, fans and pumps, where applicable), off-load tap changer (optional), on-load tap changer (optional), instrument transformers, control mechanism cabinets, and Instruments and gauges.

For most transformers, end of life is typically established as the failure of the insulation system and, more specifically, the failure of pressboard and paper insulation. While the insulating oil can be treated or changed, it is not practical to change the paper and pressboard insulation. The condition and degradation of the insulating oil, however, plays a significant role in aging and deterioration of a transformer, as it directly influences the speed of degradation of the paper insulation. Dissolved Gas Analysis (DGA) of the transformer oil and other test procedures provide important insights into transformer condition. Most of Alectra Utilities power transformers have

some form of remote monitoring, with the most sophisticated systems being associated with the TS transformers. Through these systems, alerts can be transmitted to the control room when certain condition factors reach a pre-determined threshold, thereby triggering mitigation. In addition to remote monitoring, samples are extracted from each transformer at least once a year and sent to a laboratory for analysis. The results of this analysis will determine whether intervention is required. Intervention can include, but is not limited to, performing addition testing and even removing, degasifying, and replacing the oil.

Power transformer ACA results are summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.2.1)*.

Alectra Utilities has no plans for proactively replacing any power transformers during the 2027 to 2031 DSP period but will continue to manage aging units through online monitoring and enhanced inspection and maintenance practices, as deemed necessary. Alectra Utilities does expect that proactive power transformer replacements will be necessary soon after the 2027 to 2031 DSP period.

B.2 Circuit Breakers

Circuit breakers are used to sectionalize and isolate circuits or other assets. They are often categorized by the insulation medium used in the circuit breaker and by the fault-current interruption process. The common types include oil circuit breakers, air circuit breakers, vacuum circuit breakers, and SF₆ circuit breakers. Circuit breakers can be enclosed in switchgear or can stand alone.

Circuit breakers “make” and “break” high currents and experience erosion caused by the arcing accompanying these operations. All circuit breakers undergo some contact degradation every time they open to interrupt an arc. Also, arcing produces heat and decomposition products that degrade surrounding insulation materials, nozzles, and interrupter chambers. The mechanical energy needed for the high contact velocities of these assets adds mechanical deterioration to their degradation processes.

Outdoor circuit breakers may experience adverse environmental conditions that influence their rate and severity of degradation. Additional degradation factors for outdoor-mounted circuit breakers include corrosion, effects of moisture, bushing, insulator, and mechanical deterioration.

Corrosion and moisture commonly cause degradation of internal insulation, circuit breaker performance mechanisms, and major components such as bushings, structural components, and oil seals. Another widespread problem involves corrosion of operating mechanism linkages that result in eventual link seizures. Corrosion also causes damage to metal flanges, bushing hardware, and support insulators.

Outdoor circuit breakers experience moisture ingress through defective seals, gaskets, and pressure relief and venting devices. Moisture in the interrupter tank can lead to general degradation of internal components.

Mechanical degradation presents greater end-of-life concerns than electrical degradation. Operating mechanisms, bearings, linkages, and drive rods represent components that experience most mechanical degradation problems. Other effects that arise with aging include loose primary and grounding connections, oil contamination and/or leakage (oil circuit breakers only), and deterioration of concrete foundation affecting circuit breaker stability.

Failure of a circuit breaker to operate can lead to explosion, presenting a serious safety risk and a lengthy and costly service interruption.

Chapter 5.3.2 (Figure 5.3.2 - 76) illustrates that 114 circuit breakers are in the “Very Poor” or “Poor” condition category; all these circuit breakers are enclosed in station switchgear. Typically, circuit breaker replacement for units that are enclosed in station switchgear will trigger replacement of the entire switchgear lineup, including associated protections and ancillary equipment. Replacing the entire switchgear lineup rather than retrofitting the switchgear with new circuit breakers brings this station equipment up to current operating and safety standards. Alectra Utilities will be replacing some of these circuit breakers during the 2027 to 2031 DSP period as part of station switchgear replacements. Criteria for selecting replacement candidates are described in *Section 5.3.3.2 B.3*.

B.3 Station Switchgear

Station switchgear consists of an assembly of retractable/racked devices that are totally enclosed in a metal envelope (metal-enclosed). These devices operate in the medium-voltage range, from 4.16kV to 44kV. Station switchgear includes circuit breakers, disconnect switches or fuse gear, current transformers (CTs), potential transformers (PTs), and occasionally some or all the

1 following: Metering, protective relays, internal DC and AC power, battery charger(s), and AC
2 station service transformation. Station switchgear is modular in that each circuit breaker is
3 enclosed in its own metal envelope (cell). Station switchgear is also compartmentalized, having
4 separate compartments for circuit breakers, control, incoming/outgoing cables or bus duct, and
5 busbars associated with each cell.

6 Switchgear degradation is a function of several factors: Mechanism operation and performance,
7 degradation of solid insulation, general degradation/corrosion, environmental factors, and post
8 fault maintenance (condition of contacts and arc control devices). Degradation of the circuit
9 breaker used is also a factor. However, the degradation mechanism differs slightly between air-
10 insulated and gas-insulated switchgear types. Note that circuit breakers are evaluated separately
11 from station switchgear from an HI perspective.

12 The greatest cause of maloperation of station switchgear is related to mechanism malfunction.
13 Deterioration due to corrosion or to lubrication failure may compromise mechanical performance
14 by either preventing or slowing down the operation of the circuit breaker. This is a serious issue
15 for all types of station switchgear.

16 In older air-filled equipment, degradation of active solid insulation, such as drive links, has been
17 a significant problem for some types of station switchgear. Some of the materials used in this
18 equipment, particularly those manufactured using cellulose-based materials (pressboard, SRBP,
19 laminated wood), are susceptible to moisture absorption. This results in a degradation of their
20 dielectric properties, resulting in thermal runaway or dielectric breakdown. An increasingly
21 significant area of solid-insulation degradation relates to the use of more modern polymeric
22 insulation. Polymeric materials, which are now widely used in station switchgear, are very
23 susceptible to discharge damage. These electrical stresses must be controlled to prevent any
24 discharge activity in the vicinity of polymeric material. Failures of relatively new station switchgear
25 due to discharge damage and breakdown of polymeric insulation have been relatively common
26 over the past couple of decades.

27 Temperature, humidity, and air pollution are also significant degradation factors. The safe and
28 efficient operation of station switchgear and its longevity may all be significantly compromised if
29 the station environment is not adequately controlled.

Older switchgear is not arc resistant. In the event of an explosive failure, the cabinet door could be blown off, resulting in a significant safety risk and extensive damage. Modern arc-resistant switchgear is designed with reinforced compartments that can withstand the pressure increases during high-energy faults, and explosive gases are vented, thereby significantly reducing safety risk.

Station switchgear ACA results are summarized in *Chapter 5.3.2 (Section 5.3.2.2 A.1.2.3)*. Alectra Utilities will continue replacing station switchgear during the 2027 to 2031 DSP period. Station switchgear replacement will be arc-resistant and involves replacing the circuit breakers, associated protections, and ancillary equipment. Criteria for selecting replacement candidates are described in *Section 5.3.3.2 B.3*.

B.4 Protection and Control Systems

Protection and control system equipment consists of relays, remote terminal units (RTUs), communication switches, controllers, and computing platforms typically installed in a series of panels or in the low-voltage compartments of switchgear cells. Protection and control components can also be found in control cabinets of outdoor switchgear and transformers.

The primary function of a protection and control system is to provide monitoring and protection of station equipment and to initiate circuit breaker trip and close functions. This function is extremely important because it protects equipment from being damaged by high electrical currents that flow through electrical equipment during fault conditions. Protection systems operate to clear the fault by opening circuit breakers or other protective devices to cease the flow of fault current before equipment sustains damage.

Older station protection and control systems consist of protective relays that have an electromechanical mechanism or discrete solid state components. Such relays require periodic recalibration and have a limited range of functionality compared to modern protection and control systems. Degradation of electromechanical relays is primarily related to wear and seizing of mechanical mechanisms. Degradation of solid state relays is related to the deterioration of contacts and aging of electronic components. Degradation of either type can be due to the following factors: Contact oxidation, contact welding or pitting due to excessive current, and Chemical corrosion. Degradation on relay coils is mainly a result of thermal aging due to

1 continuous energization or elevated cabinet temperatures. Excessive heat may cause the coil to
2 burn out or affect other nearby components.

3 Modern protection and control components are predominately microprocessor-based digital
4 devices that do not have mechanical or moving parts. They do not require periodic re-calibration
5 and are also less likely to experience failure. Instead, other methods are used to confirm the
6 health of the relay components; continuous monitoring through SCADA will reveal components
7 that are not operating, and sequence of events reports provide confirmation that the protections
8 are functioning properly. When compared to electromechanical or solid-state relays,
9 microprocessor-based relays provide increased functionality and flexibility in terms of protection
10 co-ordination and monitoring and control capability. Microprocessor-based relays require
11 firmware updates to address security vulnerabilities, improve performance, and enhance
12 compatibility with new software and hardware. Early generation microprocessor-based relays
13 might not have all the functionality of modern relays and might be incompatible with new software
14 and hardware. Also, there can come a point when it is no longer possible to update
15 microprocessor-based relays, either because they operate on obsolete computer platforms, such
16 as Windows 3.1, or firmware upgrades are no longer available. For any relay type, the availability
17 of parts may become limited once no longer supported by the manufacturer. Should these legacy
18 relays fail, customer outages could result, and it may be not easy to repair or replace the asset.

19 Replacing end-of-life electromechanical, solid state, and earlier generation microprocessor-based
20 protection equipment with modern microprocessor-based systems results in improved protection
21 co-ordination between station circuit breakers and downstream protective devices such as
22 reclosers and fuses. This provides better protection for system assets but also results in better
23 reliability because outages can be contained more effectively to the problem area. In addition,
24 improved protection co-ordination results in fewer momentary outages, which are a nuisance to
25 customers with sensitive electronic equipment and can disrupt entire industrial customer
26 production processes. Modern microprocessor-based systems also enable better protection of
27 station and distribution assets and support initiatives to enhance substation automation by
28 implementing functionality such as automatic transfer capability, thereby reducing the possibility
29 of customer outages during fault or equipment failure situations.

30 Protection and control system upgrades are prioritized based on asset criticality, remaining useful
31 life, required functionality, and alignment with other projects. Where the primary driver for

replacement is condition, investments are covered under Substation Renewal. Assets in deteriorating condition are identified by a history of failure or by increased maintenance or repair requirements; these investments are discussed in *Appendix B04 - Substation Renewal*. Where the primary driver for replacement is a need for additional functionality or to support other systems, investments are discussed in *Appendix B14 - Enabling Resiliency & Modernization (Section 2.1.4 C)*.

B.5 Station Renewal Strategy

In addition to HI scores, Alectra Utilities' strategy for managing station assets involves the use of monitoring technologies, investing in environmental protection measures, and strategically managing inventory on a consolidated basis (refer to *Chapter 5.4.2 2027-2031 Investment Overview* for further details). When considering station renewal activities, the following factors are evaluated to assess and mitigate the risk profile at any given station:

- Station configuration: Alectra Utilities' stations utilize both single and dual-element (transformer) arrangements. The dual-element configuration includes two transformers per station such that each transformer can normally support the full station load. Alectra Utilities monitors the HI value of each transformer to assess the overall transformer risk at the station and determines the timing for replacement of either of the transformers.
- Inter-station connectivity and back up: All of Alectra Utilities' stations are interconnected through overhead and underground feeder systems, such that load can be effectively transferred in most conditions upon the loss of all or part of a station.
- Spare asset inventory: Alectra Utilities ensures that sufficient spare power transformers and circuit breakers and/or spare parts are available by rating and operating voltage levels to support the station fleet. Spare transformers and circuit breakers may be located within a station site or in stores inventory. In some cases, spare units may be moved to station sites with higher risk profiles.
- Station peak loading: Alectra Utilities monitors station loading on a continuous basis, capturing hourly peak load values throughout the year. If certain

transformers exhibit high risk profiles, loading information will be used to assess offloading capabilities and the need for station asset replacements.

- Station capacity upgrade projects: Through the integrated planning process, Alectra Utilities will identify the timing and location of station sites where capacity upgrades are required. The Asset Management team, in consultation with Station Sustainment, will assess the risk profile of the station transformers involved and determine if the existing transformers can be maintained until the scheduled upgrade is executed. Depending on the timing of the capacity upgrade and the risk profile of the existing transformers, consideration will be given to offloading, oil de-gassing and potential refurbishment activities. If transformers that have been replaced are in Fair or Good condition, they may be tested and refurbished and maintained as spare units.
- Station decommissioning schedules: Some of Alectra Utilities' lower-voltage distribution systems are undergoing conversion to current-day standard operating voltages, through the completion of multi-year voltage conversion projects. The station risk profile for municipal stations identified for conversion are assessed with regard for the scheduled decommissioning (if applicable) of the station. Where a station with a higher risk profile is within the scope of a planned conversion project and is scheduled to be decommissioned in the short term, the risks associated with that station may be addressed by increased maintenance or refurbishments to maintain reliable operation until the decommissioning date. For Alectra Utilities voltage conversion plan in this DSP, refer to *Appendix B01 - Overhead Asset Renewal*.

As a key input for the station asset management process, HI results for major station assets are compiled for each station and provided to SMEs for review and analysis. SMEs consider HI results along with other input, including station maintenance history, station component performance issues, and station component replacement initiatives not managed through the ACA process (such as capital corrective replacements, including transformer tank and radiator reconditioning, transformer leak mitigation/re-gasketing, and procurement of critical spare parts).

Alectra Utilities considers the condition of all major assets located within a given station and completes a thorough evaluation in consultation with SMEs across relevant departments to

1 identify assets that warrant follow-up action plans as well as opportunities to bundle work by
2 station. Other than the previously mentioned input factors, SMEs also consider station
3 decommissioning schedules associated with voltage conversion projects, expansion
4 requirements, capacity constraints, magnitude and criticality of the load that is supplied, type of
5 customers supplied, potential stranded load conditions, distribution system load transfer
6 capabilities, obsolescence, availability of parts, maintainability, safety and environmental
7 concerns and budgetary constraints. Based on this evaluation, project business cases are
8 prepared for the identified assets, integrating all applicable cross-functional drivers as part of
9 Alectra Utilities' integrated planning process.

10 **C Metering Assets**

11 As of December 31, 2024, Alectra Utilities' metering asset portfolio consists of 498 wholesale
12 revenue meters and 1,082,436 retail revenue meters. As detailed in *Appendix B06 - Network*
13 *Metering*, the condition, performance, and accuracy of metering assets is mandated by federal
14 statutes (the *Weights and Measures Act* and the *Electricity and Gas Inspection Act*), by Ontario
15 Energy Board code requirements, and under the IESO's *Market Rules*.

16 Wholesale revenue meters are critical for ensuring the accurate and reliable measurement of
17 electricity delivered to the utility through the provincial grid and distributed by the utility to
18 customers. They are installed at bulk supply points, transformer stations, and municipal
19 substations.

20 Retail meters include single-phase, polyphase, and suite meters installed at customer premises
21 across residential, commercial, and multi-unit buildings. Approximately 90% of the retail meters
22 are networked, and the broader metering system includes communication networks equipment
23 and software platforms or "Head Ends" that together enable the accurate, secure, and timely
24 provision of meter data.

25 **C.1 Wholesale Revenue Metering**

26 As described *Appendix B06 - Network Metering (Section 3.1.1) Wholesale Revenue Meter*
27 *Compliance*, Alectra Utilities typically schedules the replacement of its wholesale revenue meters
28 prior to the assets reaching 20-25 years in service. This is typically the end of their practical life
29 where the meter model or firmware is no longer supported by the manufacturer, or it becomes

1 impractical to meet Measurement Canada's re-sealing requirements. The meter may be replaced
2 earlier in cases of in-service failure or due to measurement inaccuracies.

3 Alectra Utilities wholesale revenue meter fleets have an average age of 9.3 years, with 51 meters
4 aged 15 to 17 years, and 59 meters aged 18 to 20 years as of December 31, 2024. Alectra
5 Utilities' wholesale revenue meters are part of the broader wholesale metering installation which
6 also includes cabinets, cabling, and instrument transformers.

7 Alectra Utilities follows a replacement plan based on a useful life of approximately 40 years for its
8 wholesale instrumentation. This is aligned with historical failure trending for the assets. Additional
9 proactive replacements are incorporated into the plan as regulatory changes require compliance
10 upgrades, or when station rebuilds or switchgear replacements are completed. Instrumentation
11 replacements may be required reactively where measurement inaccuracies are identified or when
12 a total failure occurs.

13 *C.2 Retail Revenue Metering*

14 As described in *Appendix B06 – Network Metering (3.1.4 Meter Failures)*, most meter models are
15 relatively stable with failure rates aligned to the industry standard of up to 0.5% annually. Under
16 this normal life-cycle scenario, Alectra Utilities reactively replaces both networked and non-
17 networked meter assets as they fail.

18 As its networked Advanced Metering Infrastructure (AMI) 1.0 meters age, Alectra Utilities is
19 experiencing increased meter failure rates, approximately double the industry standard (i.e.
20 1.1%) in 2024.

21 Managing a large-scale meter network using a reactive or "run-to-fail" model is neither a practical
22 nor reliable approach at Alectra Utilities' current rate of failure for its AMI 1.0 meter assets. Each
23 failed meter can disrupt the mesh network it supports, reducing the overall system resilience. A
24 high volume of meter failures may destabilize the network entirely, leading to cascading
25 communication failures that prevent data from reaching the AMI head-end system. Failure rates
26 incrementing beyond 1% are not cost effective nor operationally practical to be managed
27 reactively, and a planned AMI renewal strategy is required.

28 Alectra Utilities' planned replacement strategy for its AMI 1.0 network meters is provided in
29 *Appendix B06 - Network Metering (Section 3.1.5)*.

5.3.3.4 Asset Refurbishment Practices

Asset refurbishment is a structured intervention aimed at restoring and rebuilding assets removed from the field due to failure or through planned replacement projects. It is intended to target assets that can be returned to an acceptable functional state, pass required testing and be reintroduced to the system. Refurbishment differs from maintenance in that maintenance involves on-site repairs or localized replacement of asset components, whereas refurbishment is typically performed after the asset has been removed from service and entails a more extensive off-site rebuild. The two exceptions to refurbishment with in-situ interventions to extend the life of the asset are cable chamber refurbishment (e.g. repairing chamber opening or roof) and underground cable injections. Alectra Utilities considers these as refurbishment due to extensive impact on the asset functional integrity and useful life.

The two main scenarios for asset refurbishment exist:

a) Assets replaced in the field that are still functional

These are major electrical assets that are proactively removed from service due to temporary installations, service upgrades, infrastructure modifications, aging and risk of failure. These assets have not encountered any failures and may still be operational at the time of removal. They undergo adequate testing to ensure they are fit to be added back into inventory. An example can be a pole mounted transformer that was returned after being installed for temporary installation for a customer until the permanent service was established. This asset has considerable useful life remaining and upon passing all the required testing, it can be used for future installations especially on a reactive basis.

b) Assets that have failed in the field

This scenario applies to assets that have sustained a failure while in service but, upon inspection, are determined to be repairable and suitable for refurbishment after removal from the field. In these cases, refurbishment may be pursued as a cost-effective solution, provided the damage is localized and the core structure or components of the asset remain intact. When applicable, these assets may undergo warranty repair processes through the Original Equipment Manufacturer (OEM) or designated service providers. The refurbishment process typically includes a root cause analysis to identify and mitigate the underlying cause of failure, which may inform future asset strategies. Following repairs, the asset is subject to functional testing, quality assurance and re-certification before it is

1 deemed suitable for adding back into inventory. This approach allows the utility to recover
2 value from failed assets while ensuring performance standards are met and reliability risks
3 are mitigated.

4 The refurbishment criteria are based on a set of engineering, economic, and operational factors
5 that include the following:

- 6 • Remaining Useful Life
- 7 • Cost Comparison: Refurbishment vs. Replacement
- 8 • Expected Life Extension
- 9 • Obsolescence and Part Availability
- 10 • Impact on Reliability and Operations
- 11 • Warranty and Post-Refurbishment Assurance

12 The major electrical assets that are considered for refurbishment include switchgear, pole-
13 mounted switches, reclosers and transformers. For pad-mounted switchgear units, commonly
14 used in residential and commercial areas, annual inspections or operational observations may
15 reveal localized component defects, such as cracked support insulators, damaged fuse holders,
16 or corona-damaged barrier boards. Where feasible, targeted repairs are performed off-site to
17 restore functionality and extend service life. Pole-mounted switches and reclosers are also
18 assessed through inspections and operational observations. Key points include pitted contacts,
19 faulty arc suppressors, binding linkages, communication issues with the relay, or missing
20 weatherproofing components, all of which can be economically repaired to avoid full asset
21 replacement. Transformers are typically removed as part of planned upgrades or voltage
22 conversions unless they have failed in the field. Once removed, they are evaluated for
23 refurbishment based on manufacturer specifications and industry standards. Key components
24 assessed include the condition of the core and windings, oil insulation, bushings, and gasket
25 integrity. Where results support viability, reconditioning and component replacement are pursued
26 to restore operational reliability. Refurbished units are then returned to inventory, mainly for
27 reactive use, offering significant cost savings and avoiding lengthy lead times over procuring new
28 units while ensuring support for legacy system configurations.

29 Refurbishment also plays a key role in underground cable chambers and distribution substations.
30 Utility chambers are subsurface concrete enclosures that house cable infrastructure and are

exposed to vehicle loading, water intrusion, and de-icing salts. These issues can lead to deterioration, particularly of roof slabs and upper wall sections. Where inspections reveal structural degradation, the chambers are refurbished in situ by restoring the upper deck while retaining the lower section, thereby preserving structural integrity and deferring costly replacements. In substations undergoing phased renewal or decommissioning, salvageable equipment such as power transformers and circuit breakers is evaluated for refurbishment potential. Condition testing determines whether components can be recertified for reuse, particularly in support of vintage systems. In cases where OEM support has ended, refurbished components are returned to inventory as legacy spares, supporting operational continuity and minimizing disruption during the transition away from obsolete systems.

5.3.3.5 Impact of Asset Replacements on Maintenance

Alectra Utilities' asset renewal programs are designed to replace functionally obsolete, deteriorated, and end-of-life assets. Alectra Utilities anticipates asset renewal programs targeting certain legacy distribution system assets will contribute to a gradual and modest reduction in required maintenance for select asset types, where legacy assets are retired and replaced with newer, standard equipment. Newer equipment typically requires less maintenance since deterioration has not yet affected the functionality of the asset. The legacy assets include but are not limited to the following:

- Porcelain insulators: replacing these units with standard polymer insulators eliminates the requirement for insulator washing
- Air-insulated pad-mounted switchgear: replacing these units with current standard solid-dielectric switchgear eliminates the requirement for dry ice cleaning
- Overhead switches: replacing these units with sealed automated switches eliminates the need to perform routine maintenance on the legacy switches

At the same time, planned system expansion will introduce new assets to the system, resulting in corresponding increases to O&M costs. Further, the following planned maintenance activities remain generally independent of system renewal expenditures:

- Maintenance activities following disruptions and damages caused by emergencies or major weather events

- Scheduled inspections that must comply with the OEB's minimum inspection requirements
- Corrective maintenance activities to address issues stemming from ongoing asset deterioration and external factors (e.g. exposure to environmental elements, animals, insects, vegetation)
- Vegetation management to ensure that clearance requirements for overhead assets are met

As part of the evaluation of the financial benefits and costs associated with system renewal investments, Alectra Utilities determines and assesses, where applicable, each candidate project's impact on OM&A expenditures, whether representing cost savings or additional cost pressures. As detailed in *Chapter 5.4.1 Capital Expenditure Summary*, this assessment forms part of the standard financial evaluation performed through the Copperleaf Portfolio system.

5.3.3.6 Asset Renewal Quantities & Prioritization

Assessing risk is an integral part of the Alectra Utilities' asset lifecycle optimization process. For each project in Copperleaf Portfolio, the risks avoided and benefits realized upon project completion are assessed. Alectra Utilities' asset lifecycle risk management practices incorporate information obtained from multiple asset management-related processes are detailed in *Chapter 5.3.1 Asset Management Process Overview*.

Alectra Utilities utilized Copperleaf's Predictive Analytics (PA) tool in conjunction with the Copperleaf's Value Framework methodology as outlined in *Chapter 5.3.1 Asset Management Process Overview*, to support asset class lifecycle optimization – determining the quantity of distribution asset replacements for the following four renewal equipment categories:

- Transformers – Overhead, Pad-mount, and Vault
- Poles – Wood and Concrete
- Switches
- Switchgear

Copperleaf's PA model determines asset replacement schedules based on avoided risk and net economical value model. The mentioned model predicts the appropriate assets to replace that generates value for customers based on Value of Lost Load (VOLL). The output is then used to

identify targeted assets that are allocated for replacements over the 2027 to 2031 period. The PA approach used to justify these renewals is consistent with the management practices and principles described in this chapter. This section outlines the details the steps undertaken in Copperleaf's PA and Value Framework to derive asset replacement quantities. The process is as follows:

1. **Establish conditional Probability of Failure (POF) for each asset class as a function of age and asset health.** The Copperleaf PA model is configured to predict asset failure rates based on their condition-adjusted age and associated probability of failure. The model integrates asset health indicators before computing the POF by modifying each assets' chronological age based on its testing and inspection results. The underlying POF and failure rate formula for each asset class remains consistent with the Gompertz-Makeham Model used in Alectra Utilities Asset Condition Assessment (refer to *Appendix E - Asset Condition Assessment* for details).
2. **Assess the net economical value of asset renewals.** The process compares the cost of renewal to the quantified monetary consequences of asset failure for the following value drivers. The cost is derived from Copperleaf's Value Framework and its consequential calculations for the four asset categories.
 - Employee Safety – exposure, severity, and cost of employee safety event
 - Public Safety – exposure, severity, and cost of public safety event
 - Environmental – cost of oil containment and clean up
 - Financial – cost of reactive replacements
 - Reliability – cost of equipment failure based on asset criticality, duration, and outage cost⁸⁵
3. **Generate asset renewal projections for the next 40 years.** The PA model's outcomes and Copperleaf's Value Framework assessment from prior steps are used to generate the replacement quantities that are economically justified for replacement for the next 40 years.

⁸⁵ Outage cost varies due to duration, load at risk, and customer mix (residential, commercial, and industrial).

4. **Apply and assess pacing scenarios and select optimal asset replacement pacing option.** Alectra Utilities reviewed the output of the PA process and its recommended asset renewal projections. Based on engineering assessment of risk, customer benefit, ability to design and resources to execute the work; assets were placed into two groups. Group 1 includes switches and switchgear, while Group 2 includes poles and transformers. Three pacing scenarios of Reduced, Moderate, and Accelerated were defined and evaluated during portfolio optimization in Copperleaf, as well as to provide choices for customer engagement. *Section 5.3.3.3 A* details the asset replacement pacing quantities selected for each of the four asset investment categories.

As mentioned in Step 4 above, Alectra Utilities reviewed Copperleaf's PA replacement forecasts for two distribution asset groups. Group 1 includes switches and switchgear, and Group 2 includes poles and transformers. To establish a sustainable pacing strategy, the PA model's 40-year output projection were assessed alongside key considerations such as customer benefit, design and construction feasibility, resource availability, and supply chain constraints. As a result, Alectra Utilities defined the following three pacing scenarios to re-evaluate through Copperleaf's portfolio optimization, and offer alternatives to adjust based on customer feedback:

- Pacing 1 - Accelerated: Front-loads replacement, assets forecasted in the first 20 years are replaced over a 15-year period, with the remaining 20 years replaced over a 25-year period.
- Pacing 2 - Moderate: Assets forecasted in the first 20 years are replaced over a 20-year period, with the remaining quantities replaced over the second 20-year period.
- Pacing 3 - Reduced: Extends the replacements of first 20 years evenly across 30 years, and the last 20 years are compressed into a 10-year period.

The Copperleaf optimization ultimately selected one of the pacing strategies for inclusion in the budget for each of the asset groups.

Group 1 (Switch and Switchgear): The PA model's forecasted replacement quantities for switches and switchgear presented no significant pacing issues, hence they were grouped together. For Switchgear, Copperleaf's optimization process selected the Reduced pace.

However, to align with Distribution Automation Level Two (self-healing) plans, the replacement quantities of the last two years (2030-2031) were increased. This was to specifically support the increased automation investments which provide direct customer benefit by improving reliability. These pacing options were then presented to customers in the second round of customer engagement. Following customer engagement (*Exhibit 1, Tab 5, Schedule 2 Application-Specific Customer Engagement*), the pacing for switches was changed from Reduced to Moderate to align with customer feedback to increase overhead spending. For switchgear, Reduced pacing options remained with an increase in the last two years.

Group 2 (Poles and Transformers): The PA model's original forecast identified an immediate backlog of approximately 38,000 poles and 17,500 transformers that were deemed economically justified for replacement as early as 2025. While addressing these volumes are economically beneficial (i.e. lower total lifecycle cost of asset), they are not feasible to execute given the current supply-chain and resource constraints. Therefore, Alectra Utilities proposed to smooth the renewal volumes of the initial years to a manageable pace and prioritized the replacement of high-risk, most deteriorated poles and transformers in earlier years.

The adjusted replacement quantities were evaluated under the three different scenarios shown in Table 5.3.3 - 5 and Table 5.3.3 - 6. Copperleaf's optimization selected the Moderate pace for both poles and transformers, except for one region where poles remained at the Reduced pace. The selected option was presented to the customers during the second round of customer engagements. Based on the feedback from customer engagements, the Moderate pacing strategy was adopted across all regions for both asset classes.

Table 5.3.3 - 5 Pacing Option: Poles

Pacing Option: Poles	2027	2028	2029	2030	2031	Total
Reduced	746	746	985	1,105	1,250	4,832
Moderate (Selected Option)	826	925	1,025	1,180	1,300	5,256
Accelerated	960	1,100	1,250	1,400	1,555	6,265

1 **Table 5.3.3 - 6 Pacing Option: Transformers**

Pacing Option: Transformers	2027	2028	2029	2030	2031	Total
Reduced	590	700	844	979	1,109	4,222
Moderate (Selected Option)	680	844	964	1,082	1,201	4,771
Accelerated	844	964	1,083	1,203	1,348	5,442

2 Alectra Utilities use these analyses to support the development of technical alternatives in project
3 business cases to avoid identified risks. As discussed in *Chapter 5.3.1 (Section 5.3.1.1 A.5)*,
4 Copperleaf Portfolio uses the Value Framework to evaluate the value of an investment. The
5 benefits and risk measures that include probability and impact are inputs to the Value Framework.
6 The risk information is used to facilitate selection of a recommended alternative for investment
7 portfolio optimization in Copperleaf Portfolio.

8 The overall approach of the DSP in terms of proposed plans is to either maintain or reduce the
9 residual risk profile for high impact assets, such as poles, switches and switchgear, while
10 considering various practical factors, such as supply chain and resource requirements. As is
11 evident from the system renewal needs, the plan is crucial to reduce the safety, environmental,
12 financial, and reliability risk.

Appendix B07

Facilities Management

Appendix B07 - Facilities Management

I Overview

Alectra Utilities occupies nine facilities (three Office Buildings and six Service Centres) to service all communities across Alectra Utilities' service area.

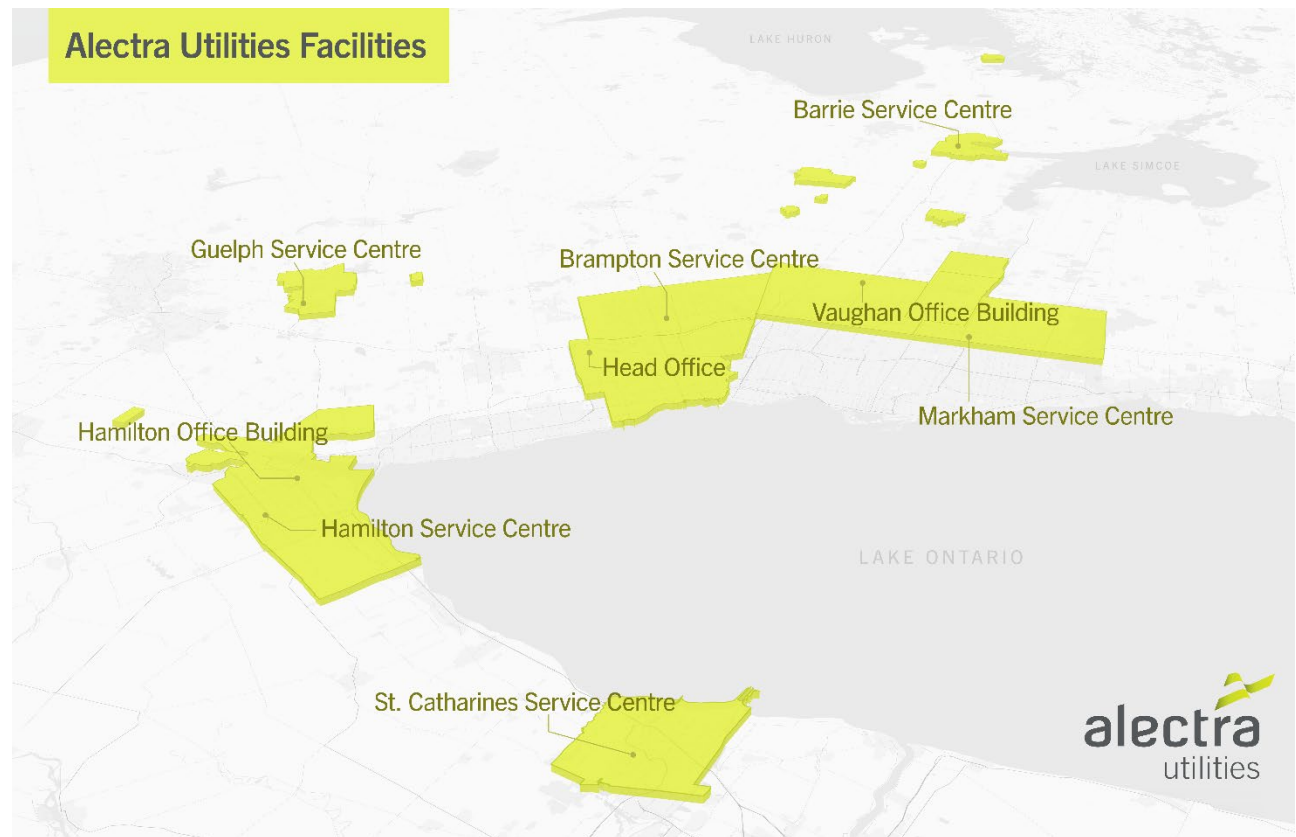


Figure B07 - 1 Alectra Utilities Service Territory and Facilities Map

1 **Table B07 - 1 Alectra Utilities Facilities Details**

Facility Name	City	Type	Square Feet	Year Built
Cityview	161 Cityview Blvd, Vaughan, ON	Office Building	92,000	2008
Addiscott	80 Addiscott Crt, Markham, ON	Service Centre	107,000	2009
Derry	2185 Derry Rd W, Mississauga, ON	Office Building	80,000	1994
John	55 John St N, Hamilton, ON	Office Building	160,000	1930 / 1950
Kennedy	200 Kennedy Rd S, Brampton, ON	Service Centre	250,000	2023
Nebo	450 Nebo Rd, Hamilton, ON	Service Centre	94,000	1982
Patterson	55 Patterson Rd, Barrie, ON	Service Centre	85,000	1990
Southgate	395 Southgate Dr, Guelph, ON	Service Centre	106,000	1995
Vansickle Rd	340 Vansickle Rd, St. Catharines, ON	Service Centre	63,000	1978

2 The Facilities Management program includes the investments necessary to maintain Alectra
 3 Utilities' facilities, ensuring they support the efficient operation of the distribution system and
 4 ongoing business activities. The Facilities Management program is comprised of the following
 5 seven categories of work aligned with respective building systems:

- 6 • Security/Life Safety
- 7 • Building Electrical Systems for Vehicle Electrification
- 8 • Building Envelope
- 9 • Building Outdoor Walkways/Driveways
- 10 • Building Heating Ventilation and Air Conditioning (HVAC)
- 11 • Roofing Structure and Roofing
- 12 • Reactive Capital (Asset Failure & Emergency Replacements)

13 Table B07 - 2 presents a summary of the capital expenditures, primary and secondary drivers
 14 and outcomes associated with the Facilities Management investment plan.

1 **Table B07 - 2 Facilities Management Investment Expenditures, Drivers and Outcomes**

	 Historical Spending					Bridge		Forecast Spending				
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
CAPEX (\$MM)	10.1	10.8	27.9	48.1	3.1	1.1	1.4	2.6	5.6	7.2	6.5	7.4
Primary Driver	System Maintenance and Capital Investment Support											
Secondary Driver	Reliability, Safety, Failure Risk											
Outcomes	Reliability, Safety, Efficiency, Customer Value, Environment											

2

II Investment Description

The proposed Facilities Management investments are required to enable Alectra Utilities to plan, execute, and support critical utility functions, on a 24/7 basis. These investments ensure that the facilities housing critical IT systems, control rooms, operations centres and work offices are equipped to serve customers and respond to operational demands, especially during emergencies. They also facilitate compliance with applicable legislative and regulatory standards, ensuring that safety requirements protecting Alectra Utilities' employees and the public are met.

Alectra Utilities classifies its facilities investments under two categories:

- **Planned Investments:** scheduled replacement or repairs of assets before failure. Planned capital projects are based on asset condition, age, and lifecycle assessments. These investments focus on the proactive renewal, modernization, and optimization of facility assets. Planned capital work maintains safety and reliability and ensures that facilities are capable of supporting the utility's business and operational needs.
- **Reactive Investments:** occurs when assets fail and emergency replacements are required (same as planned yet under emergency situations). Reactive capital projects within facilities management address asset failures and critical deficiencies that must be resolved immediately to maintain operations. These include urgent repairs to restore critical systems such as HVAC, security, or life safety equipment, or to correct deficiencies identified through audits or assessments. Over this DSP period, the planned Facilities investments include:
 - (i) Security/Life Safety - Upgrade cameras and implement an integrated security platform for better physical security
 - Building Electrical Systems for Vehicle Electrification – to support Alectra Utilities' Fleet Investments
 - Building Envelope – Windows and External Walls
 - (ii) Building Outdoor Walkways/Driveways - Paving and Parking
 - Building Heating Ventilation and Air Conditioning (HVAC)
 - (iii) Roofing Structure and Roofing

The following sections summarize Alectra Utilities' capital expenditures on Facilities Management during the DSP period. The drivers of each category are set out in *Section III*.

2.1 Planned Capital Investments

In March 2024, Alectra Utilities engaged Pinchin to complete eight Baseline Property Condition Assessments for Alectra Utilities' buildings to identify any critical issues requiring immediate attention (refer to *Appendix N - Baseline Property Condition Assessment*).

2.1.1 Security/Life Safety

Security/Life Safety enhancements are necessary to protect Alectra Utilities' employees and assets as well as the general public using updated security systems and measures.

In 2019, Alectra Utilities began the implementation of a [REDACTED] [REDACTED] [REDACTED] will improve efficiency and enhance overall security by streamlining processes, workflows, and reporting. [REDACTED] [REDACTED], improving situational awareness, response times, and overall coordination. Four of Alectra Utilities building properties [REDACTED] The remaining five building properties [REDACTED].

In addition to [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] Frequent repairs to the current system have also led to rising operational costs.

The update of security/life safety work in facilities is expected to yield the following benefits:

- Reduce the risk of systems failures by replacing end of life security systems
- Provide visual deterrents (i.e. presence of security systems) to mitigate crime risk
- Improve employee safety in and around Alectra Utilities' facilities
- Protect physical assets such as inventory and IT equipment

- Improve response time and proactive monitoring activities by streamlining processes through the consolidation of five legacy security systems
- Avoid increases in operating expenses associated with the maintenance of aging security systems
- Assist in evidence gathering where incidents require investigation
- Prevent unauthorized access to restricted areas

2.1.2 Building Electrical Systems for Vehicle Electrification

Alectra Utilities has a strategy to replace its Fleet vehicles with EVs in circumstances where it makes financial and operational sense to do so. Therefore, with the growth of Fleet EVs, it was essential for Alectra Utilities to complete a third-party study to investigate if its current buildings' electrical service can support such growth. The third-party assessment was completed by S&S Electric (refer to *Appendix O - Electrical Services & Generator Capacities and Current Demand*) and based on a set of planning assumptions regarding the potential scale and timing of fleet electrification. These assumptions were based primarily on a phased fleet conversion and charging infrastructure scaled to the anticipated adoption of the technology (for further information refer to *Appendix B08 - Fleet Renewal*). The purpose of this electrical work is to increase electrical services, generator capacities and current demand to support EV growth. The findings from this study provide an estimate of the infrastructure upgrades required to support Alectra Utilities' EV investments. Estimated costs are found in Table B07 - 3 .

2.1.3 Building Envelope

Alectra Utilities plans to address issues affecting the building envelope (i.e. building exterior facia) as they fail or become safety hazards. In particular, Alectra Utilities plans to address brick masonry walls and windows at specific locations as they fail. The age of many of these assets has resulted in an increase in repairs and operating expenditures to maintain a reliable and safe work environment for employees and the public. Alectra Utilities plans to implement building envelope repairs/replacements through its Replacement and Reactive Capital budgets throughout 2027-2031 once they are identified as safety risks. For the estimated costs for Building Envelope replacements/repairs for Alectra Utilities' buildings, refer to Pinchin's eight Baseline Property Condition Assessments that were completed in March 2024 in *Appendix N - Baseline*

1 *Property Condition Assessment.* The age and deterioration of many of these assets has resulted
2 in an increase in repairs and operating expenditures to maintain a reliable and safe work
3 environment for employees and the public.

4 **2.1.4 Building Outdoor Walkways/Driveways**

5 Alectra Utilities plans to address issues affecting outdoor walkways and driveways as they occur.
6 Interlocking walkways, sidewalks and paving of parking lots at various facilities will likely require
7 renewal investment to mitigate the risk of accidents and permit proper water drainage from the
8 rain and snow. Repairing sections that are damaged will result in a safer work environment for
9 Alectra Utilities employees. Alectra Utilities plans to implement building outdoor
10 walkways/driveway repairs/replacements through its Replacement and Reactive Capital budgets
11 throughout 2027-2031.

12 **2.1.5 Building HVAC**

13 Certain HVAC systems within Alectra Utilities' buildings have not undergone modernization or
14 major renewal since their original installation. Several HVAC units are anticipated to approach or
15 exceed the end of their useful life over the 2027-2031 period. As such, Alectra Utilities plans to
16 renew the HVAC systems through a run-to-failure approach, replacing or repairing systems only
17 when they fail or can no longer be cost-effectively maintained. Estimated costs for these
18 replacements are based on the eight Pinchin Baseline Property Condition Assessments that were
19 completed in March 2024 (refer to *Appendix N - Baseline Property Condition Assessment*).

20 **2.1.6 Roof Structure and Roofing**

21 Currently, there exists a risk of failure of key building components roofs and roof structures.
22 Alectra Utilities needs to address deteriorated assets to minimize safety risks to employees and
23 to the facility assets and critical operation systems secured within. For example, water damage
24 as shown in the Figure B07 - 2 may introduce mold as well as permanent damage to foundation
25 and building structures.

26 This approach ensures that capital is allocated where and when it is most needed, while
27 maintaining safe, functional, and compliant facilities.

1 **Table B07 - 3 Facilities Planned Capital by Type**

Investment Type	2027	2028	2029	2030	2031	Total
Security/Life Safety	0.0	1.7	0.4	0.4	0.3	2.8
Building Electrical Systems for Vehicle Electrification	1.3	1.0	0.9	0.2	0.2	3.6
Building Envelope	0.0	0.5	0.6	0.6	1.4	3.1
Building Outdoor Walkways/Driveways	0.0	0.6	0.3	0.2	0.8	1.9
Building Heating Ventilation and Air Conditioning (HVAC)	0.0	0.2	0.4	1.2	1.0	2.8
Roofing Structure and Roofing	0.0	0.0	2.8	1.9	1.5	6.2
Total (\$MM)	1.3	4.0	5.4	4.5	5.2	20.4

2 **2.2 Reactive Capital Investments**

3 The level of expenditure for these activities is largely informed by historical spending patterns.
4 Typical investments within the Reactive Capital budget over the 2027–2031 period are expected
5 to include emergency HVAC repairs, failure of elements relating to the building envelope such as
6 brick masonry, windows, and roofs that fail or pose safety hazards, and outdoor infrastructure
7 such as walkways, driveways, and parking areas that require renewal to address damage, safety
8 risks, or drainage issues. The reactive investments are the same as planned except Alectra
9 Utilities addresses the replacement of the failed assets on an emergency basis.

2.3 Summary of Investment Benefits

Table B07 - 4 summarizes the outcomes and benefits associated with the Facilities Management investments.

Table B07 - 4 Facilities Management Investment Outcomes and Benefits

Investment Benefits	Reasoning and Investment Benefits
Reliability	Sustainment of backup facility assets ensures business continuity to mitigate risks to system operations and ensure system reliability during emergency event response.
Customer Value	Alectra Utilities is required to address security and facility issues to ensure that employees are adequately equipped to provide timely and effective customer service if entering our facilities.
Safety	Security enhancements will deter potential authorized intrusions and theft from Alectra Utilities premises and improve employee and public safety.
Environment	- Removal of any hazardous substances (e.g. asbestos, vermiculite, lead) that may be identified. - Utilization of energy efficient assets such as lighting, HVAC, and other appliances that will contribute to lower energy use and operating costs.
Efficiency	- Improve worker productivity and efficiencies across the organization through the application of facility standards and updated workspaces to optimize and streamline work practices and address identified ergonomic issues. - Renewal of end-of-life facility assets such as HVAC, lighting, building envelopes to present day building codes will reduce operating costs. - Addressing obsolete systems which are not functional and/or reliable such as security systems and HVAC/boiler equipment.

III Investment Drivers and Need

The main drivers of Alectra Utilities' Facilities Management investments during the 2027-2031 period are the renewal of specific facility assets that are at end-of-life, the reduction of potential safety risks to employees and the public, the need to mitigate operating risks and potential damage to other assets and decreasing maintenance costs.

Alectra Utilities maintains nine buildings totaling approximately one million square feet of space within its service territory. To ensure that its facilities are appropriately maintained, Alectra Utilities utilizes independent experts to evaluate its buildings and identify required capital investments. In 2024, Alectra Utilities retained Pinchin Ltd. to complete a Baseline Property Condition Assessment (refer to *Appendix N - Baseline Property Condition Assessment*) to assess the current condition of each of the eight buildings (excluding the Brampton Service Centre, as it was a new building).

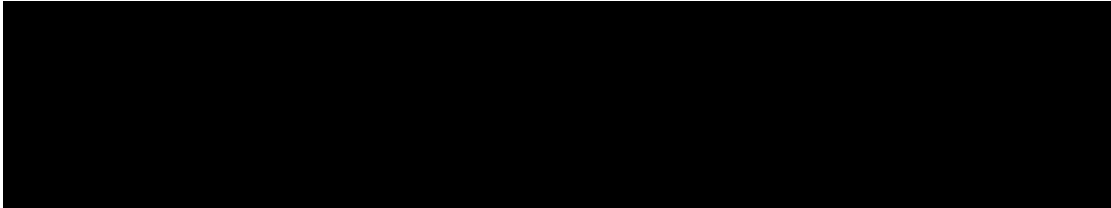
As part of the assessment, teams of specialists inspected each system or asset in Alectra Utilities' buildings to understand their condition. This review was extensive, encompassing all mechanical, electrical, plumbing and architectural elements in a building. Pinchin assessed the facilities' condition based on any deficiencies and the remaining useful life of the system, and provided an overall facility/asset condition, recommended budget, and replacement schedule. This information was a key input in preparing the repair and renewal investments set out in this portfolio.

The planned Facilities Management investments are required to support Alectra Utilities' day-to-day activities which include workflow collaboration, customer service, communications, employee productivity and engagement.

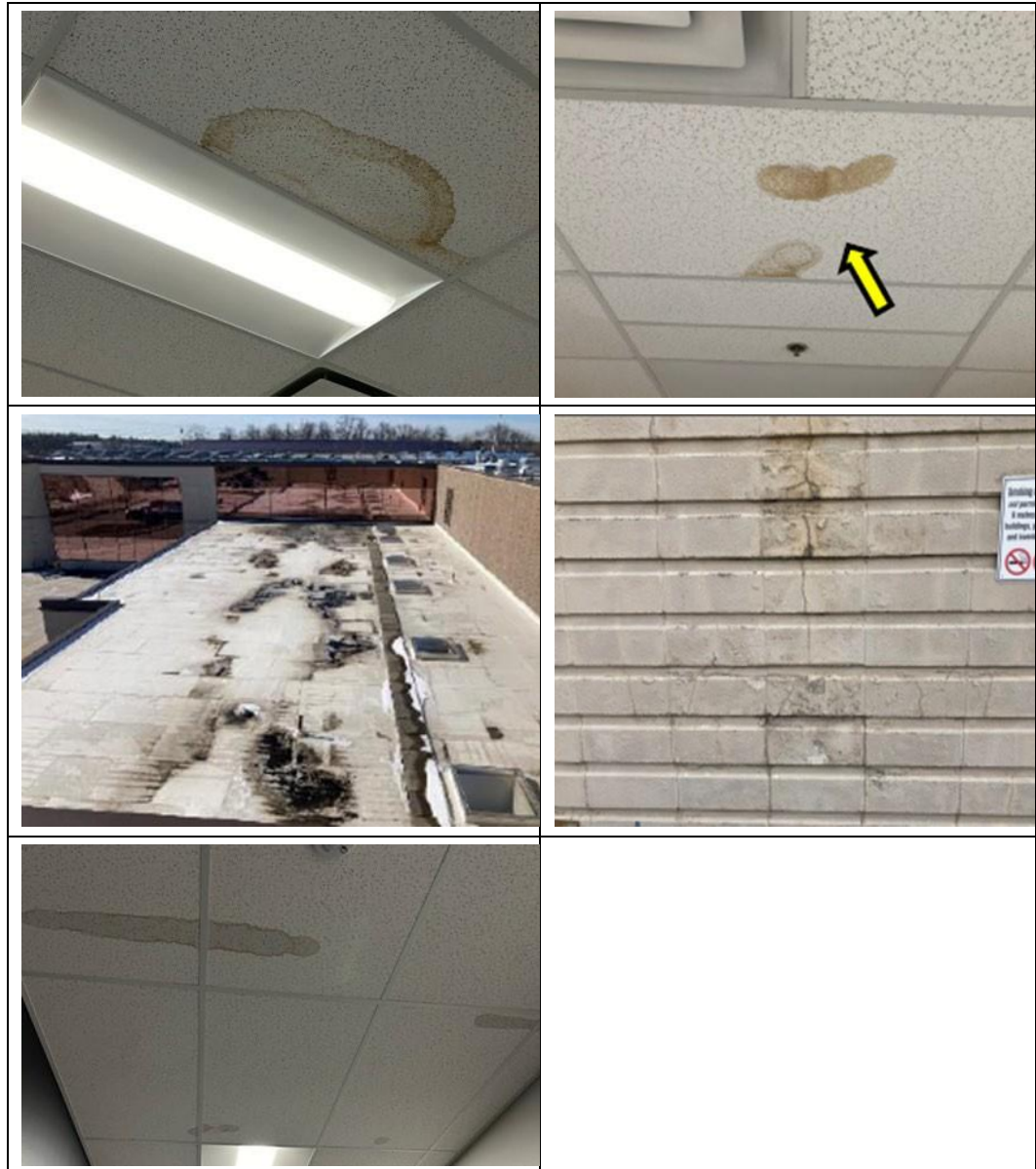
The Facilities Management investments also include necessary building infrastructure and component renewals, including replacement of end-of-life assets such as windows, roofs, elevators, and HVAC systems.

The planned Facilities Management Investments are needed to address the range of risks and operational requirements, as summarized below:

- **Security/Life Safety:** Risks of physical security intrusions due to limitations in existing security systems, including [REDACTED]

- 
- **Building HVAC:** Outdated HVAC systems at end of life pose significant risks and constraints to the working environments and conditions of Alectra Utilities' employees. The persistent failure of these systems increases maintenance and repair costs. In some cases, replacement materials are no longer available, or difficult to procure.
 - **Building Deficiencies (Including Roof Structure and Building Envelope Investments):** The risk of failure of key building components (e.g., roofs, windows, ceilings, etc.) requires Alectra Utilities to address deteriorated assets to minimize safety risks to employees and critical operation systems secured within. For example, water damage as shown in the Figure B07 - 2 may introduce mold as well as permanent damage to foundation and building structures.

- 1 The following photographs show examples of:
- 2 • Ceiling tiles with water damage caused by water leaks
- 3 • Roof damage which creates water leaks
- 4 • Foundational cracks which cause water damage



5

Figure B07 - 2 Examples of Building Deficiencies

- **Building Outdoor Walkways/Driveways:** These investments will address current accident and flooding risks due to deterioration and operational issues affecting various walkways, driveways and drainage systems.



Figure B07 - 3 Examples of Outdoor Walkways/Driveways Deficiencies

1

Table B07 - 5 Investment Drivers

Investment Driver	Reasoning and Investment Benefits
Primary Driver: System Maintenance and Capital Investment Support	- Alectra Utilities' facilities house functions that are essential to the effective and efficient operations of all elements of the utility's business, including the planning and execution of maintenance and capital work. - Specific building assets have reached the end of their typical useful lives and are no longer supported by the vendor. - Failure of deteriorated or end-of-life building assets can hinder the execution and productivity of Alectra Utilities' business functions and may directly impact Alectra Utilities' ability to respond effectively to power interruptions or emergencies.
Secondary Driver: Failure Risk	Alectra Utilities' facilities have components that have reached the end of their typical useful lives and are obsolete. Maintenance costs for deteriorated and obsolete assets are expected to continue to increase over time.
Secondary Driver: Reliability	HVAC systems and back-up generators are reaching the condition and age where major repairs or replacements are required. These assets are required to maintain temperature and power to critical infrastructure.
Secondary Driver: Safety & Security	Alectra Utilities' facilities continue to require investments in security infrastructure enhancements and upgrades to help eliminate potential dangers and threats to the public and Alectra Utilities' personnel and property.

2

IV Investment Timing & Pacing

4.1 Summary of Expenditures

Table B07 - 6 provides the year-over-year breakdown of Facilities Management investments, including the historical period from 2020-2024, the 2025-2026 bridge years, and the DSP period from 2027-2031.

Table B07 - 6 Historical and Proposed Investment Spending

	Historical Spending					Bridge		Forecast Spending				
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Facilities-Planned	6.4	1.7	2.7	2.9	1.9	0.0	0.2	1.3	4.0	5.4	4.5	5.2
Facilities-Reactive	1.0	0.9	1.2	1.0	1.5	1.1	1.2	1.3	1.6	1.8	2.0	2.2
Kennedy Road Consolidation	2.7	8.2	24.0	44.2	-0.3*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPEX (\$MM)	10.1	10.8	27.9	48.1	3.1	1.1	1.4	2.6	5.6	7.2	6.5	7.4

* Note: The negative value represents some reallocation of expenses and reversal of over accruals

4.2 Historical Expenditures (2020-2024)

The program's capital expenditures between 2020 and 2024 focused on the assets that had surpassed end of life and were negatively affecting other assets and overall building operations, the removal of hazard materials, new and/or revised regulation requirements, safety risks and bringing all locations up to a common Alectra Utilities standard since the merger of the predecessor utilities. This included repairs to building envelopes and security system replacements and/or upgrades, electrical LED retrofits, retrofitting facilities to comply with the *Accessibility for Ontario with Disabilities Act* (AODA), and landscaping and concrete work to exterior sections of Alectra Utilities' properties. Also, as shown in Table B07 - 6 above, the Kennedy Road consolidation cost totalled \$78.8MM between 2020 and 2024. Further details of the Kennedy Road consolidation are found in *Section VII*. Planned Capital expenditures were on items described in *Section 2.1* above. Historical reactive expenditures were on items described in *Section 2.2*.

4.3 Future Expenditures (2027-2031)

As outlined in *Section 4.1*, Facilities Management reactive capital projects focus on restoring equipment/assets to maintain normal operations after a breakdown to ensure business continuity. To accomplish this, the replacement of faulty parts and/or components/assets will be required. The Facilities Management capital expenditures include planned capital investments in security systems, building electrical systems for vehicle electrification, and generator replacements as described in *Section 2.1*. In addition, Alectra Utilities has proposed an average reactive capital budget of \$1.8MM per year based on historical actual expenditures and including annual escalations for inflation. Further details on reactive investments were provided in *Section 2.2*.

4.4 Execution Approach

The planned Facilities Management investments between 2027-2031 have been determined based on known conditions, regulatory requirements, potential safety risks, operational requirements and third-party assessments. Alectra Utilities' approach to such investments are based on the following guidelines and factors:

- Approved capital expenditures
- Required external and internal resources availability
- Additional findings not originally identified and/or known during the project
- Asset conditions
- Operational requirements
- Safety risks
- Regulatory compliance
- Engineering, design, and permits activities

Qualified contractors and service providers will perform all work once the scope, schedules, resource availability and final cost have been established. All projects will be sourced and purchased based on Alectra Utilities' Procurement Policy and Processes. Alectra Utilities must plan and secure the required capital budget years in advance to maintain its building assets in proper operational order.

V Options Analysis

Alectra Utilities considered the following options concerning Facilities Management investments:

- Planned Replacement
- Reactive (Asset Failure Emergency Replacements)

5.1 Planned Replacement

Under the Planned Replacement option, facilities assets would continue to deteriorate impacting operations, damaging other assets, increasing operating expenditures, increasing safety or security risks and/or not being in compliance with regulations and standards. As set out in the sections above, the facilities investments planned during the DSP period are driven by risks and issues, as assessed by the third-party consultants. Alectra Utilities cannot accept the reactive approach, as it would allow these risks and issues to continue and likely worsen. Without proper planning and/or the reactive approach cost control is nonexistent and can balloon during repairs.

5.2 Reactive (Asset Failure Emergency Replacements)

Under this option, Alectra Utilities has deemed certain assets to have less impact on the business if they fail. Investments throughout the DSP period are based on expenditures and failure rate levels that Alectra Utilities has experienced historically.

VI Investment Projects

The material Facilities Management investments from 2027 to 2031 are included in Table B07 - 7.

Table B07 - 7 Material Projects and Initiatives

Project Code	Project Name	CAPEX (\$MM)
Multiple	GP - Facilities Misc	25.6
153018	Facilities_Building Electrical Service for Electrification	2.6
152567	Facilities_EV_Charging_Stations_CRFP	1.1

VII Central Region Facilities Review Summary

In 2018, Alectra Utilities conducted a high-level review of each facility, assessing available workspaces, building conditions, planned renewal projects, and existing capital budgets to establish an investment baseline. Facilities also reviewed operational space requirements, including line operations, metering, substations, warehouse and yard space, vehicle parking, and fleet shops at each facility.

During the review it was determined that the Mavis site in Mississauga and the Sandalwood site in Brampton, would not be able to accommodate Alectra Utilities' long term operational requirements in its current configuration. For the Mavis site, there was too much office space, the warehouse and garage areas were too small, there was not enough parking to accommodate fleet and employee needs, and there was not enough outside storage. There were also several Region of Peel easements for pedestrian and vehicle access registered for the adjacent property, and for CP Rail railway within a portion of the property, which limited the use of lands to support Alectra Utilities' operations. The City of Mississauga also had access rights to the traffic signals and sensors to exit and enter the property, impacting operations use of the property.

To satisfy its requirement for outside storage, Alectra Utilities (previously Enersource) had to lease another site north of the existing Mavis site at 3456 Mavis Road. The annual costs to Alectra Utilities for leasing this facility was approximately \$254,500 per year.

The Mavis building was constructed in three phases starting circa 1965. The South and North towers were added to the building circa 1970s and 1980s, respectively. Given the age of the building, major structural items needed significant repair. The building was originally constructed for Mississauga Hydro/Enersource.

Overall, the Sandalwood facility had some space concerns and some building and supporting assets that were in poor condition. The main building was originally constructed to include the head office functions of legacy Hydro One Brampton, however, Alectra Utilities determined there would be redundant office space which could not be leased out mainly due to the design of the building. Significant capital investments would be required to retrofit the building for multi-tenant use.

Site Information Background

The review identified two service centres that presented significant risks in their existing condition at the time: 3240 Mavis Road (Mississauga) and 175 Sandalwood Parkway West (Brampton). Deficiencies at each location included:

7.1 3240 Mavis Road (Mississauga)

- The warehouse and parking garage were too small to accommodate the required inventory and vehicles.
- The warehouse space, interior parking garage, and fleet repair shop shared the same space separated only by fence walls and plastic tarps which created health and safety concerns for employees due to vehicle fumes and space restrictions.
- The building consisted of the main building with two separate additions (different grading and levels) that were constructed in different years making it difficult to use the space properly and created air quality concerns and a poor work environment.
- There were no elevators in the building, creating AODA compliance issues.
- The site had insufficient parking to satisfy both fleet and employee vehicle requirements.
- The building and supporting assets were in poor condition and beyond their expected life, which would require additional capital investments.
- A rail line (permanent easement) intersecting the property diminished the efficiency and effectiveness of the outside storage and any future growth requirements.
- A few Region of Peel permanent access easements diminished the efficiency and effectiveness of the lands and any future growth requirements.
- Due to its location, traffic congestion made it difficult to enter and exit the facilities, impacting customer response times and creating accident concerns.

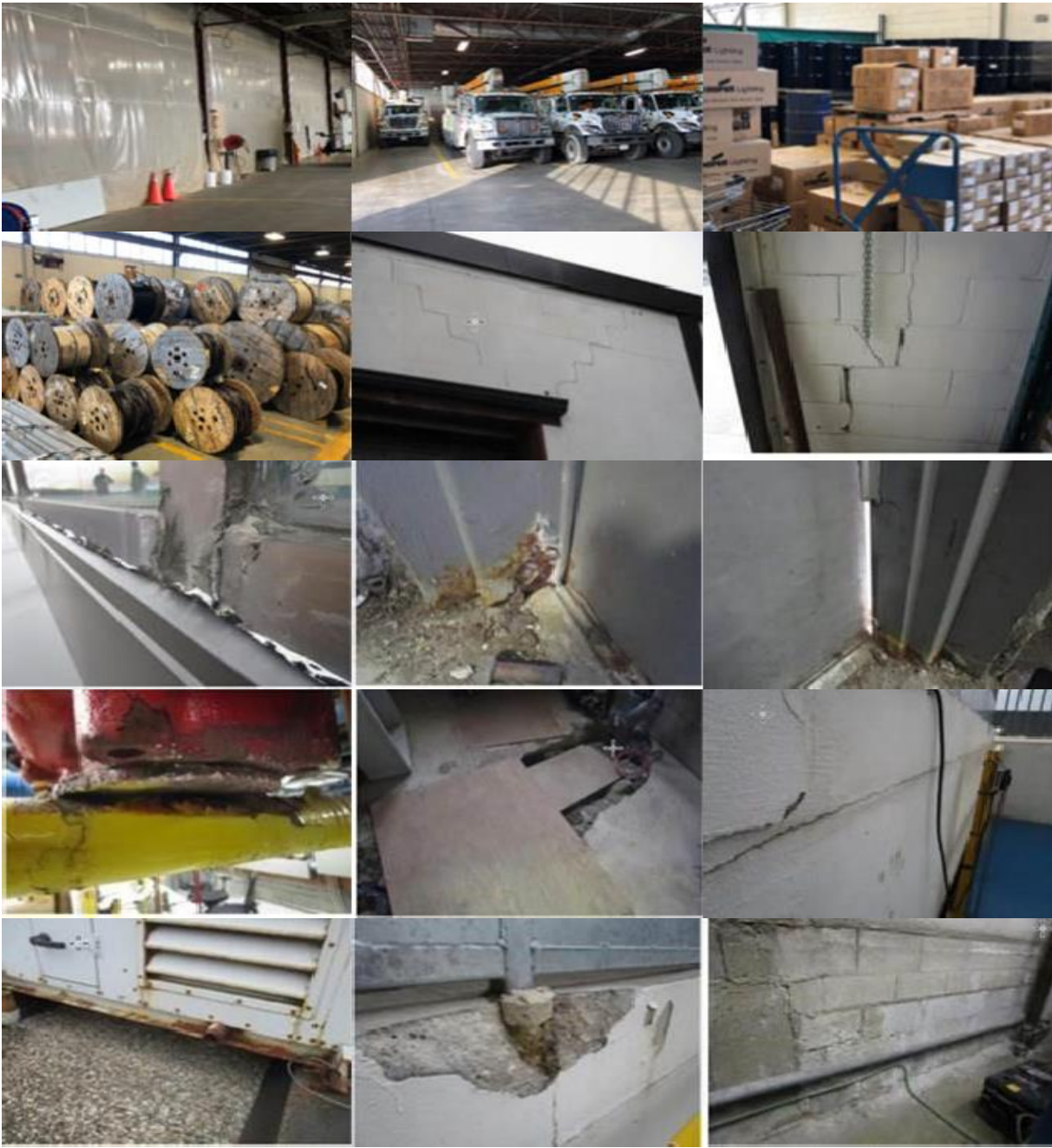


Figure B07 - 4 3240 Mavis Road Photo Gallery

7.2 175 Sandalwood Parkway West (Brampton)

- The site had more office space than needed, and significant investment would be required to convert it into alternative uses or joint tenancy.
- The warehouse, stores yard and interior parking garage were not large enough to accommodate the necessary Alectra Utilities inventory and vehicles requirements.
- Space to support operations in the back office was not sufficient. Significant capital investment would have been required to update the space. Operations would have to be relocated to temporary leased space during the renovations, which would have had an impact on employees, customers, and overall operations.
- The building's configuration did not provide sufficient fleet parking. Substantial capital investment would have been necessary to modify the site to meet fleet requirements.
- The building and supporting assets were in poor condition and beyond their expected life which would require significant capital investments.
- Permanent communication easements supporting the City of Brampton communication systems diminished the efficiency and effectiveness of the land and any future growth requirements. The possibility of the city extending Railside Drive to Sandalwood Parkway in the future would reduce available space and have a negative impact on the function of the site.

1



2



3



4



5



6

Figure B07 - 5 175 Sandalwood Parkway West Photo Gallery

1 Based on the review and findings above, Alectra Utilities engaged Cresa Toronto (Cresa) in 2019
2 to conduct a third-party assessment of these two facilities.

3 **7.3 Analysis Background**

4 A Building Condition Survey completed by EXP Services Inc. for each of the two existing
5 Operations Centres was conducted to understand capital repair and replacement requirements
6 for the existing facilities. Alectra Utilities also had an additional building condition assessment
7 conducted by Pinchin Ltd. for each of the two existing Operations Centres to understand capital
8 repair and replacement requirements for the existing facilities.

9 A preliminary site plan for the proposed redevelopment of 3240 Mavis Road was completed by
10 Paradigm Architecture and Design on behalf of Cresa. Market surveys were completed by Cresa
11 to understand the cost and availability of temporary lands/buildings to meet Alectra Utilities'
12 requirements in the event of a redevelopment of 3240 Mavis Road.

13 A detailed transportation study was completed by BA Group Inc. to understand the impact of a
14 relocation to 174 Kennedy Road South to both employees and customers.

15 Phase II Environmental Site Assessments for both 3240 Mavis Road and 175 Sandalwood
16 Parkway West were completed by BluMetric Environmental Inc. to understand any potential
17 environmental concerns with these existing facilities that would have been needed in the event of
18 a sale or redevelopment.

19 As part of its evaluation, given the age of the existing buildings at 3240 Mavis Road and 175
20 Sandalwood Parkway West, Cresa was asked to estimate the capital repairs and/or replacements
21 required to maintain the existing facilities. It is important to note that these initial reports were
22 based upon visual inspection of the major components of the buildings only and did not consider
23 any renovations or upgrades that Alectra Utilities might have considered or had to be remediated
24 due to the presence of any hazardous substances, PCBs or concealed mold. Specifically, given
25 the age of 3240 Mavis Road, the costs to maintain this facility could easily have exceeded the
26 original estimates. These reports did not consider current operational requirements and future
27 growth.

7.4 Review and Assessment

The review and assessment included looking at the following options:

- Option 1 - Remain at both Mavis and Sandalwood on an 'as is' basis and continue to lease 3456 Mavis Road and use Alectra Utilities' substation yard at 7345 Bramalea Road to satisfy south-central outside storage requirements.
- Option 2 - Redevelop the Mavis site and remain at Sandalwood on an 'as is' basis.
- Option 3 - Dispose of both Mavis and Sandalwood and relocate to a new "purpose built" Consolidated Central Operations Centre. (Selected Option)

Cresa's assessment concluded that option 1 and option 2 were not appropriate solutions for meeting Alectra Utilities' operational requirements and mitigating potential safety and environmental risks. Both options would also require significant investments in both facilities that, even after upgrades, would not meet current and long-term needs. Accordingly, Cresa recommended proceeding with Option 3.

7.4.1 Option 1 – Deferred Central Operations Centre

This option would only delay the need for a new Central Operations Centre and would expose Alectra Utilities to future financial risks from rising land values and construction costs. Given the limited availability of land with the necessary zoning, size, and location, securing a suitable site in the future could be challenging. The details of each site are listed below.

3240 Mavis Road Inspection and Capital Required – "AS IS"

- The North Tower, Central Building and Warehouse portions were constructed using Conventional Built-Up Roofing. The roofing system installed in these areas had been replaced within the past several years (i.e. North Tower circa 2012 and remaining areas circa 2009). Based upon EXP's observations, the roofing system in these areas was in good to fair condition at the time of evaluation. The roofing system in the South Tower and above the entrance canopy was Modified Bituminous Sheet Membrane Roof Assembly. Sloped metal roofs were also present at the South Tower and appeared to be in fair condition with some faded finishes at the time of inspection. The South Tower was replaced circa 2008 with an estimated age of 11 years. Based upon visual observations, the roofing system

1 of the South Tower was in fair condition however some areas of deterioration were
2 visible.

- 3 • Significant repairs of the exterior wall systems were required, including repairs to
4 the building's exterior stucco finish and perimeter block walls (some block masonry
5 units were noted to be displaced/out of place and not properly supporting loads)
6 and all deteriorated sealants required removal and replacement.
- 7 • The exterior windows were generally comprised of metal framed fixed window units
8 comprised of sealed insulating glass units (IGUs). Curtain wall systems were also
9 present throughout the building, particularly at the North Tower and South Tower.
10 The curtain wall system consisted of vision glass portions and spandrel glass
11 portions with metal frames. The glazing of the vision glass consisted of IGUs. The
12 normal effective life of IGUs is in the range of 15 to 20 years. According to the
13 date stamps on the aluminum spacers of the IGUs, the majority of the IGUs present
14 in the North Tower appeared to be from 1979 while IGUs present in the South
15 Tower appeared to be from 1990. The IGUs in the Central Building and
16 Warehouse appeared to be from 1998 or 1999. Therefore, the IGUs ranged from
17 20 to 40 years old, and would have had to be replaced.
- 18 • The structural framing of the building complex appeared to be in generally fair
19 condition, subject to specific observations including a large unsupported opening
20 at the western portion of the warehouse, surface corrosion on sections of the
21 exposed structural deck, peeling paint on portions of coated structural deck,
22 surface corrosion on a few of the structural columns, impact damage on a few of
23 the structural columns, exterior waterproofing required replacement, cracking was
24 noted on interior block walls, chipping and spalling was observed on the ends of a
25 concrete slab at a trench drain, cracking in the concrete slab and cracking along
26 sections of foundation wall.
- 27 • The main switchgear was manufactured in 2006 and appeared to be in serviceable
28 condition. Although the electrical equipment associated with the distribution
29 systems generally appeared to be in operable condition, some of the equipment
30 required maintenance including panels that were missing knockout plates, a
31 splitter in North Tower basement noted to be corroding, some wiring on the roof

1 which did not appear to be terminated properly, transformers in the main electrical
2 room and Facility Shop that were emitting loud humming noises and the rooftop
3 conduit powering the backlit sign on the North Tower which was noted to be loose
4 and had its supports turned over. The lighting systems and receptacles all
5 appeared to be in functional condition. EXP recommended replacing older T12
6 tubes with more efficient fixtures and there were a few receptacles in the
7 kitchenettes that did not appear to be GFI rated and were recommended for
8 replacement.

- 9 • The emergency generators were in operable condition and were serviced
10 regularly.
- 11 • Heating and cooling for the office portions was accomplished by approximately 30
12 heat pumps, rooftop HVAC units and electrical cooling units. Allowances had been
13 included for the ongoing replacement of the heat pumps. The cooling tower was
14 manufactured in 2007 and appeared to be in good condition. The boiler was
15 recently replaced and was in good condition at the time of inspection.
- 16 • HVAC for the Central warehouse was accomplished by roof mounted natural gas
17 HVAC units. The majority of the units were manufactured between 2007 and 2016.
18 One of the units needed to be replaced at the time of inspection. Overall,
19 ventilation equipment appeared to be in good, serviceable condition.
- 20 • The condition of the water, storm, sanitary piping as well as internal drains and
21 underground piping were unknown and may have required replacement as the
22 piping continued to age. A detailed review of the building piping by a qualified
23 contractor to determine the condition of piping, including internal remote video
24 inspection would have been required.
- 25 • The building was fully sprinkled via a wet and dry sprinkler system. The system
26 did not appear to have a backflow preventer at the time of inspection which would
27 have been required. There was some corrosion noted on the piping which may
28 have required replacement.
- 29 • The exterior site features primarily consisted of asphalt paved parking areas
30 bounded by concrete curbs. Limited soft landscape and sodded areas were noted
31 along the perimeter of the site. Overall, the asphalt pavement was in fair condition

1 with several areas in poor condition including several areas where the pavement
2 had cracked and vegetation had grown in, cracking and spalling of the concrete
3 enclosures and retaining walls, uneven/settled unit pavers, cracking and
4 deterioration on the exterior concrete steps/ramps and cracking and corrosion at
5 the base of several fence posts.

- 6 • Approximately \$2.8MM of additional capital (excluding inflation, impacts from
7 COVID-19 Pandemic, etc.) would have been required to fix the above identified
8 items and Alectra Utilities would still have the same concerns as listed under
9 *Section 7.1.*

10 **175 Sandalwood Parkway Inspection and Capital Required – “AS IS”**

- 11 • The roofing system of the building complex consisted of a combination of “Modified
12 Bituminous Sheet Membrane Roof Assemblies”, sloped metal roofs, skylights and
13 balcony spaces with patio stone surfacing. The roofing systems for the complex
14 were replaced circa 2004 with an estimated age of 15 years. Based upon visual
15 inspections the roofing systems appeared to be in good to fair condition at the time
16 of inspection.
- 17 • Exterior Walls - The exterior wall systems were a combination of insulated metal
18 siding, curtain wall glazing, precast concrete panels with some areas of corrugated
19 metal siding. No major capital expenditure was expected to be required for the
20 metal panels, precast concrete panels, and metal siding, however some work
21 would have been required on the exterior caulking and at the base of the exterior
22 walls.
- 23 • Exterior Windows and Doors - The exterior windows were generally comprised of
24 metal framed fixed window units comprised of sealed insulating glass units. The
25 IGUs in the complex were mainly from 1992 with an estimated age of 27 years at
26 the time of inspection. Several units had previously failed and EXP Services
27 recommended Alectra Utilities budget for the ongoing replacement of window
28 glazing units.
- 29 • Exterior Doors - It was noted that some capital expenditure will be required for the
30 ongoing refurbishment of the exterior doorways as the building continued to age.

- 1 • The structural framing of the building appeared to be generally in good to fair
2 condition. Several deficiencies were noted in EXP's report including step cracking
3 of block walls, cracking of the floor slab in the lobby, which should be further
4 investigated, cracking of the concrete slab typically near trench drain locations and
5 cracking on some of the exposed foundations.
- 6 • Electrical Systems - The main switch gear was manufactured in 2001 and had a
7 life expectancy of 45 to 50 years. The switchgear was expected to remain
8 serviceable for several more years.
- 9 • The electrical distribution systems appeared to be in good condition subject to
10 some deficiencies as outlined in the EXP report including some of the transformers
11 emitting a loud humming sound.
- 12 • The lighting systems appeared to be in good condition, however due to the overall
13 age, the system may have required future replacement.
- 14 • While the generator appeared to be in serviceable condition, given its age, EXP
15 recommended budgeting for replacement. The oil tank installed within the
16 generator room was not double walled nor was it placed within a concrete spill
17 containment.
- 18 • Elevators - The elevators appeared to be original to the building and were
19 approaching the end of their life. A review of the elevators was not part of EXP's
20 report. EXP recommended a review by an expert as these would have likely
21 needed to be upgraded. Preliminary forecasts were provided in the estimate
22 based upon the previous report completed by Pinchin.
- 23 • Security Gates - Some of the electrical equipment servicing the gates were noted
24 to be in poor condition and would have needed to be replaced.
- 25 • Mechanical Systems - Primary heating and cooling for the office portions of the
26 building was accomplished by several heat pumps, heat recovery units, multiple
27 fan coil units and a few electrical heaters. A replacement program would have
28 been required.
- 29 • The cooling tower was expected to require replacement.
- 30 • Plumbing and Drainage Systems – Overall, the plumbing and drainage systems
31 were in good working condition.

- 1 • Fire Suppression Systems - The sprinkler system did not appear to have a
2 backflow preventer which should have been provided. The building appeared to
3 utilize over 1,000 sprinkler heads for fire suppression, which would have required
4 a sprinkler head box that contains 24 sprinkler heads as per Ontario Fire Code.
5 The existing sprinkler headbox only contained 9 sprinkler heads and EXP
6 recommended further review of the sprinkler system.
- 7 • Fire and Life Safety Systems - There were a few penetrations between the office
8 and warehouse that would have needed to be properly sealed to maintain integrity
9 of fire suppression. EXP noted step cracking on some of the masonry block walls
10 and cast in place and the concrete walls needed to be properly sealed.
- 11 • The fire alarm panel near the server room appeared to be original and may have
12 needed to be replaced.
- 13 • Pavements and Exterior Site Features - There were several deficiencies that were
14 noted in EXP's report including refurbishment of asphalt pavement, repair of
15 concrete curbs, cracking on retaining wall and cracking on concrete piers.
- 16 • The elevated interlock walkway at the main entrance was noted to be in poor
17 condition and a complete refurbishment was recommended.
- 18 • Approximately \$1.7MM of additional Capital (excluding inflation, impacts from
19 COVID-19 Pandemic, etc.) would have been required to fix the above identified
20 items and Alectra Utilities would still have the same concerns as listed under
21 Section 7.2.

22 **7.4.2 Option 2 – Redevelopment of Mavis Road**

23 Redeveloping Mavis Road would have required leasing a comparable facility within Mississauga,
24 with the appropriate zoning, structure, lands for inventory, company and employee parking,
25 security measures, etc. for three to five years. This would have significantly impacted employees,
26 customers, operations, and the operating budget. Moreover, the redeveloped Mavis site would
27 have still fallen short of meeting present and future operational requirements.

28 Both the Mavis and Sandalwood sites were aging, space-constrained, and required substantial
29 capital investment to meet operational needs. Mavis presented safety and functionality issues,
30 including shared access with adjacent properties (permanent easements), uneven yard surfaces,

inadequate vehicle storage, and limited space for safe warehouse and fleet operations. While temporary mitigation measures were in place, they did not address the underlying risks or inefficiencies.

Continuing to operate from these sites would require additional capital expenditure without achieving the capacity or functionality needed to support Alectra Utilities' long-term operations as described above in *Section 7.4.1*.

Mavis Redevelopment

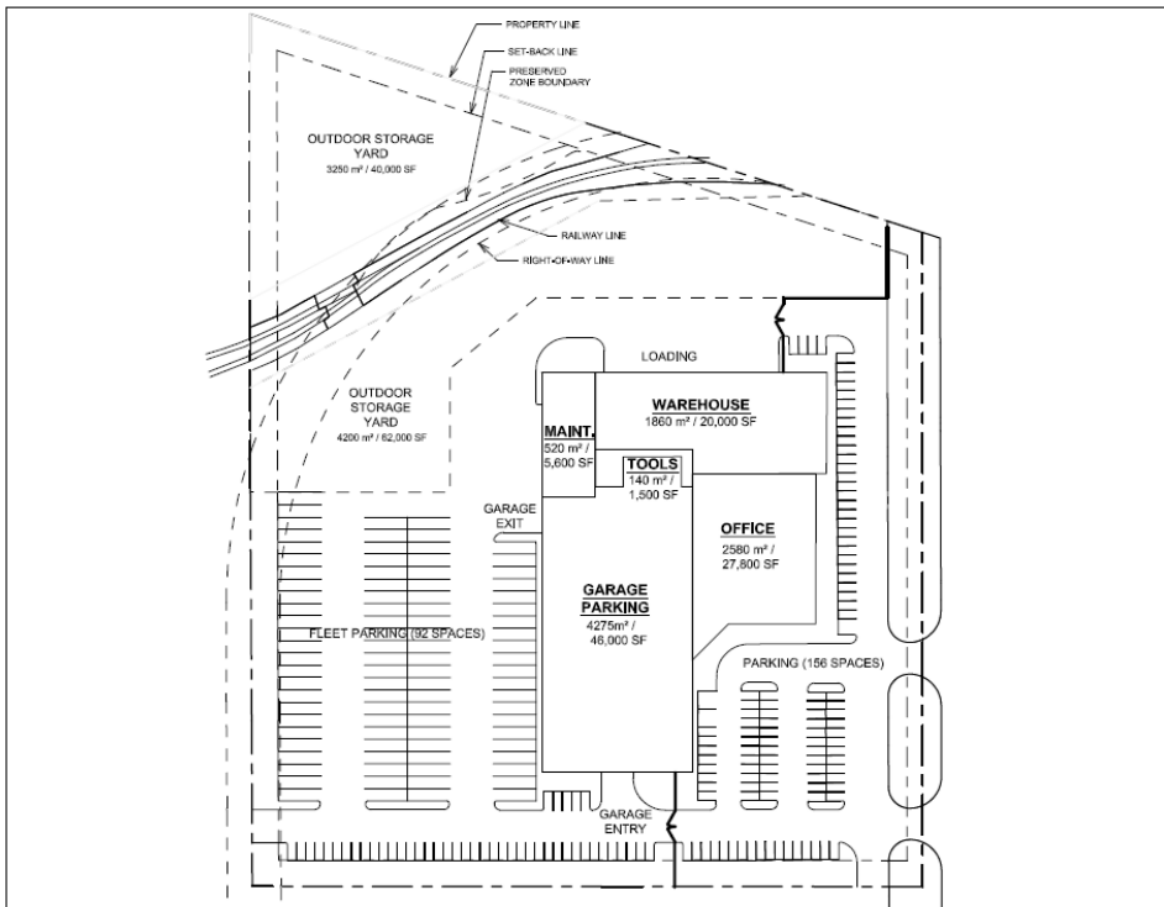


Figure B07 - 6 Mavis Development

The site plan in Figure B07 - 6 was developed to show the possible redevelopment of the Mavis Road site to create a more efficient and effective building. The two existing entrances to the site off Mavis Road would have been maintained as Cresa did not believe that Alectra Utilities would have received approval to relocate these entrances.

1 While the site plan showed approximately 100,000 square feet of outside storage, initial zoning
2 investigations indicated that current zoning only permits 10% of the total site area dedicated to
3 outside zoning. Therefore, Alectra Utilities' intended use of the site may not have complied with
4 the City of Mississauga bylaws. Further investigation would have been required to determine if
5 any site-specific zoning was needed, however, this was not completed during this review due to
6 the issues described in *Section 7.4.1*.

7 Cresa investigated the possibility of removing the rail line located in the northwest portion of the
8 site and did not believe that it would be possible. Cresa noted that there was another right of way
9 easement indicated on the site plan for an additional rail line. While the building and parking
10 requirements would have been met, given the unique shape of the outside storage and the
11 existence of the rail line, Alectra Utilities would not have been able to meet all its outside storage
12 requirements.

13 In the event Alectra Utilities was able to move forward with a redevelopment, it would have needed
14 to secure temporary land to accommodate outside storage functions and fleet parking. This
15 assumed that all office functions could be moved temporarily to other Alectra Utilities facilities.
16 Alectra Utilities would have likely required approximately 3.5 to 4 acres to temporarily
17 accommodate its outside storage and fleet parking requirements, and the land would have
18 needed to be zoned to allow for outside storage. If the office staff could not be moved to other
19 Alectra Utilities facilities, additional office space would have had to be leased during the
20 redevelopment.

21 There was also limited land with outside storage available for lease. This land is usually in high
22 demand from logistics companies looking for temporary trailer storage.

23 The current industrial vacancy rate for Mississauga and Brampton at the time was estimated to
24 be only 1.1%.

25 Cresa provided a preliminary redevelopment estimate, which would have been subject to change.
26 Additional testing, design and engineering would have been needed for a more refined budget.
27 Cresa's initial budget forecast was approximately \$25MM (excluding inflation, impact of COVID-
28 19 pandemic, etc.). The capital budget also did not consider the cost to lease space while the
29 site was being redeveloped. Cresa also did not forecast an allowance for any environmental
30 remediation that may have been required.

The redevelopment of 3240 Mavis Road might have accommodated the majority of Alectra Utilities' requirements on the existing site, however, additional outside storage would still have been required, and Alectra Utilities would still have many of the issues as outlined in *Section 7.1* (e.g. rail easements).

Sandalwood "as is" was described in *Section 7.4.2*.

Due to the costs and remaining concerns with both locations, Option 2 was not pursued.

7.4.3 Option 3 - Dispose of both Mavis and Sandalwood and Relocate (Selected Option)

Option 3 would see Alectra Utilities dispose of both 3240 Mavis Road and 175 Sandalwood Parkway West and relocate to a new purpose-built consolidated Operations Centre. Some of the initial pros and cons that Alectra Utilities identified are listed in Table B07 - 8.

Table B07 - 8 Pros and Cons to Relocate

Pros	Cons
Operational gains by operating out of single facility	Higher upfront costs than just redeveloping Mavis
Lower operating costs due to less square footage	Possible disruption of moving employees to a new location
New facility with new building systems all under warranty	Market Risk and timing considerations related to the sale of existing facilities at 3240 Mavis Road and 175 Sandalwood Parkway West include aligning the move out date with the move in date and securing appropriate value.
Ability to design a facility to meet all of Alectra Utilities' long-term requirements	

Initial Search Parameters

The initial parameters that Alectra Utilities identified were as follows:

- Area of 15 to 25 acres of land in North Mississauga or South Brampton, relatively equidistant from the two existing facilities.
- Good access to major arterial and highway systems to optimize travel time and provide service visibility to the public.

- Permissive zoning to provide for industrial use with outside storage capability.
- Minimal planning approvals required.
- Ability to lay out an efficient building to accommodate a 150,000 to 200,000 square feet facility including required parking and outside storage.
- No significant environmental, land use or zoning conflicts.
- No significant local use conflicts with sensitive land uses adjacent to the site.
- Available, on or off market.

The Search Process

Over two years, Cresa actively searched for available sites that met the criteria. The overall strategy included:

- Active searches on MLS listings.
- Active searches on the Co Star and Loop Net listings.
- Active searches on Realnet and Realtrac system.
- Ongoing calls, in-person meetings and follow-up with the Economic Development staff in both Brampton and Mississauga.
- Ongoing calls, in person meetings and follow up with major institutional landowners.
- Outreach to key real estate brokers active in the industrial market in Mississauga and Brampton.
- Ongoing monitoring of social media, industry blogs and investor news to identify organizations that may be disposing of assets.

The “Potential” Sites

Cresa was able to identify several vacant properties that would have met Alectra Utilities’ central operational requirements, but many of the sites were not available for sale.

After an extensive search, Cresa became aware of a site in South Brampton (174 Kennedy Road) that had an existing building on the property that was in the process of being demolished. This property would support Alectra Utilities’ operational requirements for the central region and align with the recommendation to pursue Option 3.

1 Cresa's efforts identified a series of options and possibilities which are outlined below:

- 2 • A site was identified at 7869 Tenth Line, Halton Hills. The site was not zoned and
3 was in the "Hold" Area identified for the new 400 series highway in north Halton.
4 While the site was located in the municipal boundary of Halton Hills, it would have
5 been able to service the Brampton and Mississauga communities. Through a
6 lengthy process and negotiations with the landowner, the approval risk was
7 elevated due to the building and site only being available for lease and the
8 development horizon was judged to be too long to provide certainty for Alectra
9 Utilities.
- 10 • Several sites were identified as being available from one developer, including a
11 number of sites on the Highway 410 corridor. Many of the available sites were too
12 small at less than 15 acres. The one site on Highway 10 at Derry Road was very
13 appealing to Alectra Utilities at 25 acres but there were planning issues that were
14 significant and a lack of political support for this site to be brought forward. Informal
15 pricing for this site was set at about \$2.5MM per acre.
- 16 • Another site on Mississauga Road, north of highway 401 and adjacent to the
17 Streetsville Glen Golf Course was identified. The site was small at 13 acres and
18 Alectra Utilities and Cresa examined several alternatives to accommodate the
19 required area but could not come up with a workable solution given the site
20 topography and the watercourse issues.
- 21 • One site was identified by Cresa through the City of Mississauga Economic
22 Development Department. Cresa did an initial review of the site and rejected the
23 opportunity as there was a TRCA restriction on the site and it was in a regulated
24 TRCA area that would have Alectra Utilities lose over 40% of the available 22 acre
25 land area.
- 26 • Cresa worked with First Gulf to identify two off-market opportunities that they were
27 aware of, including one at 134 Kennedy Road, Brampton. Cresa met with the
28 ownership group, and they had an initial asking price of \$2.5MM to \$2.6MM per
29 acre for their 16 acre site. The site had an existing building on it that would have
30 had to be demolished. Due to land size, shape and access points, this site was

1 judged to be inferior to the site to the south and not suited to meet Alectra Utilities'
2 operational requirements.

- 3 • The 174 Kennedy Road South site was identified by First Gulf but was under
4 different ownership than 134 Kennedy Road South. The owner was in the process
5 of trying to get municipal approval for a major distribution centre which was not
6 compliant with the current zoning. The site previously had a building on the site
7 that was demolished (Benson and Hedges) and the site was decommissioned with
8 crushed concrete. Through an extensive negotiation process and an evaluation of
9 the overall site, Alectra Utilities considered this site to be the most viable option
10 and a draft Agreement of Purchase and Sale was negotiated.

11 In July 2019, Management recommended the Audit, Finance and Risk Management (AFRM)
12 Committee approve and recommend to the Board of Directors to proceed with option 3 to
13 purchase 174 Kennedy Road and construct a new Central Operations Centre. Management also
14 recommended that the AFRM approve and recommend to the Board of Directors that
15 Management be authorized to sell Alectra Utilities' Mavis and Sandalwood facilities, to offset the
16 upfront cash flow requirements of the acquisition of 174 Kennedy Road and construction costs of
17 the new Central Operations Centre and to ensure the move in date to Kennedy was aligned to
18 the move out date from the Mavis and Sandalwood locations.

19 **7.5 Timeline**

- 20 • 174 Kennedy Road South property was purchased in July of 2019.
- 21 • 175 Sandalwood Parkway West was sold to BVD Petroleum in 2020 and leased
22 back until December 2023.
- 23 • To determine the property market value, in 2019, Cresa obtained two independent
24 property market appraisals. Wagner, Andrews & Kovacs Real Estate Valuation
25 (WAK) appraised the property at \$29.8MM and Altus Group at \$31.5MM
- 26 • Two purchasing offers were presented by Cresa, and the property was sold in 2020
27 to BVD Petroleum for \$32.5MM.
- 28 • 3240 Mavis Road facility was sold to the City of Mississauga in 2021 and leased
29 back until December 2023.

- 1 • To determine the property market value, in 2021, Cresa obtained two independent
2 property market appraisals. WAK appraised the property at \$27.4MM and Altus
3 Group at \$30.6MM.
- 4 • The City of Mississauga engaged Antec Appraisal Group to complete a review of
5 the Appraisal Report prepared by WAK as well as the Appraisal Report prepared
6 by Altus Group. Antec Appraisal Group concluded that both reports were within a
7 reasonable range of each other and that WAK was more supportable in terms of
8 representing the current market value as of the effective date, based on the
9 analysis provided within their report.
- 10 • The City of Mississauga then initially presented an offer lower than the average of
11 the three appraisals. Cresa negotiated a sale price of \$28.4MM, which was the
12 average of the three appraisals, which was subsequently approved by Alectra
13 Utilities' Board of Directors.
 - 14 ○ It is important to note that due to the Region of Peel's pedestrian and
15 vehicles access easements, and CP Rail railway tracks and access
16 easements, it was Cresa's opinion that the property would be a difficult sale
17 to any third party.
- 18 • 174 Kennedy Road construction started in 2020 and was completed in December
19 2023. The move from both Mavis and Sandalwood coincided with the occupancy
20 date of the new building.
- 21 • 174 Kennedy Road occupancy was mid-December 2023, with a new address of
22 200 Kennedy Road South.

23 **7.6 Costs and Savings:**

24 **Project Cost** – The project was completed within schedule, even with significant challenges
25 caused by the COVID-19 Pandemic. Alectra Utilities wanted to occupy the building by December
26 2023 to prevent additional Mavis and Sandalwood lease term renewals and reduce Alectra
27 Utilities' operating expenses. However, additional capital budget was required to complete the
28 project from the original forecast. Most of the overall project increases were due to:

- 29 • Material and labour costs increased during the COVID-19 Pandemic
- 30 • Trades strike delayed the project and increased costs

- Weather conditions increased the cost relating to soil, gravel and grading (drainage, water, snow, etc.)
- Unforeseen regulatory & municipal requirements (Toronto Regional Conservation Authority, City of Brampton Parkland Dedication)
- Changes in building regulations and requirements during project design and construction
- Increase project scope and budget to include installation of a 500kW Solar Plant to power the property, Dedicated Outdoor Air System (DOAS), EV Charging Stations, etc. to support Alectra Utilities' sustainable efforts and reduce operating costs

OM&A Savings (Efficiencies) - In December 2023, Alectra Utilities consolidated its two Central Region sites in Brampton and Mississauga into a single operating centre at 200 Kennedy Road South to better meet business needs and reduce costs. This initiative reduced operational costs by an average of \$2.9MM annually and results in cumulative savings of \$8.6MM from 2024 to 2026 from multiple business units. A key contributor to these savings is reduced facility operating costs. These savings are based on a comparison between the "do-nothing" baseline for maintaining operations at both sites and the costs of running the new consolidated facility. For more OM&A information please reference *Exhibit 4, Tab 2, Schedule 18 Facilities*.

By streamlining operations, Alectra Utilities also reduced its fleet by 21 vehicles and eliminated one mechanic position effective 2025, resulting in average annual operational savings of \$1.2MM and cumulative savings of \$3.6MM from 2024 to 2026). These savings represent the estimated running costs that would have been incurred if the 21 vehicles remained in service, along with the associated costs of retaining the mechanic. This consolidation also streamlined team structures, reducing duplication in supervision, communications, and safety initiatives (for more information on regarding this, refer to *Exhibit 1, Tab 6, Schedule 5 Productivity*).

Other Revenue and Lease Costs – With the sale of the Mavis and Sandalwood properties, Alectra Utilities negotiated lease agreements to align with Kennedy property occupancy timelines. 3240 Mavis, Mississauga and 175 Sandalwood Parkway West, Brampton were sold and leased back until Alectra Utilities moved into 200 Kennedy Rd South in December 2023. The sale of Sandalwood in 2020 resulted in a gain of \$4.8MM (pre-tax) and an initial lease liability of \$4.3MM

1 for a 30-month term (November 2020 to May 2023). A lease extension was subsequently
2 exercised, resulting in an additional lease liability of \$1.2MM. The sale of Mavis Road in 2021
3 resulted in a gain of \$13.9MM (pre-tax) and a lease liability of \$3MM with a lease term of 27.5
4 months (December 2021 to March 2024). For more on gains from property sales refer to *Exhibit*
5 *6, Tab 3, Schedule 1 Other Revenue.*

Appendix B09

Information Technology Systems

Appendix B09 - Information Technology Systems

I Overview

Alectra Utilities relies on supported, reliable, and stable Information Technology (IT) systems to operate its distribution network, manage internal corporate services, and effectively serve its customers and communities. Over the course of the Distribution System Plan (DSP) period (2027-2031), Alectra Utilities has planned investments to upgrade end-of-life systems, replace outdated equipment, enhance platforms to support evolving business operations, and implement new technologies to expand and mature its business capabilities. Investments in IT systems are vital to the continued operational stability of Alectra Utilities' distribution network, to ensure continued adherence to regulatory mandates, safeguard the utility from increasingly sophisticated cyber threats, and ultimately sustain long-term operational reliability.

The planned IT Systems investments are divided into four segments:



Figure B09 - 1 IT Investment Categories

1. **IT Software** - Alectra Utilities relies on several integrated software systems to deliver customer-facing services, effectively manage the electrical grid, and support business operations. During the DSP period, Alectra Utilities plans to invest in several critical software systems, such as:
 - **Meter-to-Cash:** Systems used for billing and payment collection from customers.
 - **Operational Technologies:** Systems and tools designed to improve grid visibility, control, process efficiency, and analytics, ensuring safe and reliable power delivery.
 - **Enterprise Resource Planning (ERP):** System used to ensure effective utility-wide financial, operational, and supply chain management and regulatory reporting.
 - **Business Optimization:** System used for capital investment planning, computer operating systems, and applications that are essential to run business operations.
2. **IT Hardware** - Data centre infrastructure, such as physical servers, network and communications equipment; end user technology, including desktops, laptops, field tablets, and multi-function printers; and hardware to sustain Alectra Utilities' Enterprise Backup and Recovery solution.
3. **IT Security** - Cybersecurity systems, services, and infrastructure essential for the ongoing protection of Alectra Utilities' technology systems, customer and employee information, and to ensure compliance with the Ontario Cyber Security Framework (OCSF)⁴⁷.
4. **Distributed Energy Resources (DER) Supporting Technologies** - Tools for DER performance analysis, system modelling, and supporting IT infrastructure required for integration, implementation planning, and customer engagement; supporting the evaluation and deployment of non-wires solutions (NWS) leveraging DERs.

⁴⁷ On March 15, 2018, the Ontario Energy Board amended the Transmission System Code and Distribution System Code requiring licensed electricity transmitters and distributors in Ontario to report on their cybersecurity preparedness relative to the newly established Ontario Cyber Security Framework. The code amendments define "cyber security" as "a body of technologies, processes, and practices designed to protect networks, computers, programs, data and personal information from attack, damage or unauthorized access", and reference both electronic and physical security.

II Investment Description

This section summarizes planned investments in Alectra Utilities' IT Systems over the 2027 to 2031 DSP period.

Table B09 - 2 IT Investment by Sub-category

IT Investment Sub-categories	2027	2028	2029	2030	2031	Total 2027 to 2031
IT Software	12.4	23.8	21.0	4.1	5.6	66.9
IT Hardware	5.4	4.6	6.7	2.9	3.0	22.6
IT Security	3.5	2.7	0.4	0.3	0.4	7.3
DER Supporting Technologies	0.2	0.3	0.3	0.3	0.1	1.2
Total (\$MM)	21.5	31.4	28.4	7.6	9.1	98.0

2.1 IT Software

Alectra Utilities has a planned investment portfolio totaling \$66.9MM in IT software projects over the DSP period. These investments focus on maintaining operational stability, system security, and overall reliability of its enterprise applications that can scale with organizational growth and adapt to evolving business and regulatory requirements.

Alectra Utilities' planned software investments during the DSP period include:

Table B09 - 3 IT Software Investments

IT Software Investments	Total 2027 to 2031 (\$MM)
2.1.1 Meter-to-Cash System	25.8
2.1.2 Operational Technologies	15.3
2.1.3 Enterprise Resource Planning	12.0
2.1.4 Business Optimization	13.8
Total	66.9

2.1.1 Meter-to-Cash System

Over the DSP period, Alectra Utilities plans to invest approximately \$25.8MM in the Meter-to-Cash System, as detailed below in Table B09 - 4. Alectra Utilities' Meter-to-Cash System is a

suite of several integrated sub-systems that provide efficient and accurate meter readings and billing services⁴⁸. This system is essential to Alectra Utilities' customer interactions as it supports customer service⁴⁹, billing and related services⁵⁰, retail transactions and settlements, as well as wholesale settlements with the Independent Electricity System Operator (IESO).

Table B09 - 4 Meter-to-Cash System Investments

Project Code(s)	Meter-to-Cash System Investments	Total 2027 to 2031 (\$MM)
152539-Meter -to-Cash - CIS - CC&B CCS/C2M upgrade	2.1.1.1 CC&B C2M Upgrade	14.4
150325-Meter-to-Cash CIS CC&B Enhancements	2.1.1.2 CC&B Enhancements	3.4
150453-Meter-to-Cash - CIS CC&B Modifications (Regulatory Enhancements)	2.1.1.3 CC&B Regulatory Modifications	2.9
150465-Meter-to-Cash LPSS (Load profile and settlements system) Upgrade	2.1.1.4 Load Profile & Settlements (LPSS)	1.3
150468-Meter-to- Cash Annual Licenses Growth on Meter-to-Cash platforms	2.1.1.5 Meter-to-Cash Annual License Growth	1.2
152343-Connexo Upgrade 152350-Primeread Upgrade 152351-Sensus Upgrade 152352-Trilliant Upgrade 152377-Meterlab Software (EMTS) 152396-SSN, Silver Springs AMI Upgrade, Legacy Guelph 152395-MV90 Upgrade	2.1.1.6 Network Metering upgrades	1.6
	Other (non-material projects)	1.0
	Total	25.8

⁴⁸ The Meter-to-Cash System includes the following sub-systems: Meter Readings, Advanced Metering Infrastructure (AMI), Meter Data Management, Wholesale and Retail Settlement, Electronic Business Transactions, Meter Data Management and Repository (MDM/R), Billing, Payments, Credit & Collections, Business Intelligence, and Reporting (and related field activity). All these systems and processes are supported by a host of interfaces and underlying technology, including complex monitoring tools, databases, and enterprise integration tools.

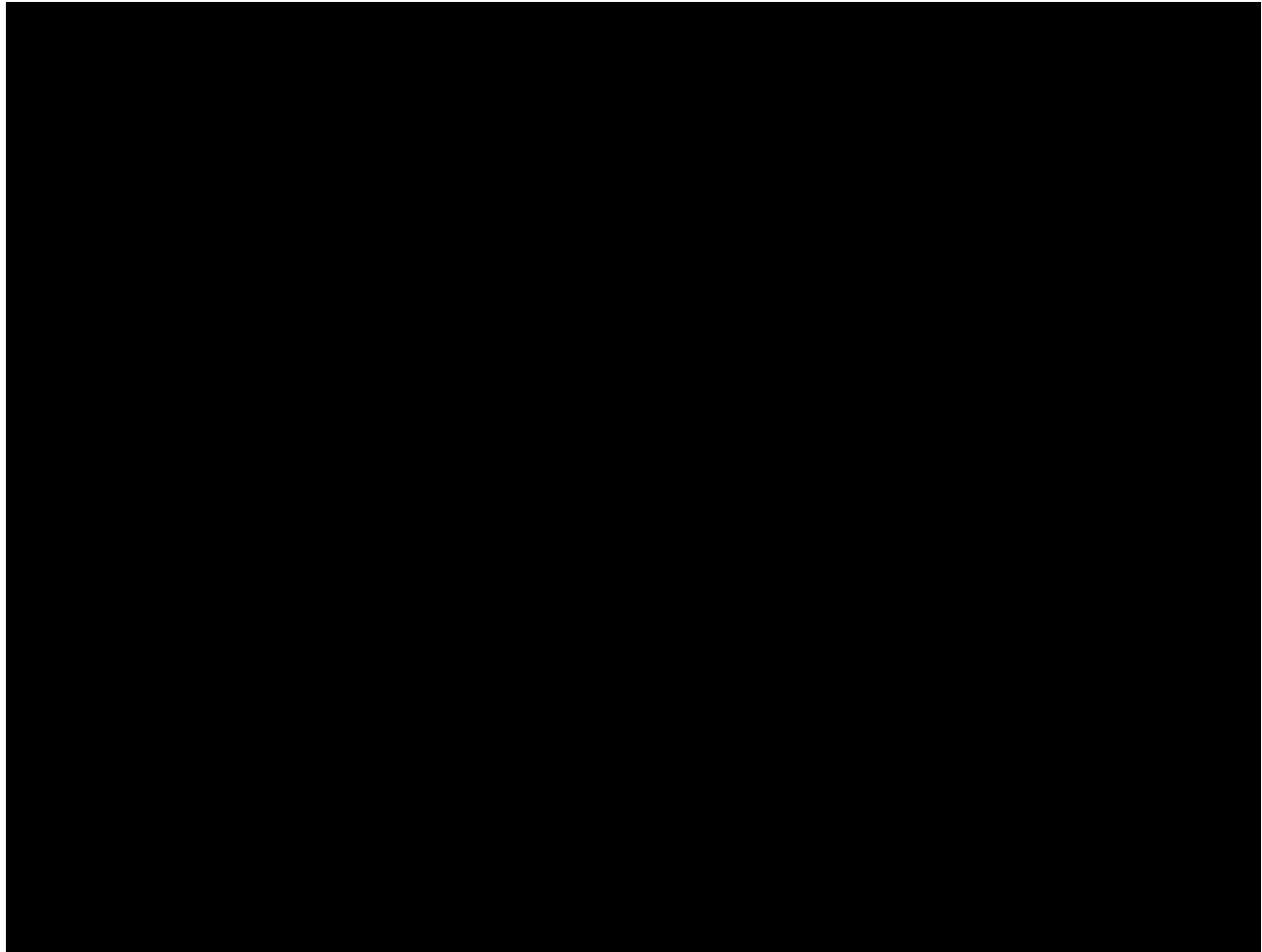
⁴⁹ Customer account management, service location management, and customer contact functions are all integrated with the Meter-to-Cash System.

⁵⁰ Including credit and collection, metering, and billing (including complex billing for embedded and wholesale market participants).

1 The Oracle Customer Care & Billing (CC&B) platform is Alectra Utilities' main enterprise system
2 for billing and customer care. This system maintains customer account details and transactional
3 data such as billing records, meter reads, metering installation data, and all other transactional
4 data related to customers. CC&B enables Alectra Utilities to issue accurate bills, respond to
5 customer inquiries, manage customer contact data, facilitate customer requests such as move-
6 in/move-out, and track field service activities related to metering and other equipment.

7 Planned investments in the Meter-to-Cash System focus on updating software to remain
8 compliant with vendor supported versions, addressing known security vulnerabilities, and
9 improving application functionality in support of evolving business processes. Enhancements to
10 the CC&B application support billing accuracy and efficiency, while enabling customer self-service
11 options, such as chatbots, that depend on this system. Without these updates, this core meter-
12 to-cash system would face increasing and unacceptable levels of reliability and cybersecurity risk,
13 potentially compromising the security and privacy of Alectra Utilities' customer data, the integrity
14 of the meter-to-cash system, and would increase the likelihood of negative operational impacts to
15 internal processes and customer facing services.

16 Figure B09 - 2 illustrates the various systems that comprise the Meter-to-Cash solutions and the
17 interactions between each system.



2.1.1.1 CC&B C2M Upgrade

During the DSP period, Alectra Utilities plans to invest \$14.4MM to upgrade the current version of CC&B to the latest version to maintain support from Oracle and other integrated system vendors.

[Redacted text block consisting of six horizontal black bars]

Therefore, upgrading to Oracle's latest version of CC&B, known as Customer to Meter (C2M), by 2029, is necessary for continued vendor support,

sustained operations of the Meter-to-Cash system environment, and [REDACTED]

2.1.1.2 CC&B Enhancements

The CC&B system functions as the central system to Alectra Utilities' Meter-to-Cash operations, supporting business functions such as Customer Care, Billing, Payments & Collections, and Metering. Over the course of the DSP period, Alectra Utilities plans to invest \$3.4MM to enhance its CC&B platform to meet evolving business needs, improve process efficiencies, and elevate the customer experience through its integration with customer-facing applications.

While the upgrade project outlined in *Section 2.1.1.1* addresses system currency, the CC&B Enhancements project focuses on building capabilities within the platform to support operational improvements and business process development. Improvements are subject to detailed value assessments and time studies⁵¹ to ensure measurable benefits are tracked to baseline. The corresponding productivity benefit estimated to be realized between 2023 and 2026 is \$1.7MM in cumulative savings, yielding an estimated \$0.4MM in average annual operational savings tied to an average of 60 system change requests per year⁵².

The CC&B Enhancement program focuses on:

- **Mitigating Risks and Improving Efficiency:** Software enhancements address known system issues that could disrupt operations or cause tedious manual workarounds. In some instances, these may lead to correcting errors manually, slowing processes, and increasing the risk of human error. Enhancements that seek to introduce efficiencies, reduce manual intervention, streamline processes, and support smoother day-to-day operations.
- **Supporting Growing Business Needs:** As the utility industry continues to evolve and adapt to changing customer demands, industry transformations, and technological changes, investments in software enhancements enable Alectra Utilities to adapt in kind. Examples are reflected in new billing models, increased

⁵¹Change Request (CR) owners are asked to perform a time study to compare time spent on a specific process prior to the CR implementation and expected time post CR implementation.

⁵² Performance Measurement – *Exhibit 1, Tab 6, Schedule 5 Productivity*

demand for digital services and communication channels, and the need for scalable data integrations to and from the CC&B platform.

2.1.1.3 CC&B Regulatory Modifications

CC&B Regulatory Modifications are mandated by regulatory bodies such as the Ontario Energy Board (OEB), IESO, and Measurement Canada. Unlike CC&B enhancements driven by business need, this investment is required to fund changes to the CC&B software to accommodate mandatory regulatory requirements, particularly as it relates to customer billing. These changes can vary in magnitude, complexity, and impact. For example, notable historical changes include the Time-of-Use rollout, Price Optionality, Ultra Low Overnight rate, the COVID Energy Assistance Program, and the Green Button initiative. From 2020 to 2024, Alectra Utilities spent an average of \$0.7MM annually to modify CC&B in response to regulatory requirements. Using this historical average as a guide, Alectra Utilities intends to spend approximately \$2.9MM over the DSP period on CC&B regulatory modifications.

2.1.1.4 Load Profile & Settlements

Over the DSP period, Alectra Utilities plans to invest \$1.3MM to transition from its current Load Profile and Settlements System (LPSS) to Oracle Market Settlement Management (MSM). LPSS is critical for wholesale settlements with the IESO, Hydro One, and embedded generators, as well as for billing interval customers, including large users and commercial customers with a demand of over 50kW.

Alectra Utilities' current LPSS is no longer supported by Oracle. In 2022, Alectra Utilities secured a temporary license support extension with Oracle through 2024 and secured a third-party maintenance contract to address regulatory changes, such as those introduced by the IESO's Market Renewal Program. However, this support does not include product upgrades or security enhancements.

Transitioning to MSM will ensure full support for the entire application lifecycle, including feature updates, security patches, and system fixes. As a core application, MSM is vital to Alectra Utilities' billing and settlement operations for both interval and Net System Load Shape accounts. This investment will keep the settlement system aligned with vendor support cycles, enabling ongoing operational stability.

1 **2.1.1.5 Meter-to-Cash Annual License Growth**

2 To remain in compliance with Oracle's licensing model, Alectra Utilities must invest \$1.2MM in its
3 Customer Information System licensing over the DSP period. As part of its broader effort to
4 transition customers to its cloud offerings, Oracle now requires organizations upgrading to the
5 C2M platform to adopt a new license model. While Alectra Utilities does not currently plan to
6 move to Oracle's cloud, this model provides the right to deploy C2M either on-premises or via
7 Oracle's Customer Cloud Service. By proceeding with the on-premises upgrade under this new
8 model, Alectra Utilities preserves future flexibility to transition to the cloud if it becomes
9 advantageous or necessary.

10 **2.1.1.6 Network Metering Upgrades**

11 During the DSP period, Alectra Utilities plans to invest approximately \$1.6MM in Network Metering
12 related upgrades to ensure operational sustainability, service reliability and operational efficiency
13 of these systems. Timely and accurate meter read data is required to maintain compliance with
14 the Distribution System Code which mandates that distributors issue accurate bills to customers
15 at least 98% of the time, and to issue no more than two estimated bills in a 12-month period.

16 Alectra Utilities typically follows an N-1⁵³ upgrade strategy to ensure that it continues to receive
17 system vendor support, while not incurring unnecessary risks related to new software releases.

18 Alectra Utilities currently maintains eight software systems to read its residential, commercial,
19 industrial, wholesale and suite-metered customers. By the end of this DSP period, Alectra Utilities
20 plans to transition to four meter reading systems including two AMI Head End systems, an MV90
21 system, and a single suite metering software system. Consolidation of these systems will reduce
22 the duplication of effort related to testing, training, integrations, and compliance obligations.

23 **2.1.2 Operational Technologies**

24 Alectra Utilities plans to invest \$15.3MM in operational technologies over the DSP period, with
25 approximately 75% allocated to the implementation of Alectra Utilities' Mobile Workforce

⁵³ N-1 Upgrade Strategy is an IT approach to software and systems, where "N" represents the current, most recent version available, and "N-1" signifies the previous version, one step behind the latest. By deliberately installing the N-1 version, organizations aim to reduce the risks associated with brand new releases, such as unforeseen bugs or compatibility issues, while still maintaining a relatively recent and well-supported software state.

Management (WFM) solution. In addition to WFM, Alectra Utilities will upgrade and enhance its Supervisory Control and Data Acquisition (SCADA) system, Geographical Information System (GIS), and Outage Management System (OMS) to meet evolving operational requirements and address any known security vulnerabilities. These investments will enhance Alectra Utilities' ability to plan, manage, and respond to system operations effectively, contributing to a more modern and resilient grid.

Table B09 - 5 Operational Technologies Investments

Project Code(s)	Operational Technologies Investments	Total 2027 to 2031 (\$MM)
102263-Work Force Management / Mobile Dispatch	2.1.2.1 - Workforce Management	11.5
150563- SCADA - SCADA/OMS Software Upgrade Cycle	2.1.2.2 - SCADA/OMS Software Upgrade Cycle	1.6
	Other (non-material projects)	2.2
	Total	15.3

2.1.2.1 Workforce Management / Mobile Dispatch

Over the course of the DSP period, Alectra Utilities has a planned \$11.5MM investment to implement a Mobile WFM solution. This project will introduce a sophisticated and digitized fieldwork management tool equipped with critical functionalities that will improve the efficiency of fieldwork, streamline operations, and enhance the customer experience through its planned integration with Alectra Utilities' customer portal for service request scheduling and customer communications.

The WFM project is a multi-year, multi-phase initiative. The phases that are planned and budgeted are as follows:

- Phase 1: Service Connections and Metering Work
- Phase 2: Distribution Capital Work
- Phase 3: Inspections and Maintenance Work
- Phase 4: Reactive and Emergency Work

Implementing a WFM solution is important for Alectra Utilities as the company faces an increasing volume of maintenance and capital activities, which necessitate a computerized tool to optimize

resource allocation, job scheduling, dispatch, and routing. Alectra Utilities expects work volumes to rise as it reinforces, expands, and modernizes its grid to address customer growth, increasing extreme weather challenges, increased DER access, and electrification growth within its service territories. The implementation of the WFM system will drive productivity gains by optimizing and automating several manual functions related to field service work.

The WFM investment enables improvements in work execution, reporting, operations, and customer service as follows:

- **Work Execution and Reporting:** Alectra Utilities' existing workflow processes for field service are based primarily on manual paper-based methods. Consequently, data collected in the field must be entered by hand into back-office systems, leading to delays in data availability and making these processes susceptible to human error. Reporting on the status of work and performance metrics is done manually as well, which restricts visibility for potential improvements. The WFM system will deliver benefits by automating and digitizing workflow processes, creating a unified platform for scheduling, dispatching, and reporting for all types of fieldwork, including contractor activities. It will significantly reduce manual effort in managing documentation, work packages, and data updates. The system will streamline material ordering, allowing field crews to pre-order materials for scheduled pickup, optimizing material use and field operations. Real-time asset updates to GIS, EAM, and ERP systems will enhance data accuracy and accelerate workflows, while automated scheduling will increase efficiency, particularly for short-duration tasks. The system's geospatial capabilities will enhance crew routing and field activity allocation, further boosting productivity.
- **Operations:** The WFM system will support operational reliability by improving the execution and reporting of inspection and maintenance tasks, potentially reducing equipment failures, and ensuring a more resilient grid. The WFM system is expected to drive significant productivity gains, creating additional capacity for internal and external staff to manage increased workloads. By digitizing data capture, the WFM system will improve the accuracy of the GIS system, enabling more effective operation of the ADMS, a key component of grid operations.

- **Customer Experience:** The WFM system will enrich the customer experience through improved appointment scheduling, compliance, and communication, offering real-time updates on service requests, improved communication regarding scheduled appointments, and by providing online self-service options, ensuring a positive customer experience. Key customer preferences and shifts that underpin Alectra Utilities' investment plan include, growth in digital-first preferences, as usage of digital online service channels continue to grow year-over-year⁵⁴. These comprehensive improvements to Alectra Utilities' field operations and customer engagement will deliver enhanced service quality, while supporting enterprise-wide growth and delivering tangible process efficiency.

The benefits that will be realized from the implementation of the WFM system are significant. Two of the most significant benefits are in the areas of personnel efficiencies and reliability gains, as summarized below:

- **Efficiency gains** amongst field, supervisory, and back-office (clerical) are primarily from:
 - Improvements in scheduling, resource allocation, and route optimization that will result in time savings in the planning and scheduling of work, and a reduction in crew travel times. This will result in efficiency gains amongst field staff, supervisory personnel, and staff involved in job scheduling.
 - Process digitization will result in the automation of current manual, paper-based processes. This will result in time savings amongst field, supervisory, and clerical staff.
- **Reliability gains** over the useful life of the WFM system are realized primarily from:
 - Digitization of Distribution System Inspection processes that will result in an improved flow of data for asset analytics purposes, thereby allowing for more effective issuing, execution, and tracking of follow-up corrective actions. This will result in fewer unplanned equipment failures, leading to improved reliability.

⁵⁴ Engagement section: *Exhibit 1, Tab 5, Schedule 1 Ongoing Customer Engagement*

- Improved scheduling and tracking of maintenance work, primarily vegetation management activities, will result in a more effective vegetation management program and consequently will result in reliability improvements.

2.1.2.2 SCADA/OMS Software Upgrade Cycle

Over the DSP period, Alectra Utilities plans to spend \$1.6MM to keep its SCADA/OMS software current and supported. The SCADA/OMS Software Upgrade Cycle project involves upgrading Alectra Utilities' SCADA system, which is also embedded with its OMS system for a portion of its service territory. There is no available option to purchase support to stay on the current version.

Alectra Utilities operates a single-vendor SCADA system that includes an integrated OMS for its Central North (Brampton) and Guelph service areas. As the SCADA and OMS platforms are integrated, any SCADA system upgrade also results in an upgrade to the OMS in these territories. Under this program, Alectra Utilities will upgrade its SCADA system, which in turn, will update the OMS in the Central North and Guelph territories to the latest version.

Enhancements made by the vendor to fix issues or system bugs will be provided as system patches. Failing to address issues on this critical application could lead to safety concerns and potential work refusals, if staff are not able to safely execute a task due to an unresolved system issue.

Upgrading SCADA/OMS software provides essential developments in monitoring, control, and security, ensuring safer and more efficient operations. Additionally, system patches typically address cybersecurity vulnerabilities and incorporate security features such as stronger encryption, enhanced authentication, and improved access controls, which further reduce the risk of system exploitation. The proposed upgrades will ensure continued vendor support, including critical security updates, and continued compliance with standards such as NIST and IEC 62443.

2.1.3 Enterprise Resource Planning (ERP)

Alectra Utilities has allocated a budget of \$12.0MM for ERP investment over the DSP period. The Oracle JD Edwards (JDE) serves as Alectra Utilities' ERP system, acting as the primary enterprise system for financial and regulatory reporting. JDE handles various business processes, such as managing capital and operational expenditures, supply chain operations, financial and estimation

1 routines, work order management as well as asset registry and nameplate information.
2 Furthermore, JDE provides extensive functionalities for supply chain management, including
3 procurement, inventory control, and order processing.
4 The ERP investment is comprised of Continuous Improvement (\$7.5MM) and System Upgrades
5 (\$4.5MM) projects.

6 **Table B09 - 6 ERP Investments**

Project Code(s)	ERP Investments	Total 2027 to 2031 (\$MM)
150469-ERP Continuous Improvement	2.1.3.1 ERP Continuous Improvement	7.5
152996-ERP System Upgrades	2.1.3.2 ERP System Upgrades	4.5
	Total	12.0

7 *2.1.3.1 ERP Continuous Improvement*

8 Alectra Utilities plans to invest \$7.5MM over the DSP period to implement fixes and process
9 enhancements to its ERP platform. In alignment with Alectra Utilities' commitment to continuous
10 improvement and operational efficiency, each proposed ERP enhancement undergoes a value
11 assessment and time study to ensure it delivers meaningful operational benefits and is prioritized
12 through a steering committee of internal stakeholders.

13 The planned investment focuses on improving process efficiency through targeted integrations
14 and system refinements, serving as a proactive measure to mitigate risks, such as data integrity
15 issues resulting from manual entry errors, operational inefficiencies leading to manual rework,
16 and limitations imposed by outdated technologies. Through these enhancements, Alectra Utilities
17 will address current challenges, including manual invoicing, inefficient payment and work order
18 processes, and outdated approval and validation controls. The planned enhancements will
19 automate key workflows, reduce manual tasks, and introduce strengthened validation
20 mechanisms, resulting in increased productivity, improved data accuracy, and enhanced
21 compliance readiness. These improvements will better position Alectra Utilities to meet
22 regulatory, financial, and internal control requirements, which are essential for successfully
23 completing annual financial audits and general computer control reviews.

The ERP Continuous Improvement Program will be delivered through a model that brings together the expertise of internal teams, vendors, and specialist advisors. This approach ensures the enhancements are efficiently implemented, achieve the intended value targets, and are aligned with evolving business processes and operational requirements.

2.1.3.2 ERP System Upgrades

Over the DSP period, Alectra Utilities plans to invest \$4.5MM in periodic ERP upgrades. This investment will ensure Alectra Utilities' ERP system remains secure, supported, and capable of adapting to evolving business and regulatory requirements. As technological advancements continue, routine ERP upgrades are essential for sustaining operational stability, safeguarding data integrity, mitigating cybersecurity risks, and adhering to regulatory standards.

While Oracle issues annual releases accompanied by quarterly feature updates under its continuous improvement model, Alectra Utilities has opted for a biennial upgrade schedule. This approach maintains cost-effectiveness, operational efficiency, and up-to-date technology, preventing risk from outdated or unsupported software.

The requirement for cyclical ERP upgrades is driven by the following:

- **Vendor Support Requirements:** Oracle requires customers to maintain version currency based on their application lifecycle to receive technical support, security patches, and critical defect fixes. Without these upgrades, Alectra Utilities would risk losing vendor support, increasing exposure to unpatched vulnerabilities, and incurring higher costs for extended support arrangements.
- **Cybersecurity and Operational Risk:** Outdated and unsupported software is more susceptible to security exploits because of a lack of remediation in the form of regular security patches. Regular upgrades ensure the latest security patches and performance improvements are applied to the system, reducing the risk of data breaches, system outages, or integrity issues in financial and operational data.
- **Regulatory and Reporting Compliance:** ERP upgrades are essential to maintain alignment with changing regulatory and reporting standards (e.g. financial accounting updates, tax changes, regulatory reporting for utilities). Without regular upgrades, Alectra Utilities risks non-compliance with regulatory requirements.

- **Business Functionality Improvements:** Oracle’s updates introduce features and functionality that improve automation, reporting, integration capabilities, and user efficiency. Upgrades may include enhanced workflow orchestration tools, improved analytics, and new integration connectors, enhancing interoperability with other systems.

2.1.4 Business Optimization

Alectra Utilities, through its Business Optimization investment portfolio, plans to invest \$13.8MM towards upgrading and enhancing existing core applications not covered under previously identified IT software categories, including for capital investment planning, computer operating systems, and applications that are essential to run business operations. The Business Optimization investment is comprised of the C55 Alectra Utilities: Optimization of Business Practices (\$7.7MM), AMI 2.0 – Grid Edge Analytics (\$4.3MM), and other non-material projects (\$1.8MM).

Table B09 - 7 Business Optimization Investments

Project Code(s)	Business Optimization Investments	Total 2027 to 2031 (\$MM)
151136-C55 Alectra: Optimization of Business Practices	2.1.4.1 – C55 Alectra Utilities: Optimization of Business Practices	7.7
152576-AMI 2.0 - Grid Edge Analytics	2.1.4.2 - AMI 2.0 - Grid Edge Analytics	4.3
	Other (non-material projects)	1.8
	Total	13.8

2.1.4.1 C55 Alectra Utilities: Optimization of Business Practices

Since 2014, Alectra Utilities has adopted the Industrial and Financial Systems (IFS) Copperleaf platform (C55) from Copperleaf Technologies Inc., an Asset Investment Planning & Management platform. The C55 platform has played a pivotal role in developing and optimizing Alectra Utilities’ capital budget. It leverages a calibrated Value Framework to evaluate individual investments and optimize the value of an investment portfolio (refer to *Chapter 5.3.1 Asset Management Process* for more detail regarding the optimization).

During the 2027-2031 period, Alectra Utilities plans to invest \$7.7MM in capital to further develop and enhance the IFS C55 platform as part of the platform's continuous improvement. Improvements include, but are not limited to, integration of multiple enterprise systems responsible for planning, scheduling, execution, and tracking of both capital and operating projects. Such integrations will facilitate seamless data transfer between systems, ensuring data accuracy and consistency, minimizing manual data entries, and enhancing overall portfolio management. Alectra Utilities also plans to use the budget to meet and comply with future OEB requirements. For example, Alectra Utilities will incorporate the Benefit-Cost Analysis (BCA) Framework and the Vulnerability Assessment and System Hardening (VASH) into C55.

In addition, Alectra Utilities will continue to refine its capital planning tools, including the roll-out of a Self-Serve Analytics reporting tool that aims to simplify financial reporting, address OEB requirements, and improve employee productivity.

2.1.4.2 AMI 2.0 – Grid Edge Analytics

Alectra Utilities plans to invest \$4.3MM in grid edge analytics over the DSP period, using the enhanced functionalities offered by the new Advanced Metering Infrastructure (AMI) 2.0 system. The deployment of AMI 2.0 analytics will generate more frequent and detailed data than current AMI systems. This data and associated analytics will allow Alectra Utilities to analyze its system and customer patterns, supporting the development of revised processes and services. For example, more detailed information about transformer loading can help to identify where to prioritize maintenance and/or replacement work and identify overheating equipment, which can result in injuries and damage to property. Reports from enabled meters can more accurately identify where meters are located in the field, helping to keep GIS up to date and reducing time spent making field visits to meters.

Alectra Utilities intends to implement grid-edge analytic technology on a limited basis after deploying the next-generation AMI system. This initiative will focus on roughly 5% of installed meters and is designed to enable Alectra Utilities employees to become familiar with new data and information from the AMI system. The process will allow business units to incorporate additional data streams into their processes. Improved data quality will benefit system operations, planning, and customer service. For example, system operations would have improved information about transformer loading, which would be an input into maintenance schedules that

1 would more efficiently allocate resources. Increased granularity of customer load profile data
2 would provide system planning with insights that would be incorporated into future system
3 forecasts that would more accurately forecast demand and more efficiently allocate capital.
4 Customer service would also be able to use that data to support customer requests and to provide
5 more rapid and accurate updates regarding outages, providing an improved customer experience.
6 The grid-edge analytics deployment would begin in 2028 and continue through at least 2031. The
7 data collected from this initial implementation will inform future decisions regarding broader
8 adoption of this technology by Alectra Utilities.

9 This project corresponds with global technology trends to provide increased functionality through
10 software. Software enables ongoing improvements, often mitigating the need for hardware
11 replacement. This investment will enable Alectra Utilities to take a phased approach to
12 technology implementation, ensuring thorough due diligence is completed before committing to a
13 larger-scale investment. Alectra Utilities anticipates that this solution will allow the organization
14 to respond to current and future needs, including increased loads, greater use of DERs, and
15 meeting customer expectations for timely and relevant information (refer to *Exhibit 1, Tab 5,*
16 *Schedule 1 Ongoing Customer Engagement*, page 8, lines 5-26). This approach enhances the
17 operational resiliency of grid operations and assists in preparing for future requirements in a
18 coordinated manner.

19 **2.2 IT Hardware**

20 Alectra Utilities has a planned investment portfolio of \$22.6MM in IT Hardware projects over the
21 DSP period. The primary driver of this investment portfolio is functional obsolescence, as
22 replacing IT hardware on a cyclical basis is a necessity to ensure the reliable performance of
23 systems that support customer services, core distribution operations, and other critical business
24 functions. IT hardware includes backend infrastructure (servers, storage, networking, and
25 communication systems) and endpoint devices (desktops, laptops, tablets, and printers), all of
26 which are critical to field and business operations.

27 Hardware failures can disrupt outage response, limit access to critical systems, and compromise
28 the safety and security of both employees and customers. To mitigate these risks, Alectra Utilities
29 follows asset lifecycle management best practices, replacing out-of-warranty and end-of-life
30 hardware to minimize potential system downtime, reduce maintenance costs, improve system

performance, and address security vulnerabilities. Throughout the DSP period, Alectra Utilities plans to replace approximately 20% of endpoint assets and 15% of backend infrastructure assets each year (based on asset amortization schedule and asset criticality) to maintain system performance, supportability, and operational stability.

Alectra Utilities' planned hardware investments during the DSP period are categorized in Table B09 - 8 for 2027 to 2031.

Table B09 - 8 IT Hardware Investments

Project Code(s)	IT Hardware Investments	Total 2027 to 2031 (\$MM)
102098-IT End User - Client Computing 102099-IT End User - Printer & Copier Fleet Replacement 103030-SCADA - Technology Upgrades Improving the System Control Room Environment 152556-Metering Tablets 152339-OT Infrastructure - Control Room Hardware Upgrade Cycle 152646-Interactive Digital Communications System	2.2.1 End User Technology	10.4
102157-IT Infrastructure - Server Refresh 150391-IT Infrastructure - Wireless LAN Upgrade 150396-IT Infrastructure - Network Refresh 150558-OT Infrastructure - Network Hardware Upgrade Cycle 150583-SCADA - Server Hardware Upgrade Cycle 151525-Meter-to-Cash Hardware Expansion/Renewal for all Oracle based applications 152097-OT Infrastructure - Software Defined Networking 152390-OT Infrastructure - Core Network Switch Replacement 152516-IT Infrastructure - Control Room Phone System Refresh 152955-GIS Hardware Upgrade Cycle	2.2.2 Data Centre Infrastructure	9.9
153072-IT Infrastructure- Backup Refresh Current	2.2.3 Enterprise Backup & Recovery	2.3
	Total	22.6

2.2.1 End User Technology

Alectra Utilities plans to invest approximately \$10.4MM over the DSP period in End User Technology, due primarily to functional obsolescence of client hardware. This includes desktops, laptops, tablets, printers, and mobile devices used by office staff, field crews, and control room operators. Alectra Utilities' asset lifecycle management practices align with industry standards such as Information Technology Infrastructure Library (ITIL) and vendor-recommended refresh cycles, which typically range from three to five years. By replacing devices older than five years, Alectra Utilities ensures continued vendor support, including warranty coverage, access to firmware and security updates, and compatibility with modern enterprise applications. This approach not only maintains device reliability and performance but also reduces the risk of downtime, cyber security vulnerabilities, and increased support costs associated with aging, unsupported hardware.

Regarding its multifunction printer fleet, Alectra Utilities will optimize the fleet through centralization and consolidation efforts where possible. Despite this overall reduction, these devices remain essential tools for employees who require printed materials to perform their job functions. Large multifunction printers typically possess a six-year lifespan for parts availability, security updates, and vendor support, making a regular upgrade cycle necessary. Neglecting to maintain an updated printer fleet can result in increased operational costs, including higher toner expenses and out-of-warranty repair fees. Additionally, printers are known to be common targets of cyber-attacks, such as network breaches and denial-of-service attacks. Regularly updating Alectra Utilities' printer fleet is essential for mitigating these risks and enhancing Alectra Utilities' overall cybersecurity posture.

2.2.2 Data Centre Infrastructure

During the DSP period, Alectra Utilities plans to invest \$9.9MM in data centre infrastructure. Alectra Utilities must regularly replace back-end hardware devices to ensure operational reliability and stability of its core systems. This investment will be used to replace hardware that has reached its end-of-life as part of normal asset lifecycle management best practices, and in alignment with Alectra Utilities' asset useful life timeframes. Alectra Utilities follows asset lifecycle management best practices for infrastructure hardware, guided by ITIL and aligned with industry benchmarks recommending refresh cycles of three to seven years. By replacing servers, storage,

and network devices within their supported lifecycle, Alectra ensures continued vendor support, including warranty coverage, firmware and security updates, and access to technical expertise. This approach reduces the risk of system failures, cyber vulnerabilities, and costly downtime, while ensuring infrastructure remains reliable, efficient, and compliant with regulatory and security requirements. Planned investments include renewing:

- Physical servers and storage devices, that enable web-based services, individual applications, and databases
- Networking devices, including routers, switches, load balancers, and wireless access points
- Phone system equipment for control room operations

Alectra Utilities relies on infrastructure hardware to operate reliably and securely. Replacing network, storage, and server related hardware as part of normal asset lifecycle management is cost-effective and essential for maintaining core business operations.

2.2.3 Enterprise Backup & Recovery

Alectra Utilities plans to invest \$2.3MM to renew its backup infrastructure to meet growing data demands. The current system faces capacity and reliability challenges due to increasing data production and system implementations. Without a timely refresh, Alectra Utilities faces increased risk of backup storage limitations, server failures, incomplete backups, and potential data loss. These risks jeopardize business continuity, disaster recovery, data integrity and resiliency, as well as risks adherence to data retention requirements. This investment will deploy supported infrastructure sized for current and future needs, ensuring the continued operations of Alectra Utilities' backup and recovery system.

2.3 IT Security

Alectra Utilities' investment in its IT Security portfolio is both a necessity and a strategic commitment to maintaining a robust security framework, supporting business continuity, and protecting the customers and communities we serve. Over the DSP period, Alectra Utilities' planned IT Security investment portfolio is \$7.3MM. With the growth of artificial intelligence and the increasing capabilities of rapidly evolving technologies, Alectra Utilities requires ongoing investment to address increasingly more sophisticated cybersecurity threats. This is especially

important as Alectra Utilities' distribution system and several back-office systems become increasingly connected. To effectively identify, detect, respond to, and recover from these threats, Alectra Utilities is investing in IT security infrastructure and services to protect system operations, safeguard sensitive data, and ensure compliance with the Ontario Cyber Security Framework (OCSF). In contrast to other investments where cybersecurity is a secondary consideration, the initiatives described here concentrate mainly on reducing cyber risk.

During the DSP period, Alectra Utilities planned IT security investments are categorized in Table B09 - 9.

Table B09 - 9 IT Security Investments

Project Code(s)	IT Security Investments	Total 2027 to 2031 (\$MM)
151812-Cyber Security - Security Upgrades	2.3.1 Cyber Security Device Upgrades	5.6
152571 [REDACTED]		
150520-Cyber Security - Security Additions & Enhancements	2.3.2 Foundational Governance & Security Services	1.7
	Total	7.3

2.3.1 Cyber Security Device Upgrades

Over the course of the DSP period, Alectra Utilities has planned a \$5.6MM investment to replace its aging security devices and infrastructure following vendor-scheduled end-of-life or end-of-support periods. These upgrades are vital to ensuring a secure and resilient technology environment, enabling resilient operations while safeguarding Alectra Utilities' critical assets and data that support internal business and field operations.

Most of this investment is directed at replacing Alectra Utilities' aging network firewalls that are critical for protecting both corporate and operational technology networks. As vendor support for these systems is ending, security patches and technical support will become unavailable, which would create an unacceptable level of risk to the organization due to the increased potential for cyber exploits from exposed vulnerabilities and the increased possibility for extended downtime of critical security infrastructure.

1 Similarly, upgrading Alectra Utilities' [REDACTED] systems is of critical
2 importance to ensuring effective [REDACTED] of Alectra Utilities' corporate and
3 OT networks, particularly given the growing use of mobile computing devices and reliance on
4 third-party service providers connecting to Alectra Utilities' networks. [REDACTED]

5 [REDACTED]
6 [REDACTED]
7 The enhanced [REDACTED] will strengthen network security through tighter access controls.

8 [REDACTED]
9 [REDACTED]
10 [REDACTED]
11 [REDACTED]
12 **2.3.2 Foundational Governance & Security Services**

13 During the DSP period, Alectra Utilities plans to invest \$1.7MM on foundational governance and
14 security services. With advancements in technologies such as artificial intelligence, cyber threats
15 are becoming increasingly sophisticated and more difficult to detect. This investment will enable
16 Alectra Utilities to adapt to, and address, new cyber threats with the speed and resources needed
17 to proactively thwart impending attacks. This will involve enhancing current security technologies
18 and implementing new security services to address the growing digital threat landscape. These
19 measures will strengthen Alectra Utilities' defenses against cyber threats, promote compliance
20 with the OCSF, and meet the specific requirements of Alectra Utilities' cyber insurance providers.

21 The goals of this investment are to:

- 22 • Improve Alectra Utilities' security posture
23 • Promote regulatory compliance
24 • Address identified risks through regular annual audits
25 • Develop and improve necessary cyber capabilities to address new and advanced
26 cyber threats

27 Ultimately, Alectra Utilities' investment in IT Security will support its efforts to protect its systems
28 and data in accordance with relevant laws, maintain ongoing enhancements in cybersecurity

practices to mitigate cyber risk, and continue to encourage and educate employees on cybersecurity best practices.

2.4 DER Supporting Technologies

Alectra Utilities is proactively addressing the growing adoption of DERs detailed in *Appendix J - Load Forecast & System Capacity Adequacy Assessment Report (Section 3)*, to support grid planning and operations, enhance customer value, and manage the impact of electrification on the grid. With electric vehicle transportation and heating electrification introducing significant and increasing electricity demands, DERs are an essential and innovative approach to balance these demands while maintaining grid reliability and minimizing infrastructure costs.

The following section outlines the investment Alectra Utilities is making in DER supporting technologies over the DSP period.

Table B09 - 10 DER Investments

Project Code(s)	DER Supporting Technologies Investments	Total 2027 to 2031 (\$MM)
152995-Customer Non-Wires Solution Design & Development 152589-Alectra Drive for Fleets 152574-SEW Customer Engagement eMobility 152603-Grid Enablement: School Bus Fleets	2.4.1 Customer Non-Wires Solution Design & Development & other DER	1.2
	Total	1.2

2.4.1 Customer Non-Wires Solution Design & Development

As detailed in *Appendix J - Load Forecast & System Capacity Adequacy Assessment Report (Section 3)*, Alectra Utilities' distribution system continues to have a net increase in electrical demand on its grid. In some cases, load growth will necessitate investment for Alectra Utilities to serve its customers safely and effectively, as the increase in load exceeds the capacity of the existing infrastructure. If unaddressed, this could lead to infrastructure failures before the end of

1 the asset's expected lifespan, resulting in earlier replacement and renewal, and resulting in higher
2 costs for customers.

3 Customer-sited DERs offer valuable flexibility and capacity for the distribution system. Efficient
4 use of DERs enables load curtailment and shifting to off-peak periods, helping manage and defer
5 load growth within current limits until upgrades are made. Where there is alignment between the
6 system need and the availability of flexible load, DERs can serve as Non-Wires Solutions (NWS).
7 Where there is an appropriate fit with system needs, the use of NWS is expected to be able to
8 provide cost savings to ratepayers. NWS allow existing assets to be used for their anticipated
9 lifespan rather than requiring early replacement due to stress and overuse, and system expansion
10 can be deferred or avoided. This reasoning is documented in the OEB's *Non-Wires Solutions*
11 *Guidelines for Electricity Distributors*, issued March 28, 2024 (NWS Guidelines). Utilities are to
12 undertake their analysis in line with the OEB's *Benefit-Cost Analysis Framework for Addressing*
13 *Electricity System Needs*, issued May 16, 2024 (BCA Framework).

14 Alectra Utilities has a planned investment of \$1.2MM over the DSP period to support the
15 development of customer NWS by developing a set of DER program models that can be deployed
16 to serve as NWS, and an analytical process by which these NWS can be evaluated against
17 system needs to identify where they meet performance and cost/benefit requirements provided
18 by the Non-Wires Solutions Guidelines. A comprehensive design approach informed by various
19 Alectra Utilities business functions will allow the organization to use the potential of NWS
20 effectively. For clarity, this project does not include the deployment of NWS to address system
21 needs; it is to develop the analytical framework, perform modelling, and develop working program
22 and technology models to be able to use DERs in the field to meet appropriate system needs.

23 Through this project, Alectra Utilities will first collect a list of DERs that could be used to provide
24 grid services. DER technologies will be assessed based on a review of performance literature
25 and validated through interviews with those familiar with the in-field performance of the
26 technology. The resulting performance characteristics will create a consolidated database which
27 can be used to inform the selection of optimal DER solutions.

28 Once the tools have been identified, customer research will be leveraged to develop customer-
29 centric program designs which can produce NWS. Factors relevant for customer decision making
30 will be documented and made available for use through the design process. These insights will

help shape program parameters to ensure alignment with customer needs and expectations as program prototypes are developed. Review of existing program evaluations will also be used to inform preliminary designs and document assumptions and scenarios.

Once draft program designs have been developed, they will be modelled against system needs to assess their ability to address system requirements, and how they perform in terms of cost-effectiveness depending upon different input assumptions. This will result in mapping of programs against system needs, essentially creating a list of tools that are available for use, and under what conditions.

In alignment with the program designs, one or more implementation plans will be developed to establish a structured framework for deploying NWS. This process will involve acquiring and integrating technology, defining vendor requirements, and educating customers to drive NWS awareness and adoption within target segments. These efforts will also align NWS resources with Alectra Utilities' operations to support grid needs.

2.5 Summary of Investment Outcomes and Benefits

Table B09 - 11 summarizes the overall outcomes and benefits associated with the Information Technology Systems portfolio.

Table B09 - 11 Investment Outcomes and Benefits

Outcome	Investment Benefits & Objectives
Customer Focus	Reliability and Service Continuity: - Ensures the consistent delivery of reliable services by upholding secure and well-functioning systems. - Supports outage restoration efforts and timely access to data during disruptions. - Reduces system disruptions associated with unsupported or less efficient technology. - Implements advanced security protocols to protect company and customer data.
	Enhanced Customer Experience: - Improves appointment compliance, scheduling, and customer communication through timely updates for service requests. - Ensures scalability to handle growing customer demand.

Outcome	Investment Benefits & Objectives
Operational Effectiveness	Safety and Security: Enhances operational security measures to safeguard confidential customer interactions and data.
	Enhanced System Reliability and Continuity: - Decreases the risk of software challenges through regular updates and enhancements, ensuring operational continuity and compatibility with updated systems. - Maintains operational efficiency and system stability by updating hardware and software that have reached their end-of-life. - Adopts modern technologies (e.g. Oracle MSM, C2M) for reliable lifecycle support and improved process efficiency.
	Process Automation and Workflow Efficiency: - Automates workflows and reduces manual intervention to increase productivity and reduce human error. - Streamlines operations, reporting, and resource usage across enterprise tools. - Improves interoperability between systems to ensure secure, scalable, and reusable integrations.
	Advanced Analytics and Decision-Making: - Uses advanced analytics and real-time monitoring to enhance situational awareness. - Optimizes crew routing and resource allocation using geospatial capabilities. Cybersecurity and Resilience: - Reduces risks associated with outdated systems by refreshing critical security infrastructure. - Ensures resilience against potential threats by aligning to the regulatory requirements and security standards of the OCSF.
Public Policy Responsiveness	Regulatory Compliance and Alignment: - Maintains compliance with regulatory requirements through modifications and enhancements to its existing enterprise systems. - Aligns with OEB NWS guidelines to implement cost-effective alternatives to traditional infrastructure upgrades.

Outcome	Investment Benefits & Objectives
	- Aligns with the OCSF, industry best practices, and cyber insurance standards. Supporting Sustainability and Energy Transition: - Promotes alignment with broader energy sustainability and resilience objectives. - Encourages grid resilience and flexibility by advancing DER-based solutions.
Financial Performance	Cost Management and Efficiency Gains: - Reduces operational costs through automation, process efficiency, and resource consolidation. - Mitigates risks and costs of outdated hardware and unsupported systems by adhering to vendor updates and support cycles. Strategic Investments and Planning: - Invests in software and system upgrades with continuous value assessments to measure improvement efficacy and prioritize system changes. - Improves financial planning through robust value frameworks, enhanced reporting, and strategic project selection. Risk Mitigation and Compliance: - Avoids costs from potential data breaches, compliance violations, and operational downtime by addressing security vulnerabilities. - Prevents potential financial losses by maintaining regulatory compliance and adhering to cybersecurity standards. Productivity and Resource Optimization: - Extends asset life and reduces maintenance costs with advanced planning and lifecycle management. - Enhances cost-effectiveness through labour efficiencies and automated systems.

III Investment Drivers & Needs

The IT Systems portfolio plays a critical role in ensuring the safe, secure, and efficient operation of Alectra Utilities' distribution system. This portfolio encompasses the implementation of new system solutions, ongoing maintenance, targeted strategic enhancements, and the replacement of unsupported and end-of-life hardware and software.

This program is guided by six key investment drivers: functional obsolescence, addressing the need to update critical end-of-life systems; operational efficiency, which ensures streamlined processes and optimal resource utilization; cybersecurity and resilience, which focuses on mitigating emerging security threats to safeguard sensitive information and maintain operational integrity; and regulatory compliance and readiness, ensuring adherence to evolving mandates.

These drivers exemplify Alectra Utilities' dedication to the OEB's Renewed Regulatory Framework (RRF) outcomes: customer focus, operational effectiveness, public policy responsiveness, and financial performance.

Further details on these drivers are included in Table B09 - 12.

Table B09 - 12 Investment Drivers, Reasoning, and Investment Benefits

Investment Driver	Reasoning & Investment Benefits
Functional Obsolescence	Many of Alectra Utilities' IT systems are nearing end-of-life, increasing risks of failures, inefficiency, and higher maintenance costs. Upgrading ensures stability, reliability, modern compatibility, and vendor support while reducing downtime, security threats, and compliance issues. These improvements help maintain business continuity and long-term sustainability.
Operational Efficiency	The modernization and enhancement of systems such as ERP and Meter-to-Cash, alongside the deployment of new platforms like Workforce Management, are strategically designed to optimize operational workflows through automation, minimization of manual processes, and more efficient allocation of resources. These initiatives aim to lower operational costs and standardize procedures across key business functions. By improving overall efficiency, Alectra Utilities will be better positioned to manage increased workloads.
Cybersecurity and Resilience	As cyber threats increase and become more complex and utility systems become increasingly interconnected, robust cybersecurity measures are essential.

Investment Driver	Reasoning & Investment Benefits
	boosts data security, minimizes vulnerabilities, ensures OCSF compliance, and protects critical assets, reducing financial and operational risks from cyberattacks.
Regulatory Compliance and Readiness	Alectra Utilities invests in IT systems to help meet OEB, IESO, and regulatory requirements. Strategic IT upgrades and enhancements enable the organization to address compliance changes, such as new rate structures or modifications in reporting requirements. Maintaining adaptable and flexible systems and processes allows Alectra Utilities to respond to changes in the market, customer needs, and regulations.

IV Investment Timing & Pacing

4.1 Summary of Expenditures

Table B09 – 13 provides the year-over-year breakdown of Information Technology Systems investments, including the historical period from 2020 to 2024, the forecasted bridge years from 2025 and 2026, and the forecast period from 2027 to 2031.

Table B09 – 13 Historical & Proposed Investment Spending

	Historical Spending					Bridge		Forecast Spending				
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
CAPEX (\$MM)	14.1	13.3	21.0	14.8	15.1	13.4	13.0	21.5	31.4	28.4	7.6	9.1

4.2 Historical Expenditures (2020-2024)

Table B09 – 14 provides the historical budget allocated from the 2020 – 2024 DSP period, actual spend, and the subsequent variance to budget.

Table B09 – 14 Historical Investment Spending Compared To 2020-2024 DSP

Year	2020	2021	2022	2023	2024	Total
2020-2024 DSP Budget CAPEX (\$MM)	14.9	18.6	20.7	13.2	9.4	76.8
Actual Spend CAPEX (\$MM)	14.1	13.3	21.0	14.8	15.1	78.3
Variance CAPEX (\$MM)	0.8	5.3	(0.3)	(1.6)	(5.7)	(1.5)

IT Systems' historical expenditures between 2020 and 2024 total \$78.3MM, with a total variance to budget of approximately 2% or \$1.5MM.

During the historical rate period, Alectra Utilities' expenditures under the IT Systems program were as follows.

Table B09 - 15 IT Systems Historical Expenditures from 2020 to 2024

IT Investment Sub-categories	2020	2021	2022	2023	2024	Total
IT Software:						
Meter-to-Cash	3.3	3.1	8.4	5.6	3.9	24.3
Operational Technologies	0.3	0.8	1.3	1.1	2.7	6.2
Enterprise Resource Planning	1.5	2.2	1.3	1.9	1.9	8.8
Business Optimization	1.7	2.8	3.1	2.8	1.5	11.9
Total IT Software	6.8	8.9	14.1	11.4	10.0	51.2
IT Hardware:						
End User Technology	2.4	1.6	1.6	1.5	1.1	8.2
Data Centre Infrastructure	3.3	1.9	3.5	1.4	1.3	11.4
Enterprise Backup & Recovery	0.0	0.0	0.0	0.0	1.6	1.6
Operational Technologies	0.0	0.0	0.2	0.0	0.0	0.2
Business Optimization	0.4	0.0	0.5	0.0	0.0	0.9
Total IT Hardware	6.1	3.5	5.8	2.9	4.0	22.3
IT Security:						
Cyber Security Upgrades	0.0	0.0	0.4	0.3	0.1	0.8
Foundational Governance & Security Services	0.8	0.6	0.4	0.4	0.4	2.6
Total IT Security	0.8	0.6	0.8	0.7	0.5	3.4
Total DER Supporting Technologies	0.4	0.3	0.3	(0.2)	0.6	1.4
Total (\$MM)	14.1	13.3	21.0	14.8	15.1	78.3

4.2.1 IT Software

Alectra Utilities invested \$51.2MM in IT Software, which accounts for 65% of the total planned IT Systems investment over the 2020-2024 historical period. Within this category, the Meter-to-Cash system received a \$24.3MM investment, which includes an \$8.5MM investment to upgrade Alectra Utilities' CC&B system. The project finished under budget by \$4.8MM due to favourable contract terms, adjustments to the original project scope, and the use of lower-cost off-shore resources.

Alectra Utilities allocated \$11.9MM to Business Optimization expenditures, primarily to address system licensing and enhancements to its capital planning and optimization platform (Copperleaf C55). These enhancements included developing and implementing Alectra Utilities' capital planning reporting environment, enabling additional security measures, and updating its business case value framework if needed. These improvements ensured that Alectra Utilities' investment planning system remained well-aligned with the detailed reporting and accountability requirements of its regulated environment.

During this period, Alectra Utilities' historical ERP investments totalled \$8.8MM, primarily for ERP upgrades to maintain vendor compliance with supported versions, address cybersecurity vulnerabilities, and introduce ongoing improvements that better aligned system capabilities with business processes and evolving operational needs. During this time, Alectra Utilities introduced its productivity framework. As a result, enhancements planned for enterprise systems such as Alectra Utilities' ERP system undergo a rigorous value assessment to ensure proper prioritization of enhancements tied to value for investment.

Lastly, Alectra Utilities allocated \$6.2MM to Operational Technology capital expenditures, focusing primarily on upgrades and enhancements to its OMS, GIS, and SCADA platforms. These investments ensured that at the relevant time, the platforms remained up-to-date and fully supported by vendors, addressed key security vulnerabilities, and provided targeted improvements to address business process inefficiencies in line with evolving operational requirements.

4.2.2 IT Hardware

IT Hardware investments accounted for approximately 28% or \$22.3MM of the total IT Systems expenditures over the 2020-2024 historical period. Specifically, investments in data centre infrastructure totalling \$11.4MM were used to replace obsolete and end-of-life infrastructure hardware. This was followed by \$8.2MM in end-user technology costs, which saw a significant increase due to the COVID-19 pandemic, as the organization diligently worked to procure client computing hardware necessary to enable business continuity through remote work. Lastly, Alectra Utilities allocated \$1.6MM towards an enterprise backup and recovery solution, enhancing its data resilience by implementing a modernized architecture that leverages both hybrid cloud and on-premises environments.

4.2.3 IT Security

IT security investments accounted for approximately 4%, or \$3.4MM, of total IT System expenditures during this historical period. These investments were primarily focused on replacing end-of-life security infrastructure, including [REDACTED]. Additional investments supported the development and implementation of an [REDACTED] [REDACTED] enhancing Alectra Utilities' overall cybersecurity posture and access management capabilities.

4.2.4 DER Supporting Technologies

Over this historical period, Alectra Utilities' GRE&T Centre invested approximately \$1.4MM in several Distributed Energy Resource (DER) enablement initiatives, aimed at enhancing grid flexibility and supporting customer electrification. These initiatives were supported and partially funded by various government agencies including NRCAN, the OEB, and the IESO.

Key projects included the development of a transactive energy platform to facilitate customer participation in an energy marketplace (\$0.8MM), the commencement of a digital eMobility customer engagement platform to support residential Electric Vehicle (EV) adoption and explore managed EV charging (\$0.4MM), and a vehicle-to-grid project exploring bidirectional charging with electric school buses to provide grid services (\$0.1MM). The 2023 credit of \$0.2MM in Table B09 - 15 was attributable to the timing of government funding received on the transactive energy platform.

These DER initiatives support Alectra Utilities' strategic transition to a distributed, decarbonized, and customer-centric electricity system.

4.3 Bridge Expenditures (2025 to 2026)

Capital expenditures over the bridge period between 2025 and 2026 are forecasted to be \$26.4MM.

Table B09 - 16 Bridge Expenditure 2025-2026

IT Investment Sub-categories	2025	2026	Total
IT Software:			
Meter-to-Cash	3.5	2.6	6.1
Operational Technologies	2.1	2.0	4.1
Enterprise Resource Planning	1.8	2.7	4.5
Business Optimization	1.9	1.0	2.9
Total IT Software	9.3	8.3	17.6
IT Hardware:			
End User Technology	1.0	1.4	2.4
Data Centre Infrastructure	1.2	1.3	2.5
Total IT Hardware	2.2	2.7	4.9
Total IT Security	0.3	0.4	0.7
Total DER Supporting Technologies	1.6	1.6	3.2
Total (\$MM)	13.4	13.0	26.4

4.3.1 IT Software

Over the bridge period, Alectra Utilities plans to invest \$17.6MM in its IT software, which represents approximately 67% of the total IT system budget.

This investment includes \$6.1MM in Meter-to-Cash investments broken out by \$1.4MM for enhancements to Customer Care and Billing (CC&B) and \$1.2MM for regulatory modifications. \$2.4MM is allocated for CC&B licensing as Alectra Utilities transitions to Oracle's new licensing model in preparation for its Customer to Meter (C2M) upgrade. The remaining \$1.1MM will be distributed across several minor projects related to network metering upgrades on its core Advanced Metering Infrastructure (AMI) 1.0 platforms, including Trilliant, Connexo, and others (refer to *Section 2.1.1* for more details).

Investments in ERP total \$4.5MM or 26% of the total IT Software budget over the bridge years. Of this, \$3.3MM is attributable to ERP Continuous Improvements and \$1.2MM allocated to ERP System Upgrades (refer to *Section 2.1.3* for more details).

Additionally, Alectra Utilities plans to invest \$2.9MM in Business Optimization, attributed to optimizing business practices via its Copperleaf C55 platform for capital investment planning and optimization (refer to *Section 2.1.4* for more details).

Lastly, Alectra Utilities intends to invest \$4.1MM in Operational Technologies. The primary investment is attributable to the purchase and phase one implementation of Alectra Utilities' Workforce Management system (\$2.7MM), with the remaining \$1.4MM split between five upgrade and enhancement projects to Alectra Utilities' GIS, OMS, SCADA, and PI platforms respectively (refer to *Section 2.1.2* for more details).

4.3.2 IT Hardware

Over the bridge years, Alectra Utilities plans to invest \$4.9MM in IT hardware to refresh its aging infrastructure and client devices. This investment includes \$2.5MM for upgrading end-of-life data center infrastructure and \$2.4MM for replacing outdated client computing hardware. These upgrades are in line with asset management lifecycle best practices and Alectra Utilities' useful life timelines (refer to *Section 2.2.1* and *Section 2.2.2* for more details).

4.3.3 IT Security

Over the bridge years, Alectra Utilities plans to invest \$0.7MM in IT Security to advance our cybersecurity tools and controls to align with the Ontario Cyber Security Framework (OCSF).

4.3.4 DER Supporting Technologies

Over the bridge years, Alectra Utilities plans to invest \$3.2MM in DER Supporting Technologies. Specifically, \$2MM on Alectra Utilities Drive for Fleets, and \$1.1MM on the continuation of the Customer Engagement eMobility project respectively.

The Alectra Utilities Drive for Fleets program will be designed to enable smart managed EV charging in a limited capacity, evaluating and supporting companies as they move from internal combustion engine fleets to EVs. Through the integration of advanced technologies and advisory offerings, the initiative aims to create mutually beneficial outcomes for both customers and Alectra Utilities. The initiative aims to support customers' efforts to decarbonize their transportation assets and enhance Alectra Utilities' grid resilience while ensuring cost efficiency for its ratepayers. This program is a key element of Alectra Utilities' broader strategy to support the energy transition and meet the increasing demand for sustainable energy solutions.

Regarding the \$1.1MM investment in Customer Engagement eMobility, Alectra Utilities intends to continue its deployment of an eMobility module on its customer portal to enhance residential customer engagement and participation in DERs. The goal is to assess the value of the information and tools provided to customers on their electrification journey and to evaluate how customers perceive a program designed to support their transition into prosumers through managed EV charging.

4.4 Future Expenditures (2027 to 2031)

Expenditures between 2027 and 2031 are forecast to be \$98.0MM. Significant IT Systems cost drivers during the DSP period include:

4.4.1 IT Software

Investments in IT Software over the DSP period total \$66.9MM or approximately 68% of the total planned IT Systems investment. The primary drivers for this investment are functional obsolescence and operational efficiency, specifically within the Meter-to-Cash sub-category, totaling \$25.8MM. Of this investment, \$14.4MM is attributable to upgrading Alectra Utilities' CC&B system to the latest version of Oracle Customer to Meter (C2M) over 2028 and 2029, ensuring system currency and remaining compliant with Oracle's support requirements. Additionally, planned CC&B enhancements (\$3.4MM), regulatory modifications (\$2.9MM), Load Profile and Settlements system upgrade (\$1.3MM), and Meter-to-Cash license growth (\$1.2MM) make up the remaining material Meter-to-Cash investments. The remaining \$2.6MM will be distributed across several minor projects related to network metering upgrades on its core Advanced Metering Infrastructure (AMI) 1.0 platforms, including Primeread, Sensus, Connexo, and others (refer to *Section 2.1.1* for more details on Alectra Utilities' planned Meter-to-Cash investments).

Over the DSP period, investments in Alectra Utilities' Operational Technologies total \$15.3MM driven specifically by the need for improved operational efficiency related to Alectra Utilities' field services and mobile dispatching capabilities. Of the planned \$15.3MM investment in operational technologies, \$11.5MM is attributable to the phased implementation of a new Workforce Management and Mobile Dispatch system. This project is aimed at digitizing and modernizing Alectra Utilities' fieldwork, ensuring optimization of Alectra Utilities' field service processes regarding crew scheduling, automated routing, field data capture, customer communications, and other core field services capabilities. This investment ensures that Alectra Utilities' field services function has the necessary technology to efficiently manage field operations both from a back-office and front-line perspective. Phases for this project commence in 2025 and end in 2029 (refer to *Section 2.1.2* for more details on Alectra Utilities' planned Operational Technology investments).

Investments in Alectra Utilities' ERP software total \$12.0MM over the DSP period, specifically attributed to ERP Continuous Improvements (\$7.5MM) and ERP System Upgrades (\$4.5MM). These investments will continue to improve system capabilities and align system requirements with business processes. As with all core enterprise systems, ERP improvements are subject to a rigorous value assessment, ensuring that Alectra Utilities is receiving value for its investment (refer to *Section 2.1.3* for more details on Alectra Utilities' planned ERP investments).

Lastly, Alectra Utilities has a planned investment of \$13.8MM in Business Optimization. Of this investment, \$7.7MM is attributable to the optimization of Alectra Utilities' Copperleaf C55 system, to continue enhancing the system to meet and comply with future OEB requirements (e.g. BCA framework for NWS). This program spans the entire DSP period, with an average annual spend of \$1.5MM. Additionally, Alectra Utilities has planned a \$4.3MM investment in AMI 2.0 – Grid Edge Analytics. This project aims to utilize the advanced analytical capabilities of the new AMI 2.0 meters, allowing Alectra Utilities to gain a deeper understanding of its system and customers, which will enable the development of more efficient processes and services (refer to *Section 2.1.4* for more details on Alectra Utilities' planned Business Optimization investments).

4.4.2 IT Hardware

Over the DSP period, Alectra Utilities plans to invest \$22.6MM in IT hardware to refresh its aging infrastructure, client devices, and enterprise backup and recovery solution. This investment includes \$9.9MM for upgrading end-of-life data centre infrastructure and \$10.4MM for replacing outdated client computing hardware. These upgrades are in line with asset management lifecycle best practices and Alectra Utilities' useful life timelines, ensuring annual investments are tied to an asset replacement schedule. Additionally, Alectra Utilities intends to refresh its backup and recovery solution in 2029, ensuring the system has the necessary capacity and capabilities to address Alectra Utilities' growing digital and hybrid technology landscape (refer to *Section 2.2* for more details on Alectra Utilities' planned IT Hardware investments).

4.4.3 IT Security

Over the DSP period, Alectra Utilities has planned \$7.3MM in IT Security investments. From this amount, \$5.6MM is driven by functional obsolescence as Alectra Utilities plans to replace several components of its security infrastructure such as [REDACTED] in

1 alignment with asset management best practices and vendor-supported lifecycle timelines. The
2 remaining \$1.7MM investment is attributable to foundational governance and security services.
3 This investment is planned annually, with an average annual spend of \$0.3MM. This investment
4 will position Alectra Utilities to effectively respond to emerging cyber threats throughout the DSP
5 period. The initiative includes enhancing existing security technologies and introducing new
6 security services to address the evolving digital threat landscape. These actions will reinforce
7 Alectra Utilities' cybersecurity posture, facilitate compliance with the OCSF, and ensure alignment
8 with the requirements of Alectra Utilities' cyber insurance providers (refer to *Section 2.3* for more
9 details on Alectra Utilities' planned IT Security investments).

10 **4.4.4 DER Supporting Technologies**

11 Over the DSP period, Alectra Utilities plans to invest \$1.2MM in DER Supporting Technologies.
12 This investment is related primarily to the Customer Non-Wires Solution (NWS) Design and
13 Development project. This project will develop a set of DER program models that can be deployed
14 to serve as NWS. A comprehensive design approach, informed by various Alectra Utilities
15 business units, will allow Alectra Utilities to effectively utilize the potential of NWS (refer to *Section*
16 *2.4* for more details on Alectra Utilities' planned DER Supporting Technologies investments).

1

Table B09 - 17 Planned Investment Projects 2027-2031

IT Investment Sub-categories	2027	2028	2029	2030	2031	Total
IT Software:						
Meter-to-Cash	2.9	10.5	9.5	1.3	1.6	25.8
Operational Technologies	4.5	4.8	4.7	0.5	0.8	15.3
Enterprise Resource Planning	3.0	2.4	3.4	1.0	2.2	12.0
Business Optimization	2.0	6.1	3.4	1.3	1.0	13.8
Total IT Software	12.4	23.8	21.0	4.1	5.6	66.9
IT Hardware:						
End User Technology	1.9	2.3	2.0	2.1	2.1	10.4
Data Centre Infrastructure	3.5	2.3	2.4	0.8	0.9	9.9
Enterprise Backup & Recovery	0.0	0.0	2.3	0.0	0.0	2.3
Total IT Hardware	5.4	4.6	6.7	2.9	3.0	22.6
IT Security:						
Cyber Security Device Upgrades	3.1	2.4	0.1	0.0	0.0	5.6
Foundational Governance & Security Services	0.4	0.3	0.3	0.3	0.4	1.7
Total IT Security	3.5	2.7	0.4	0.3	0.4	7.3
Total DER Supporting Technologies	0.2	0.3	0.3	0.3	0.1	1.2
Total (\$MM)	21.5	31.4	28.4	7.6	9.1	98.0

2

V Options Analysis

Alectra Utilities develops several scope and pacing options for its capital investment plan which is designed to align with both internal priorities and external needs. This section summarizes the options analysis, aggregated at the category level, for the IT Systems portfolio. According to the Customer Engagement Report, residential, GS<50, and GS>50 customers are aligned with the proposed plan and associated rate increase derived from the investment options selected⁵⁵.

5.1 IT Software

Status Quo Option (No Investment):

The status quo option involves maintaining Alectra Utilities' current software systems in place, with no investment during the DSP period. Most investments in the IT software portfolio are related to enterprise system upgrades and enhancements, and touch on all investment drivers listed in *Section III*. Software upgrades and enhancements are necessary to avoid functional obsolescence, maintain operational efficiency and stability, reduce the risk of cyber threats by patching known vulnerabilities, and allow for the modifications of core enterprise systems to meet regulatory mandates. Therefore, maintaining the current state of Alectra Utilities' IT Software landscape, whether by deferring upgrades, foregoing enhancements, or relying on aging and outdated systems, was consistently viewed as an unsustainable option.

The status quo approach would expose Alectra Utilities to several risks, including:

- Loss of vendor support and system upgrades/patches
- Increased vulnerability to system failures and cyber threats
- Operational inefficiencies and declining user satisfaction
- Non-compliance with evolving regulatory requirements
- Escalating long-term costs due to reactive remediation

Foregoing or deferring investment in IT software will result in elevated operational risk and reduce the organization's ability to meet customer, regulatory, and operational needs effectively.

⁵⁵ Exhibit 1, Tab 5, Schedule 2 Application Specific Customer Engagement

Options Considered:

While each IT software project has detailed options considered on a per project basis, across the IT software portfolio, Alectra Utilities typically evaluated three approaches with respect to its investments in IT Software in addition to maintaining the status quo:

1. **Pacing Upgrades Based on Vendor Support:** Options included upgrading software platforms either annually, biennially, or on a deferred schedule. Alectra Utilities considered the appropriate frequency of introducing upgrades based on several factors such as maintaining alignment with vendor-supported versions, managing internal resource demands, and balancing capital and operational expenditures. More frequent upgrades (e.g. annual) offered functionality improvements but imposed higher resource overhead. Biennial or strategically timed upgrades were often preferred for balancing functional improvements and security with business impact and resource efficiency.
2. **Outsourcing or Third-Party Support:** Some alternatives involved outsourcing system enhancements to contractors or relying on third-party support vendors for systems nearing end-of-life. While these could offer temporary resource relief, they typically introduced complexity, integration risk, diminished control over critical business processes, and increased cost. As a result, these options were not recommended due to high costs and potential for operational misalignment.
3. **System Replacement or License Model Restructuring:** In cases where existing systems were approaching functional or contractual limitations, full system replacement or licensing model changes were considered. While more capital intensive upfront, these options were evaluated for their long-term cost-effectiveness, scalability, and alignment with enterprise architecture and digital strategy goals.

Recommended Option:

Alectra Utilities' recommended approach to its IT Software investment portfolio emphasizes proactive investment methods that prioritize:

- Maintaining vendor-supported upgrade cycles, ensuring platforms remain supported, secure, and stable

- Implementing targeted system enhancements which have undergone a rigorous evaluation process and prioritized by a steering committee of business stakeholders to drive measurable efficiency gains, support regulatory compliance, and improve customer and employee experience
- Transitioning to modern licensing or cloud-based models when financially beneficial and aligned with system roadmaps
- Coordinating software investments with broader system changes to maximize integration benefits, avoid duplication of effort, and reduce implementation risks

This approach enables Alectra Utilities to modernize its software ecosystem in a cost-effective, secure, and business-aligned manner, balancing improvements with operational continuity and stability.

5.2 IT Hardware

Status Quo Option (No Investment)

The status quo option involves maintaining Alectra Utilities' current hardware systems in place, with no investment during the DSP period. Across the IT Hardware portfolio, including end-user technology, data centre infrastructure, and enterprise backup systems, functional obsolescence is the primary investment driver. Maintaining the status quo, with no additional investment over the DSP period, will result in aging and unsupported hardware, which poses significant risks to Alectra Utilities' operations. These risks include:

- Increased downtime, degraded performance, and inconsistent user experiences
- Escalating cybersecurity threats due to a lack of firmware and patch support
- Higher maintenance and repair costs for aging or out-of-warranty equipment
- Operational inefficiencies and inability to scale or run modern applications
- Increased OPEX from extended third-party support for end-of-life systems

In all cases, the status quo option failed to provide a sustainable and secure approach to maintaining IT infrastructure, user productivity, and operational stability of Alectra Utilities' core technology platforms and client devices.

Options Considered:

Alectra Utilities generally evaluated three types of investment strategies across IT Hardware in addition to maintaining the status quo:

1. **Extended Hardware Lifecycles:** Extending device lifecycles (e.g. five to six years for end-user devices, seven to eight years for infrastructure hardware) helped smooth capital expenditures, but increased operational risk and costs. Higher failure rates, out-of-warranty repairs, and loss of vendor support creates the potential for long-term inefficiencies and security vulnerabilities. These approaches often shift costs from CAPEX to OPEX and are suboptimal for systems critical to maintain operational stability.
2. **Staggered Refresh Strategies:** For hardware such as client devices or network infrastructure, staggered refreshes were considered to align investments across the DSP period. Staggered refreshes focus on maintaining refresh timelines for most hardware, while deferring some less critical hardware for another year where the risk of failure or performance degradation would not have a significant impact. This approach was aimed at reducing budget volatility and to accommodate financial constraints, while still mitigating risk by prioritizing the most critical assets.
- **Cloud Alternatives:** In select scenarios (e.g. backup and recovery), a transition to a cloud-only solution was explored. While potentially eliminating hardware costs and simplifying scalability, a cloud-only approach was found to be more expensive overall and not well-suited to Alectra Utilities' hybrid environment due to the significant presence of on-premise systems and data. This option also introduces concerns around slower recovery times.

Recommended Option:

Alectra Utilities adopted the staggered option as a proactive and risk-balanced refresh strategy for its IT Hardware investments. This approach involved:

- Phased refresh cycles for end-user technology, maintaining most of the fleet on a four-year cycle, while selectively extending device lifecycles for a portion of the fleet to optimize capital allocation

- Five to six-year refresh cycles for data centre infrastructure, aligned with vendor support timelines to reduce security and performance risks while balancing its financial investment with other priorities
- Adopting a scalable, hyperscale architecture for enterprise backup and recovery with a five-year lifecycle, supporting hybrid environments and enabling seamless expansion and operational resilience

This proactive and balanced approach ensures Alectra Utilities maintains a secure, efficient, and reliable IT hardware foundation, minimizing lifecycle risk while balancing capital and operating costs. IT Hardware investments decisions were made in alignment with IT asset management best practices, ensuring operational stability while supporting essential business operations.

5.3 IT Security

Status Quo Option (Do Nothing):

The status quo option involves maintaining Alectra Utilities' current IT Security systems in place, with no investment during the DSP period. No investment in IT Security would expose the organization to growing cybersecurity vulnerabilities, operational disruptions, and regulatory non-compliance with Ontario's Cyber Security Framework (OCSF). As a result, the status quo is not a viable investment option.

Risks associated with outdated cybersecurity devices and governance tools include:

- Increased susceptibility to malware, ransomware, and unauthorized access
- Inability to meet evolving regulatory and cyber insurance requirements, including the OCSF
- Higher likelihood of data breaches, service interruptions, and reputational damage potentially resulting in significant financial damages and eroding customer trust
- Diminished ability to detect and respond to advanced persistent threats

Without proactive investments in IT Security devices and services, Alectra Utilities would lack the resilience and agility to defend against modern cyber risks, putting our employees, customers, and grid operations at risk.

Options Considered:

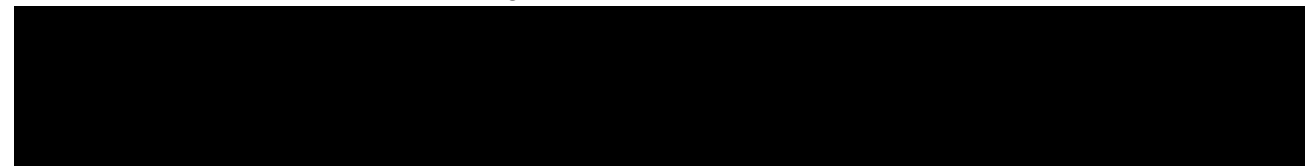
Alectra Utilities evaluated multiple investment options to modernize its cybersecurity infrastructure and governance framework against constantly evolving cyber threats:

1. **Fixed Replacement Cycles:** A standardized refresh schedule ensures consistent upgrades across the security stack, replacing firewalls, access controls, and other devices at regular intervals. While this reduces risk exposure and simplifies planning, it leads to higher capital costs by replacing hardware before end-of-life, reducing asset utilization efficiency.
2. **Cloud-Based or Subscription Security Services:** Subscription-based and cloud-native security tools offer real-time updates, scalability, and operational flexibility, particularly for threat detection and response. While these models may reduce upfront capital costs, they typically increase long-term operating costs and reliance on third-party providers. Additionally, full cloud adoption is limited for critical OT environments that still require on-premises controls.
3. **On-Premises-Only Models:** Alectra Utilities considered an investment approach that centered solely on utilizing on-premises security infrastructure and services. While this approach offered a higher degree of control, it was deemed to lack agility and scalability. This approach may be effective for foundational systems, especially in the OT environment, but it cannot respond as quickly to the dynamic threat landscape, limiting long-term resilience.
4. **Hybrid Investment Strategy:** Alectra Utilities considered a hybrid investment approach that combines targeted capital investment with scalable, cloud-based security solutions, balancing organizational risk with value, cost, and agility to respond to increasingly sophisticated cyber threats.

Recommended Option:

Alectra Utilities has adopted a hybrid cybersecurity investment strategy, that combines targeted capital investment with scalable, cloud-based security solutions, the optimal approach to balance organization risk, value, cost, and agility:

- Device replacements are scheduled based on asset lifecycle best practices and vendor supported versioning, rather than fixed cycles to balance cost with risk mitigation. In some cases, extended support agreements ensure continuous protection while avoiding premature replacements.



- Cloud-based services are incorporated for advanced threat detection, governance automation, and scalable response capabilities, providing operational agility while reducing the burden on internal resources.

This blended approach ensures Alectra Utilities remains compliant with the OCSF while maintaining a strong cybersecurity posture that is adaptable, cost-effective, and responsive to constantly evolving cyber threats.

5.4 DER Supporting Technologies

Status Quo Option (No Investment):

Alectra Utilities explored the option of not investing in DER Supporting Technologies over the DSP period. However, a lack of investment in the exploration, design, and integration DER NWS would potentially expose Alectra Utilities to regulatory non-compliance and operational inefficiencies.

Specifically, these include:

- Challenges to meet OEB requirements mandating the evaluation of NWS for projects over \$2MM
- Suboptimal grid planning and investment decisions, potentially resulting in higher long-term costs

- Diminished understanding of customer behaviour and market dynamics, leading to low program participation and limited DER adoption, and
- Missed opportunities to defer traditional infrastructure investments, improve grid reliability, and reduce peak demand through cost-effective, customer-centric alternatives

Given these risks, the status quo is not a viable approach for the DER Supporting Technologies investment category.

Options Considered:

Alectra Utilities evaluated two principal strategies for advancing its DER and NWS design capabilities:

1. **Adapting External Program Models Without Local Validation:** This approach refers to the adoption of established NWS program frameworks from other jurisdictions without conducting comprehensive local feasibility studies or customer engagement. It can reduce initial design costs and accelerate implementation timelines. However, this method may not account for Alectra Utilities' specific grid characteristics, customer demographics, and market conditions. The absence of localized analysis could impact procurement costs, program performance, and long-term outcomes.
2. **Primary Research and Custom Program Development:** Building all NWS program components from scratch through extensive local research and tailored design ensures optimal alignment with local needs but increases initial costs and timelines. This approach may also duplicate existing efforts by other utilities, causing inefficiencies.

Recommended Option:

Alectra Utilities recommends a data-driven and tailored design approach for DER NWS. This strategy leverages established best practices and resources from other utilities while incorporating local system, customer, and market data to ensure regulatory compliance and cost-effectiveness.

1 Key features of this approach include:

- 2 • Customizing NWS program design to reflect Alectra Utilities' grid characteristics
- 3 and customer demographics
- 4 • Conducting targeted feasibility assessments to ensure effectiveness and
- 5 operational integration
- 6 • Embedding regulatory requirements and procurement considerations early in the
- 7 design phase
- 8 • Focusing on customer-centric design to drive adoption and program success

9 This balanced strategy avoids reinventing existing models while ensuring solutions are aligned to
10 Alectra Utilities' operational context and regulatory obligations. It supports more informed
11 decision-making, facilitates DER adoption, and positions Alectra Utilities to optimize its grid
12 investments through innovative, NWS alternatives.

VI Investment Projects

The material investments from 2027 to 2031 that form the IT Systems investments are included in Table B09 - 18.

Table B09 - 18 Material Projects and Initiatives (2027-2031)

Project Code	Project Name	CAPEX (\$MM)
152539	Meter -to-Cash - CIS - CC&B CCS/C2M upgrade	14.4
102263	Work Force Management / Mobile Dispatch	11.5
102098	IT End User - Client Computing	8.5
151136	C55 Alectra Utilities: Optimization of Business Practices	7.7
150469	ERP Continuous Improvement	7.5
151812	Cyber Security - Security Upgrades	5.4
152996	ERP System Upgrades	4.5
152576	AMI 2.0 - Grid Edge Analytics	4.3
150325	Meter-to-Cash CIS CC&B Enhancements	3.4
102157	IT Infrastructure - Server Refresh	3.4
150453	Meter-to-Cash - CIS CC&B Modifications(Regulatory Enhancements)	2.9
153072	IT Infrastructure- Backup Refresh Current	2.3
150396	IT Infrastructure - Network Refresh	1.9
150520	Cyber Security - Security Additions & Enhancements	1.7
150563	SCADA - SCADA/OMS Software Upgrade Cycle	1.6
152995	Customer Non-Wires Solution Design & Development	1.4
150465	Meter-to-Cash LPSS(Load profile and settlements system)Upgrade	1.3
150468	Meter-to- Cash Annual Licenses Growth on Meter-to-Cash platforms	1.2
152097	OT Infrastructure - Software Defined Networking	1.2

Appendix C

Alectra Value Framework Definition Document



2024

Alectra Utilities Value Framework Definition Document

Copperleaf Technologies
2920 Virtual Way, Suite 140
Vancouver, BC, V5M 0C4
Canada
Tel: +1 604 639 9700
Fax: +1 604 639 9700



Statement of Confidentiality

This document contains confidential information including trade secrets, privileged, financial, and proprietary information which are extremely valuable and could cause irreparable harm to Copperleaf Technologies Inc ("Copperleaf" or "we") if revealed directly or indirectly to its competitors. Accordingly, all pages of this document have been submitted in confidence and provided for the sole benefit of the organization who has received it from Copperleaf. Reproduction in whole or in part, whether on paper, on the internet, or on any other medium including utilization in machines capable of reproduction or retrieval, without the express written permission of Copperleaf is prohibited. Distribution of this document is prohibited without express written consent from Copperleaf. Others who would like a copy of this document may seek to obtain it directly from Copperleaf by visiting us at www.copperleaf.com

Contents

1	Introduction	5
2	Value-Based Decision-Making	6
2.1	Introduction to Value-Based Decision-Making	6
2.2	Value Measure Types and Criteria	7
2.3	Assessing and Optimizing Investments	8
3	Organizational Objectives	10
3.1	Strategic Objectives and Value Measures	10
3.1.1	Value Drivers and Value Measures	10
3.1.2	Strategic Objectives Details	10
4	Risk Matrix	14
4.1	Consequence Definition	14
4.1.1	Consequence Levels	15
4.1.2	Consequence Definitions	15
4.2	Likelihood Definition	18
4.3	Risk Matrix	19
4.4	Risk Levels	20
4.5	Using the Risk Matrix for Calculation of Value Measure Output	0
5	Value Models and Value Measures	2
5.1	Value Measure and Value Model Types	4
5.1.1	Value Measures and Units	4
5.1.2	Baselines and Outcomes	4
5.1.3	Use of Value Models	4
5.1.4	Time Varying Values	4
5.2	Investment Models	4
5.2.1	Benefits	5
5.2.2	Costs	36
5.2.3	IT	39
5.2.4	Risks	59
6	Contact Copperleaf	73

1 Introduction

The following Value Framework Definition Document is intended to capture the information needed to specify the risk mitigation and benefit values associated with Investments in Alectra Utilities Value Framework. This document also captures the relevant processes, methodologies and key assumptions that were used to develop the Value Framework. This document will also, briefly, review how the Value Framework is used to evaluate Investments and arrive at optimized recommendations.

2 Value-Based Decision-Making

2.1 Introduction to Value-Based Decision-Making

For an organization to optimize the use of its limited resources, it must have a mechanism to determine the relative value of each Investment. The following elements can contribute to the overall value of an Investment:

- Risks mitigated by an Investment
- Consequences of a given risk, if they're not mitigated
- Financial impacts, such as cost savings
- Overall cost of the Investment
- Impacts to Key Performance Indicators (KPIs)
- Service measures
- Overall organizational value adds

An Investment's net value is then used to determine both its independent merit and its standing among other Investments competing for resources in a constrained Optimization process. The process used to generate the Value Framework captured in this document is called Value-Based Decision-Making (VDM) and is an implementation of Multi-Criteria Decision Analysis (MCDA). The VDM approach (Figure 1. Value-Based Decision-Making Approach) is a best practice in Asset Investment Planning and Management (AIPM) and encourages organizations to:

- Use a value-based approach to guide the development of the decision criteria and the relative weighting of the criteria to one another.
- Use a rational economic approach calibrated to a common scale so that dissimilar Investments can be compared based on a wide range of criteria.
- Align these criteria to the objectives and values of the organization to ensure that higher value translates into more success for the organization sooner.
- Use a quantitative, consistent, and repeatable approach to assess all benefits.
- Use a risk-informed approach, made by constructing an appropriate Risk Matrix to align the mitigation of risk to the common scale, ensuring risk is factored into decision-making.
- Ensure that both financial and non-financial benefits are included, and that their contributions are aligned to the common scale.

The VDM approach can be simplified into two primary activities:

- Develop a unique Value Framework that captures the organization's key Value Measures, financial parameters, and Risk Matrix, and is aligned with the overall organizational goals.
- Use the Value Framework to evaluate and optimize potential Investments.

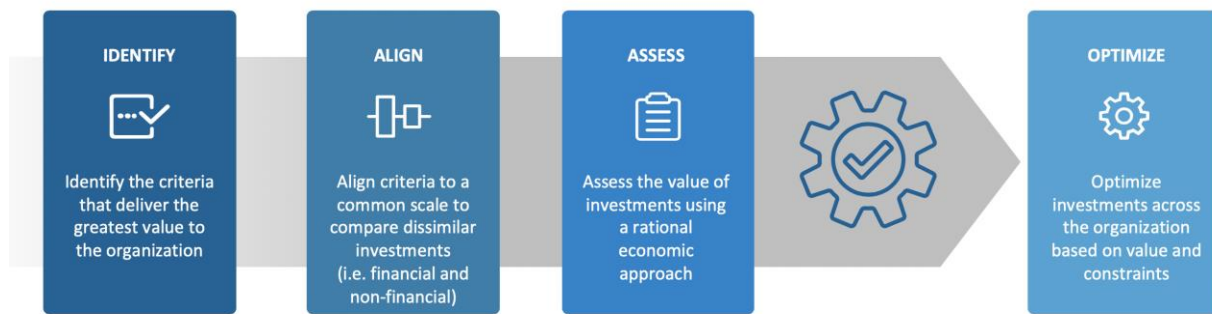


Figure 1: Value-Based Decision-Making Approach

The Copperleaf Value Framework (Figure 2: Copperleaf Value Framework) begins with the organization's strategic objectives and the scope of the Investments being considered. These guide the definition of Value Measures, Risk Matrix, and, ultimately, Value Function. It also defines and documents the financial parameters to be used in evaluating Investments, as well as any detailed supporting calculations, supporting processes, and related assumptions.

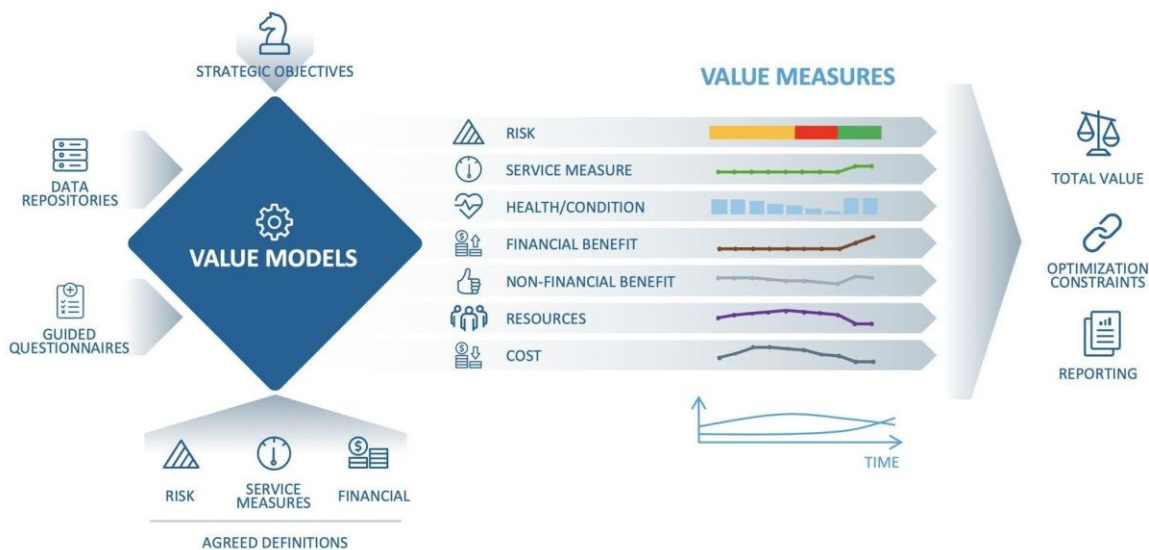


Figure 2: Copperleaf Value Framework

2.2 Value Measure Types and Criteria

Value Measures used at Alectra Utilities can be classified into four main types:

- **Condition Value Measures** are used to capture the health of an Asset and are typically used as inputs to other Value Measures (for example, to calculate the probability of failure of an Asset) and for reporting.

- **Risk Value Measures** are typically configured with a baseline and an outcome calculation and are mainly used to capture the value of an Investment in avoiding undesirable events. For example, an Investment might be targeted to reduce safety and reliability consequences linked to the in-service failure of an Asset. Risk mitigation is typically included in the Value Function as a positive contributor to Investment Value.
- **Benefits** capture desirable outcomes that are created by an Investment, such as improvements in revenue or Client service. As with all Value Measures, Benefits may be configured to have both a baseline and an outcome, but it is typical for a Benefit Value Measure to have only an outcome. Benefits are typically included in the Value Function as a positive contributor to Investment Value.
- **Cost Value Measures** represent the money that must be spent to execute the Investment. There is an Investment Cost Value Measure that is used as a negative contributor to Investment Value. Then there are Value Measures that represent the breakdown of the Investment Cost into individual Account Types that can be used as Constraints, and for reporting (Capital Spend or O&M Spend). These measures are not typically included in the Value Function as they would duplicate the Value expressed by the Total Cost Value Measure.

2.3 Assessing and Optimizing Investments

The Value Function combines all the required Value Measures to assess and compute the overall value that each Investment is bringing to the organization, taking into account its financial and non-financial benefits, Risk Mitigation, and cost. All Investments are then optimized automatically by selecting the combination of start dates and Investment Alternatives that will bring the highest total value to the organization while satisfying financial, resource, service measure, and timing constraints.

While each Investment may bring value to the organization, it's not until the Investments are compared to one another, and financial constraints are applied, that it is known whether a specific Investment will be funded or not, and in what timeframe. A lower value Investment may be delayed in lieu of other, more urgent Investments, or it may ultimately be deemed unnecessary. Conversely, a lower value Investment may be expedited if it is the only feasible option remaining, after most funds have been allocated to higher value projects.

Decisions about which Investments should be funded and when, are made using Copperleaf Portfolio's Optimization module. A full description of its functionality is beyond the scope of this document. For further details, consult the resources relating to the Optimization module, or contact Copperleaf directly.

Independent of the role that value plays within Optimization, it is often useful to see the value of an Investment. This is represented by various financial metrics, which can be attached to portfolios or included in reports. The following are some of the most useful metrics to help determine the relative value of Investments:

- **Value:** The net value of the Investment, as well as the breakdown of components making up that value is visible to the Investment owner. An Investment with a net value less than zero is an Investment in which all the benefits specified for the Investment have a present value less than the present value of the cost. Investments with a net value less than zero should be reconsidered (for example, if this Investment is required for compliance reasons but has a negative value, that may indicate that the Compliance Risk has been misestimated) and/or re-evaluated for other value opportunities.
- **Value/\$:** An Investment with a larger net value is bringing more value to the organization; however, larger Investments typically bring more value than smaller Investments. Therefore, Value/\$, (that is,

net value/cost of the Investment) can help to compare the effectiveness of Investments of different sizes.

For more details on financial metrics and reporting, consult the documentation on those topics, or contact Copperleaf directly.

3 Organizational Objectives

This section outlines the organizational objectives for Alectra Utilities.

3.1 Strategic Objectives and Value Measures

Alectra Utilities has eight key strategies to which all the identified Value Drivers roll up:

- Financial
- Reliability
- Safety & Security
- Regulatory & Compliance
- Customer Service
- Environmental
- Public & Employee Perception
- Innovation & Technology

3.1.1 Value Drivers and Value Measures

Eight Value Drivers have been identified. These represent categories or areas where value can be created by Capital Investments which support the Strategic Objectives:

- Financial
- Reliability
- Safety & Security
- Regulatory & Compliance
- Customer Service
- Environmental
- Public & Employee Perception
- Innovation & Technology

Each Value Driver is comprised of one or more Value Measures. Value Measures are the specific attributes of an Investment that will be evaluated to objectively determine how the Investment delivers value to Alectra Utilities, and to place that value on a common economic scale. The following sections detail the Value Measures for each Value Driver as well as the Value Models that are used to calculate them.

3.1.2 Strategic Objectives Details

The follow sections detail the Strategic Objectives.

3.1.2.1 Financial

3.1.2.1.1 VALUE DRIVERS AND VALUE MEASURES

The Financial objective Value Drivers and their associated Value Measures.

Financial

- Capital Financial Benefit
- Financial Risk
- Future Revenue
- OM&A Financial Benefit

3.1.2.2 Reliability

3.1.2.2.1 VALUE DRIVERS AND VALUE MEASURES

The Reliability objective Value Drivers and their associated Value Measures.

Reliability

- Distribution System Capacity Risk
- Reliability Benefit
- Reliability for Spares Benefit

3.1.2.3 Safety & Security

3.1.2.3.1 VALUE DRIVERS AND VALUE MEASURES

The Safety & Security objective Value Drivers and their associated Value Measures.

Safety & Security

- Cyber Security Risk
- Safety Risk
- Cyber Security Benefit

3.1.2.4 Regulatory & Compliance

3.1.2.4.1 VALUE DRIVERS AND VALUE MEASURES

The Regulatory & Compliance objective Value Drivers and their associated Value Measures.

Regulatory & Compliance

- Compliance Risk
- Rate Ready Organization Benefit

3.1.2.5 Customer Service

3.1.2.5.1 VALUE DRIVERS AND VALUE MEASURES

The Customer Service objective Value Drivers and their associated Value Measures.

Customer Service

- Customer Communication Benefit
- Customer Centricity
- Customer Service Benefit

3.1.2.6 Environmental

3.1.2.6.1 VALUE DRIVERS AND VALUE MEASURES

The Environmental objective Value Drivers and their associated Value Measures.

Environmental

- Environmental Improvements Benefit
- Environmental Risk

3.1.2.7 Public & Employee Perception

3.1.2.7.1 VALUE DRIVERS AND VALUE MEASURES

The Public & Employee Perception objective Value Drivers and their associated Value Measures.

Public & Employee Perception

- Employee Wellness Benefit
- Reputational Risk

3.1.2.8 Innovation & Technology

3.1.2.8.1 VALUE DRIVERS AND VALUE MEASURES

The Innovation & Technology objective Value Drivers and their associated Value Measures.

Innovation & Technology

- IT Capacity Risk
- Data Collection, Sharing and Reuse
- Technological Innovation Benefit

- IT Technical Risk

4 Risk Matrix

As described above, Risk is defined as the probability of an event occurring multiplied by the Consequence of that event. The Risk Matrix is built around the risk types that are important to the organization (that is, safety, environmental, lost production, etc.) and the associated Consequences by severity level. It is essential that the Consequence levels are aligned across the different risk types.

The Investment owner specifies:

- Baseline Risk: The risk present if the Investment is not completed.
- Residual Risk: The risk present after the Investment is completed.

Value of Risk Mitigated is computed as: $\text{Mitigated Risk} = \text{Baseline Risk} - \text{Residual Risk (Post-Investment Baseline Risk)}$

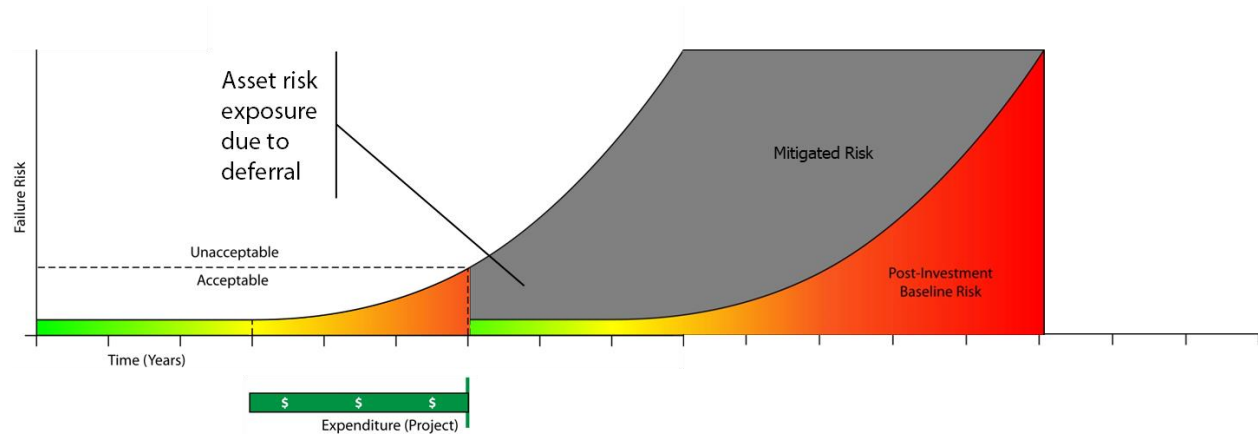


Figure 3: Mitigated Risk Over Time

Risks may be calculated automatically based on a combination of user entered data and Asset Attributes, or may be specified based on the Likelihood and Consequence levels defined in the Risk Matrix. When risks are specified using the Risk Matrix, the value of each risk is evaluated based on the definitions provided in Consequence Definition and Likelihood Definition sections of this document.

4.1 Consequence Definition

The definition of the Consequence levels was developed by first looking at the overall range of Consequences (usually starting with financial consequences). Once the range was established, Consequence levels are created such that each level increases non-linearly (usually between 3x to 10x increase per level). This provides a clear progression between levels where changing a Consequence level results in a meaningful, conclusive change.

Existing Alectra Utilities risk Consequences were aligned with the more granular Consequence levels to provide flexibility for Investment risk evaluation.

4.1.1 Consequence Levels

Attributes	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000
Default Description								
Maximum Value	149	499	1499	4499	7499	12499	29999	50000
Minimum Value	0	149	499	1499	4499	7499	12499	29999
Average Value	0	150	500	1500	4500	7500	12500	30000

Table 1: Consequence Levels

4.1.2 Consequence Definitions

Consequence	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000
Cyber Security Risk	None: no cyber security risk detected	N/A	No amount of information is withdrawn / lost; no system impact to end-users	Small amount of non-sensitive information is withdrawn / lost; lost system efficiency to end-users; time/cost to recovery with existing resources	Moderate amount of non-sensitive information / small amount of sensitive information is withdrawn / lost; lost access to non-critical systems to end-users; time/cost to recovery require additional resources	N/A	Moderate amount of sensitive information is withdrawn / lost; lost access to critical systems to subset of end-users; time/cost to recovery is unpredictable but can be remedied with additional resources	Large amount of sensitive information is withdrawn / lost; lost access to some critical systems to all end-users; time/cost to recovery is not possible
Distribution System Capacity Risk	Threat: Able to supply load without exceeding planning limits	N/A	Threat: Can supply all load but temporarily exceeding planning limits	Threat: Can supply all load but there is sustained operation exceeding planning limits	Threat: Can supply all load but exceeding thermal limits	N/A	Threat: Unable to service a new load or mandated upgrades required to be completed on the transmission system	N/A

Consequence	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000
							to meet Regional Planning directives.	
Environmental Risk	No noticeable impacts with minor clean-up implications	Known impacts contained to the worksite such as fugitive emissions, minor spills with short term (< 1 year) clean-up implications	Known impacts contained to the worksite such as fugitive emissions, minor spills with medium term (up to 2 years) clean-up implications	Impacts with medium term (2 to 5 years) cleanup implications that are contained to the worksite	Impacts are long term (>5 years) and are not contained on the worksite resulting in potential loss of flora, fauna and/or fish habitat. Impact significant enough to gain attention in provincial news media	N/A	Impacts cause long term (> 20 years) damage to a water body, an environmentally/culturally sensitive receptor resulting in actual loss of flora, fauna or fish habitat. Impact significant enough to gain attention in national news media	N/A
Financial Risk	Threat/Opportunity: Immaterial financial impact	Threat/Opportunity: Financial impact of an event up to \$300,000	Threat/Opportunity: Financial impact of an event \$300,000 to \$1,000,000	Threat/Opportunity: Financial impact of an event \$1,000,000 to \$3,000,000	Threat/Opportunity: Financial impact of an event \$3,000,000 to \$5,000,000	Threat/Opportunity: Financial impact of an event \$5,000,000 to \$10,000,000	Threat/Opportunity: Financial impact of an event \$10,000,000 to \$15,000,000	Threat/Opportunity: Financial impact an event over \$15,000,000
IT Capacity Risk	Lack of capacity (or currency) of a system has no expected impact on Alectra's workforce	Lack of capacity (or currency) of system that impacts significantly (e.g. >10% average decrease in productivity) for more than 10 Alectra's employees	Lack of capacity (or currency) of system that impacts significantly (e.g. >10% average decrease in productivity) for more than 50 Alectra's employees.	Lack of capacity (or currency) of system that impacts significantly (e.g. >10% average decrease in productivity) for more than 150 Alectra's employees	Lack of capacity (or currency) of system that impacts significantly (e.g. >10% average decrease in productivity) for more than 450 Alectra's employees.	Lack of capacity (or currency) of system that impacts significantly (e.g. >10% average decrease in productivity) for more than 750 Alectra's employees	Lack of capacity (or currency) of an Enterprise wide system that impacts significantly (e.g. >10% average decrease in productivity) the entire Alectra's workforce.	N/A

Consequence	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000
Reputational Risk	Immaterial consequence which does not garner media coverage.	Localized issue involving direct to customer(s) or stakeholder(s) communications and easily resolved.	Adverse local/community media or social media coverage. Organized stakeholder pressure to the company.	Adverse regional coverage, one or more media types.	Adverse regional coverage, one or more media types. Multi-channel stakeholder pressure through call-centre, Board or executive channels.	Adverse national coverage, multiple media types with wide reach (e.g., news/publications, radio, social media channels).	Adverse national coverage, multiple media types with wide reach (e.g., news/publications, radio, social media channels). Multi-channel stakeholder pressure through call-centre, Board or executive channels.	Sustained, adverse national media coverage with adverse impact to community stakeholders. Shifting public opinion and negatively impacting company morale with multi-channel stakeholder pressure that is rapid and sustained (multi-day/week).
Safety Risk	Insignificant/Negligible impact on staff and public safety	Impact of event requires additional actions than routine activity. Reportable incident of minor injuries of staff or members of the public.	An event that cannot be managed under routine activity and requires some additional management time and focus. Risk of injury of staff or members of the public requiring medical attention.	An event that cannot be managed under routine activity and requires some additional management time and focus. Reportable incident of acute/ first-aid injuries of staff or members of the public but no lost time injuries.	A major event with a long recovery period that stretches plans to the limit and requires major management efforts to endure, or company efforts to remedy adverse effects on the public. Reportable incident with serious but non-life threatening injuries.	A major event with a long recovery period that stretches plans to the limit and requires major management efforts to endure. Reportable incident of chronic/ long-term injuries of staff/members of the public and/or disability	A fatal event that can lead to the collapse of the organization or significant damage to the public. Life threatening injuries with long-term health implications.	A fatal event that can lead to the collapse of the organization or significant damage to the public. Reportable incident of any loss of life.

Consequence	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000
						(resulting in Lost Time Injuries)		

Table 2: Consequence Definitions

4.2 Likelihood Definition

The definition of Likelihood levels follows a similar principle to Consequence in order to get adequate differentiation between levels; however, the range doesn't need to be determined as it is between 0 and 100%. Again, an increase of 3x to 10x between levels is the norm. The types of risk events that are being considered may also impact the definitions of Likelihood levels.

	None	Once in 1,000 years	Once in 333 years	Once in 100 years	Once in 33 years	Once in 10 years	Once in 3 years	Once in 2 years	Very Likely	Almost Certain
Description	Event unlikely to occur in next 1000 years	Approximately 0.1% chance of event occurring this year (e.g. 1 in 1000 year event)	Approximately 0.3% chance of event occurring this year (e.g. 1 in 333 year event)	Approximately 1% chance of event occurring this year (e.g. 1 in 100 year event)	Approximately 3% chance of event occurring this year (e.g. 1 in 33 year event)	Approximately 10% chance of event occurring this year (e.g. 1 in 10 year event)	Approximately 30% chance of event occurring this year (e.g. 1 in 3 year event)	Approximately 50% chance of event occurring this year (e.g. 1 in 2 year event)	Approximately 75% chance of event occurring this year (e.g. 1 in 1.3 year event)	Imminent (>95% chance of occurring this year)

Table 3: Likelihood Definitions

4.3 Risk Matrix

Almost Certain								
Very Likely								
Once in 2 years								
Once in 3 years								
Once in 10 years								
Once in 33 years								
Once in 100 years								
Once in 333 years								
Once in 1,000 years								
None								
	None	Impact 150	Impact 500	Impact 1,500	Impact 4,500	Impact 7,500	Impact 12,500	Impact 30,000

4.4 Risk Levels

Risk Levels	Low	Medium	High

4.5 Using the Risk Matrix for Calculation of Value Measure Output

For Value Models that calculate Value Measure Outputs using a probability and consequence value from the Risk Matrix, a specific questionnaire has been created. This questionnaire is a **Manual Risk questionnaire (named accordingly for each Risk Matrix Value Model)** e.g. **Compliance Risk Questionnaire for Compliance Risk**.

The user is prompted to answer the following questions in the **Manual Risk** questionnaire:

Variable Prompt	Description	Time Varying?	Selection Options
Risk Consequence	What is the consequence of this event occurring?	YES	Dropdown - Risk Matrix Consequence
Risk Probability	What is the probability of this event occurring?	YES	Dropdown - Risk Matrix Probability
Provide any rationale or assumptions for the answers provided	Provide background information justifying selection of answers	NO	Max 10,000 characters expanded Text-box

Table 4: Manual Risk Questionnaire

The user chooses the appropriate probability, consequence levels and frequency based on the definitions shown in the Consequence Definitions section of this document.

The Investment is expected to reduce either the probability of the event, the consequence of the event, or both. This risk is calculated directly in value units using the Risk Matrix model described in the Risk Matrix section.

For both the baseline and the outcome values, risk is calculated as:

$$\text{Risk} = \text{Risk Consequence} * \text{Risk Probability}$$

By default, the system will assume the risk is fully mitigated to a value of zero from the month following the last month of the Investment with spend. This behavior uses a default **Automated Risk Mitigation** questionnaire selection which has no user inputs.

If the user wishes to override this default behavior and specify an outcome risk profile or a non-default impact date, they may use the questionnaire described above.

The Mitigated Risk value generated for the measure annually is equal to:

$$\text{Risk Value} = \text{Baseline Risk} - \text{Outcome Risk}$$

Questionnaire
Manual Risk
Save
Revert
+

Jan 2020 to No End Date

Jan 2020
to
No End Date

- What is the consequence of this event occurring?**
- What is the probability of this event occurring?**
- What is the Exposure Factor / Probability of Concurrent Failure?**
1.0000

Figure 4: Manual Risk Questionnaire

Questionnaire
Manual Risk
Save
Revert
+

All Time
Jun 2018 to No End Date

- Provide any rationale or assumptions for the numbers provided.**

Figure 5: Manual Risk Rationale

5 Value Models and Value Measures

Whereas Value Measures cover the different types of value that a given Investment can bring to the organization, Value Models capture the way in which these Measures are calculated.

A Value Model can be used to calculate one or more Value Measures as shown in the figure below:

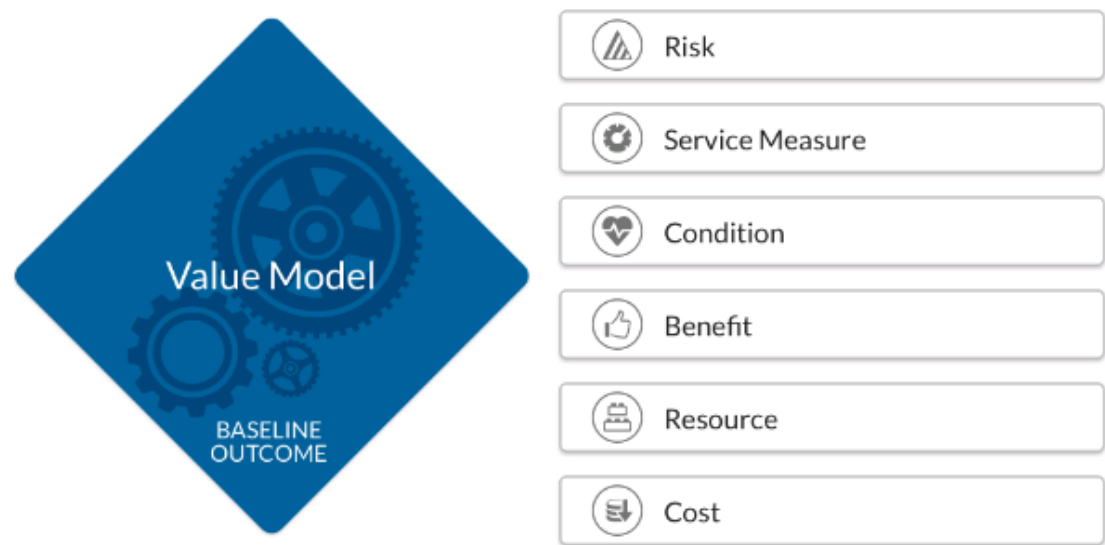


Figure 6: Value Models and Value Measures

As displayed above, some Value Models are driven by preexisting data in the system, while others require manual data entry into a Questionnaire. Some Questionnaires may ask for inputs relating to the matrix, while others may include a more complex set of questions that feeds a calculation. All approaches are discussed in the following sections. The following tables provide a summary of the Value Models and their corresponding Value Measure outputs.

Value Model Groups

Benefits

Value Model	Usage	Output Value Measures
Capital Financial Benefit	Optional	Capital Financial Benefit
Customer Centricity	Optional	Customer Centricity
Customer Communication Benefit	Optional	Customer Communication Benefit
Customer Service Benefit	Optional	Customer Service Benefit
Employee Wellness Benefit	Optional	Employee Wellness Benefit
Environmental Improvements Benefit	Optional	Environmental Improvements Benefit
OM&A Financial Benefit	Optional	OM&A Financial Benefit
Rate Ready Organization Benefit	Optional	Rate Ready Organization Benefit

Value Model	Usage	Output Value Measures
Reliability Benefit	Optional	Reliability Benefit
Reliability for Spares Benefit	Optional	Reliability for Spares Benefit
Technological Innovation Benefit	Optional	Technological Innovation Benefit

Table 5: Summary of Value Models in the Benefits Group and their Output Value Measures

Costs

Value Model	Usage	Output Value Measures
Cost	Mandatory	- Investment Cost Capital - Investment Cost OPEX - Investment Cost
Future Revenue	Optional	- Future Revenue - Future Revenue Total

Table 6: Summary of Value Models in the Costs Group and their Output Value Measures

IT

Value Model	Usage	Output Value Measures
Cyber Security Benefit	Optional	Cyber Security Benefit
Cyber Security Complex	Optional	Cyber Security Risk
Data Reuse Benefit	Optional	Data Collection, Sharing and Reuse
IT Capacity Risk	Optional	IT Capacity Risk
IT Technical Risk	Optional	IT Technical Risk

Table 7: Summary of Value Models in the IT Group and their Output Value Measures

Risks

Value Model	Usage	Output Value Measures
Compliance Risk	Optional	Compliance Risk
Distribution System Capacity Risk	Optional	Distribution System Capacity Risk
Environmental Risk	Optional	Environmental Risk
Financial Risk	Optional	Financial Risk
PA Results	Optional	- Financial Risk - Safety Risk - Reliability Risk - Environmental Risk
Reputational Risk	Optional	Reputational Risk
Safety Risk	Optional	Safety Risk

Table 8: Summary of Value Models in the Risks Group and their Output Value Measures

5.1 Value Measure and Value Model Types

5.1.1 Value Measures and Units

Value Measures may be calculated in any unit. For Value Measures to be included in a Value Function, a conversion is made between the units used for the Value Measure and the standard Value Units that are used in the Risk Matrix and in all Value calculations.

At Alectra Utilities, all Value Measures used in a Value Function are calculated either directly in Value Units (Risk Matrix-based Value Models) or in Canadian Dollar. Any models that are computed in Canadian Dollar have a conversion factor of 1:1000 applied to normalize it to the Value Measure scale.

5.1.2 Baselines and Outcomes

Value Measures may be configured either to measure a change in Value created by an Investment, or the absolute Value that exists after the Investment has been completed.

For example, risk mitigation is typically measured as the delta between the risk without the Investment (baseline risk) and the outcome or residual risk after the Investment is completed. For Value Measures such as Investment Cost, only the outcome after Investment completion is relevant as there is no baseline to be considered.

5.1.3 Use of Value Models

As described above, Value Models can be designated as either “mandatory” or “optional” for Assets or Investments, or both. This allows the system to automatically add certain Value Models such as Investment Cost or Asset Risk to all Investments, or to all Assets of a given Asset Type.

5.1.4 Time Varying Values

All Value Measures are calculated as streams of value over time. The System and Questionnaire inputs used in calculation may be defined as either fixed or varying over the time period. For example, the Asset Type of an Asset is a value that does not change over time, while the Probability of Failure of that same Asset may be specified to increase over time as the Asset ages.

5.2 Investment Models

The Value Models discussed in this section are models that are not mandatory for, and therefore not automatically added to, either Assets or Investments.

A user may add any of the Value Models in this section to an Investment. Additionally, a user may add any of the Value Models in this section to an asset, except the Avoided Future Asset Replacement which is tied to investment spend.

5.2.1 Benefits

5.2.1.1 Capital Financial Benefit

Capital Financial Benefit is used to measure Capital savings such as labour cost saving, productivity improvements, and other capital cost savings. Financial Benefit Type variable determines whether the savings would result in the tangible future cost reduction (Expected Reduction), cost avoidance (Avoided Cost) or productivity improvement (Efficiency Benefit).

5.2.1.1.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

Capital Financial Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Capital Financial Benefit Value Model.

Capital Financial Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Financial Benefit Type	Dropdown List	Yes	CapFinBen_TYPE	Financial Benefit Type	
Inside Labour Savings (hours per year)	Number (1 decimal place)	Yes	CapFinBen_LABH	Inside Labour Savings (hours per year)	
Outside Labour Savings (hours per year)	Number (1 decimal place)	Yes	CapFinBen_OLAB	Outside Labour Savings (hours per year)	
Other Capital Cost Savings (dollars per year)	Number (0 decimal places)	Yes	CapFinBen_COST	Other Capital Cost Savings (dollars per year)	
Probability of Benefit Achievement for Avoided Cost and Efficiency Benefits (Assume 100% for Expected Reduction) (%)	Number (2 decimal places)	Yes	CapFinBen_PROB	Enter a Value between 0-100 for Avoided Cost and Efficiency Benefit, enter 100 for Expected Reduction	
Type of Other Capital Cost Savings	Dropdown List	Yes	CapFinBen_TYCO	Type of Other Capital Cost Savings	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	CapFinBen_TEXT		

Dropdown List Detail

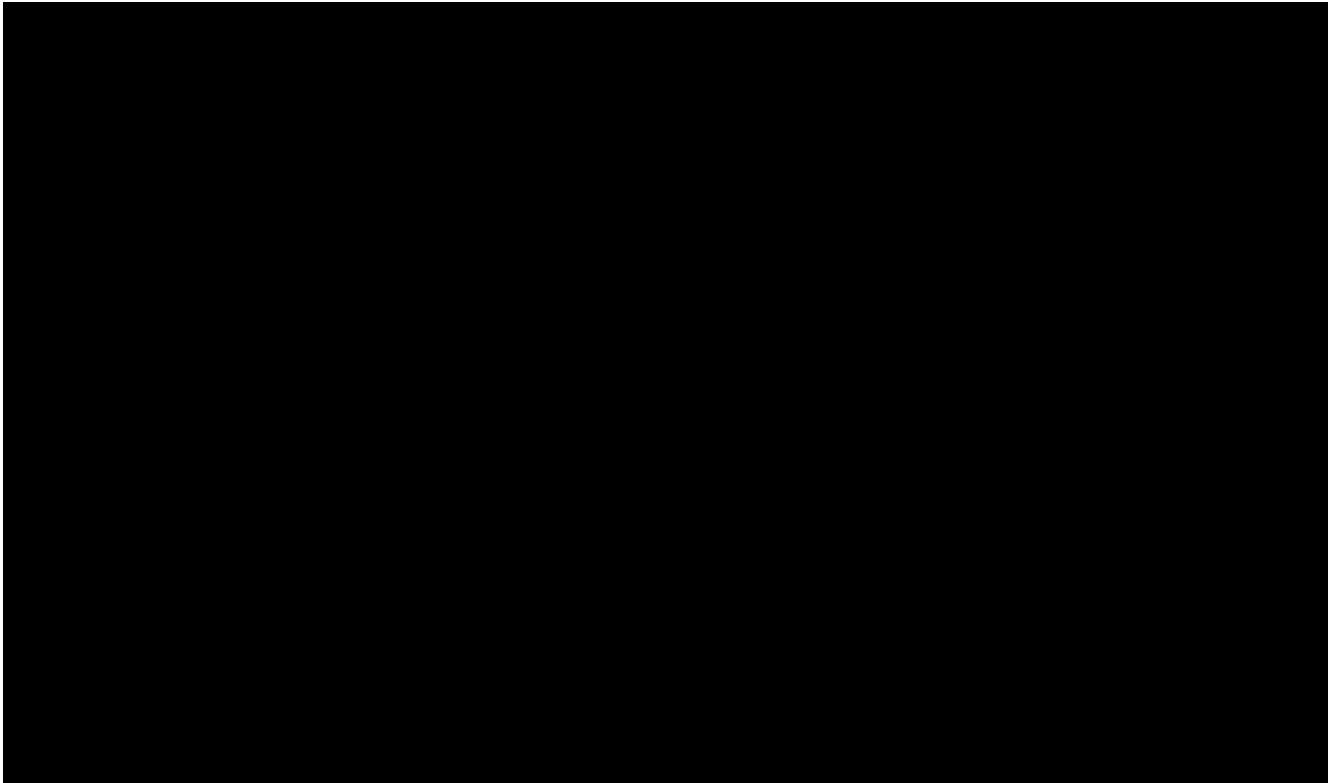
Table 10: Capital Financial Benefit Questionnaires Dropdown List Details

5.2.1.1.2 VALUE MODEL OUTPUTS

Table 12: Capital Financial Benefit Output Value Measures

© 2024 Copperleaf Technologies Inc.

Capital Financial Benefit is used to measure Capital savings such as labour cost saving, productivity improvements, other capital cost savings. Financial Benefit Type variable determines whether the savings would result in the tangible future cost reduction (Expected Reduction), cost avoidance (Avoided Cost) or productivity improvement (Efficiency Benefit).



Examples of Benefit Types

Expected Reduction benefit type: This benefit type measures a tangible reduction that can be applied to future budget. For example, a change to the project is made such that services of an outside contractor are no longer needed. Therefore, the contractor position can be eliminated saving Alectra the cost of the contractor. The budget for the years following the contractor elimination can be reduced by the amount saved.

Avoided Cost benefit type: This benefit type measures the potential expenditures that would be avoided as a result of the project. To reflect the uncertainty in measuring and achieving the avoided costs the probability factor can be applied. For example, the project targets installing automated digital fault detectors. The new equipment would save hours of crew time by reporting the exact location of faults that would otherwise have to be determined manually by Alectra crews. In this example the probability of realizing the benefit is 100% as it is certain that the equipment will automatically determine and report faulty information to the control.

Efficiency benefit type: This benefit type is aimed at measuring productivity improvements. To reflect the uncertainty in measuring and achieving productivity gains the probability factor can be applied. For example, new software can enable employees to perform their day-to-day tasks faster. The time savings can be utilized by the employees to perform additional tasks. For demonstration purposes, let's say that the probability of employees taking advantage of the time savings is 75% meaning that that 3/4 of the employees will become more productive as result of the project.

5.2.1.2 Customer Centricity

Customer Centricity measures the value of enhancements to the following three pillars: customer engagement, brand loyalty, and ease of interaction. Customer Centricity is computed directly in Value Units so the conversion factor for the value measure is 1.

5.2.1.2.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

Customer Centricity User Questionnaires

The user is prompted to answer the following Questionnaires for the Customer Centricity Value Model.

Customer Centricity - Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the expected reach of customer engagement improvement of this project?	Dropdown List	Yes	CustomerEngagement	Customer Engagement	
What is the probability of Customer Engagement being achieved?	Number (2 decimal places)	Yes	CustomerEngagementProbability	Answer in integers between 0-100	
What is the expected impact to Alectra’s Customer Net Promoter Score?	Dropdown List	Yes	NetPromoterScoreImpact		
What is the probability of Net Promoter Score being achieved?	Number (2 decimal places)	Yes	NetPromoterScoreProbability	Answer in integers between 0-100	
What is the expected impact to Alectra’s Customer Net Supporter Score?	Dropdown List	Yes	NetSupporterScoreImpact		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the probability of Net Supporter Score being achieved?	Number (2 decimal places)	Yes	NetSupporterScoreProbability	Answer in integers between 0-100	
What is the expected reach of the project to improve ease of interaction for customers?	Dropdown List	Yes	EaseOfInteraction		
What is the probability of Ease Of Interaction being achieved?	Number (2 decimal places)	Yes	EaseOfInteractionProbability	Answer in integers between 0-100	

Table 13a: Customer Centricity - Outcome Time Varying Questionnaire

Customer Centricity - Outcome - Time Invariant

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 145b: Customer Centricity - Outcome Time Invariant Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
What is the expected reach of customer engagement improvement of this project?	a) Improves Customer Engagement for over 75% of customers b) Improves Customer Engagement for between 50 and 75% of customers c) Improves Customer Engagement for between 25 and 50% of customers d) Improves Customer Engagement for between 5 and 25% of customers e) Improves Customer Engagement for less than 5% of customers
What is the expected reach of the project to improve ease of interaction for customers?	a) Improves Ease Of Interaction for over 75% of customers b) Improves Ease Of Interaction for between 50 and 75% of customers c) Improves Ease Of Interaction for between 25 and 50% of customers d) Improves Ease Of Interaction for between 5 and 25% of customers

Measure Prompt	Dropdown (Value)
	e) Improves Ease Of Interaction for less than 5% of customers
What is the expected impact to Alectra’s Customer Net Promoter Score?	a) Significant increase b) Moderate increase c) No increase
What is the expected impact to Alectra’s Customer Net Supporter Score?	a) Significant increase b) Moderate increase c) No increase

Table 156: Customer Centricity Questionnaires Dropdown List Details

5.2.1.2.2 VALUE MODEL OUTPUTS

The **Customer Centricity** Value Model outputs the Value Measures as shown below:

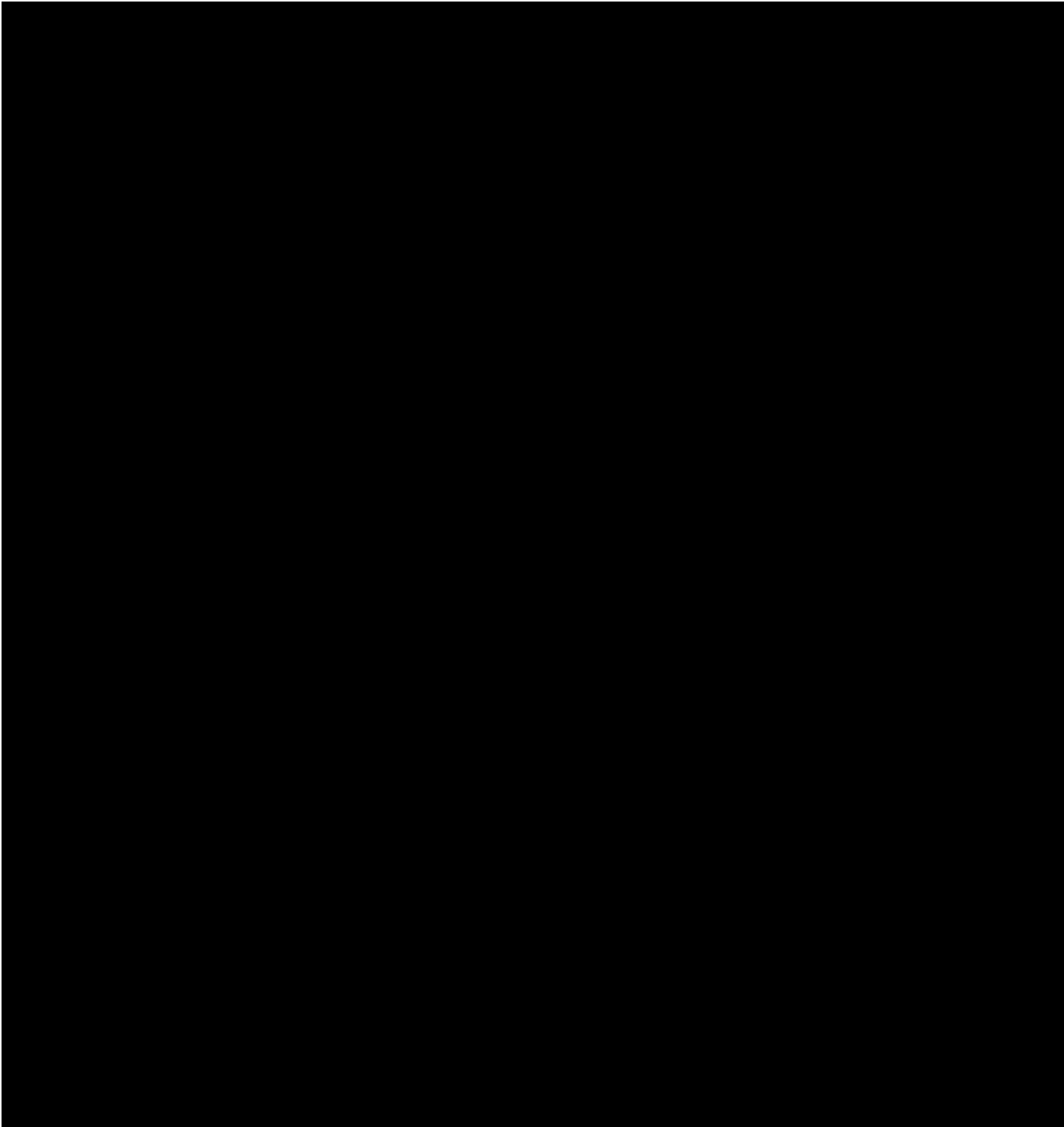
Value Model	Usage	Output Value Measures
Customer Centricity	Optional	Customer Centricity

Table 17: Customer Centricity Output Value Measures



Measure Description

Customer Centricity measures the value of enhancements to the following three pillars: customer engagement, brand loyalty, and ease of interaction. Customer Centricity is computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.1.3 Customer Communication Benefit

Customer Communication Benefit is used to assess the impact (positive % change) of the project on the customer satisfaction survey.

5.2.1.3.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Customer Communication Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Customer Communication Benefit Value Model.

Customer Communication Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the expected impact of this project on the percentage of customers answering "Satisfied" or "Very Satisfied" on the next Utility Pulse Survey?	Dropdown List	Yes	ECC1	What is the expected impact of this project on the percentage of customers answering "Satisfied" or "Very Satisfied" on the next Utility Pulse Survey?	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	ECCText		

Table 18: Customer Communication Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
What is the expected impact of this project on the percentage of customers answering "Satisfied" or "Very Satisfied" on the next Utility Pulse Survey?	• No Impact • Non-Measureable Positive Impact • Positive Impact of 1 percentage point • Positive Impact of 2 percentage points • Positive Impact of 3 percentage points • Positive Impact of 4 percentage points

Measure Prompt	Dropdown (Value)
	- Positive Impact of 5 or more percentage points - Positive Impact of less than 1 percentage point

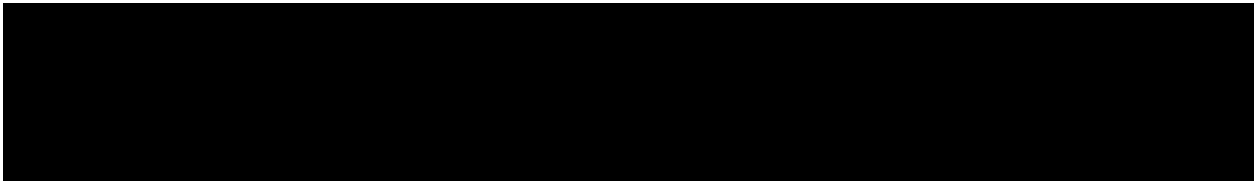
Table 19: Customer Communication Benefit Questionnaires Dropdown List Details

5.2.1.3.2 VALUE MODEL OUTPUTS

The **Customer Communication Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Customer Communication Benefit	Optional	Customer Communication Benefit

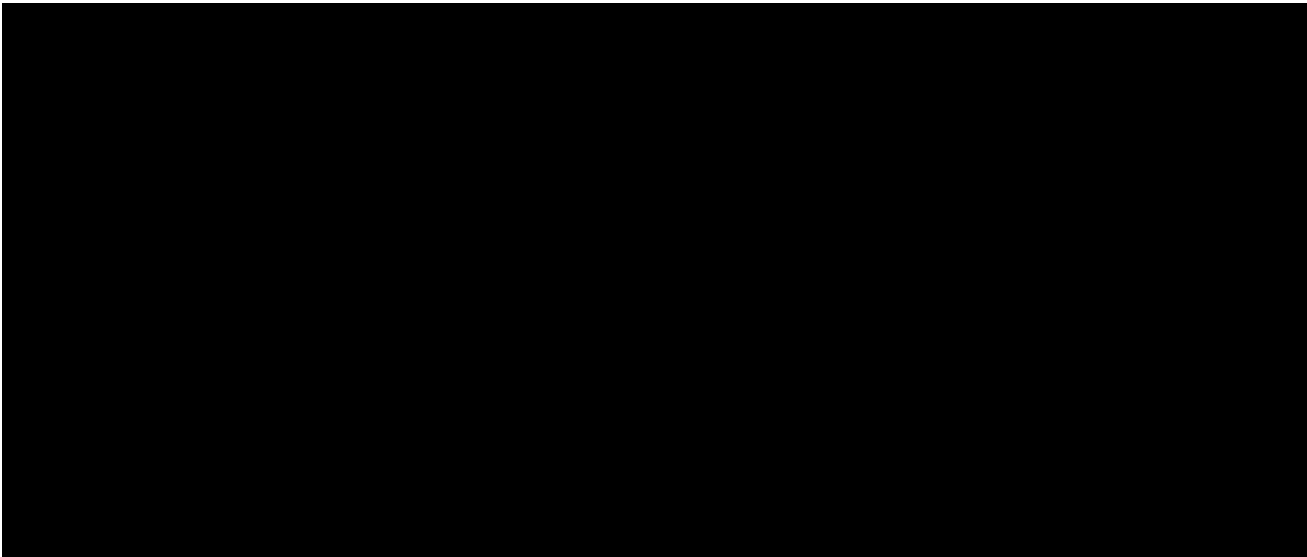
Table 20: Customer Communication Benefit Output Value Measures



Customer Communication Benefit

Measure Description

Customer Communication Benefit is used to assess the impact (positive % change) of the project on the customer satisfaction survey. Customer Communication Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.1.4 Customer Service Benefit

Customer Service Benefit is used to assess the impact of a project on Service Quality Indicators (SQI).

5.2.1.4.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Customer Service Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Customer Service Benefit Value Model.

Customer Service Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Percentage Improvement in New Connections SQI	Number (2 decimal places)	Yes	SQ01	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Appointments Scheduled SQI	Number (2 decimal places)	Yes	SQ02	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Appointments Met SQI	Number (2 decimal places)	Yes	SQ03	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Rescheduled Missed Appointments SQI	Number (2 decimal places)	Yes	SQ04	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Telephone Calls Answered Within Acceptable Time SQI	Number (2 decimal places)	Yes	SQ05	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Telephone Calls Abandon Rate SQI	Number (2 decimal places)	Yes	SQ06	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Written Response SQI	Number (2 decimal places)	Yes	SQ07	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Percentage Improvement in Emergency Response SQI	Number (2 decimal places)	Yes	SQ08	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Reconnection Performance Standards following disconnection for Non-Payment	Number (2 decimal places)	Yes	SQ09	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Percentage Improvement in Micro-embedded Generation Facility Connections on time	Number (2 decimal places)	Yes	SQ10	Enter 15% as 15. Enter negative impacts as negative integers (-10% as -10).	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	SQText		

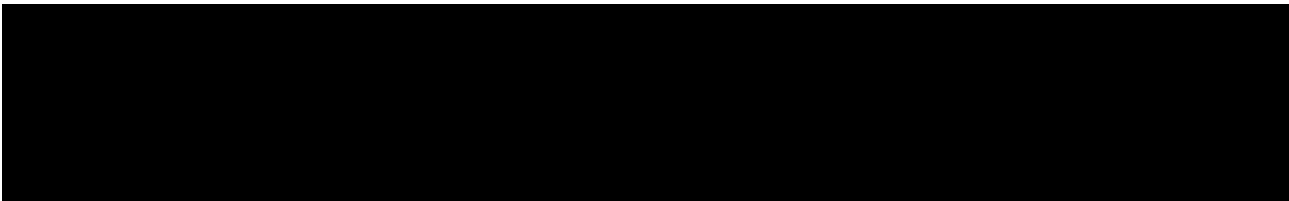
Table 21: Customer Service Benefit - Outcome Time Varying Questionnaire

5.2.1.4.2 VALUE MODEL OUTPUTS

The **Customer Service Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Customer Service Benefit	Optional	• Customer Service Benefit

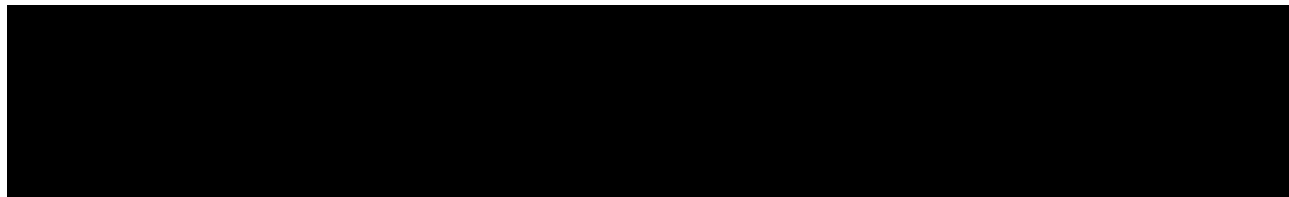
Table 22: Customer Service Benefit Output Value Measures

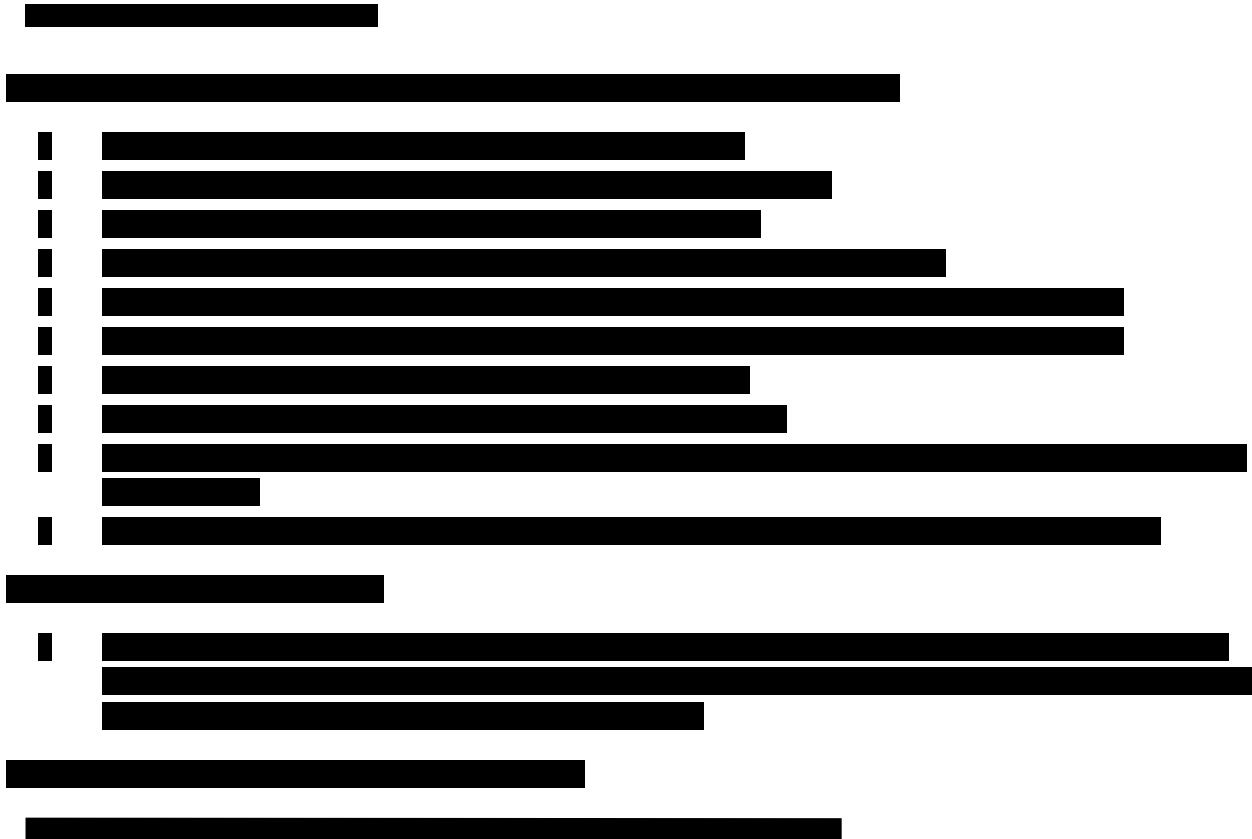


Customer Service Benefit

Measure Description

Customer Service Benefit is used to assess the impact of a project on Service Quality Indicators (SQI). Customer Service Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.





5.2.1.5 Employee Wellness Benefit

Employee Wellness Benefit is used to assess the improvement in physical wellness of Alectra employees.

5.2.1.5.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Employee Wellness Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Employee Wellness Benefit Value Model.

Employee Wellness Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Does this project have a positive impact on an employee's ability to perform their job/job satisfaction/the	Dropdown List	Yes	EW Mental		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
ease-of-use of tools available?					
How will the employees physical wellness be improved?	Dropdown List	Yes	EW1	Desc: How will the employees physical wellness be improved?	
What percentage of all Alectra employees will be improved by this project?	Number (1 decimal place)	Yes	EW2	Desc: What percentage of all Alectra employees will be improved by this project? Enter a value between 0-100.	
Does this project align with one of the 5 Alectra Cultural and Behavioural Commitments? If yes, select which value it most closely aligns to.	Dropdown List	No	AlectraCBCs		
Provide the rationale or assumptions for the answers provided above.	Text	Yes	EWText		

Table 23: Employee Wellness Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
How will the employees physical wellness be improved?	- Build awareness - Eliminate injuries - Mitigate injuries or improve employee comfort
Does this project have a positive impact on an employee's ability to perform their job/job satisfaction/the ease-of-use of tools available?	- No - Yes
Does this project align with one of the 5 Alectra Cultural and Behavioural Commitments? If yes, select which value it most closely aligns to.	- Delivers What We Promise - Ensures Clarity and Focus - Is Customer Centric - Is One Team - Prioritizes Well-Being

Table 24: Employee Wellness Benefit Questionnaires Dropdown List Details

5.2.1.5.2 VALUE MODEL OUTPUTS

The **Employee Wellness Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Employee Wellness Benefit	Optional	Employee Wellness Benefit

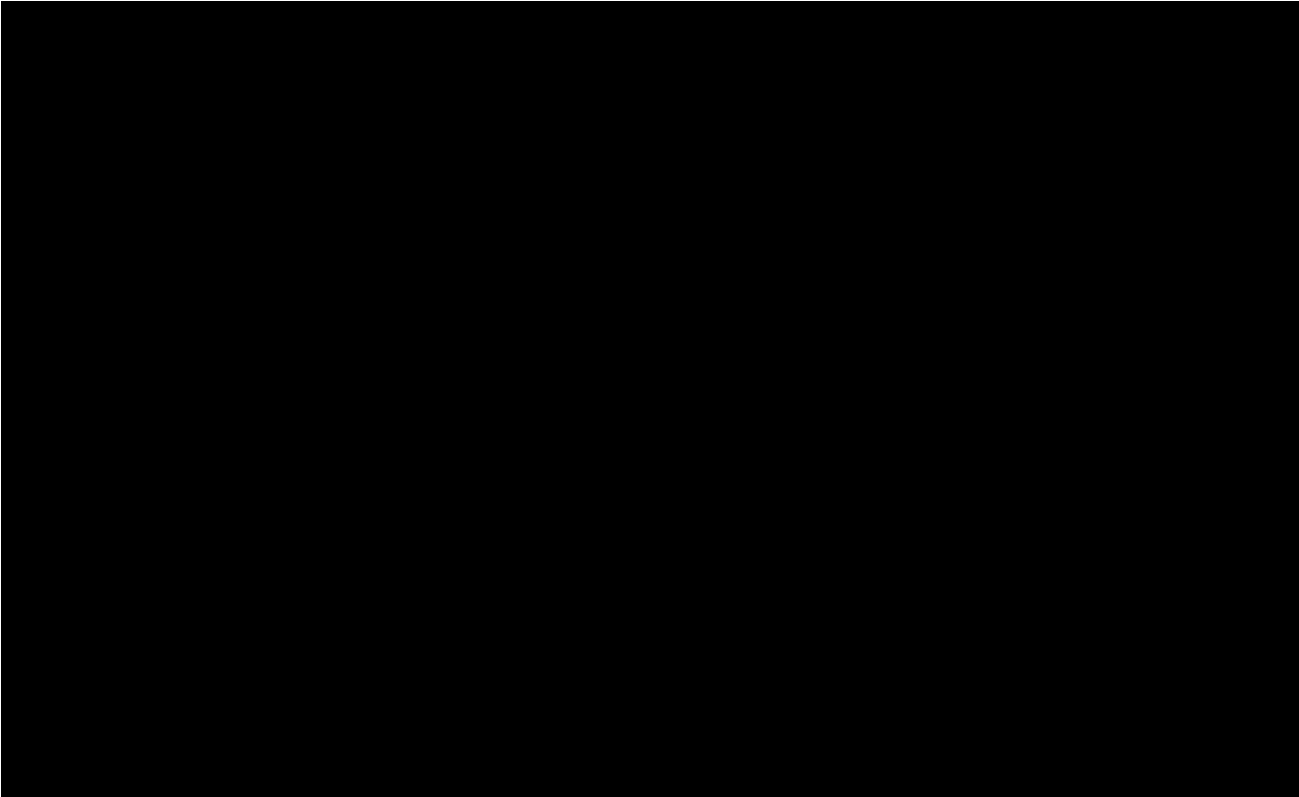
Table 25: Employee Wellness Benefit Output Value Measures



Employee Wellness Benefit

Measure Description

Employee Wellness Benefit is used to assess the improvement in physical wellness of Alectra employees. Employee Wellness Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.1.6 Environmental Improvements Benefit

Environmental Improvements Benefit measures the positive impact on the environment. It is used to measure improvements such value of CO2 emission reduction and energy efficiency (MWh) savings.

5.2.1.6.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

Environmental Improvements Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Environmental Improvements Benefit Value Model.

Environmental Improvements Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Quantity of waste paper that will be reduced each year (sheets of standard size paper)	Number (2 decimal places)	Yes	EnvImp_EI1	Desc: Quantity of waste paper that will be reduced each year (sheets of standard size paper)	
Quantity of CO2 Emissions to be reduced each year (tonnes)	Number (2 decimal places)	Yes	EnvImp_EI2	Desc: Quantity of CO2 Emissions to be reduced each year (tonnes)	
Energy Saved (MWh) saved per year if project completed (Line Losses, Reduced Consumption)	Number (2 decimal places)	Yes	EnvImp_EI3	Desc: Energy Saved (MWh) saved per year if project completed (Line Losses, Reduced Consumption)	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	EnvImp_Text		

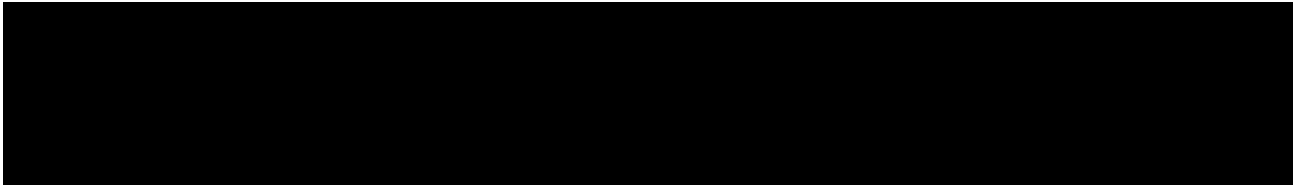
Table 26: Environmental Improvements Benefit - Outcome Time Varying Questionnaire

5.2.1.6.2 VALUE MODEL OUTPUTS

The **Environmental Improvements Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Environmental Improvements Benefit	Optional	Environmental Improvements Benefit

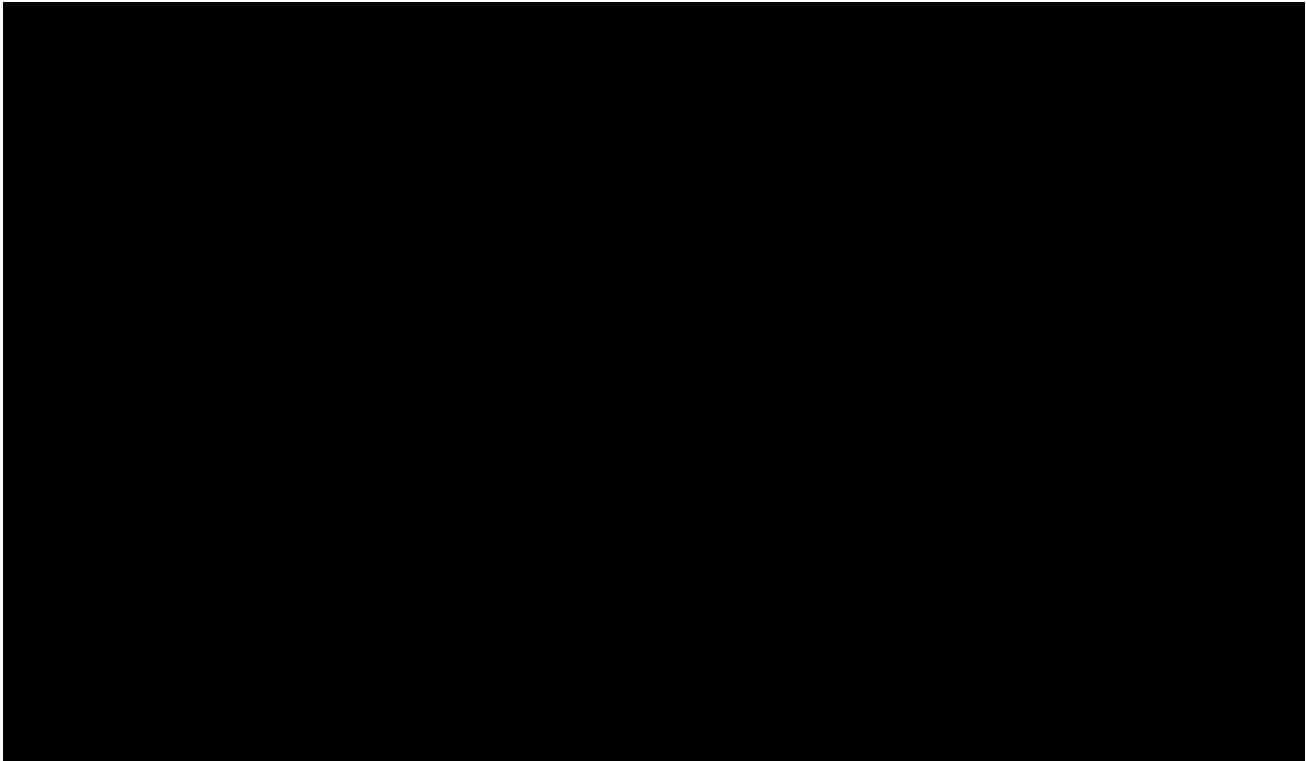
Table 28: Environmental Improvements Benefit Output Value Measures



Environmental Improvements Benefit

Measure Description

Environmental Improvements Benefit measures the positive impact on the environment. It is used to measure improvements such value of CO2 emission reduction and energy efficiency (MWh) savings. Environmental Improvements Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.1.7 OM&A Financial Benefit

OM&A Financial Benefits is used to measure OM&A savings such as labour cost saving, productivity improvements, other OM&A cost savings. Financial Benefit Type variable determines whether the savings would result in the tangible future cost reduction (Expected Reduction), cost avoidance (Avoided Cost) or

productivity improvement (Efficiency Benefit). This benefit is similar to Capital Financial only is targeted at OM&A expenditures.

5.2.1.7.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

OM&A Financial Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the OM&A Financial Benefit Value Model.

OMA Financial Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Financial Benefit Type	Dropdown List	Yes	FinBen_TYPE	Financial Benefit Type	
Inside Labour Savings (hours per year)	Number (1 decimal place)	Yes	FinBen_LABH	Inside Labour Savings (hours per year)	
Outside Labour Savings (hours per year)	Number (1 decimal place)	Yes	FinBen_OLAB	Outside Labour Savings (hours per year)	
Other OM&A Cost Savings (dollars per year)	Number (0 decimal places)	Yes	FinBen_COST	Other OM&A Cost Savings (dollars per year)	
Type of Other OM&A Cost Savings	Dropdown List	Yes	FinBen_TYCO	Type of Other OM&A Cost Savings	
Probability of Benefit Achievement for Avoided Cost and Efficiency Benefits (Assume 100% for Expected Reduction) (%)	Number (2 decimal places)	Yes	FinBen_PROB	Enter a Value between 0-100 for Avoided Cost and Efficiency Benefit, enter 100 for Expected Reduction	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	FinBen_TEXT		

Table 29: OM&A Financial Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
Type of Other OM&A Cost Savings	• Contract • Materials • Not Applicable

Measure Prompt	Dropdown (Value)
	Other
Financial Benefit Type	- Avoided Cost - Efficiency Benefit - Expected Reduction

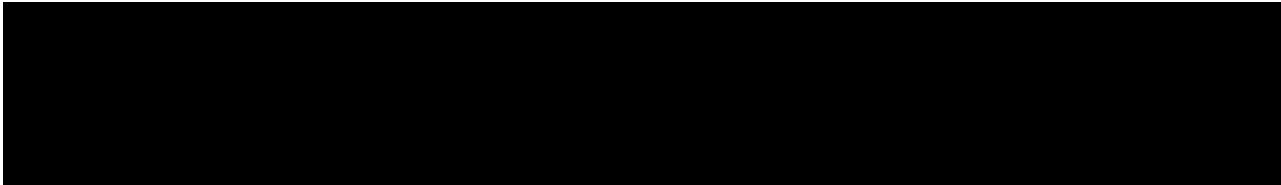
Table 30: OM&A Financial Benefit Questionnaires Dropdown List Details

5.2.1.7.2 VALUE MODEL OUTPUTS

The **OM&A Financial Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
OM&A Financial Benefit	Optional	OM&A Financial Benefit

Table 32: OM&A Financial Benefit Output Value Measures

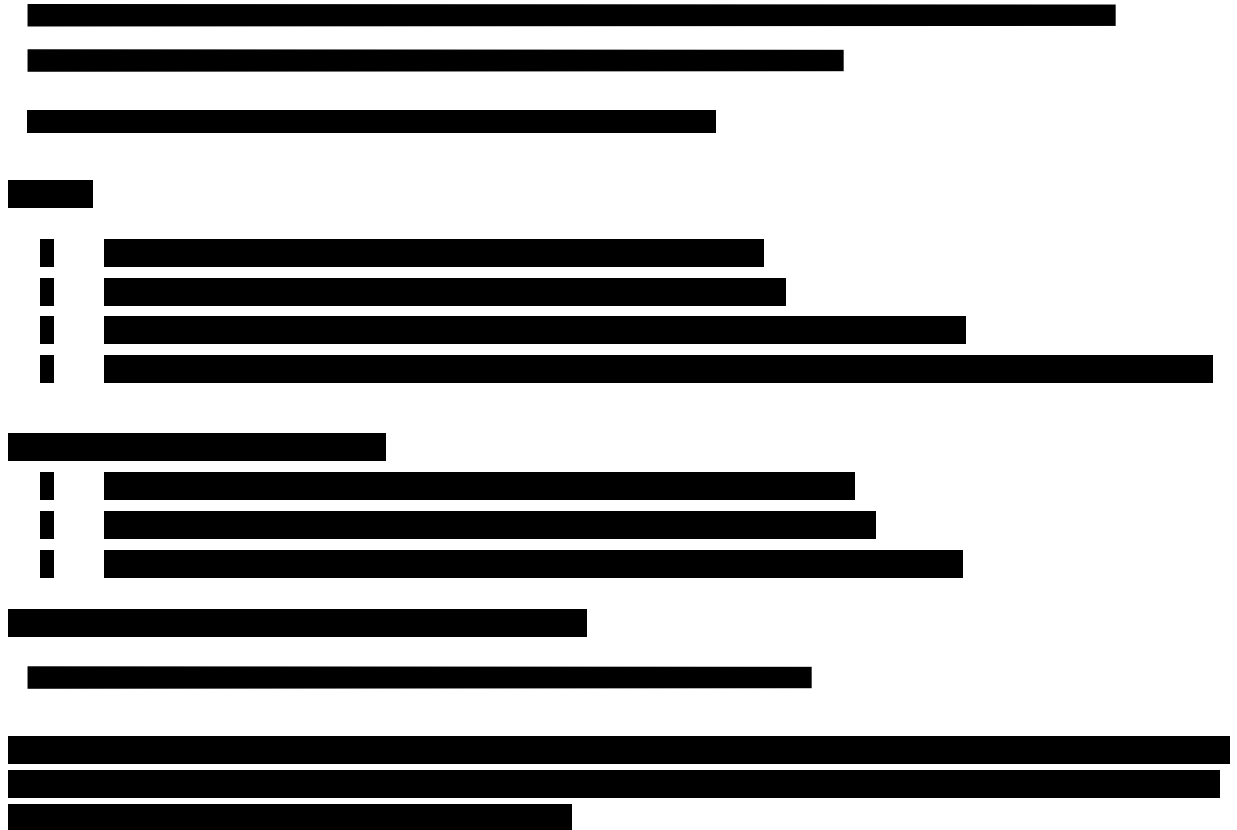


OM&A Financial Benefit

Measure Description

OM&A Financial Benefits Model is used to measure OM&A savings such as labour cost saving, productivity improvements, other OM&A cost savings. Financial Benefit Type variable determines whether the savings would result in the tangible future cost reduction (Expected Reduction), cost avoidance (Avoided Cost) or productivity improvement (Efficiency Benefit). This benefit is similar to Capital Financial only is targeted at OM&A expenditures.





Examples of Benefit Types

Expected Reduction benefit type: This benefit type measures a tangible reduction that can be applied to future budget. For example, a change to the project is made such that services of an outside contractor are no longer needed. Therefore, the contractor position can be eliminated saving Alectra the cost of the contractor. The budget for the years following the contractor elimination can be reduced by the amount saved.

Avoided Cost benefit type: This benefit type measures the potential expenditures that would be avoided as a result of the project. To reflect the uncertainty in measuring and achieving the avoided costs the probability factor can be applied. For example, the project targets installing automated digital fault detectors. The new equipment would save hours of crew time by reporting the exact location of faults that would otherwise have to be determined manually by Alectra crews. In this example the probability of realizing the benefit is 100% as it is certain that the equipment will automatically determine and report faulty information to the control.

Efficiency benefit type: This benefit type is aimed at measuring productivity improvements. To reflect the uncertainty in measuring and achieving productivity gains the probability factor can be applied. For example, new software can enable employees to perform their day-to-day tasks faster. The time savings can be utilized by the employees to perform additional tasks. For demonstration purposes, let's say that the probability of employees taking advantage of the time savings is 75% meaning that that 3/4 of the employees will become more productive as result of the project.

5.2.1.8 Rate Ready Organization Benefit

Rate Ready Organization Benefit is aimed at measuring the increase in likelihood of Alectra rate application approval by the regulator.

5.2.1.8.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Rate Ready Organization Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Rate Ready Organization Benefit Value Model.

Rate Ready Organization Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
If the project is completed, what will be the impact on the ability to prepare/defend rate submission?	Dropdown List	Yes	RRO1	Desc: If the project is completed, what will be the impact on the ability to prepare/defend rate submission?	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	RR0Text		

Table 33: Rate Ready Organization Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
If the project is completed, what will be the impact on the ability to prepare/defend rate submission?	• No impact • Will make it possible to prepare rate submission or significantly increase likelihood of approval

Table 34: Rate Ready Organization Benefit Questionnaires Dropdown List Details

5.2.1.8.2 VALUE MODEL OUTPUTS

The Rate Ready Organization Benefit Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Rate Ready Organization Benefit	Optional	• Rate Ready Organization Benefit

Table 35: Rate Ready Organization Benefit Output Value Measures

Rate Ready Organization Benefit

Measure Description

Rate Ready Organization Benefit is aimed at measuring the increase in likelihood of Alectra rate application approval by the regulator. Rate Ready Organization Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.

5.2.1.9 Reliability Benefit

Reliability Benefit computes the societal cost of an outage to the customer, and is based on the variable: peak load lost, duration of the outage, duration for which redundancy is lost and the type of the customer affected. The inputs are outlined below. Additional reliability benefits are allocated to project which affects worst performing feeders which is in line with Alectra's mandate of improving the reliability for the worst performing areas.

5.2.1.9.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

Reliability Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Reliability Benefit Value Model.

Reliability Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
How many failures per year will be avoided by implementing this project?	Number (2 decimal places)	Yes	REL_FAIL	If there is only a small probability of a failure each year, enter the probability as a decimal (e.g. 5% chance of occurring in a year, enter as 0.05)	
For each of the failures what would be the expected Peak Lost Load (Connected KVA), or in the case of redundant equipment the Peak load at risk (KVA)	Number (2 decimal places)	Yes	REL_PEAK	For each of the failures what would be the expected Peak Lost Load (Connected KVA), or in the case of redundant equipment the Peak load at risk (KVA)	
What is the average duration of the outage caused by the failures? (hours)	Number (2 decimal places)	Yes	REL_DUR	What is the average duration of the outage caused by the failures? (hours)	
If this is redundant equipment and there is a failure, what is the duration of the period for which redundancy will be lost (hours)?	Number (2 decimal places)	Yes	REL_DURR	If this is redundant equipment and there is a failure, what is the duration of the period for which redundancy will be lost (hours)?	
What is the customer type?	Dropdown List	Yes	REL_TYPE	What is the customer type? Select "Mixed" if it is unclear if the customers are residential or commercial.	
Has this feeder been identified on the worst performing feeder report in the past 2 years, OR has this area been identified by the Key Accounts Manager as an area of concern?	Dropdown List	Yes	REL_WORS	Has this feeder been identified on the worst performing feeder report in the past 2 years, OR has this area been identified by the Key Accounts Manager as an area of concern?	
(Optional Information Used in Legacy Projects and Not used in Value	Text	No	REL_NCUS		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Calculation) What is the average number of customers impacted by each failure?					
Provide the rationale or assumptions for the answers provided above.	Text	Yes	REL_TEXT		

Table 36: Reliability Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
What is the customer type?	- Commercial - Industrial - Mixed Residential/Commercial - Mixed Residential/Commercial/Industrial - Mixed Residential/Industrial - Purely Commercial/Industrial - Residential
Has this feeder been identified on the worst performing feeder report in the past 2 years, OR has this area been identified by the Key Accounts Manager as an area of concern?	- No - Yes

Table 37: Reliability Benefit Questionnaires Dropdown List Details

[illegible]

5.2.1.9.2 VALUE MODEL OUTPUTS

The **Reliability Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Reliability Benefit	Optional	Reliability Benefit

Table 39: Reliability Benefit Output Value Measures

Reliability Benefit

Measure Description

Reliability Benefit computes the societal cost of an outage to the customer, and is based on the variables: peak load lost, duration of the outage, duration for which redundancy is lost and the type of the customer affected. The inputs are outlined below. Additional reliability benefits are allocated to the project which affects worst performing feeders which is in line with Alectra's mandate of improving the reliability for the worst performing areas.

5.2.1.10 Reliability for Spares Benefit

Reliability for Spares Benefit is used to assess the impact of spare equipment on reliability.

5.2.1.10.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields

Reliability for Spares Benefit User Questionnaires

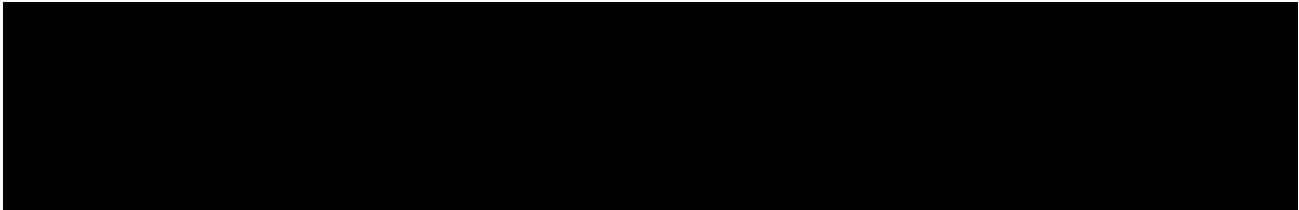
The user is prompted to answer the following Questionnaires for the Reliability for Spares Benefit Value Model.

Reliability for Spares Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the probability that a spare will be required in this year? (%)	Number (2 decimal places)	Yes	RS_PROB	Enter 15% as 15.	
Without a spare available what would be the expected outage duration? (days)	Number (2 decimal places)	Yes	RS_DUR	Without a spare available what would be the expected outage duration? (days)	
With a spare available what would be the expected outage duration? (days)	Number (2 decimal places)	Yes	RS_DURS	With a spare available what would be the expected outage duration? (days)	
If this spare is for redundant equipment: If no spare was available, and the equipment failed, what is the duration	Number (2 decimal places)	Yes	RS_DURR	If this spare is for redundant equipment: If no spare was available, and the equipment failed, what is the duration	

Value Model	Usage	Output Value Measures
Reliability for Spares Benefit	Optional	Reliability for Spares Benefit

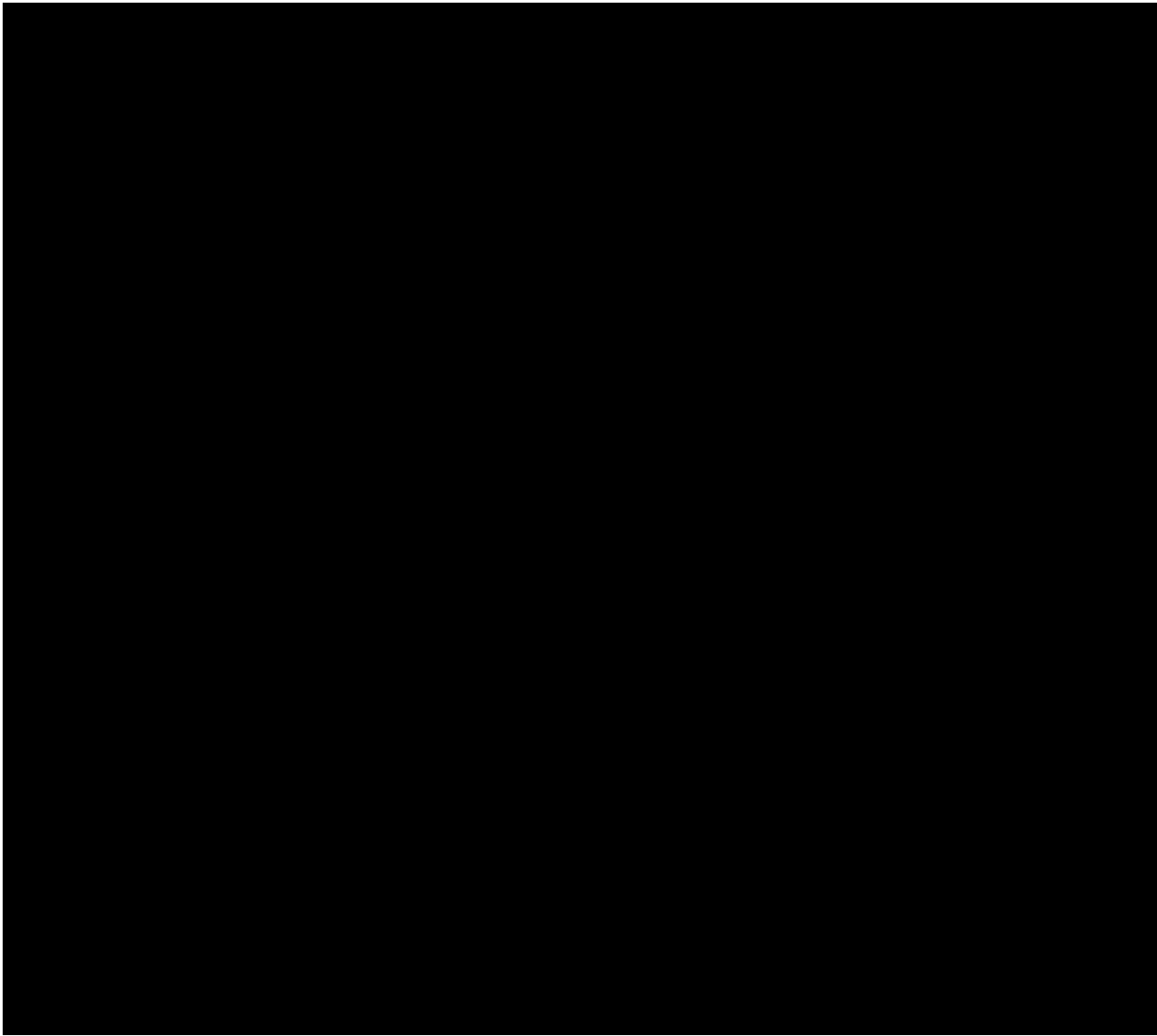
Table 42: Reliability for Spares Benefit Output Value Measures



Reliability for Spares Benefit

Measure Description

Reliability for Spares Benefit is used to assess the impact of spare equipment on reliability. Reliability Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.1.11 Technological Innovation Benefit

Technological Innovation Benefit is used to indicate that a new technology is adopted by Alectra. This Value Measure is used only when clearly new technology is adopted by Alectra; it does not apply when an upgrade to an existing technology is implemented. Technological Innovation Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.

5.2.1.11.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Technological Innovation Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Technological Innovation Benefit Value Model.

Technological Innovation Benefit - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Does this project introduce or apply new technology?	CheckBox	Yes	TechInno_TI1	Does this project introduce or apply new technology that has never been used at Alectra before (does not include enhancements to existing technology)?	
Provide the rationale or assumptions for the answers provided above.	Text	Yes	TechInno_Text		

Table 43: Technological Innovation Benefit - Outcome Time Varying Questionnaire

5.2.1.11.2 VALUE MODEL OUTPUTS

The **Technological Innovation Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Technological Innovation Benefit	Optional	Technological Innovation Benefit

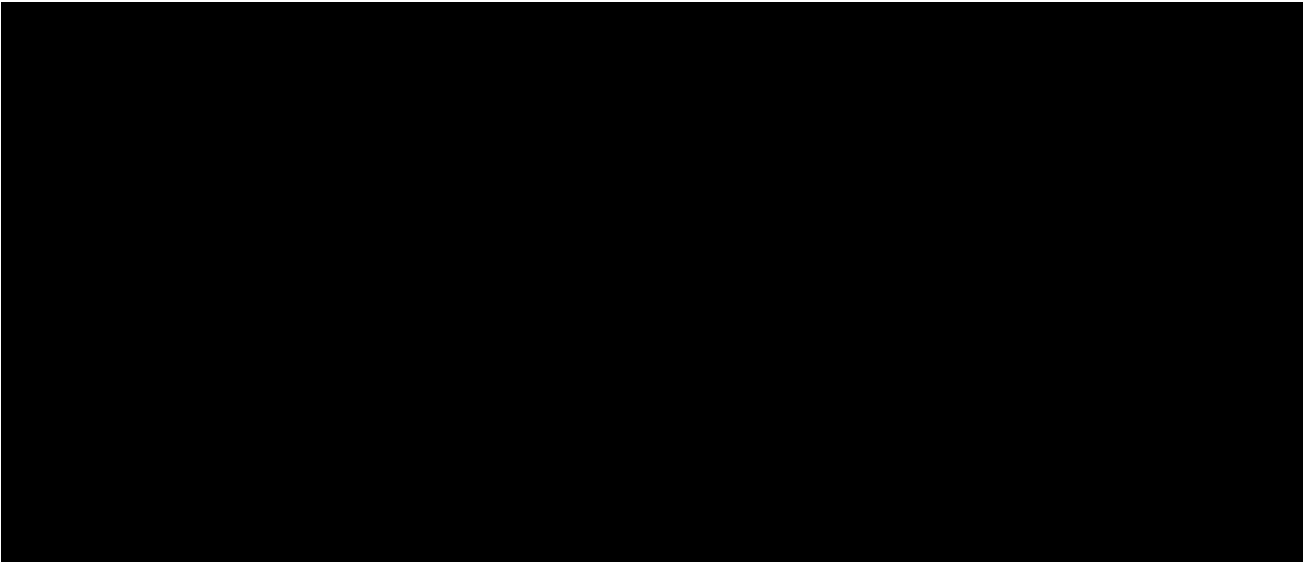
Table 44: Technological Innovation Benefit Output Value Measures



Technological Innovation Benefit

Measure Description

Technological Innovation Benefit is used to indicate that a new technology is adopted by Alectra. This Value Measure is used only when clearly new technology is adopted by Alectra; it does not apply when an upgrade to an existing technology is implemented. Technological Innovation Benefits are computed directly in Value Units so the conversion factor for the value measure is 1.



5.2.2 Costs

5.2.2.1 Future Revenue

Future Revenue is used to represent the value derived from expected cash flows (reimbursements) provided by the regulator.

For Buckets (programmatic work), the **Future Revenue Model** uses economic principles to determine what the necessary cash flows are for the 25 years following the In-Service Date of the project to entirely offset the **Investment Cost**. A Service Measure called **Future Revenue Total** provides the exact cash flows amounts in dollars while the **Future Revenue** value measure yields the value in value units.

For Projects, users define the **expected revenue** for the first 5 years as well as the expected steady-state revenue from year 6 to year 25.

5.2.2.1.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields
- System Core Fields

Future Revenue User Questionnaires

The user is prompted to answer the following Questionnaires for the Future Revenue Value Model.

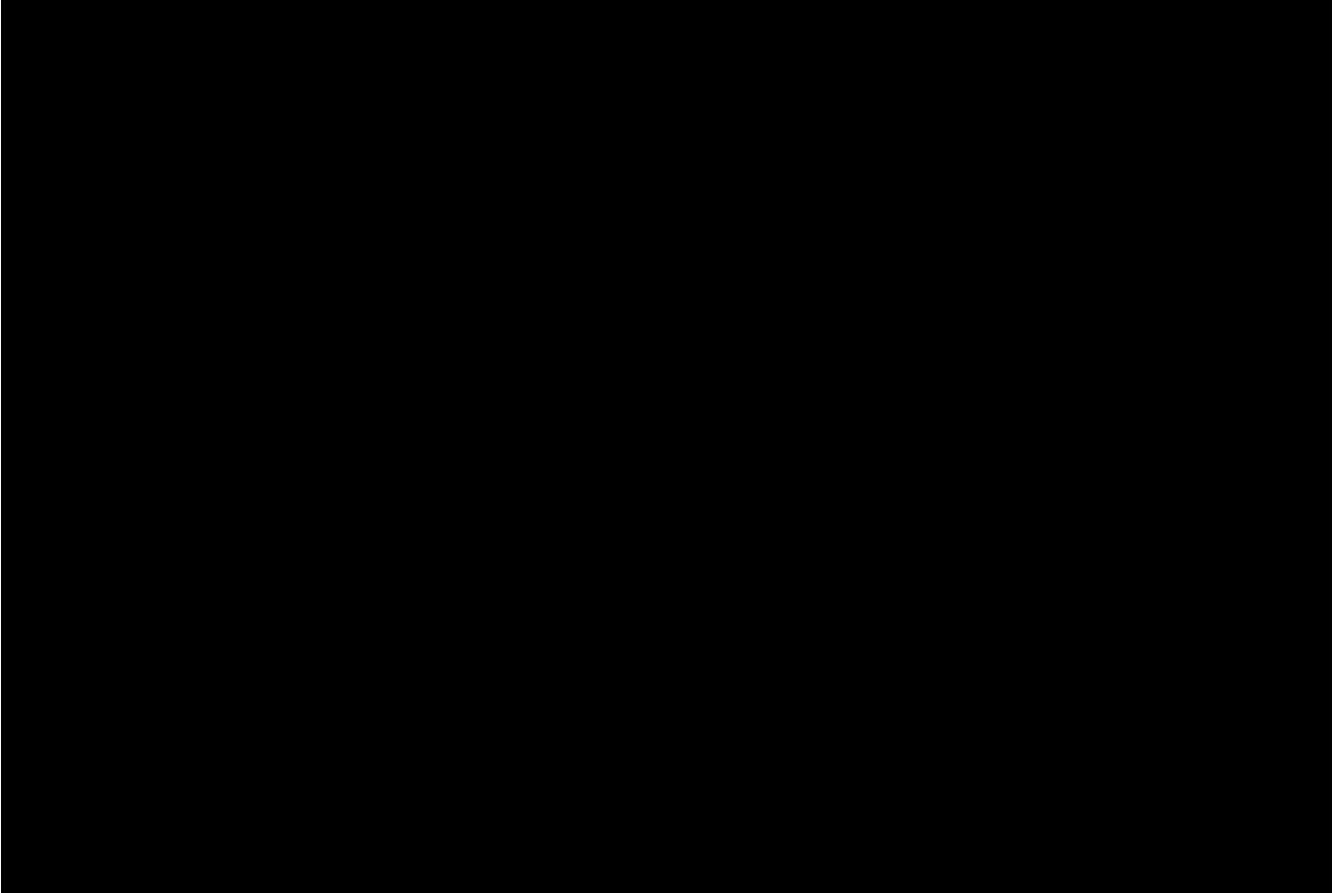
Project - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Year One Future Revenue	Number (2 decimal places)	No	YearOneRevenue	Enter the expected future revenue for the first year of customer connections.	
Year Two Future Revenue	Number (2 decimal places)	No	YearTwoRevenue	Enter the expected future revenue for the second year of customer connections.	
Year Three Future Revenue	Number (2 decimal places)	No	YearThreeRevenue	Enter the expected future revenue for the third year of customer connections.	
Year Four Future Revenue	Number (2 decimal places)	No	YearFourRevenue	Enter the expected future revenue for the fourth year of customer connections.	
Year Five Future Revenue	Number (2 decimal places)	No	YearFiveRevenue	Enter the expected future revenue for the fifth year of customer connections.	
Steady State Future Revenue	Number (2 decimal places)	No	YearSixSteadyStateRevenue	Enter the expected steady-state future revenue for the sixth year of customer connections and beyond.	
Provide a rationale or assumptions for	Text	Yes	RationaleTimeInvariant		

Future Revenue

Measure Description

Future Revenue is used to represent the value derived from expected cash flows (reimbursements) provided by the regulator.



5.2.3 IT

5.2.3.1 Cyber Security Benefit

CyberSecurityBenefit measures the positive impact of a Project on Alectra's cyber security.

5.2.3.1.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

Cyber Security Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Cyber Security Benefit Value Model.

Cyber Security Benefit - Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Will the implementation of this project provide enhanced security features or functionality?	Dropdown List	Yes	EnhancedSecurity		
Is this project impacting a business critical system?	Dropdown List	Yes	ImpactingBCS	e.g., GIS, OMS, SCADA, ERP, CIS, Microsoft O365, Citrix VDI	
Will this project replace a system that is end-of-life or end-of-support?	Dropdown List	Yes	SystemEOL	End-of-life: Companies often label products as EOL several years after production has ended. When a device reaches EOL status, the company ends official support, no longer providing technical help or hardware repairs. End-of-Support: Refers to a situation in which a company ceases support for a product or service. This is typically applied to hardware and software products when a company releases a new version and ends support for previous versions.	
What is the likelihood of achieving this benefit?	Number (1 decimal place)	Yes	CyberSecurityLikelihood		
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 48: Cyber Security Benefit - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
Will the implementation of this project provide enhanced security features or functionality?	- No - Yes
Is this project impacting a business critical system?	- No - Yes
Will this project replace a system that is end-of-life or end-of-support?	- End-of-life - End-of-support - Neither

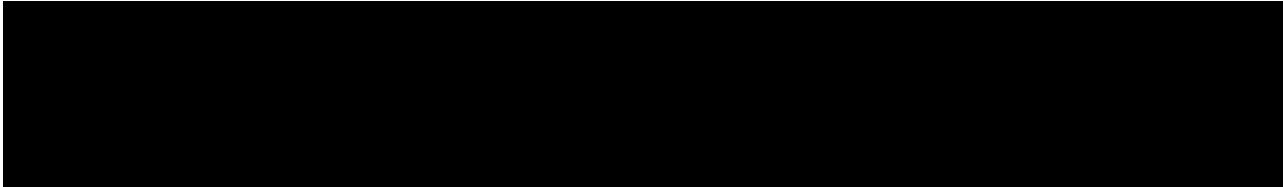
Table 49: Cyber Security Benefit Questionnaires Dropdown List Details

5.2.3.1.2 VALUE MODEL OUTPUTS

The **Cyber Security Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Cyber Security Benefit	Optional	Cyber Security Benefit

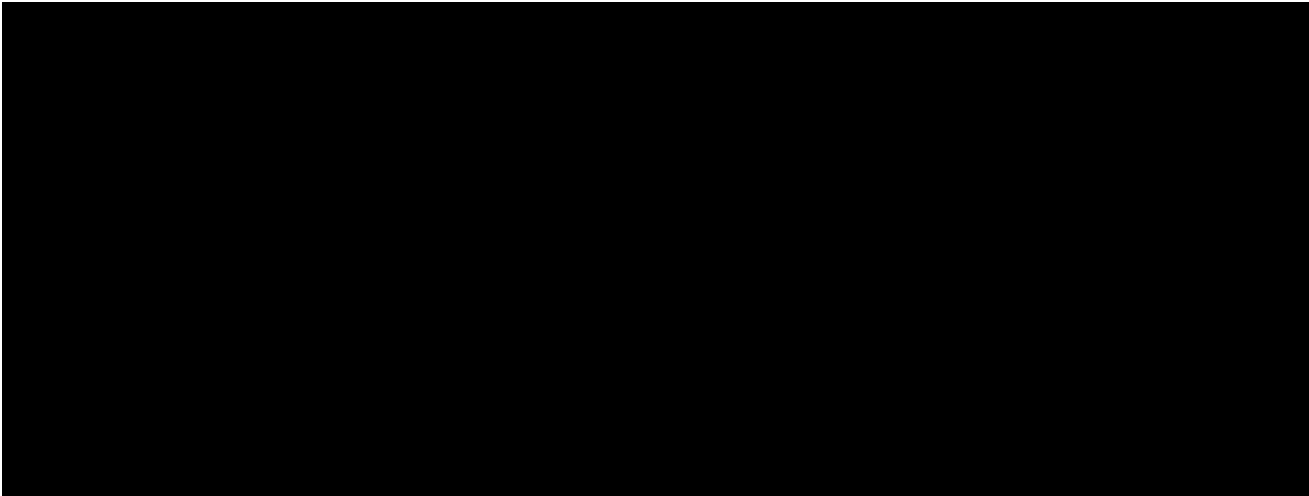
Table 50: Cyber Security Benefit Output Value Measures



Cyber Security Benefit

Measure Description

CyberSecurityBenefit measures the positive impact of a Project on Alectra's cyber security..



5.2.3.2 Cyber Security Complex

Cyber Security Complex measures the mitigation of the risk of cyber-security breaches. The value model is intended to capture the multi-dimensional nature of most cybersecurity projects by outputting multiple relevant Value Measures.

5.2.3.2.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Cyber Security Complex User Questionnaires

The user is prompted to answer the following Questionnaires for the Cyber Security Complex Value Model.

Cyber Security Risk - Baseline - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the probability of a cyber security threat?	Dropdown List	Yes	CyberSecurityProbability		
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 51: Cyber Security Complex - Baseline Time Varying Questionnaire

LEGACY - Cyber Security Risk - Baseline - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Will this investment have a direct positive impact on Cyber Security?	Dropdown List	Yes	ImpactCyberSecurity		
Is this investment impacting any business critical systems?	Dropdown List	Yes	ImpactExternalCyberSecurity	E.g. OMS, GIS, SCADA, CRS, ERP, Microsoft O365, Citrix VDI	
Does this investment have a direct impact on assets governed	Dropdown List	Yes	ImpactComplianceCyberSecurity		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
by any Alectra policy/standard or any industry compliance or governing body (i.e. Regulatory or NERC)?					
What is the probability of a cyber security threat?	Dropdown List	Yes	CyberSecurityProbability		
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 52: Cyber Security Complex - Baseline Time Varying Questionnaire

Cyber Security Risk - Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
What is the probability of a cyber security threat?	Dropdown List	Yes	CyberSecurityProbability		
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 53: Cyber Security Complex - Outcome Time Varying Questionnaire

LEGACY - Cyber Security Risk - Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Will this investment have a direct positive impact on Cyber Security?	Dropdown List	Yes	ImpactCyberSecurity		
Is this investment impacting any business critical systems?	Dropdown List	Yes	ImpactExternalCyberSecurity	E.g. OMS, GIS, SCADA, CRS, ERP, Microsoft O365, Citrix VDI	
Does this investment have a direct impact on assets governed	Dropdown List	Yes	ImpactComplianceCyberSecurity		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
by any Alectra policy/standard or any industry compliance or governing body (i.e. Regulatory or NERC)?					
What is the probability of a cyber security threat?	Dropdown List	Yes	CyberSecurityProbability		
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 54: Cyber Security Complex - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
What is the probability of a cyber security threat?	- A - Very High Probability due to known threat or immediate action required ☐ - B - High Probability, recommended action req. from manufacturer, vendor/auth. 3rd party ☐ - C - Medium Probability due to routine or scheduled action ☐ - D - Low Probability due to minimal threat or existing mechanism(s) in place are sufficient ☐ - E - Zero or Minimal Probability ☐
Does this investment have a direct impact on assets governed by any Alectra policy/standard or any industry compliance or governing body (i.e. Regulatory or NERC)?	- No ☐ - Yes ☐
Will this investment have a direct positive impact on Cyber Security?	- Direct ☐ - Indirect ☐ - No ☐
Is this investment impacting any business critical systems?	- No ☐ - Yes ☐

Table 55: Cyber Security Complex Questionnaires Dropdown List Details

Cyber Security Complex Core Fields

- CurrentMeasureBaselineUnits

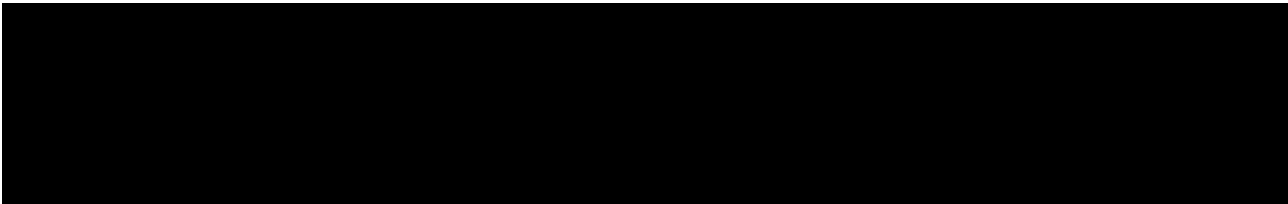
- CurrentMeasureBaselineZynos
- InvestmentSpendByAccountType

5.2.3.2.2 VALUE MODEL OUTPUTS

The **Cyber Security Complex** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Cyber Security Complex	Optional	• Cyber Security Risk

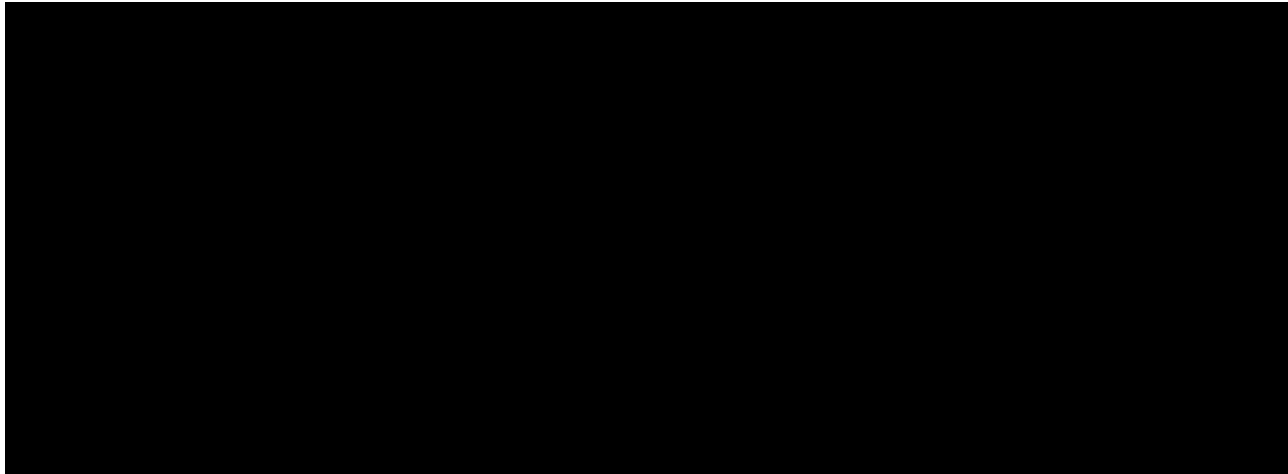
Table 56: Cyber Security Complex Output Value Measures



Cyber Security Risk

Measure Description

Cyber Security Risk measures the mitigation of the risk of cyber security breaches and is used to capture the aspects of an Investment/Project that impact cyber security concerns. If the Investment/Project has a compliance component as well, the Compliance Risk Value Model should also be added to that Investment/Project.



5.2.3.3 Data Reuse Benefit

The **Data Reuse Benefit** Value Model measures the benefit of Collection, Sharing and Reuse enhancements to an organizations' data landscape.

5.2.3.3.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields
- System Core Fields

Data Reuse Benefit User Questionnaires

The user is prompted to answer the following Questionnaires for the Data Reuse Benefit Value Model.

Data Reuse Benefit - Outcome - Time Invariant

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Will the data derived from this project be included in the Alectra Enterprise Data Warehouse for sharing and reuse across the organization?	Dropdown List	Yes	ContributionDataSharingReuse		
Will this investment increase the speed or frequency with which a dataset is available?	Dropdown List	Yes	SpeedFrequencyDataAccess		
What is the number of potential users who are expected to use this data?	Dropdown List	Yes	NumberUsersDataUse		
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 57: Data Reuse Benefit - Outcome Time Invariant Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
Will the data derived from this project be included in the Alectra Enterprise Data Warehouse for sharing and reuse across the organization?	• No ☐ • Yes ☐
What is the number of potential users who are expected to use this data?	• 1. >1000 ☐ • 2. 100-1000 ☐ • 3. 10-100 ☐ • 4. <10 ☐
Will this investment increase the speed or frequency with which a dataset is available?	• 1. Significantly ☐ • 2. Moderately ☐ • 3. Minimally ☐

Measure Prompt	Dropdown (Value)
	4. No

Table 58: Data Reuse Benefit Questionnaires Dropdown List Details

Data Reuse Benefit Core Fields

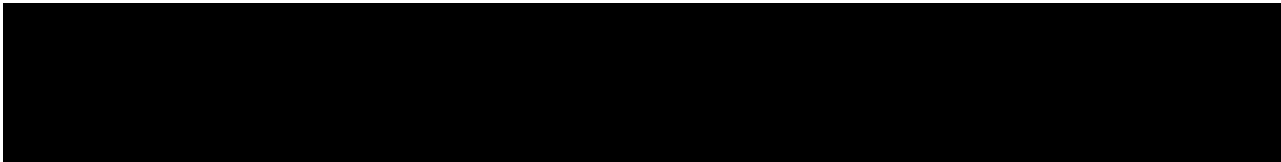
- InvestmentSpendByAccountType

5.2.3.3.2 VALUE MODEL OUTPUTS

The **Data Reuse Benefit** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Data Reuse Benefit	Optional	Data Collection, Sharing and Reuse

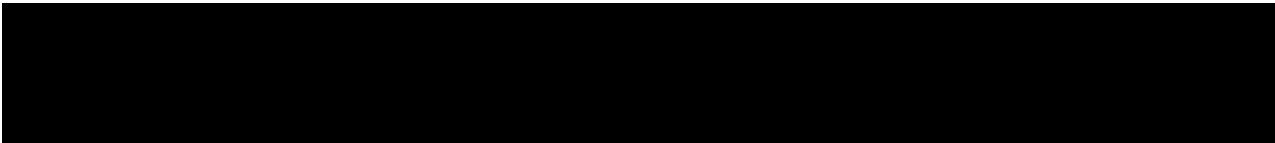
Table 60: Data Reuse Benefit Output Value Measures



Data Collection, Sharing and Reuse

Measure Description

Data Collection, Sharing & Reuse measures the value of enhancements to the organization's data landscape. This includes hardware and software contributing to availability of valuable information, reporting and other business intelligence usages.





5.2.3.4 IT Capacity Risk

IT Capacity Risk represents the potential productivity impact of failing to meet Alectra's IT requirements. An example of IT capacity risk would be a network link between sites that potentially does not have the bandwidth required to support all of the users at one site.

5.2.3.4.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

IT Capacity Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the IT Capacity Risk Value Model.

IT Capacity Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Comment	Text	Yes	RiskTextComment		

Table 61: IT Capacity Risk - Baseline Time Varying Questionnaire

IT Capacity Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 62: IT Capacity Risk - Outcome Time Varying Questionnaire

IT Capacity Risk Core Fields

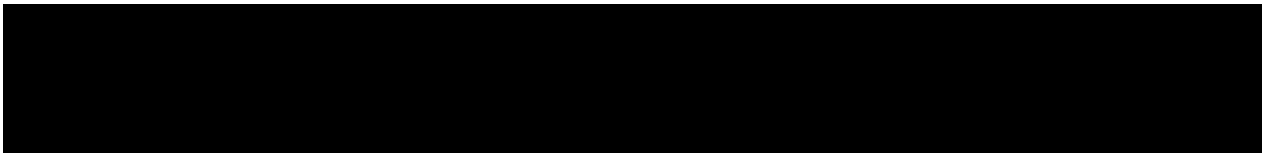
- InvestmentSpendByAccountType

5.2.3.4.2 VALUE MODEL OUTPUTS

The **IT Capacity Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
IT Capacity Risk	Optional	• IT Capacity Risk

Table 63: IT Capacity Risk Output Value Measures



IT Capacity Risk

Measure Description

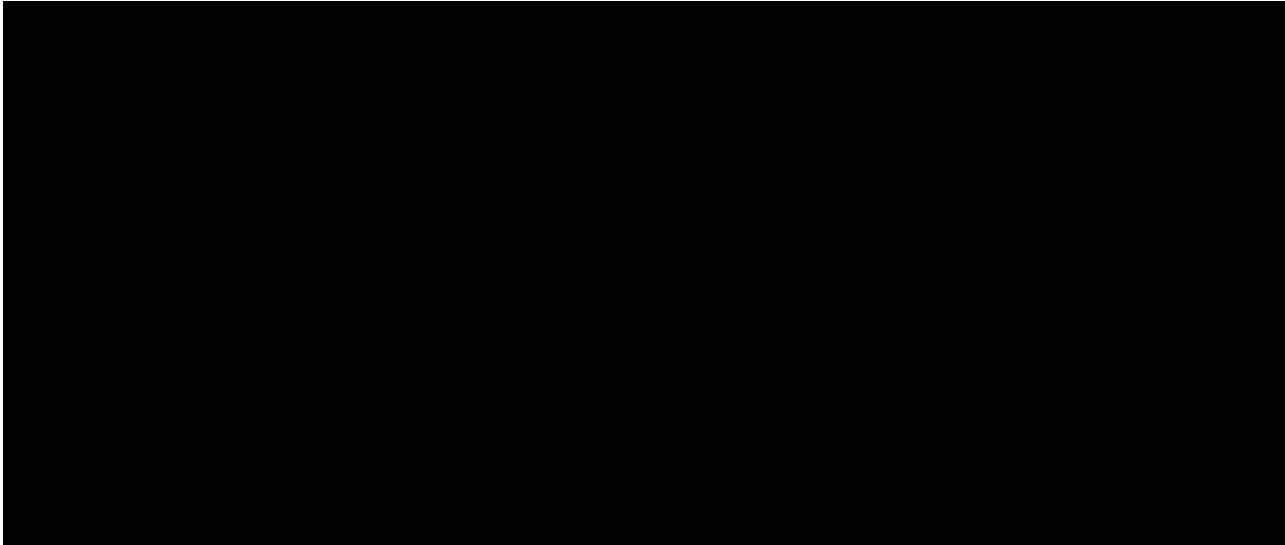
IT Capacity Risk represents the potential productivity impact of failing to meet Alectra's IT requirements. An example of IT capacity risk would be a network link between sites that potentially does not have the bandwidth required to support all of the users at one site.

Assessment of IT capacity risk is based on the number of users whose productivity would likely be significantly impacted by the insufficiency.

IT Capacity Consequences are aligned with financial consequences as follows:

- The productivity of an average employee is valued at \$100,000

- A significant is assumed to be a 10% reduction in efficiency
- Thus, IT capacity risk is assumed to be equivalent to **\$10,000 per affected employee**



5.2.3.5 IT Technical Risk

IT Technical Risk captures the value generated by investments which mitigate the risk of software, application, or asset performance/operability shortfalls. This includes technical or compliance issues or systems becoming unsupported (e.g. expiring support agreements).

5.2.3.5.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields
- System Core Fields

IT Technical Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the IT Technical Risk Value Model.

IT Technical Risk - Baseline - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Will the current software or asset be out of support/warranty within the calendar year?	Dropdown List	Yes	ITWarrantyExpiryBaseline		
What would the level of vendor support,	Dropdown List	Yes	ITRiskVendorSupportBaseline		

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
response time and cost be if the current software or asset were out of support/warranty?					
What is the impact, or significant financial impact, on business if the current software/application or asset is non-operational?	Dropdown List	Yes	ITSeverityBusinessImpactBaseline		
What is the approximate impacted number of users/employees of the software/application ?	Dropdown List	Yes	ITSeverityNumUsersBaseline		
Is the current software or asset out of compliance OR facing imminent risk of being out of compliance?	Dropdown List	Yes	ITRiskComplianceBaseline	Either IT compliance or regulatory compliance	
How much downtime does the current software/application or asset experience?	Dropdown List	Yes	ITDurationDowntimeImpactBaseline		
Is the current software or asset business critical or does it support a business critical application?	Dropdown List	Yes	ITRiskBusinessCriticalBaseline	E.g. OMS, GIS, SCADA, CRS, ERP, Microsoft O365, Citrix VDI	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 64: IT Technical Risk - Baseline Time Varying Questionnaire

LEGACY - IT Technical Risk - Baseline - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Does the proposed solution result in the asset/software being easier or cheaper to maintain relative to the status quo?	Dropdown List	Yes	ITRiskEasierMaintain		
Will the newly implemented software or asset be out of support/warranty within the calendar year?	Dropdown List	Yes	ITWarrantyExpiry		
What would the level of vendor support, response time and cost be if the newly implemented software or asset were out of support/warranty?	Dropdown List	Yes	ITRiskVendorSupport		
What is the impact, or significant financial impact, on business if the newly implemented software/application or asset is non-operational?	Dropdown List	Yes	ITSeverityBusinessImpact		
What is the approximate impacted number of users/employees of the newly implemented software/application?	Dropdown List	Yes	ITSeverityNumUsers		
Is the newly implemented software or asset out of compliance OR facing imminent risk of being out of compliance?	Dropdown List	Yes	ITRiskCompliance	Either IT compliance or regulatory compliance	
How much downtime does the newly implemented software/application or asset experience?	Dropdown List	Yes	ITDurationDowntimeImpact		
Is the newly implemented software or asset business critical or does it support a business critical application?	Dropdown List	Yes	ITRiskBusinessCritical	E.g. OMS, GIS, SCADA, CRS, ERP, Microsoft O365, Citrix VDI	
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 65: IT Technical Risk - Baseline Time Varying Questionnaire

IT Technical Risk - Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Does the proposed solution result in the asset/software being easier or cheaper to maintain relative to the status quo?	Dropdown List	Yes	ITRiskEasierMaintain		
Will the newly implemented software or asset be out of support/warranty within the calendar year?	Dropdown List	Yes	ITWarrantyExpiry		
What would the level of vendor support, response time and cost be if the newly implemented software or asset were out of support/warranty?	Dropdown List	Yes	ITRiskVendorSupport		
What is the impact, or significant financial impact, on business if the newly implemented software/application or asset is non-operational?	Dropdown List	Yes	ITSeverityBusinessImpact		
What is the approximate impacted number of users/employees of the newly implemented software/application?	Dropdown List	Yes	ITSeverityNumUsers		
Is the newly implemented software or asset out of compliance OR facing imminent risk of being out of compliance?	Dropdown List	Yes	ITRiskCompliance	Either IT compliance or regulatory compliance	
How much downtime does the newly implemented software/application or asset experience?	Dropdown List	Yes	ITDurationDowntimeImpact		
Is the newly implemented software or asset business critical or does it support a business critical application?	Dropdown List	Yes	ITRiskBusinessCritical	E.g. OMS, GIS, SCADA, CRS, ERP, Microsoft O365, Citrix VDI	

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 66: IT Technical Risk - Outcome Time Varying Questionnaire

Dropdown List Detail

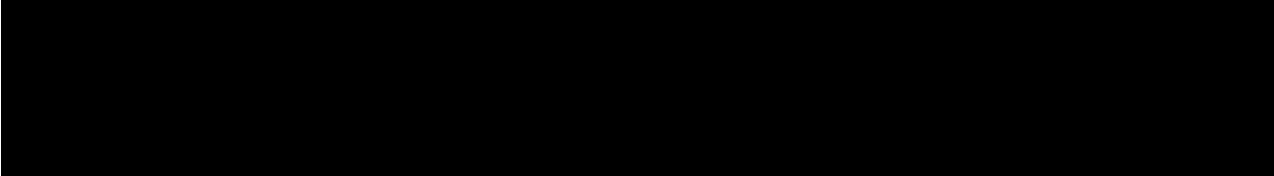
Measure Prompt	Dropdown (Value)
How much downtime does the current software/application or asset experience?	- A - Much more than average downtime (>2x) [REDACTED] - B - More than average downtime [REDACTED] - C - About average downtime [REDACTED] - D - Less than average downtime [REDACTED] - E - Much less than average downtime (<0.5x) [REDACTED] F) Solution has no impact on downtime [REDACTED]
Is the current software or asset business critical or does it support a business critical application?	- No [REDACTED] - Yes [REDACTED]
Is the current software or asset out of compliance OR facing imminent risk of being out of compliance?	- No [REDACTED] - Yes [REDACTED]
What would the level of vendor support, response time and cost be if the current software or asset were out of support/warranty?	- A - No support from vendor and no upgrade available [REDACTED] - B - No support from vendor but upgrade available [REDACTED] - C - High cost (>\$100k) and/or long response time (>2 weeks) [REDACTED] - D - Medium cost (>\$50k) and/or long response time (>1 week) [REDACTED] - E - Low cost (\$10-50k) and/or response time (<2 days) [REDACTED] - F - Insignificant cost and/or response time [REDACTED]
What is the impact, or significant financial impact, on business if the current software/application or asset is non-operational?	- A - High (50% decrease in productivity or a significant financial impact) [REDACTED] - B - Medium (25% decrease in productivity or a moderate financial impact) [REDACTED] - C - Low (10% decrease in productivity or a low financial impact) [REDACTED]

Measure Prompt	Dropdown (Value)
	D - None
What is the approximate impacted number of users/employees of the software/application?	- A - >500 users/employees - B - 251-500 users/employees - C - 151-250 users/employees - D - 26-150 users/employees - E - 0-25 users/employees
Will the current software or asset be out of support/warranty within the calendar year?	- No - Yes
How much downtime does the newly implemented software/application or asset experience?	- A - Much more than average downtime (>2x) - B - More than average downtime - C - About average downtime - D - Less than average downtime - E - Much less than average downtime (<0.5x) F) Solution has no impact on downtime
Is the newly implemented software or asset business critical or does it support a business critical application?	- No - Yes
Is the newly implemented software or asset out of compliance OR facing imminent risk of being out of compliance?	- No - Yes
Does the proposed solution result in the asset/software being easier or cheaper to maintain relative to the status quo?	- A - Easier or cheaper to maintain - B - About average maintenance cost - C - More difficult or more costly to maintain
What would the level of vendor support, response time and cost be if the newly implemented software or asset were out of support/warranty?	- A - No support from vendor and no upgrade available - B - No support from vendor but upgrade available - C - High cost (>\$100k) and/or long response time (>2 weeks) - D - Medium cost (>\$50k) and/or long response time (>1 week) - E - Low cost (\$10-50k) and/or response time (<2 days) - F - Insignificant cost and/or response time

The **IT Technical Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
IT Technical Risk	Optional	IT Technical Risk

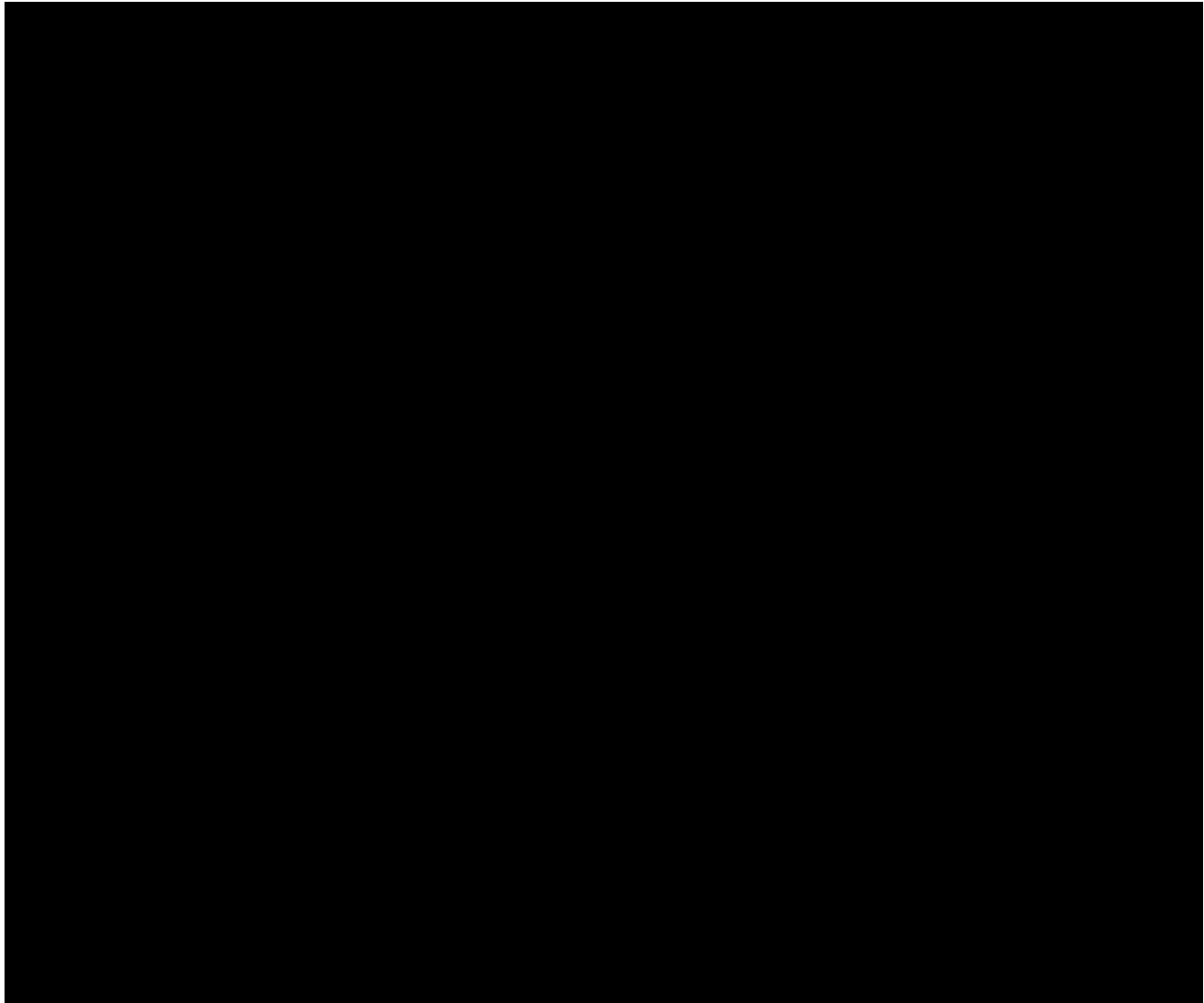
Table 69: IT Technical Risk Output Value Measures



IT Technical Risk

Measure Description

IT - Technical Risk captures the value generated by investments which mitigate the risk of software, application, or asset performance/operability/reliability shortfalls. This includes technical or compliance issues or systems becoming unsupported (e.g. expiring support agreements).



5.2.4 Risks

5.2.4.1 Compliance Risk

Compliance Risk is used to capture the impact of an event or a failure which would cause the utility to fail to comply with a government or regulatory mandate or with an internal policy.

5.2.4.1.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Configurable Fields
- System Core Fields

Compliance Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Compliance Risk Value Model.

Compliance Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Compliance Classification	Dropdown List	Yes	ComplianceClassification		
Fine Frequency	Dropdown List	Yes	FineFrequency		
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 70: Compliance Risk - Baseline Time Varying Questionnaire

Compliance Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Compliance Classification	Dropdown List	Yes	ComplianceClassification		
Fine Frequency	Dropdown List	Yes	FineFrequencyOutcome		
Provide a rationale or assumptions for the numbers provided.	Text	Yes	RationaleTimeInvariant		

Table 71: Compliance Risk - Outcome Time Varying Questionnaire

Dropdown List Detail

Measure Prompt	Dropdown (Value)
Compliance Classification	• Connection and Cost Recovery Agreements • Corporate or Other Contractual Issues • Distribution System Code • ESA Regulations • IESO Requirements • Measurement Canada • Municipal By-laws • Other • Public Service Works on Highway Act (PSWHA)
Fine Frequency	• A - Almost Certain • B - Once In 2 Years • C - Once In 5 Years • D - Once In 10 Years • E - Once In 20 Years • F - None

Table 72: Compliance Risk Questionnaires Dropdown List Details

Compliance Risk Core Fields

- InvestmentSpendByAccountType

5.2.4.1.2 VALUE MODEL OUTPUTS

The **Compliance Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Compliance Risk	Optional	• Compliance Risk

Table 74: Compliance Risk Output Value Measures

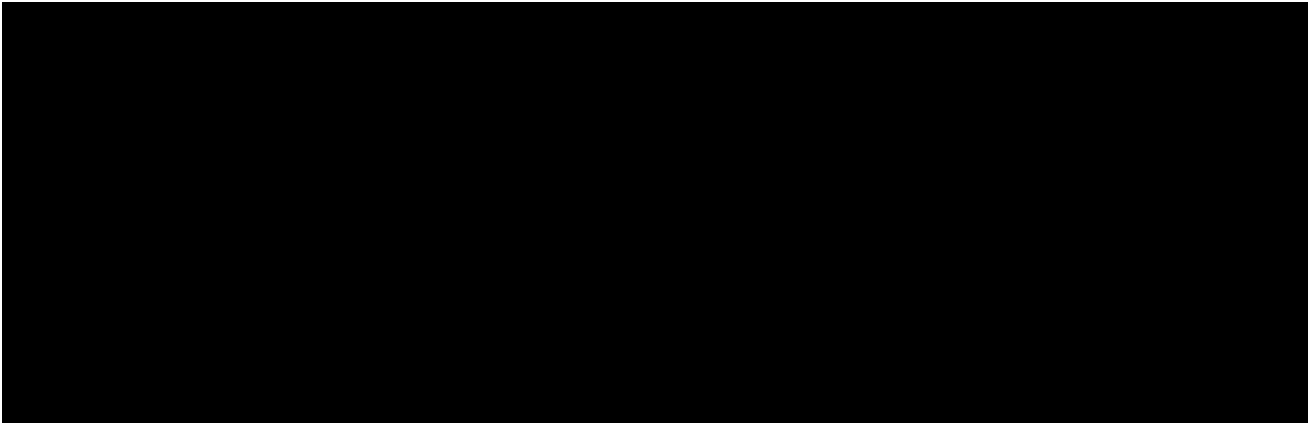
Compliance Risk

Measure Description

Compliance Risk is used to capture the impact of an event or a failure which would cause the utility to fail to comply with a government or regulatory mandate or with an internal policy.

Compliance Risk is typically assessed based on the fines that would be assessed for non-compliance or the cost to Alectra of any operating restrictions that would be imposed as a result of the non-compliance.

Failure to conform to an internal policy is evaluated as a minor consequence.



5.2.4.2 Distribution System Capacity Risk

Distribution System Capacity Risk is used when a failure or event will threaten Alectra's ability to deliver power to all customers according to tariff.

5.2.4.2.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Distribution System Capacity Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Distribution System Capacity Risk Value Model.

Distribution System Capacity Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Comment	Text	Yes	RiskTextComment		

Table 75: Distribution System Capacity Risk - Baseline Time Varying Questionnaire

Distribution System Capacity Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 76: Distribution System Capacity Risk - Outcome Time Varying Questionnaire

Distribution System Capacity Risk Core Fields

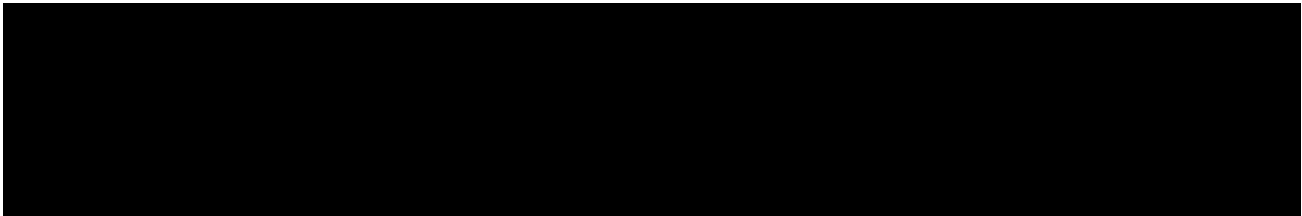
- InvestmentSpendByAccountType

5.2.4.2.2 VALUE MODEL OUTPUTS

The **Distribution System Capacity Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Distribution System Capacity Risk	Optional	Distribution System Capacity Risk

Table 77: Distribution System Capacity Risk Output Value Measures



Distribution System Capacity Risk

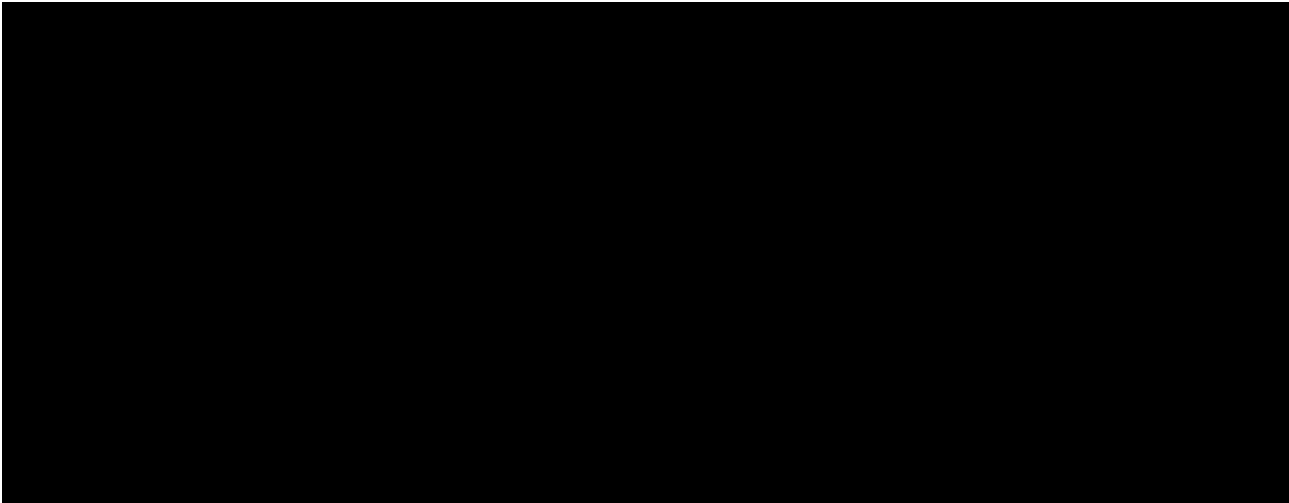
Measure Description

Distribution System Capacity Risk is used when a failure or event will threaten Alectra's ability to deliver power to all customers according to tariff.

The following types of risk would typically fall under this category:

- Overloading of transmission or distributions circuits
- Lack of required redundancy in transmission or distributions circuits (classes as "Exceeding planning limit")

- Events that lead to an under-voltage situation for some customers



5.2.4.3 Environmental Risk

Environmental Risk is assessed based on the cost of remediation efforts to reverse any damage potentially caused. Damage so severe as not to be reversible is ranked using the most severe consequence classification.

5.2.4.3.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Environmental Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Environmental Risk Value Model.

Environmental Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 78: Environmental Risk - Baseline Time Varying Questionnaire

Environmental Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 79: Environmental Risk - Outcome Time Varying Questionnaire

Environmental Risk Core Fields

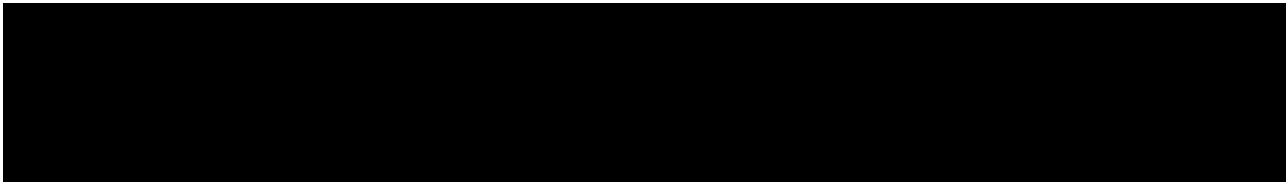
- InvestmentSpendByAccountType

5.2.4.3.2 VALUE MODEL OUTPUTS

The **Environmental Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Environmental Risk	Optional	• Environmental Risk

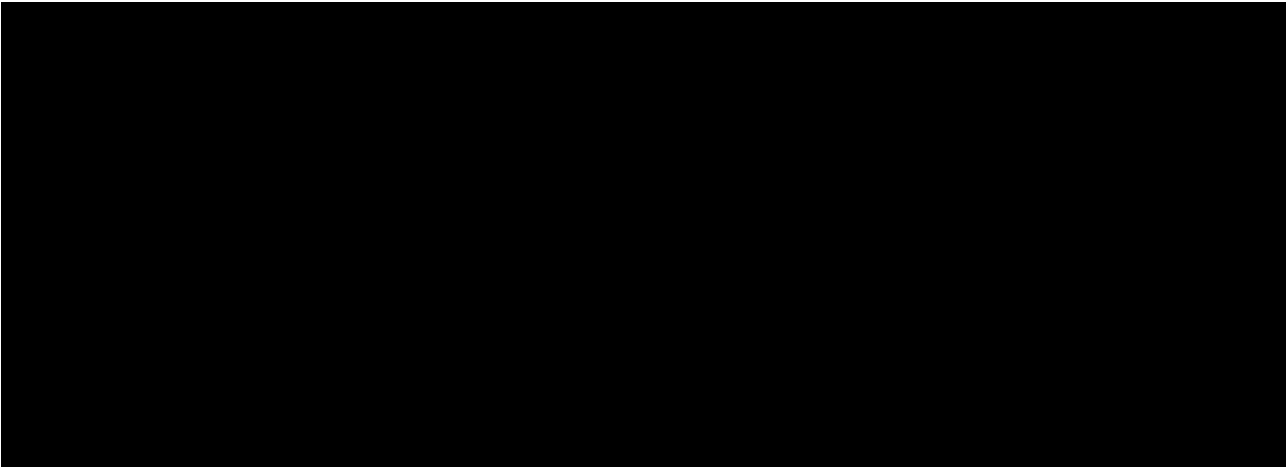
Table 80: Environmental Risk Output Value Measures



Environmental Risk

Measure Description

Environmental Risk is assessed based on the cost of remediation efforts to reverse any damage potentially caused. Damage so severe as not to be reversible is ranked using the most severe consequence classification.



5.2.4.4 Financial Risk

Financial Risk is used to represent a failure mode or an event that will have a direct financial consequence for Alectra. For example, if the failure of a piece of equipment in a switchyard causes the destruction of a nearby breaker, there would be a financial risk associated with that failure whose consequence is valued at the cost of repair or replacement of the breaker.

Assessment of financial risk is based on the direct cost to Alectra of a failure or event occurring.

5.2.4.4.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Financial Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Financial Risk Value Model.

Financial Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 81: Financial Risk - Baseline Time Varying Questionnaire

Financial Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 82: Financial Risk - Outcome Time Varying Questionnaire

Financial Risk Core Fields

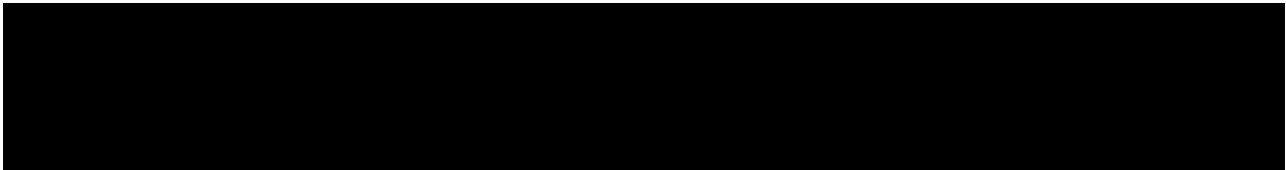
- InvestmentSpendByAccountType

5.2.4.4.2 VALUE MODEL OUTPUTS

The **Financial Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Financial Risk	Optional	Financial Risk

Table 83: Financial Risk Output Value Measures

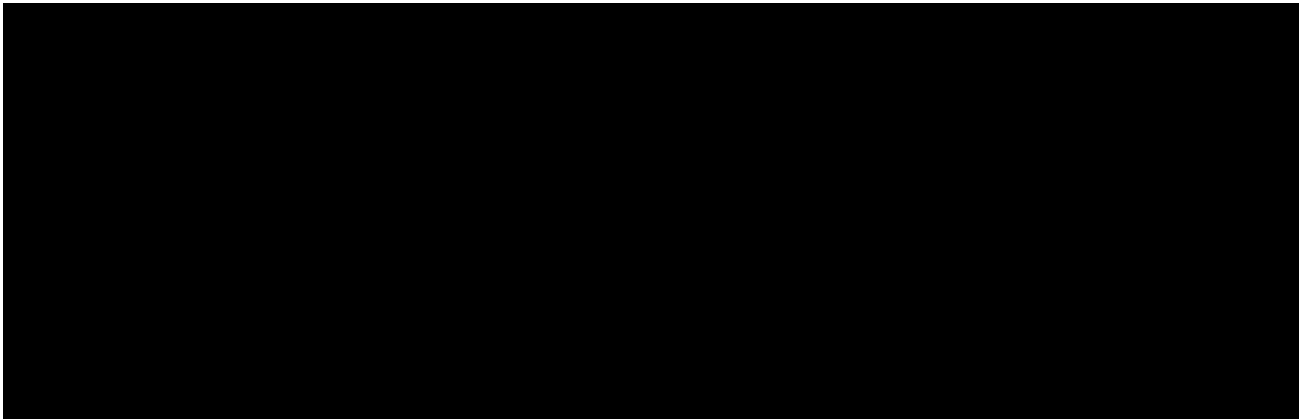


Financial Risk

Measure Description

Financial Risk is used to represent a failure mode or an event that will have a direct financial consequence for Alectra. For example, if a failure of a piece of equipment in a switchyard causes the destruction of a nearby breaker, there would be a financial risk associated with that failure whose consequence is valued at the cost of repair or replacement of the breaker.

Assessment of financial risk is based on the direct cost to Alectra of a failure or event occurring.



5.2.4.5 PA Results

The PA Results Value Model allows users to associate results from Predictive Analytics strategy alternatives with Projects in Copperleaf Portfolio. There are four value measures that are used: Financial Risk, Safety Risk, Environmental Risk, and Reliability Risk. There are no calculations as the value units that are input for a given year for a value measure is what is output by the PA Results model (along with the application of inflation and discount rates accordingly).

5.2.4.5.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires

PA Results User Questionnaires

The user is prompted to answer the following Questionnaires for the PA Results Value Model.

Poles - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Poles Safety Risk	Number (4 decimal places)	No	PolesSafetyRisk		
Poles Reliability Risk	Number (4 decimal places)	No	PolesReliabilityRisk		
Poles Environmental Risk	Number (4 decimal places)	No	PolesEnvironmentalRisk		
Poles Financial Risk	Number (4 decimal places)	No	PolesFinancialRisk		

Table 84: PA Results - Outcome Time Varying Questionnaire

Switches - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Switches Safety Risk	Number (4 decimal places)	No	SwitchesSafetyRisk		
Switches Reliability Risk	Number (4 decimal places)	No	SwitchesReliabilityRisk		
Switches Environmental Risk	Number (4 decimal places)	No	SwitchesEnvironmentalRisk		
Switches Financial Risk	Number (4 decimal places)	No	SwitchesFinancialRisk		

Table 85: PA Results - Outcome Time Varying Questionnaire

Switchgear - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Switchgear Safety Risk	Number (4 decimal places)	No	SwitchgearSafetyRisk		
Switchgear Reliability Risk	Number (4 decimal places)	No	SwitchgearReliabilityRisk		
Switchgear Environmental Risk	Number (4 decimal places)	No	SwitchgearEnvironmentalRisk		
Switchgear Financial Risk	Number (4 decimal places)	No	SwitchgearFinancialRisk		

Table 86: PA Results - Outcome Time Varying Questionnaire

Transformers - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Transformers Safety Risk	Number (4 decimal places)	No	TransformersSafetyRisk		
Transformers Reliability Risk	Number (4 decimal places)	No	TransformersReliabilityRisk		
Transformers Environmental Risk	Number (4 decimal places)	No	TransformersEnvironmentalRisk		
Transformers Financial Risk	Number (4 decimal places)	No	TransformersFinancialRisk		

Table 87: PA Results - Outcome Time Varying Questionnaire

Cables - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Cables Safety Risk	Number (4 decimal places)	No	CablesSafetyRisk		
Cables Reliability Risk	Number (4 decimal places)	No	CablesReliabilityRisk		
Cables Environmental Risk	Number (4 decimal places)	No	CablesEnvironmentalRisk		
Cables Financial Risk	Number (4 decimal places)	No	CablesFinancialRisk		

Table 88: PA Results - Outcome Time Varying Questionnaire

Fleet - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Fleet Safety Risk	Number (4 decimal places)	No	FleetSafetyRisk		
Fleet Reliability Risk	Number (4 decimal places)	No	FleetReliabilityRisk		
Fleet Environmental Risk	Number (4 decimal places)	No	FleetEnvironmentalRisk		
Fleet Financial Risk	Number (4 decimal places)	No	FleetFinancialRisk		

Table 89: PA Results - Outcome Time Varying Questionnaire

5.2.4.5.2 VALUE MODEL OUTPUTS

The **PA Results** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
PA Results	Optional	- Financial Risk - Safety Risk - Reliability Risk - Environmental Risk

Table 90: PA Results Output Value Measures

5.2.4.6 Reputational Risk

Reputational Risk represents the risk that a failure or event will cause Alectra customers or other external stakeholders to lose or weaken confidence in the organization.

5.2.4.6.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Reputational Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Reputational Risk Value Model.

Reputational Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 91: Reputational Risk - Baseline Time Varying Questionnaire

Reputational Risk Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 92: Reputational Risk - Outcome Time Varying Questionnaire

Reputational Risk Core Fields

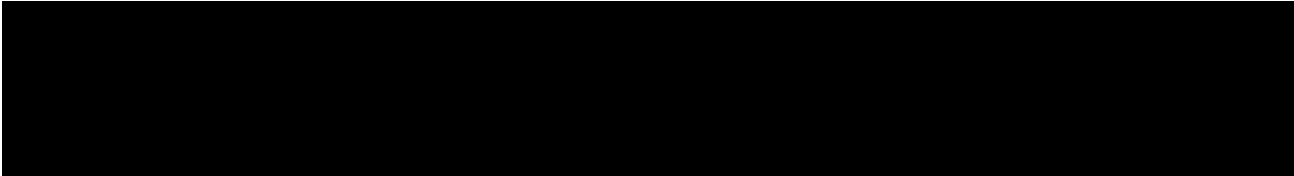
- InvestmentSpendByAccountType

5.2.4.6.2 VALUE MODEL OUTPUTS

The **Reputational Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Reputational Risk	Optional	Reputational Risk

Table 93: Reputational Risk Output Value Measures

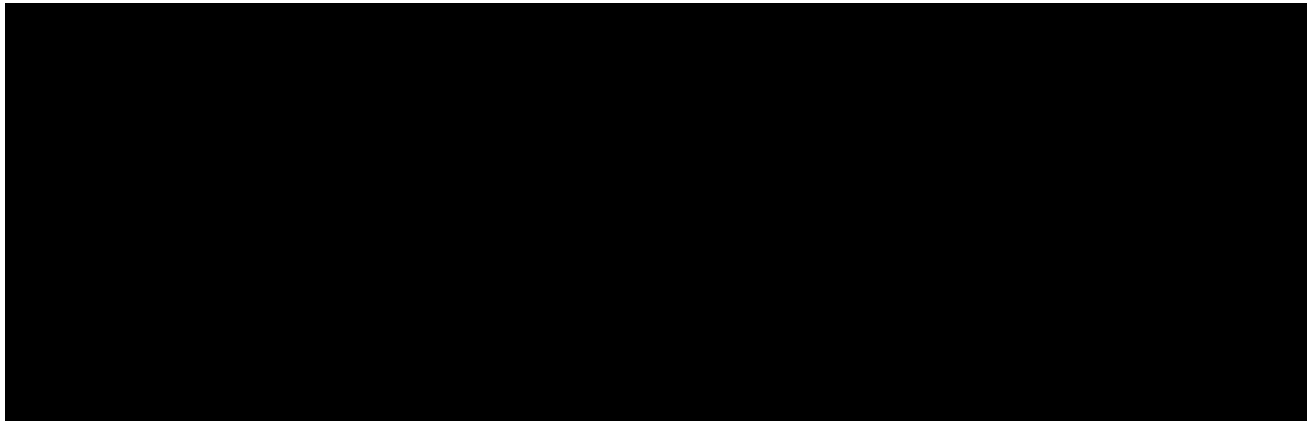


Reputational Risk

Measure Description

Reputational Risk represents the risk that a failure or event will cause Alectra customers or other external stakeholders to lose or weaken confidence in the organization.

Because it is difficult to directly assess public perception, the level of consequence is assessed based on the amount of negative media coverage expected if the event or failure occurs. The higher levels of risk are associated with loss in stakeholder confidence, where the stakeholder is defined as the Ontario Energy Board or key stakeholders (e.g. City of Vaughan).



5.2.4.7 Safety Risk

Alectra does not purposefully expose employees or the general public to known safety hazards.

If a significant safety risk that could lead to serious injury or death has been identified then that risk must be mitigated either by a capital investment, an O&M investment or some kind of operating restriction. If no operating restriction is possible to mitigate the risk and the only way to address the safety risk is by a capital investment, then that investment should be considered mandatory. Multiple alternatives may be created to represent multiple approaches to mitigating the risk on a temporary or permanent basis.

5.2.4.7.1 VALUE MODEL INPUTS

Takes Inputs from:

- User Questionnaires
- System Core Fields

Safety Risk User Questionnaires

The user is prompted to answer the following Questionnaires for the Safety Risk Value Model.

Safety Risk - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 94: Safety Risk - Baseline Time Varying Questionnaire

Safety Override Outcome - Time Varying

Measure Prompt	Type	Required	Measure Prompt Code	Description	Unit
Risk Probability	Dropdown List	Yes	RiskProbability	The probability of the risk.	
Risk Consequence	Dropdown List	Yes	RiskConsequence	The consequence of a risk.	
Risk Comment	Text	Yes	RiskTextComment		

Table 95: Safety Risk - Outcome Time Varying Questionnaire

Safety Risk Core Fields

- InvestmentSpendByAccountType

5.2.4.7.2 VALUE MODEL OUTPUTS

The **Safety Risk** Value Model outputs the Value Measures as shown below:

Value Model	Usage	Output Value Measures
Safety Risk	Optional	Safety Risk

Table 96: Safety Risk Output Value Measures

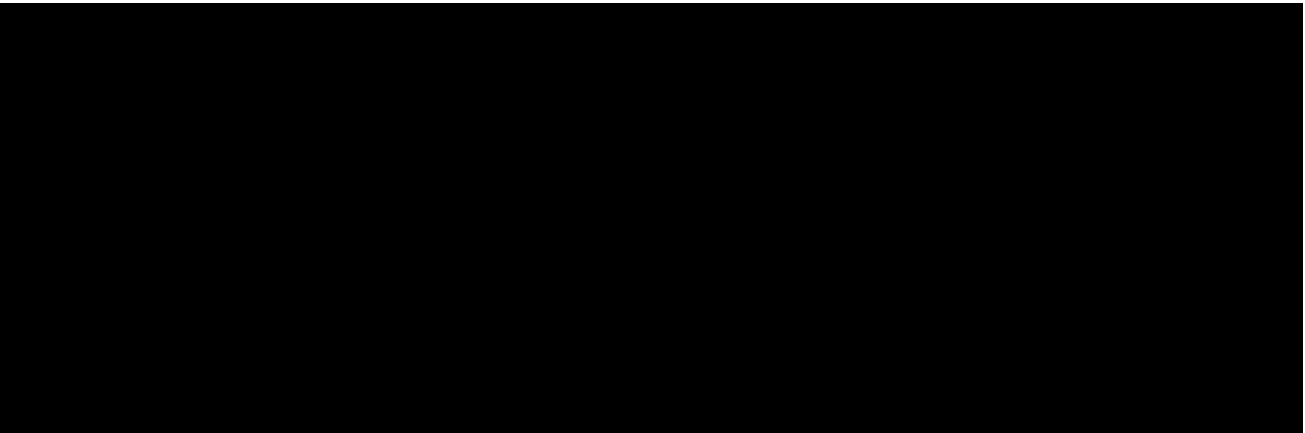


Safety Risk

Measure Description

Alectra does not purposefully expose employees or the general public to known safety hazards.

If a significant safety risk that could lead to serious injury or death has been identified then that risk must be mitigated either by a capital investment, an O&M investment or some kind of operating restriction. If no operating restriction is possible to mitigate the risk and the only way to address the safety risk and the only way to address the safety risk is by a capital investment, then that investment should be considered mandatory. Multiple alternatives may be created to represent multiple approaches to mitigating the risk on a temporary or permanent basis.



6 Contact Copperleaf

Copperleaf provides decision analytics to organizations facing the challenges of managing critical infrastructure. Our enterprise software solutions leverage operational, financial and asset data to empower our clients to make investment decisions that deliver the highest business value. Copperleaf is a member of The Institute of Asset Management (IAM) and actively participates in shaping the future of asset management standards, including ISO 55000. Headquartered in Vancouver, our solutions are distributed and supported by regional staff and partners worldwide. We are committed to building a better world, one decision at a time.

Appendix O

Electrical Services & Generator Capacities and Current Demand



February 29th, 2024

Alectra Utilities Inc
161 Cityview Boulevard
Vaughan, Ontario
L4H 0A9

Attn: Peter Del Nero, Manager, Facilities Operation

Re: Report for Electrical Services and Generator Capacities and current Demand

Hi Peter,

We have completed our report for the Electrical Service and emergency capabilities and the current electrical demand at the following facilities:

**80 Addiscott Court, Markham
55 Patterson Road, Barrie
161 Cityview Boulevard, Vaughan
2185 Derry Road West, Mississauga
395 Southgate Drive, Guelph
450 Nebo Road, Hamilton
340 Vansickle Rd, St. Catharines
55 John Street North, Hamilton**

Our report is based on:

- The highest demand recorded on the facilities hydro bill in the previous 12 months.
- The current electrical service capacity and condition.
- The current emergency back up capacity and condition.
- New load not currently utilized.

If you have any questions following reviewing this report, please don't hesitate to contact me.

Regards,

Steven Jones

Table of Contents

Description	Page
80 Addiscott Court, Markham	3
55 Patterson Road, Barrie	4
161 Cityview Boulevard, Vaughan	5
2185 Derry Road West, Mississauga	6
395 Southgate Drive, Guelph	7
450 Nebo Road, Hamilton	8
340 Vansickle Rd, St. Catharines	9
55 John Street North, Hamilton	10
Charger Specifications Level 2 FLO	11
Charger Specifications Level 4 FLO	12
Charger Specifications Level 3/4 IN-CHARGE	13
Charger Specifications Level 4 IN-CHARGE	14

80 Addiscott Court, Markham

Electrical Service Capacity 800 amp / 600/347 volt, 3 phase, 4 wire Max at 80% = 640 amp

Emergency Back Up Capacity 600 amp / 600/347 volt, 3 phase, 4 wire Max at 80% = 480 amp

The main service is 800 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 448.00 kW - October 2023

Additional Loads

(1) ICE 120 120.00 kW

(1) ICE 80 19.20 kW

(1) Flo 100 kW truck charger 108.00 kW

(10) Level 2 car chargers @ 7.2 kW = 72.00 kW

Total additional load 319.20 kW @ 90% per ESA Demand Load Calculations = 287.28 kW

Electrical Service Demand 448.00 kW

Total Demand. 735.28 kW = 715 amps

Conclusions:

There is no additional power from the electrical service available for future growth. Since the generator feeds the entire building, there is no **available emergency power available**.

If you overload the generator, the generator will not work. There is no way to split future loads off the generator without major revamping of service.

The main service has no capacity for future loads.

Replacement of main service and generator is required for future expansion.

55 Patterson Road, Barrie

Electrical Service Capacity	1200 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 960 amp
Emergency Back Up Capacity	600 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 480 amp

The main service is 1200 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 185.00 kW - October 2023

Additional Loads:

(7) Level 2 car chargers @ 7.2 kW = 50.40 kW

Total additional load	50.40 kW @ 90% per ESA Demand Load Calculations = 45.36 kW
Electrical Service Demand	185.00 kW
Total Demand	230.36 kW = 224.00 amps

Conclusions:

736 amps (756.00 kW) of electrical service available for future growth however this is limited by the generator as it feeds the entire building. There are 256 (263.00 kW) amps of emergency power available.

While the main service has capacity for future loads, it is maxed out as far as space to add fusible disconnect and is out of date.

Replacement of main service is recommended for future expansion.

161 Cityview Blvd, Vaughan

Electrical Service Capacity	1200 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 960 amp
Emergency Back Up Capacity	480 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 384 amp

The main service is 1200 amp. It is backed up by a 480 amp generator.
When there is a power outage, an automatic transfer switches the power supply from the generator.
The generator only powers the emergency loads in the building, which is 88 amps.

Highest Demand in 12 months 448.00 kW - October 2023

Additional Loads:

(1) ICE 60 kW truck charger	60.00 kW
(1) Flo 50 kW truck charger	54.00 kW
(13) Level 2 car chargers @ 7.2 kW =	93.60 kW

All car chargers are currently on the non-emergency power supply.

Total additional load	207.60 kW @ 90% per ESA Demand Load Calculations = 186.84 kW
Electrical Service Demand	448.00 kW
Total Demand	632.84 KW = 616.20 amps

Conclusions:

344 amps of electrical service available for future growth (353.00 kW).
296 amps of emergency power is available (304.00 kW).

2185 Derry Road West, Mississauga

Electrical Service Capacity 1200 amp / 600/347 volt, 3 phase, 4 wire Max at 80 % = 960 amp
Emergency Back Up Capacity 600 amp / 600/347 volt, 3 phase, 4 wire Max at 80 % = 480 amp

The main service is 1200 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 465.00 kW - January 2024

Additional Loads:

(1) Flo 50 kW truck charger 54.00 kW
(2) Level 2 car chargers @ 7.2 kW = 14.20 kW
(8) Level 2 car chargers @ 6.5 kW = 52.00 kW

Total additional load 120.20 kW @ 90% per ESA Demand Load Calculations = 108.18 kW
Electrical Service Demand 465.00 kW
Total Demand 508.18 kW = 494.00 amps

Conclusions:

466 amps (479.00 kW) of electrical service available for future growth however since the generator feeds the entire building, there is **no future available emergency power available**.

If you overload the generator, the generator will not work. There is no way to split future loads off the generator without major revamping of service.

The main service has capacity for future loads.

Replacement of main generator is required for future expansion.

As an alternate to replacing the generator, an emergency panel and system could be installed to remove the non-essential items off the generator.

395 Southgate Drive, Guelph

Electrical Service Capacity	1600 amp / 600/347 volt, 3 phase, 4 wire	Max at 80% = 1280 amp
Emergency Back Up Capacity	600 amp / 600/347 volt, 3 phase, 4 wire	Max at 80% = 480 amp

The main service is 1600 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 534.00 kW Jan 2024

Additional Loads:

(1) ICE 60 kW truck charger	60.00 kW
(1) FLO 50 kW truck charger	54.00 kW
(6) Level 2 car chargers @ 7.2 kW	= 43.20 kW

Total additional load	157.20 kW @ 90% per ESA Demand Load Calculations = 125.76 kW
Electrical Service Demand	500.60 kW
Total Demand	626.36 kW = 610 amps

Conclusions:

670 amps (688.00 kW) of electrical service available for future growth however since the generator feeds the entire building, there is no **future available power available**.

If you overload the generator, the generator will not work. There is no way to split future loads off the generator without major revamping of service.

The main service has capacity for future loads and is in good condition.

Replacement of main generator is required for future expansion.

As an alternate to replacing the generator, an emergency panel and system could be installed to remove the non-essential items off the generator.

450 Nebo Road, Hamilton

Electrical Service Capacity	1200 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 960 amp
Emergency Back Up Capacity	600 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 480 amp

The main service is 1200 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 229.00 kW - Jan 2024

Additional Loads:

(1) ICE 120 KW truck charger	120.00 kW
(1) ICE 80 truck charger	19.20 kW
(11) Level 2 car chargers @ 7.2 kW	= 79.20 kW

Total additional load	218.40 kW @ 90% per ESA Demand Load Calculations = 196.56 kW
Electrical Service Demand	229.00 kW
Total Demand	447.74 kW = 435 amps

Conclusions:

535 amps (550.00 kW) of electrical service available for future growth however since the generator feeds the entire building, there is **limited future available power available**.

If you overload the generator, the generator will not work. There is no way to split future loads off the generator without major revamping of service.

While the main service has capacity for future loads, it is maxed out as far as space to add fusible disconnect and is out of date. Parts are not available, and replacement of entire switchboard should be considered.

Replacement of main service equipment and generator is required for future expansion.

As an alternate to replacing the generator, an emergency panel and system could be installed to remove the non-essential items off the generator.

340 Vansickle Road, St. Catharines

Electrical Service Capacity	1000 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 800 amp
Emergency Back Up Capacity	450 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 360 amp

The main service is 1000 amp. It is backed up by a 600 amp generator. When there is a power outage, an automatic transfer switches the power supply to the generator. The generator powers the entire building.

Highest Demand in 12 months 200.60 kW - May 2023

Additional Loads:

(9) Level 2 car chargers @ 7.2 kW = 64.80 kW

Total additional load	64.80 kW @ 90% per ESA Demand Load Calculations = 58.32 kW
Electrical Service Demand	200.60 kW
Total Demand	258.92 kW = 252.11 amps

Conclusions:

548 amps (563.00 kW) of electrical service available for future growth however since the generator feeds the entire building, there is only 108 amps available future growth.

If you overload the generator, the generator will not work. There is no way to split future loads off the generator without major revamping of service.

While the main service has capacity for future loads, it is maxed out as far as space to add fusible disconnect and is out of date. Parts are not available, and replacement of entire switchboard should be considered.

There is available power from the main electrical service however the equipment should be replaced and there are approximately 110 amps from the generator for future expansion.

As an alternate to replacing the generator an emergency panel and system could be installed to remove the non-essential items off the generator.

55 John Street North, Hamilton

Electrical Service Capacity	600 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 480 amp
Emergency Back Up Capacity	900 amp / 600/347 volt, 3 phase, 4 wire	Max at 80 % = 720 amp

The main service is 600 amp. It is backed up by a 900 amp generator. When there is a power outage, an automatic transfer switches the power supply from the generator. The generator powers the entire building.

Highest Demand in 12 months 388.00 kW - Jan 2024

Additional Loads:

(6) Level 2 car chargers @ 7.2 kW = 43.20 kW

Total additional load	43.20 kW @ 90% per ESA Demand Load Calculations = 38.88 kW
Electrical Service Demand	388.00 kW
Total Demand	426.88 kW = 415 amps

Conclusions:

65 amps (67.00 kW) of electrical service available for future growth in electrical service. The generator feeds the entire building. There are 305 amps (312.00 kW) available for future growth.

Upgrading of main service is required for future expansion of large truck chargers.

Car and Truck Charger Specifications of existing Chargers already in use

Level 2 Chargers FLO - 19.2 Amps at 208 volt or 7.20 kW



Technical specifications

Aluminum casing	NEMA 4X
Charging connector	SAE J1772
Cable	21' (optional 25')
Electrical load	Standard: 30 A @ 208 VAC or 240 VAC for each charging station
Charging power	1.2 kW to 7.2 kW (maximum configurable by software)
Output current	6 A to 30 A (maximum configurable by software)
Integrated GFCI	20 mA, auto reset (3 attempts at 15-minute intervals)
Frequency	60 Hz
Operating and storage temperature	-40 °F to 122 °F
Weight	Charging station: 21 lb Pedestal: 32 lb
Humidity	Up to 95% (non-condensing)
Card reader	ISO 14443 A/B, ISO 15693, NFC
Communication interface	ZigBee - IEEE 802.15.4 meshed network
Networking	Cellular - 3G/LTE (gateway is installed separately for optimal performances)
Certifications	CSA certified for Canada and United States Complies with UL 2594, UL 2231-1, UL 2231-2
EMC compliance	USA - FCC 47 CFR 15, class A CAN - ICES-3 (A) / NMB-3 (A)



Learn more
info@flo.com
1 855 543-8356
flo.com

Designed and manufactured
by AddEnergie

© 2017 Flo Inc. All rights reserved. This document is for informational purposes only. All other trademarks are the property of their respective owners. All other trademarks are the property of their respective owners. All other trademarks are the property of their respective owners.

Technical specifications

	50 kW	100 kW
Casing	Aluminum Type 3R enclosure– Resistant to harsh weather and vandalism	
Charging connectors	SAE Combo (CCS1) and CHAdeMO	
Cable length	20' (6.1 m) CMS included as an option	12' (3.7 m)
Supply voltage	Nominal three-phase 480 Y/277 VAC (neutral required), 60 Hz nominal (408 to 528 VAC, 55 to 65 Hz)	
Maximum input current	65 A @ 480 VAC	130 A @ 480 VAC
Maximum input power	54 kW	108 kW
Power factor	98% or better	
Efficiency (at max. output power)	93% or better	
Output power measurement accuracy	+/-1%	
Output voltage range	50 to 500 VDC	
Output current range	0.5 to 125 ADC	0.5 to 200 ADC
Dimensions (H x W x D)	79.7" x 49.25" x 32.8" (2,024 mm x 1,251 mm x 833 mm) Height with top sign installed 105.28" (2,674 mm)	
Weight	560 lbs (255 kg) With cable management system 675 lbs (300 kg)	675 lbs (300 kg)
Operating temperature	-40 °F to 122 °F (-40 °C to 50 °C)	
Storage temperature	-40°F to 158°F (-40°C to +70°C)	
Humidity	Up to 95% (non-condensing)	
Credit card reader	Optional. Payment by credit card (tap, insert, swipe) And NFC (Google Pay, Apple Pay)	
RFID card reader	Fitted standard. Supports ISO 14443 A/B, ISO 15693.	
Certifications	cULus: UL 2202, UL 2231-1, UL 2231-2, CSA C22.2 No. 107.1 CSA C22.2 No. 281.1, CSA C22.2 No. 281.2 FCC part 15 Class A ICES-3 (A)	
Networking	Cellular – 4G (LTE), HSPA+	
Model #	DOCH502AN1FLP03	DOCH502AO1FLP03



Learn more
info@fio.com
1 855 543-8356
fio.com

Designed and manufactured by
AddEnergy Technologies Inc.

Downloaded from fcl.oxfordjournals.org/ by University of California, San Diego on 05/11/15. For personal use only.

[illegible]

Level 3 Car and Truck Charger - 80 amps / 208 volts 19.2 kW

Technical Specifications

Configuration	SKU
Voltage	208-240 Vac
AC Input Power Connection	L1, L2, GND
Recommended Breaker	100A 2W+G Circuit
Output Parameters	Value
Voltage	208 / 240 Vac $\pm 10\%$, 1Ø
Current - Max	80A
Power - Max	19.2kW
Controls and Interface	Value
Charging Connectors	SAE J1772 Type 1
Communication	OCPP 1.6J
Network Connection	Wi-Fi, LTE
RFID	RFID Card Reader
Environment	Value
Temperature - Operating	-31°F + 131°F / -35°C + 55°C
Temperature - Storage	-40°F + 176°F / -40°C + 80°C
Altitude - Operating	6560ft / 2,000m
Protection - Intrusion	NEMA3R (IP55)
General	Value
Cable Length	25ft (18 ft Optional)
Certifications	UL 991, 2231-1, 2231-2, 2594

GET IN TOUCH 818.897.GOEV
 1433 Fifth Street, Santa Monica, CA 90401
 hello@inchargeus.com | inchargeus.com



©2022 In-Charge US | All Rights Reserved



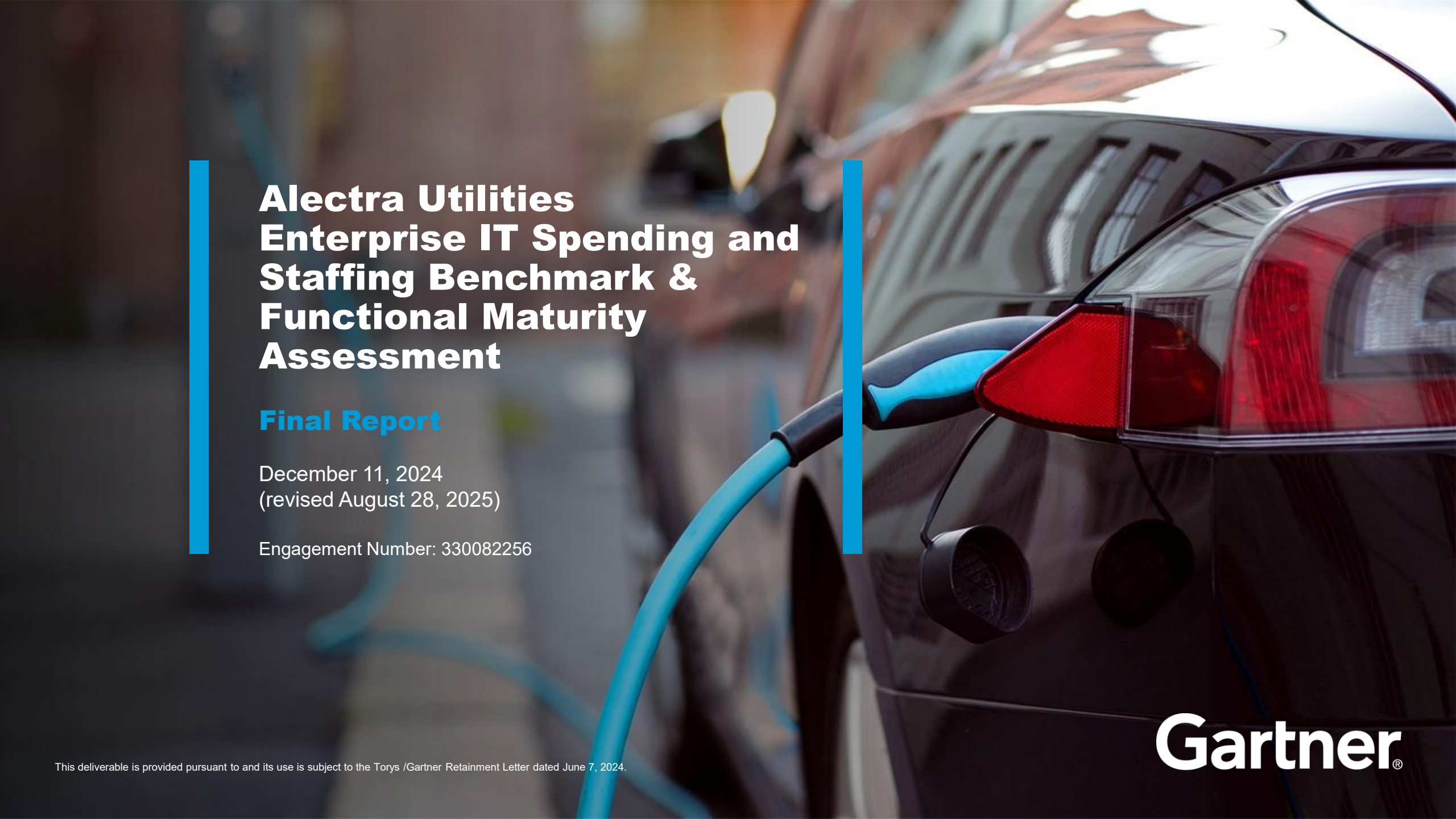
Level 4 Car and Truck Chargers 77 amp / 60 kW 154 amp / 120 kW



Technical Data		Description	Remarks
Nominal Input	Phases/Lines	3 phases + PE	
	Voltage	480Vac (+/-10%)	
	Frequency	45 ~ 60 Hz	
	Current	60:115A; 120:153A; 180: 288A	
	Power	60: 60kW; 120: 120kW; 180: 180kW	
	Power factor	≥0.99	
	System Efficiency	≥ 94.5% (Full load)	
DC Output CCS1	Voltage	150~1000Vdc	
	Current	60: 60A @ 1000V; 120: 120A @ 1000V; 180: 180A @ 1000V	
	Nominal Power	180kW	
DC Output CHAdeMO	Voltage	200~500Vdc	
	Current	125A	
	Nominal Power	62.5kW	
Cabinet	Dimensions(W*D*H)	700*750*1750 (mm)	
	Weight	60: 380lbs / 172kg; 120: 472lbs / 214kg; 180: 564lbs / 256kg	
	Protection Degree	IP55, IK10	
HMI and Command Unit	Local Interface	TFT Color touch display 7"	
	Communication	Router 4G/5G (GSM or LTE)	
	Protocol	OCPP1.6	
Environment conditions	Operating temperature ¹	-40°F ~ 167°F (-40°C ~ +75°C), Derating After 131°F (55°C)	
	Transportation/ Storage temperature	-40°F ~ 167°F (-40°C ~ +75°C)	
	Humidity	5%RH~95%RH	
	Place of Installation	Indoor / Outdoor	
	Altitude	2000m (6561 ft)	
	Sound Noise	≤55dB (nominal Input/output power, the environment temperature is 77°F (25°C).)	
	Atmospheric pressure	80KPa~110KPa	
	Ovenvoltage category	II	
	Protection class	Class I	
Note 1: -40°C~+75°C, derating from 55°C			

Attachment 4-5

Enterprise IT Spending and Staffing Benchmark & Functional Maturity Assessment (Gartner Report)



Alectra Utilities Enterprise IT Spending and Staffing Benchmark & Functional Maturity Assessment

Final Report

December 11, 2024
(revised August 28, 2025)

Engagement Number: 330082256

Gartner®

Table of Contents



1.0

Summary of Findings



2.0

Objectives & Approach



3.0

Enterprise IT Spending & Staffing Analysis



4.0

IT Maturity Assessment Analysis



5.0

Appendix – Benchmarking Definitions



1.0

Summary of Findings



Summary of Findings



IT spending is 50% lower than peer organizations,

suggesting a very cost-efficient environment, however, this negatively impacts the volume & pace of delivering new capabilities to the business and enhancing customer experience.



IT staffing levels are 35% lower than peer organizations;

this is partially offset by a higher use of outsourcing compared with peer organizations. The largest FTE gap is within Applications (development and support).



Alectra spends fewer real dollars across “Run” & “Grow / Transform”, as well as almost every IT Domain;

while running cost efficiently is positive, limited investment in Growth & Transformation may impede organizational progress over the longer term.



Despite having significantly fewer resources available, **Alectra’s IT capability maturity is just slightly lower than peer organizations.**

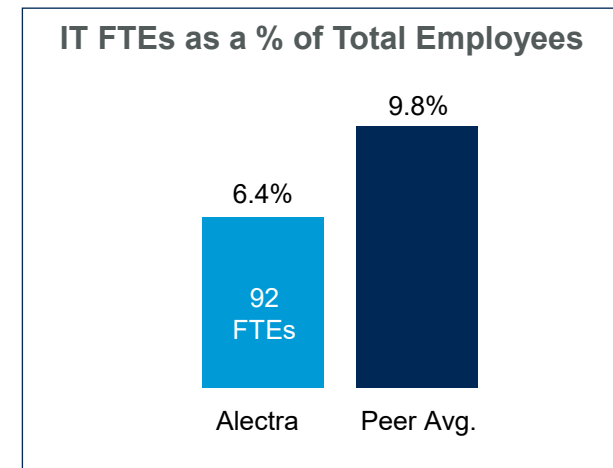
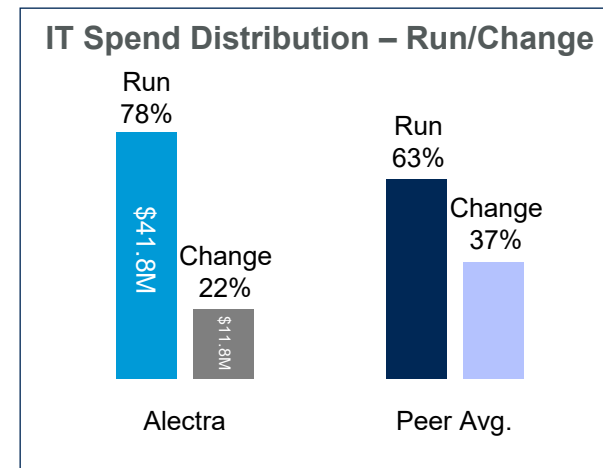
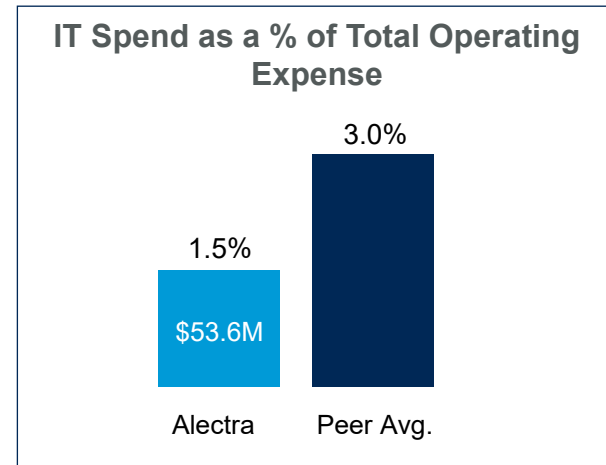
Security & Risk Management is Alectra’s most mature IT domain, Data & Analytics is the least mature.



Areas for IT capability maturity improvement were identified across all in-scope domains; however, **Alectra will see the most benefit from focusing on maturity enhancements within Data & Analytics.**

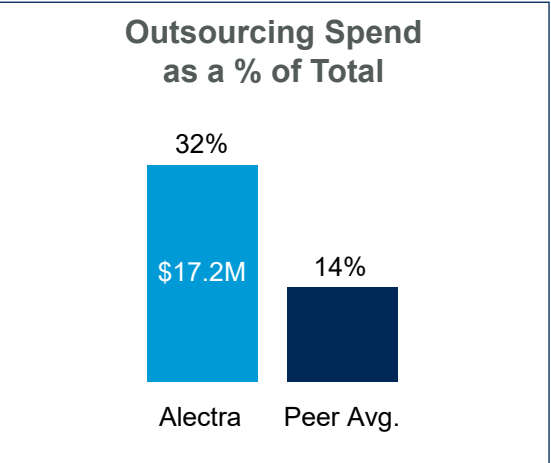
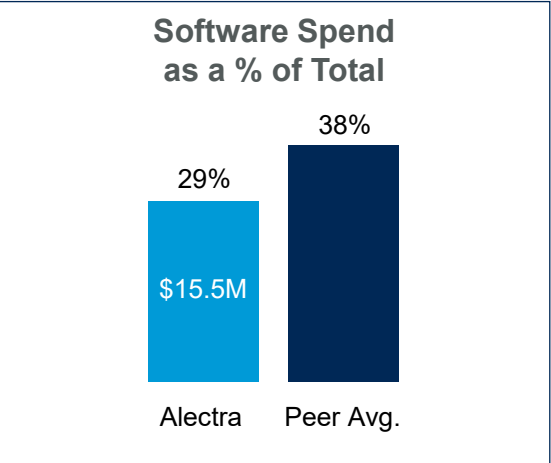
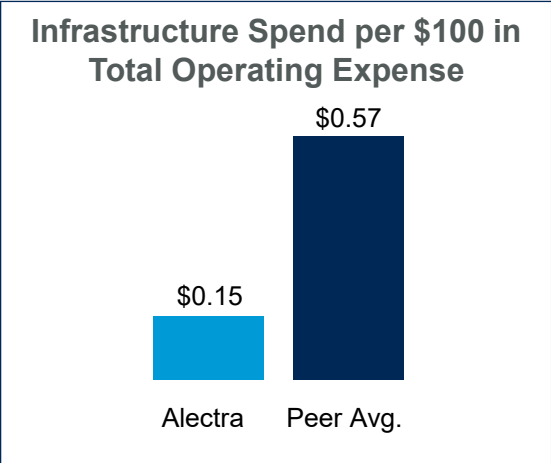
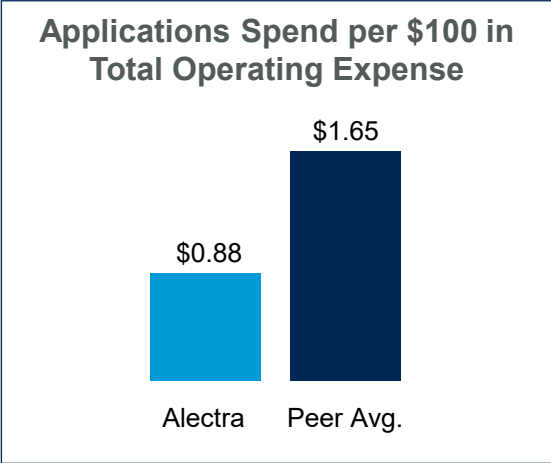
Alectra's 2023 IT Spend was 50% less than similar electric utility organizations; lower levels of spend cut across both “Run” and “Growth & Transformation” activities

- For benchmarking purposes, Alectra was compared to a custom peer group of seven electric utility organizations and Gartner's IT Key Metrics Data for the broader Utilities industry. **Alectra's total IT spend for 2023 was \$53.6 million.**
- IT Spending was 50% less than the custom peer group average;** IT Spend as a % of Operating Expenses was 1.5% compared to an average of 3.0% for the peer group. The lower level of spend can be attributed to lower levels of Run, as well as Growth & Transformation spending.
- Real dollar spending on IT Run costs were \$1.17 for Alectra compared with \$1.89 for peers per \$100 in total Operating Expense, this **suggests a cost-efficient environment.**
- Alectra allocated 41% less spend to “change the business” activities than the peer group average** (22% of IT Spending vs. 37%). Alectra's real dollar spending on Growth & Transformation was \$0.33 per \$100 in Operating Expense, compared with \$1.11 for the peer group. This significantly lower level of spend may result in enhanced capabilities (i.e., AI, data & analytics, etc.) being delivered at a much slower pace.
- Alectra's IT staffing levels were materially lower than the peer group average** (6.4% IT FTEs as a % of Total Employees vs. 9.8%). This is partially explained by a higher level of Outsourcing than peer organizations for activities including Application Development and IT Security.



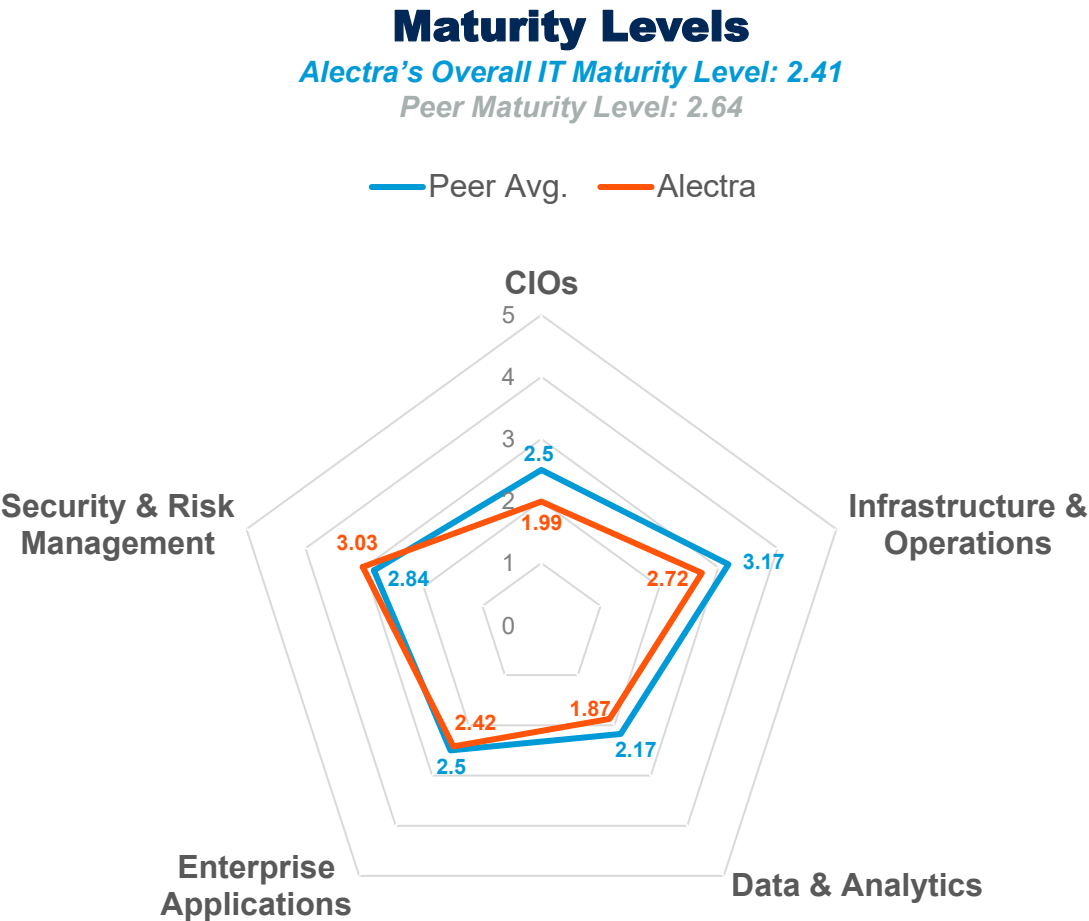
Alectra has a much lower level of investment across Applications & Infrastructure, meaning a slower pace of delivering new capabilities and creating a potential risk to service availability over the long-term

- **Alectra allocated a similar amount of spend to Applications than the peer group** average (58% of IT spend vs. 55%). However, given the overall spend level is half of that of the peer group, real dollar spending on applications is significantly less (\$0.88 per \$100 in Operating Expense vs. \$1.65). This limits Alectra's ability to enhance the functionality of existing capabilities and deliver new ones.
- **Alectra's allocation to Data Center and Network (infrastructure) was lower** than the peer group (10% of IT spending vs. 19%). Real dollar spending on infrastructure was significantly less (\$0.15 per \$100 in Operating Expense vs. \$0.57). This suggests a cost-efficient environment, however, this low level of spend could create a risk to service availability and/or accumulation of technical debt over time.
- **Overall allocation to Software spending is materially lower than the peer group** (29% of IT spend vs. 38%). The bulk of this variance was in a lower allocation to on-premises software than peers (19% of IT spend vs. 30%), the allocation to software-as-a-service was similar to the peer group average.
- **Overall allocation to Outsourcing spending was significantly more** than the peer group average (32% of IT Spend vs. 14%). Typically, a higher allocation to Outsourcing results in a lower allocation to Personnel. In Alectra's case, Personnel was just slightly lower than the peer group average (27% vs. 30%). Leveraging Outsourcing is an important element of Alectra's delivery model. A strong ecosystem of vendor partners is used to access specialized resources (i.e., Cyber Security and Application Development).



The IT capability assessments showed that Alectra's maturity across all domains is slightly lower than peers

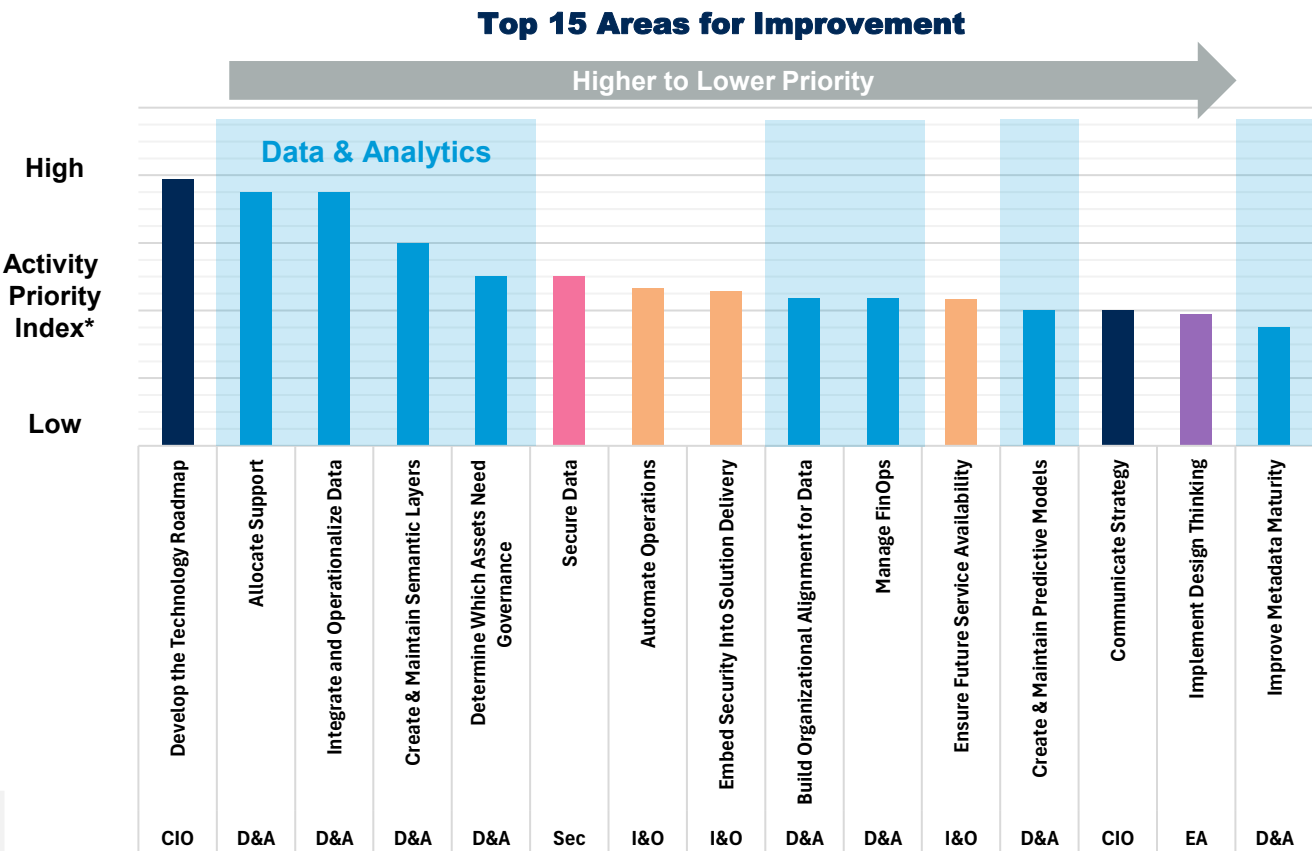
- Alectra was compared to a peer group of 7 to 13 organizations (depending on data available for each IT domain) from the energy and utility industry with similar levels of revenue.
- 128 functional activities across 5 IT domains were assessed by comparing Alectra's current state to Gartner's best practices.
- Alectra's IT maturity level across the 5 in-scope domains was 2.4 compared to 2.6 for the peer group. Higher level of maturity was observed in the Security and Risk Management, and all other domains reflected maturity either very similar or lower than peers.
- Within Alectra, Security and Risk Management was the most mature domain at 3.0. Data & Analytics (D&A) was the least mature at 1.9.
- The low maturity scores for D&A could be attributed to the relatively recent establishment of the Alectra Data Office (ADO) and the Enterprise Architecture practice. Gartner was advised that the IT departments of the legacy utility companies that merged to form Alectra were relatively immature in D&A practice and lacked core IT practices such as enterprise architecture and data management, which are essential for a mature D&A practice.
- Comparing current maturity levels to peer organizations provides external perspective, however it is more important to analyze the gaps between maturity and the importance of the activity for the organization in achieving its overall objectives (see next page)



Maturity scores are assessed on a scale from 1-5, with the score of 5 representing Gartner's best practices for the IT domain

Based on maturity assessment results, opportunities for improvement exist in each domain, however improving Data & Analytics capabilities would add the most value to Alectra

- 103 of 128 functional activities had a positive Activity Priority Index meaning there is value to Alectra in improving the capability; each domain in scope had opportunities for improvement
- 5 of the 5 in-scope domains had a number of functional activities identified in the **Top 15 Areas of Improvement**:
 - Data & Analytics = 8
 - Infrastructure & Operations = 3
 - Chief Information Officer (CIO) = 2
 - Enterprise Applications = 1
 - Security & Risk Management = 1
- When relative importance is considered, improvements to the maturity of the Data & Analytics domain would add the most value to Alectra



Legend

- IT Score for CIOs (CIO)
- Data & Analytics (D&A)
- Security & Risk Management (Sec)
- Infrastructure & Operations (I&O)
- Enterprise Applications (EA)

*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.



2.0

Objectives & Approach



Business context and objectives



Context

- Alectra requires an independent and objective expert benchmark of its overall IT spend and staffing position relative to comparable peer organizations, and an assessment of process maturity of its IT functional areas and to establish a reliable baseline.
- In the short-term, this spending and staffing benchmark and maturity assessments will provide data driven insights for the organization's regulatory filing and provide inputs for developing a roadmap of initiatives that Alectra's IT Leaders will drive to advance maturity and efficiency levels consistent with Alectra's Business and IT strategic objectives.
- Longer term, these spend, and maturity assessments will form the basis for a transformational strategy because of the current state baseline and recommendations.
- Gartner's insights and recommendations will highlight IT capabilities needed for Alectra to align to existing organizational strategies, increase the pace of value being brought to the business, and enable the promise for future transformational aspirations.



Proposed Engagement Objectives

Gartner will combine several unique and proprietary Gartner assets and capabilities that will give Alectra a fact-based, objective starting point for its ongoing strategic direction. These capabilities include:

- Gartner's world-leading IT Benchmark database to support a fact-based comparison, using a custom-built peer group to Alectra's environment, to anchor the current state in key IT enterprise-level cost and staffing measures.
- Gartner Research maturity models aligned to key capability areas that integrate Gartner Research insights and industry leading frameworks to support maturation objectives.

Outcomes of the engagement will include:

- A current state summary of Alectra's IT spend and staffing levels relative to peers with a comparable environment that will identify optimization opportunities to focus future strategic efforts.
- A current state summary of Alectra's maturity across selected IT domains
- A set of prioritized recommendations based on the comparative analysis that will advance Alectra in areas directly impactful to IT and business objectives.
- Guidance on appropriate re-measurement periods and the foundation to measure progress objectively.

Alectra & Gartner collaborated to establish an enterprise-level baseline of IT spend and staffing relative to peers; and an assessment of process maturity of key IT functions

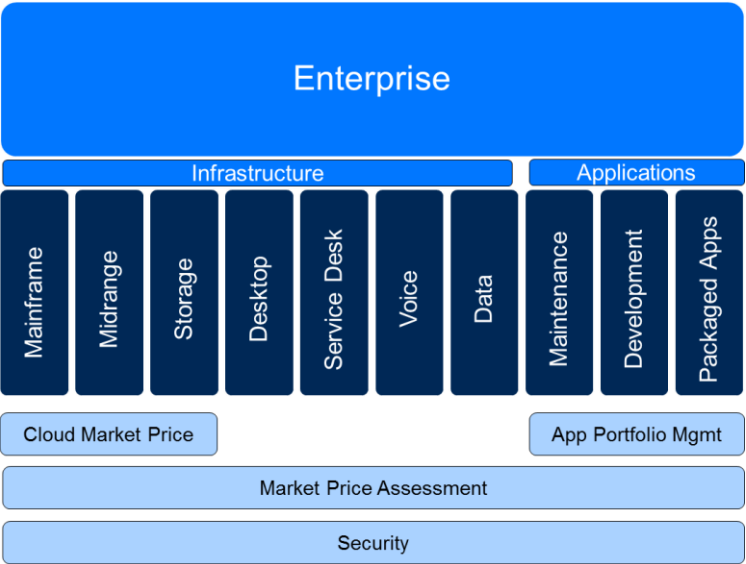


IT SPENDING AND STAFFING

+



PROCESS MATURITY



- IT\$ / Rev
- IT\$ / Opex
- IT FTEs / FTE
- Run/Grown / Transform

Current State Assessment of IT Process Areas:

- CIOs (IT Governance, IT Finance, etc.)
- Enterprise Applications
- Data & Analytics
- Security & Risk Management
- Infrastructure & Operations

3.0

Enterprise IT Spending & Staffing Analysis

Section 3.0 Outline

A

IT Spending & Staffing Benchmark - Methodology Overview

B

Enterprise IT Spending & Staffing Analysis

3.A

IT Spending & Staffing Benchmark – Methodology Overview

Spending & Staffing Benchmark Methodology Overview

Gartner used its industry-leading benchmarking consensus models to evaluate total IT Spending and Staffing relative to a hand selected group of industry peers and IT Key Metrics Data for the Utilities industry.

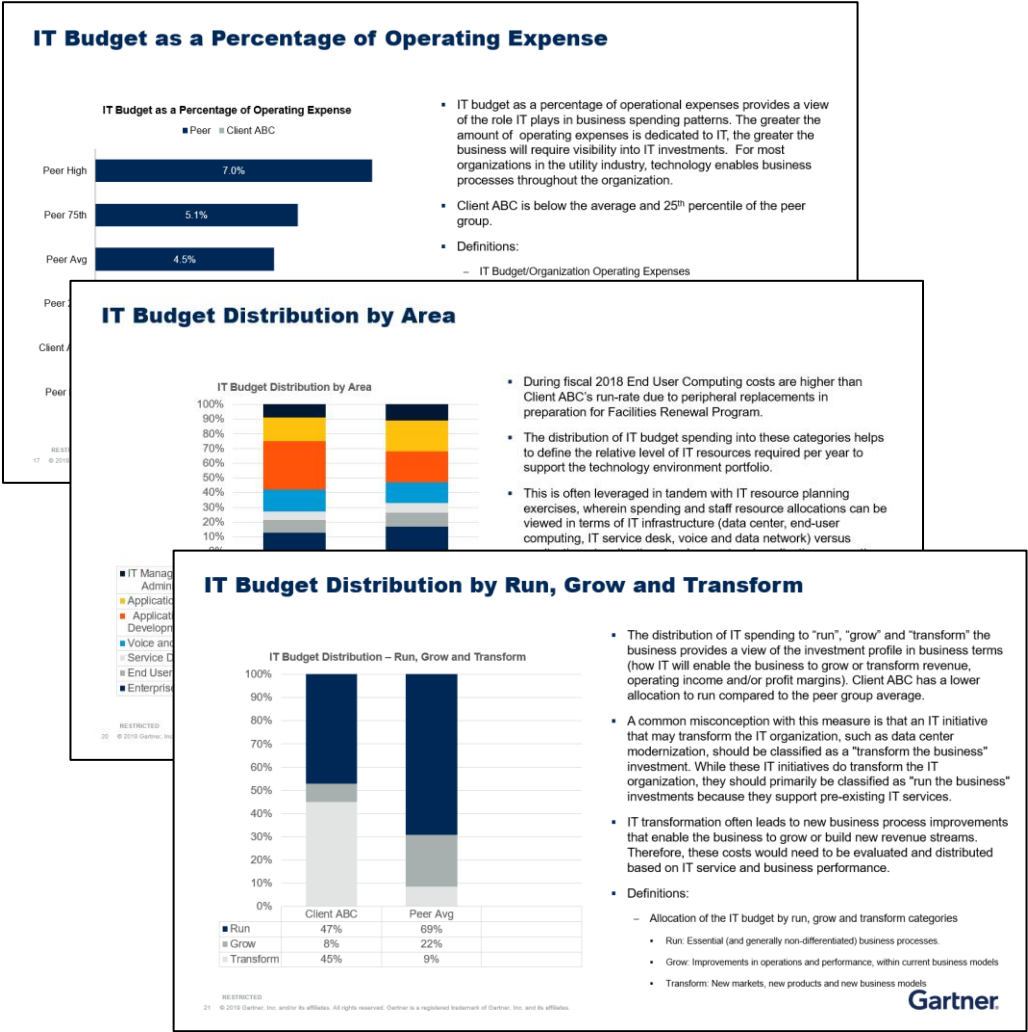
The Enterprise View: IT Spending and Staffing Assessment analysis provides and compares the following metrics:

Spending Measures

- IT Spending as a % of Revenue
- IT Spending as a % of Operating Expense
- IT Spending Per Employee
- Capital vs. Operational Spending
- Run vs. Grow vs. Transform Spending
- Distribution of IT Spend—Hardware, Software, Personnel, Outsourcing, Other
- Distribution of IT Spend—by IT Function

Staffing Measures

- IT Staff as a % of Company Employees
- IT Contractor Usage
- Distribution of IT Staff—by IT Function



3.B

Enterprise IT Spending & Staffing Benchmark Analysis

Analysis Notes

- Alectra's data submission for this benchmarking engagement includes:
 - Actual Revenue, Operating Expenses and Total Employees for fiscal year ending December 31, 2023
 - Actual IT Spending & Staffing for fiscal year ending December 31, 2023
- Operational Technology spending and staffing are excluded from the analysis (for Alectra & the Peer Group)
- Peer Group data is from 2022-2023
- Gartner's IT Key Metrics Data (ITKMD) for the Utilities Industry is from 2023

Peer Group Profiles

Primary peer group for comparative analysis	
Selection Criteria	
Primary Criteria	Utilities Industry
Secondary Criteria	Nature of Business (i.e., electrical utility with a distribution focus), Total Revenue, Total Operating Expenses, # of Employees and Geography

Custom Peer Group Profile		
Number of Organizations	7	
Geographical Location	Canada (3), USA (1), Brazil (1), Austria (1), Australia (1)	
	Alectra*	Peer Group Average
Total Revenue	\$3.81 Billion	\$3.26 Billion**
Total Operating Expense	\$3.53 Billion	\$3.08 Billion**
Total Employees	1,439	1,620

* Alectra data is for fiscal year ending December 31, 2023 (12 months actuals)
** All analysis is in Canadian dollars, using the exchange rate of 1 USD = 1.34 CAD

Secondary peer group for additional context	
2023 IT Key Metrics Data (ITKMD) Utilities	
140	
Utilities	
Global	
2023 ITKMD	



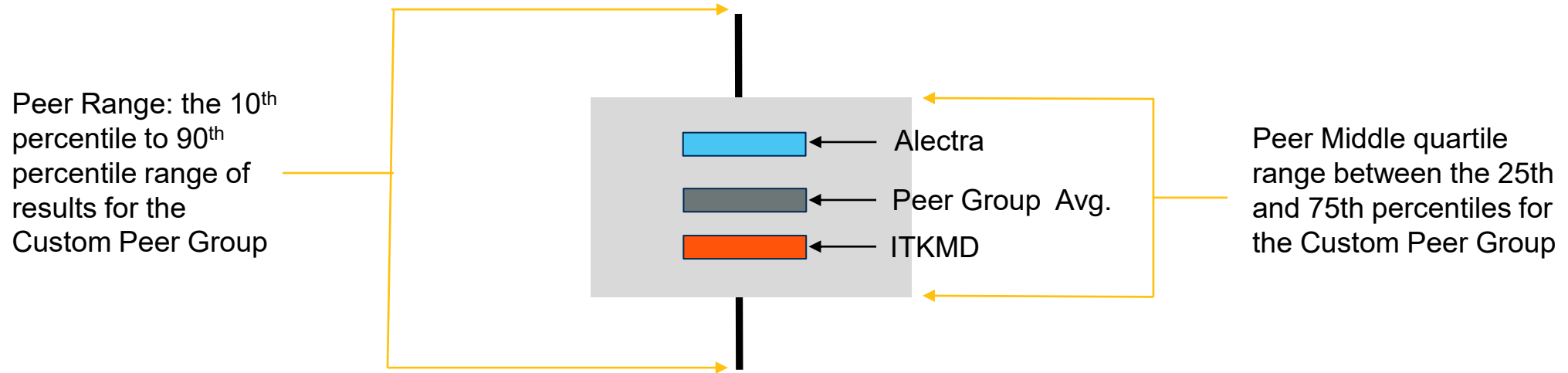
IT Spending



Benchmark Analysis Methodology

Peer Comparisons

Alectra's results are displayed in comparison with the following reference points:



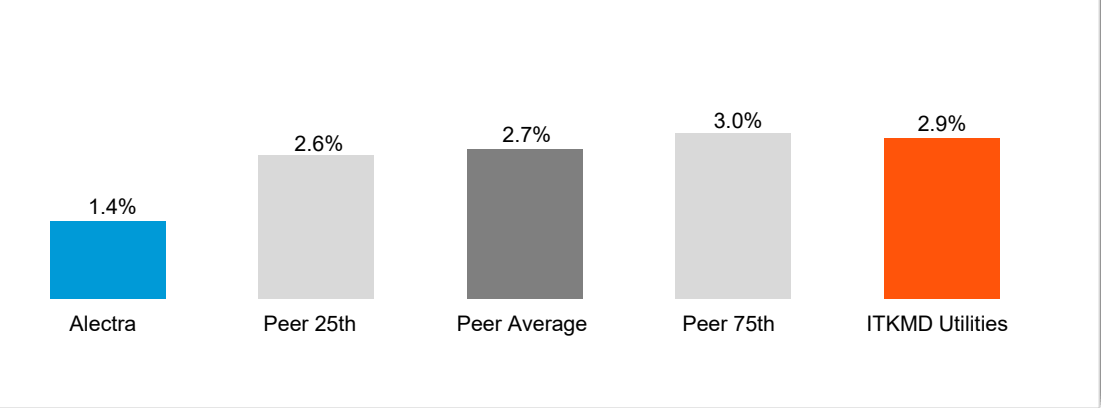
There are not necessarily “good” or “bad” results for any individual metric.

Differences in spending and staffing metrics derived from this analysis provide insight into current strategic IT investment levels versus your competitive landscape.

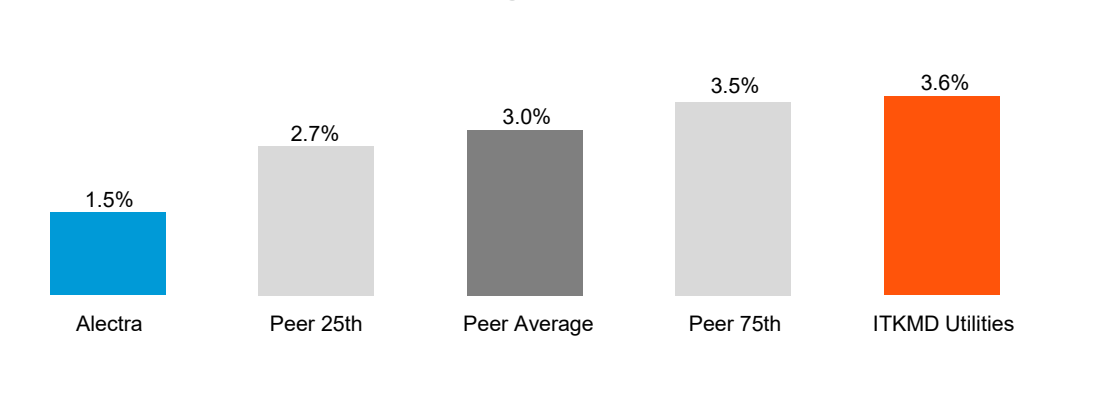
These measures should also be considered within the context of your future state organizational objectives.

Alectra’s overall 2023 IT Spend was materially lower than industry peers

IT Spend as a % of Revenue



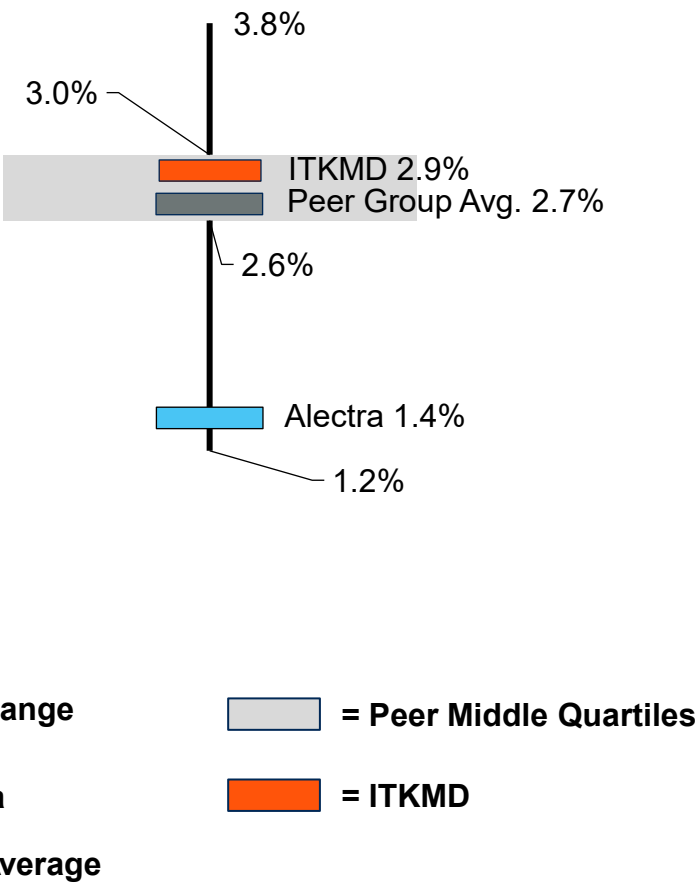
IT Spend as a % of Operating Expense



Observations / Implications

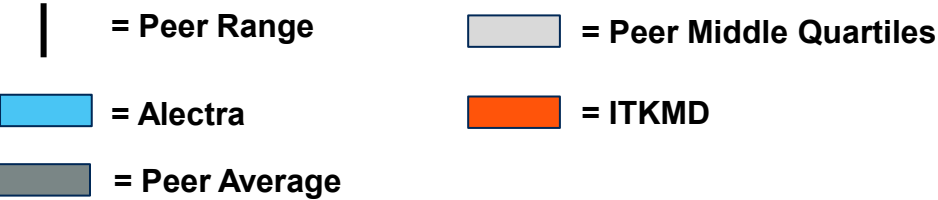
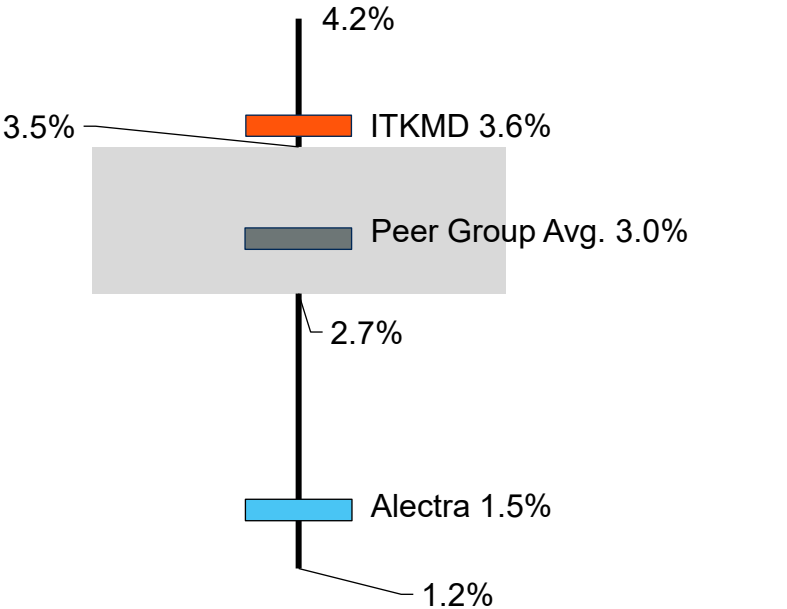
- Alectra’s 2023 IT Spending was \$53.6 million. IT Spend as a % of Revenue was 1.4% compared to an average of 2.7% for the peer group. IT Spending as a % of Operating Expenses was 1.5% compared to an average of 3.0% for the peer group. Both of these metrics indicate that Alectra’s overall IT spend level was materially lower than the peer group average and Gartner’s IT Key Metrics Data for the Utilities industry.
- The “right” level of IT spend is the level that will deliver the necessary IT solutions that will enable Alectra to deliver on its business objectives, in a cost-effective manner. Investing an additional dollar in IT makes sense if it can reduce operational costs elsewhere in the business.
- To ensure value for money from all IT investments, it will be important for Alectra to continue to develop Strategic Cost Optimization capabilities (i.e., controlling new spend, rationalizing technology assets, managing contract and vendor spend, increasing productivity & efficiency, leading and governing cost management).

IT Spend as a Percentage of Revenue



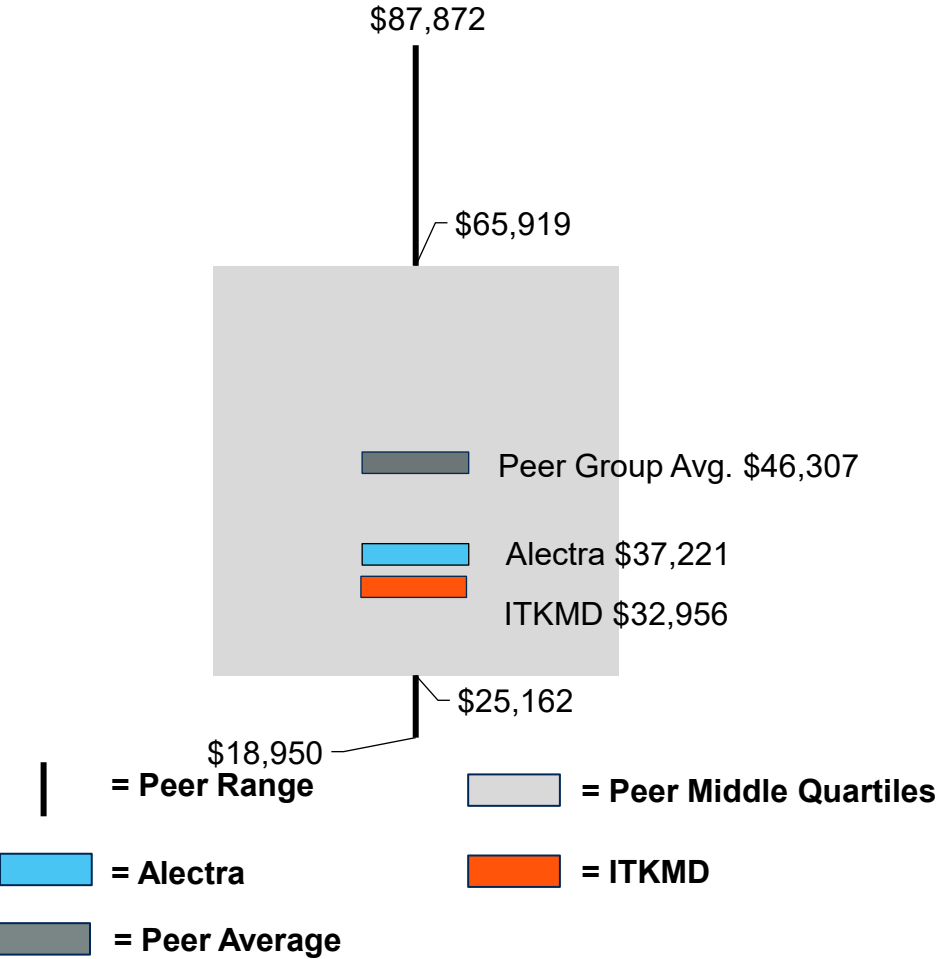
Description	IT spending as a percentage of revenue provides a view of the role IT plays in the spending patterns of the organization. The greater the amount of the operational expenses that is dedicated to IT, typically the greater need for visibility into the IT investments the organization will require.	
Definition	IT Spending includes capital and operations spending for technology during the study period, including labour, software, hardware, telecommunications expenses; includes project spending	
Calculation	IT Spend / Revenue	Alectra: \$53,561,242 / \$3,813,876,000

IT Spend as a Percentage of Operational Expense



Description	• IT spending as a percentage of operational expenses provides a view of the role IT plays in the spending patterns of the organization.	
Definition	IT Spending includes capital and operations spending for technology during the study period, including labour, software, hardware, telecommunications expenses; includes project spending	
Calculation	IT Spend / Operational Expense	Alectra: \$53,561,242 / \$3,533,777,000

IT Spend per Employee

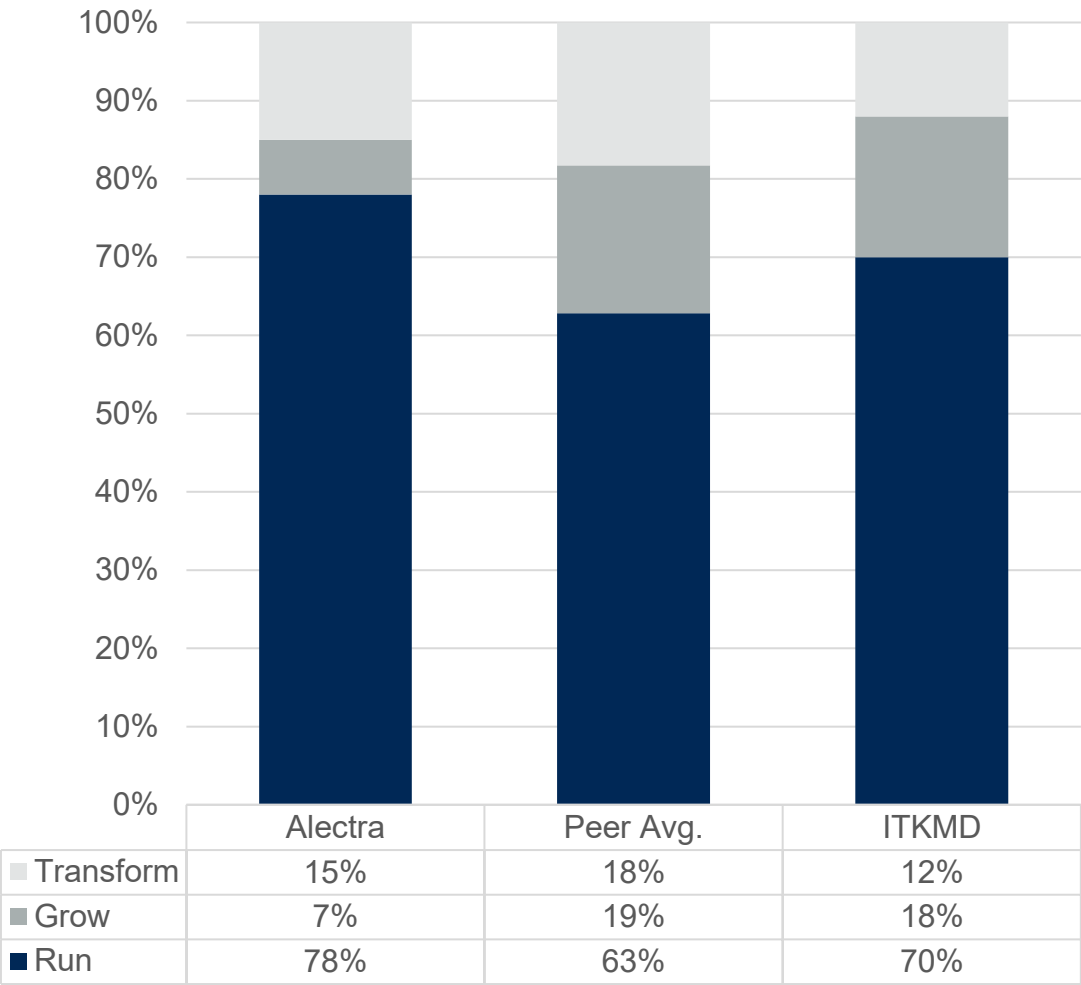


Observations / Implications

- IT Spend per Employee for Alectra (\$37,221) was lower than the peer group average of \$46,307.
- This metric is calculated using Alectra’s 1,439 organizational employees and does not consider any contractor workforce.
- Alectra should continue to evaluate IT investments that will enable all staff and business functions to improve productivity and modernize their operations. This could lead to reduced costs in other parts of the organization.

Description	- IT spending per employee provides insight into the amount of technology support an organization’s workforce receives. - High spending can imply higher levels of automation and/or higher investment in IT in general. Low spending levels can be related to higher overall staffing levels and or lower IT investment than peers. - Large variations within industry groups can represent different business models for service or product delivery.	
Definition	IT Spending includes capital and operations spending for technology during the study period, including labour, software, hardware, telecommunications expenses and includes project spending. Organization Employees includes staff, exclusive of Contractors.	
Calculation	IT Spending / Organization Employees	Alectra: \$53,561,242 / 1,439

IT Spend Distribution by Run, Grow and Transform



Observations / Implications

- In 2023, Alectra allocated 22% of IT Spending to Growth / Transformation (i.e., “change the business” activities), 41% less than the peer group average of 37%.
- This is the result of an overall lower level of IT spend, and therefore, a requirement to allocate a greater percentage of IT spending to “run the business” activities. Despite a higher allocation to “run”, Alectra still spends 38% fewer real dollars than the peer group average (see page 29).
- Alectra’s level of investment in Growth and Transformation will likely need to increase in the future in order to accelerate the pace of digital transformation and meet the requirements of the business (i.e., data & analytics, AI, cyber program, etc.). Run funding will also likely need to increase to support new capabilities as they come online and enter steady-state and to maintain service availability.

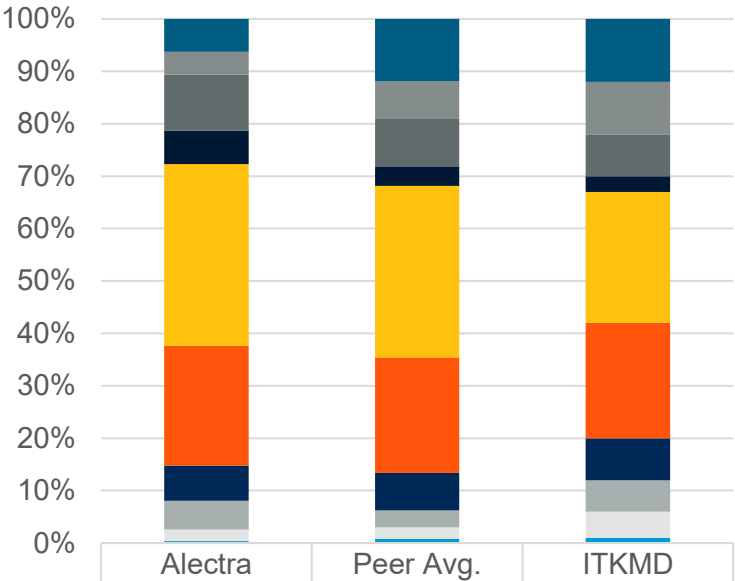
Description

- The distribution of IT spending provides a view of the investment profile in business terms (how IT will enable the business to grow or transform revenue, operating income and/or profit margins)

Definition

- Allocation of IT Spending by Run, Grow and Transform, where:
- Run: Essential (and generally non-differentiated) business processes.
 - Grow: Improvements in operations and performance, within current business models
 - Transform: new services and new operating models

IT Spend Distribution by IT Functional Area



■ Data Center	6%	12%	12%
■ Network	4%	7%	10%
■ Workplace Services	11%	9%	8%
■ IT Service Desk	6%	4%	3%
■ Application Development	35%	33%	25%
■ Application Support	23%	22%	22%
■ Governance & Business Management	7%	7%	8%
■ IT Security	6%	3%	6%
■ IT Ops. Mgmt	2%	2%	5%
■ Ser. Con't / DR*	0%	1%	1%

*Alectra reported \$196k which rounds to 0%

Observations / Implications

- Alectra allocated a similar amount of spend to Applications than the peer group average (58% of IT spend vs. 55%).
- IT domains with higher spend allocation than the peer group average include IT Security (+100%), IT Service Desk (+50%), and Workplace Services (+22%).
- IT domains with lower spend allocation than the peer group average include Data Center (-50%), Network (-43%).
- Governance & Business Management, IT Operations Management and Service Continuity / Disaster Recovery spend allocations were comparable with the peer group.
- Given Alectra’s overall lower level of IT spend, most domains spent fewer real dollars than the peer group averages (see page 29). The only exception was IT Security, where spend level was similar.

Description	• This information is often leveraged in tandem with IT resource planning exercises, wherein resource allocations can be viewed in terms of IT infrastructure versus applications versus IT overhead. • While this measure is helpful in identifying relative volumes of IT resource consumption by IT functional area, as compared to Peers, it does not aid in identifying whether resources are being leveraged in a cost-effective or productive manner.
Definition	Allocated IT Spending among the different functional areas

From a real dollar perspective, Alectra’s “Run” & “Grow/Transform” spend were significantly lower than Peers; this translated into lower levels of spend across all IT domains

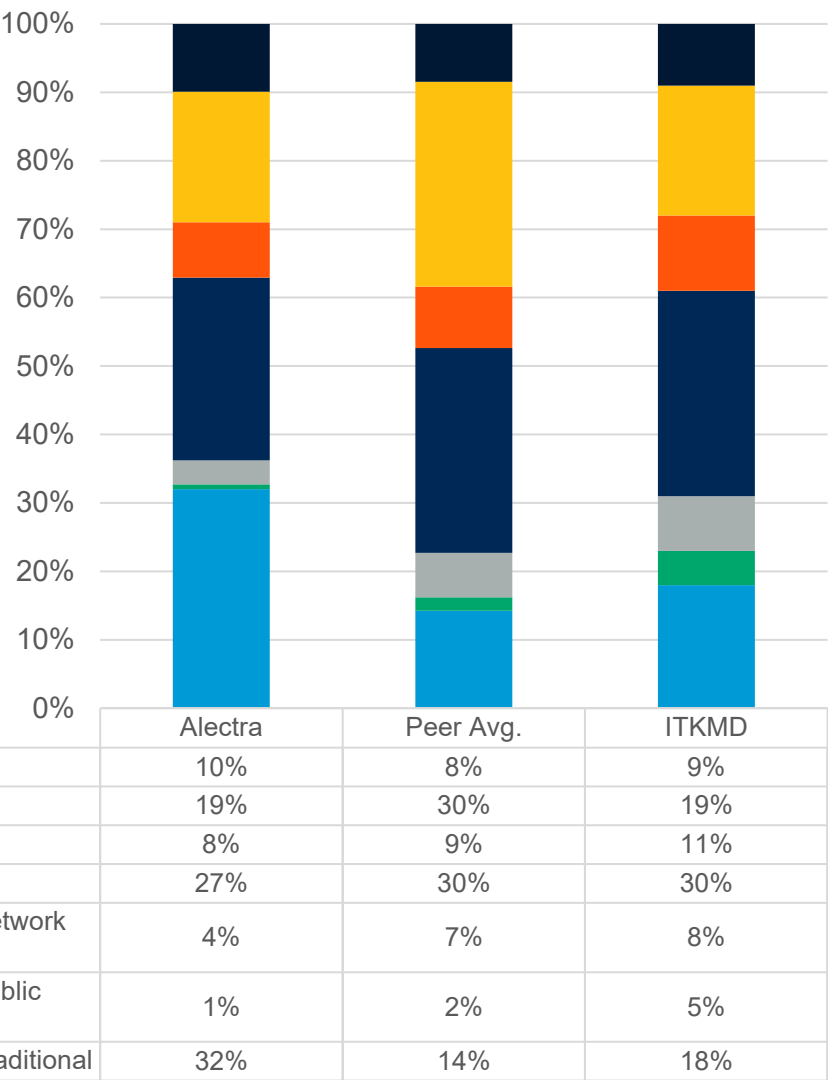
IT Spend per \$100 of Operating Expense

Enterprise View		IT Spend as % of Operating Expense		IT Spend per \$100 of Operating Expense		
		Alectra Utilities	Peer Avg	Alectra Utilities	Peer Avg	Variance
		1.50%	3.00%	\$ 1.50	\$ 3.00	(\$1.50)
Investment View		Run / Change Distribution		Run / Change per \$100 of Operating Expense		
		Alectra Utilities	Peer Avg	Alectra Utilities	Peer Avg	Variance
Run		78%	63%	\$ 1.17	\$ 1.89	(\$0.72)
Grow / Transform		22%	37%	\$ 0.33	\$ 1.11	(\$0.78)
Total		100%	100%	\$ 1.50	\$ 3.00	(\$1.50)
Technical View		IT Functional Area Distribution		IT Functional Area Spend per \$100 of Operating Expense		
		Alectra Utilities	Peer Avg	Alectra Utilities	Peer Avg	Variance
Data Center		6%	12%	\$ 0.09	\$ 0.36	(\$0.27)
Voice and Data Network		4%	7%	\$ 0.06	\$ 0.21	(\$0.15)
Workplace Services		11%	9%	\$ 0.17	\$ 0.27	(\$0.11)
IT Service Desk		6%	4%	\$ 0.09	\$ 0.12	(\$0.03)
Application Development		35%	33%	\$ 0.53	\$ 0.99	(\$0.47)
Application Support		23%	22%	\$ 0.35	\$ 0.66	(\$0.32)
Governance & Business Mgmt.		7%	7%	\$ 0.11	\$ 0.21	(\$0.11)
IT Security		6%	3%	\$ 0.09	\$ 0.09	\$0.00
IT Ops Mgmt.		2%	2%	\$ 0.03	\$ 0.06	(\$0.03)
Service Con't. / DR		0%	1%	\$ 0.01	\$ 0.03	(\$0.02)
Total		100%	100%	\$ 1.51	\$ 3.00	(\$1.49)

From a real dollar perspective both “Run” and “Grow / Transform” spending were materially lower than peer group levels

All IT domains, except IT Security, had lower real dollar spending than the peer group average. Application Development had the largest real dollar gap

IT Spend Distribution by Cost Category



Observations / Implications

- Alectra relied more on External Services – Traditional, (32% of IT spend) than the peer group average (14%). Typically, a higher allocation to Outsourcing results in a lower allocation to Personnel. In Alectra’s case, Personnel was just slightly lower (27% versus an average of 30% for the peer group).
- Leveraging Outsourcing is an important element of Alectra’s delivery model. A strong ecosystem of vendor partners is used to access specialized resources (i.e., Cyber Security and Application Development).
- Alectra’s overall allocation to software is materially lower than the peer group (29% versus 38%).
- Allocation to hardware is similar to the peer group average.

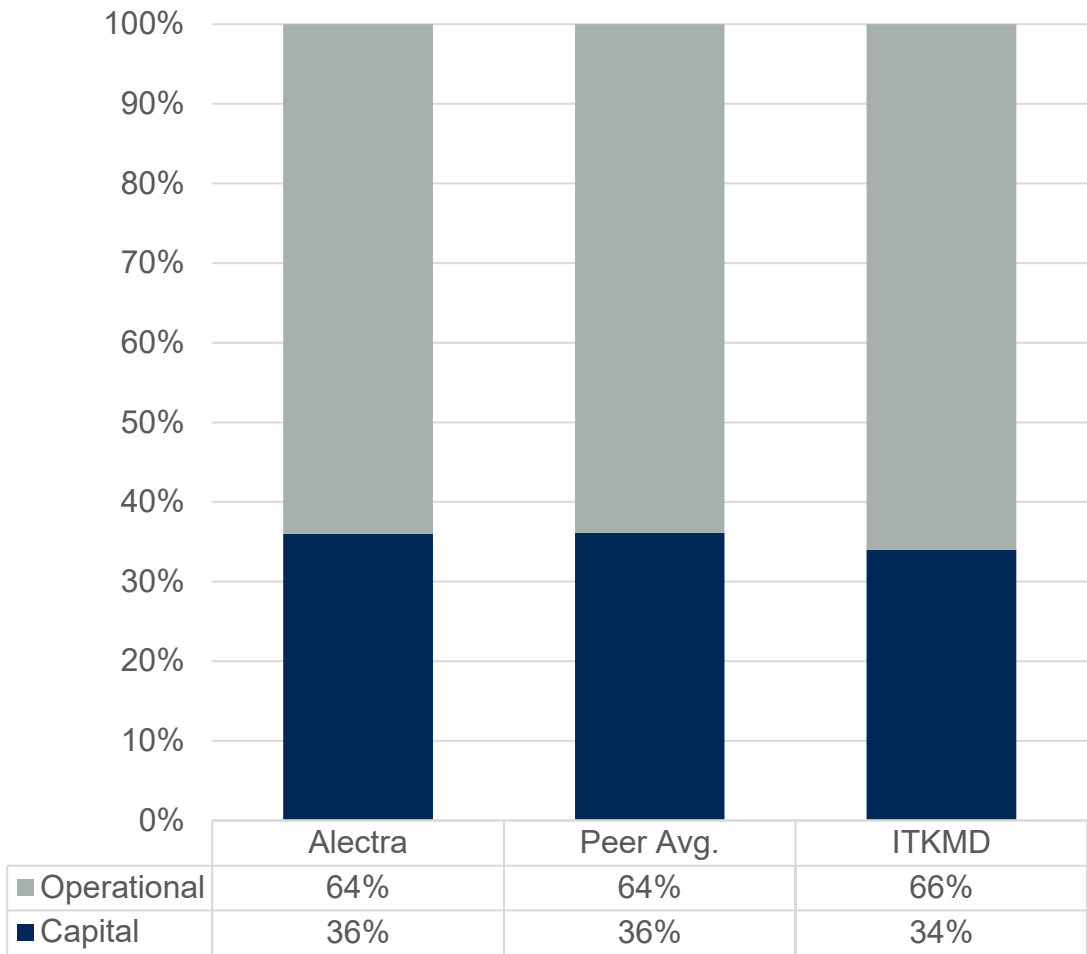
Description

- This measure can be helpful in adding context to the IT investment strategy from a sourcing perspective, in terms of accounting-based resources that may be insourced versus services delivered by a third party.
- As an organization increases or decreases the level of outsourced services, it may find an inverse effect in its associated personnel, hardware and/or software expenditures, depending on the scope of services retained and on requirements.

Definition

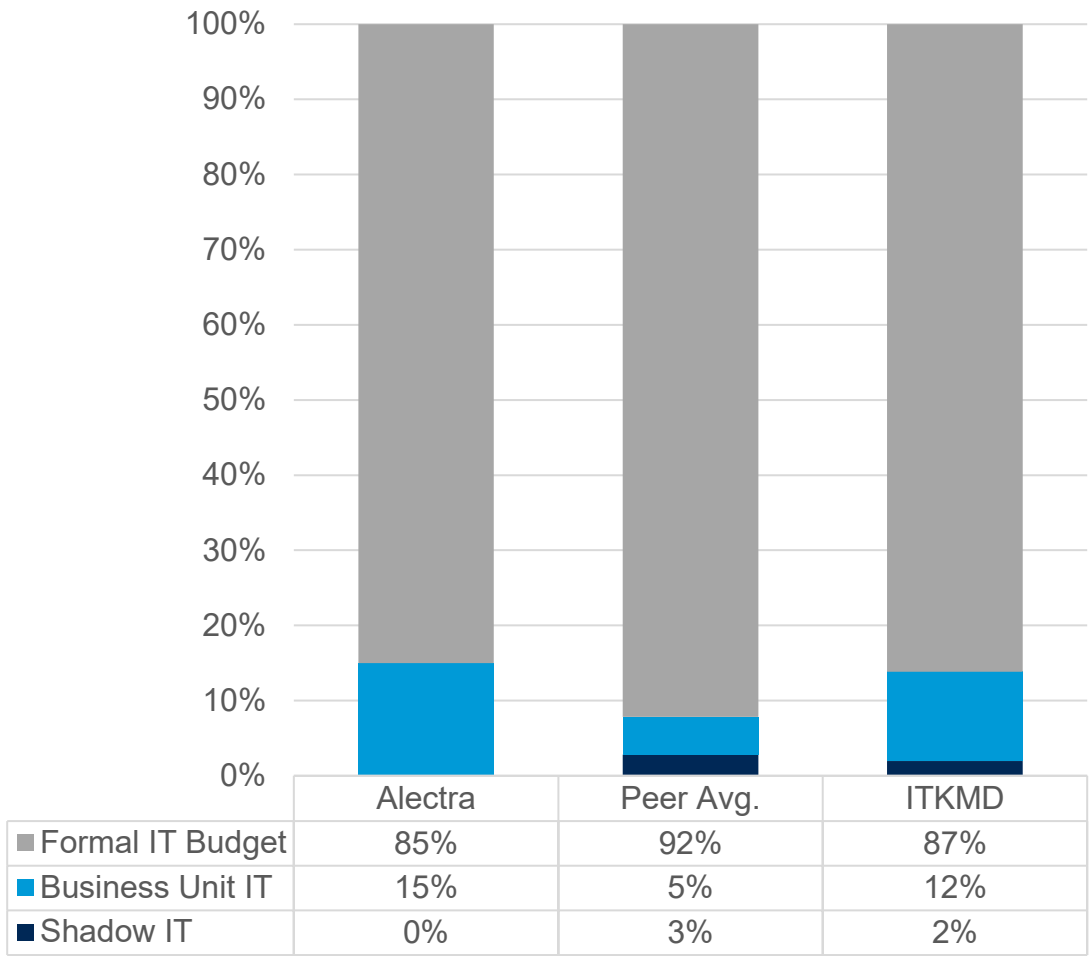
Allocated IT Spending among the different cost categories

IT Spend Distribution – Operations vs. Capital



Observations / Implications	
- Alectra allocated the same amount of its IT spending to capital as the peer group average (36%). - Applications and Infrastructure are increasingly cloud-based, creating an escalating shift away from more traditional capital-based models to operational funding. - There can be unanticipated or overlooked operating budget increases as a result of SaaS and IaaS contracts. The resultant shift from capital expenditure (CapEx) to operating expenditure (OpEx) can cause budgetary and cost management pressures.	
Description	- IT capital expenses vs. operational expenses helps to portray the investment profile for an organization in a given year. - Organizations with a higher capital spending may... - Be investing heavily in strategic IT infrastructure - Have reached a planned point of investment in their infrastructure lifecycle - Not have been managing asset investments well (i.e., "catching up") - Simply have a more aggressive capitalization policy - The break out of Run, Grow, Transform spending that follows may provide more insight
Definition	Distribution of IT Operational spending versus Capital spending

IT Spend Distribution – Funding Source (Formal IT Budget, Business Unit, Shadow IT)



Observations / Implications

- Alectra’s IT spend is slightly more decentralized than the peer group average with IT controlling 85% of the spend, compared to an average of 92% for centralized IT within the peer group.
- In organizations with largely centralized IT spend, it is important that there is a high level of transparency with the business, so they understand the allocation of IT resources and the impact of their decisions on IT spending.

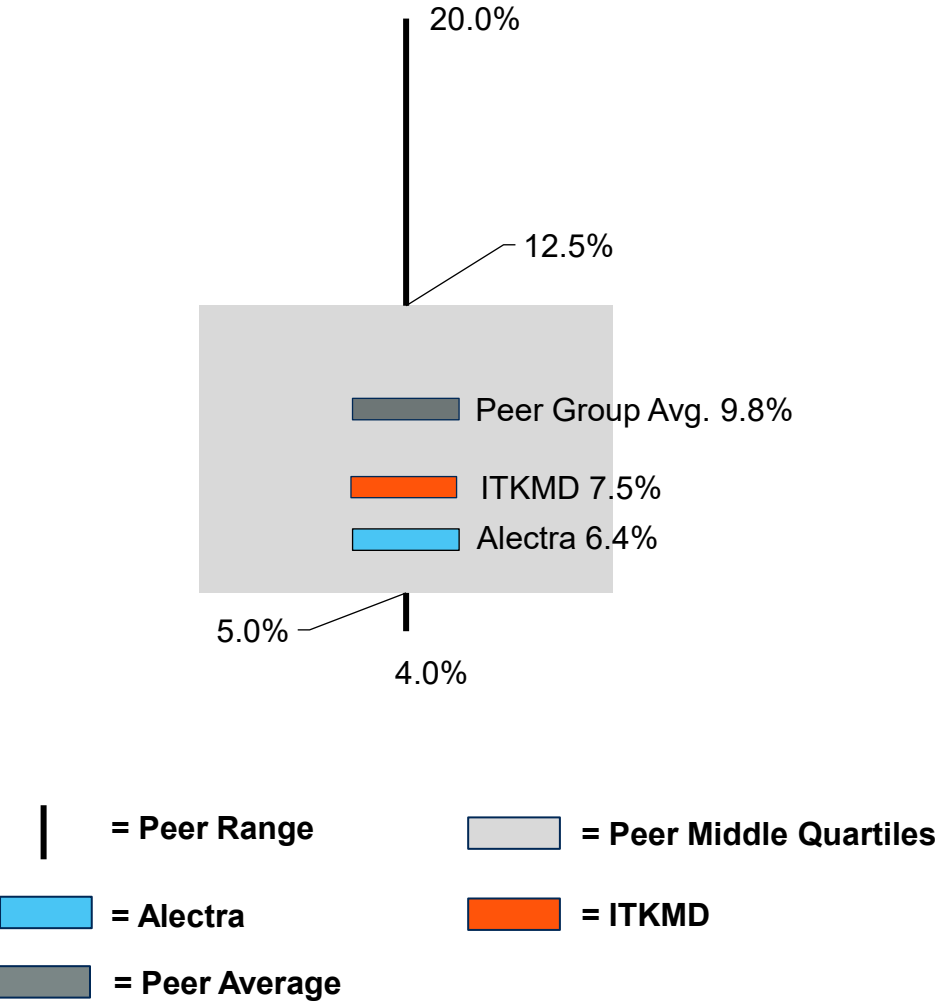
Description	The distribution of IT spending provides a view of the source of IT fund and who is responsible for the specific budget
Definition	Allocation of IT Spending by Formal, Business Unit and Shadow IT, where: - Formal IT: IT spending that the IT department is accountable for. - Business Unit IT: IT spending where profit centers or overhead departments are accountable. - Shadow IT: IT spending anywhere in the enterprise for which the IT department is not accountable.



IT Staffing

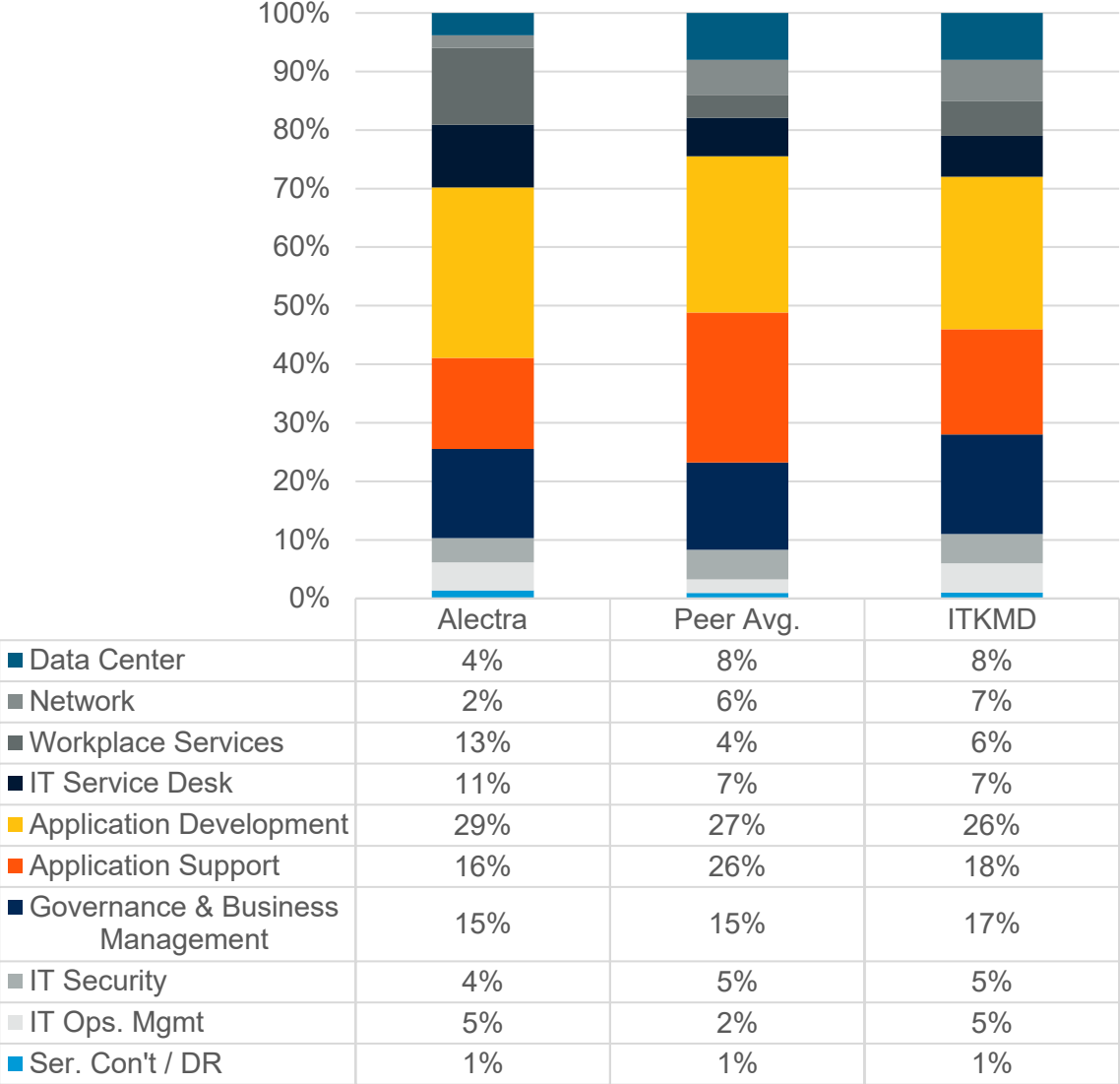


IT FTEs as a Percentage of Total Employees



Observations / Implications	
- Alectra’s level of IT staffing was significantly lower than the peer group average, with IT FTEs as a % of Total Employees being 6.4% compared with 9.8%. - This result is aligned with the fact that Alectra’s use of Outsourcing is significantly higher than the peer group’s. - Lack of personnel (i.e., IT FTEs and outsourced resources) was cited as the largest barrier to advancing digital capabilities at scale.	
Description	- The percentage of IT FTEs in the organization compared to the total number of employees is a key measure of how critical IT support is to the business. This measure can be heavily influenced, however, by the level of outsourcing an organization may have. - Organizations with high levels of manageability and automation should require fewer operations staff. Manual processes and lack of standards will increase the number of IT FTEs needed.
Definition	IT FTEs includes in-house and contractor FTEs, does not include managed services adjusted FTEs. Organization Employees includes employees, exclusive on Contractors.
Calculation	IT FTEs / Organization Employees Alectra: 92 / 1,439

IT FTEs Distribution by IT Functional Area



Observations / Implications

- Alectra’s IT FTE allocations were materially higher than the peer group average for Workplace Services (+225%), IT Operations Management (+150%) and IT Service Desk (+57%)
- Alectra’s IT FTE allocation were less than the peer group average for Network (-66%), Data Center (-50%), Application Support (-38%) and IT Security (-20%)
- Given Alectra’s overall lower level of staffing, most domains had fewer IT FTEs than the peer group averages (see page 34). The only exception was Workplace Services, IT Operations Management & IT Service Desk.

Description	By viewing human resources (IT FTEs) within the context of the total portfolio, organizations are able to identify which environment is the most labour- intensive as a % of the IT labour pool. Typically, application activities (development and support) demand the most resources from both cost and staffing perspectives. The degree to which an organization outsources should be considered alongside such staffing metrics.
Definition	Distributes In House and Contractor IT FTEs among the different functional areas

Overall IT staffing levels are significantly lower than peers; only Workplace Services, IT Operations Management & IT Service Desk have more IT FTEs than peers

IT FTEs per 100 Total Employees

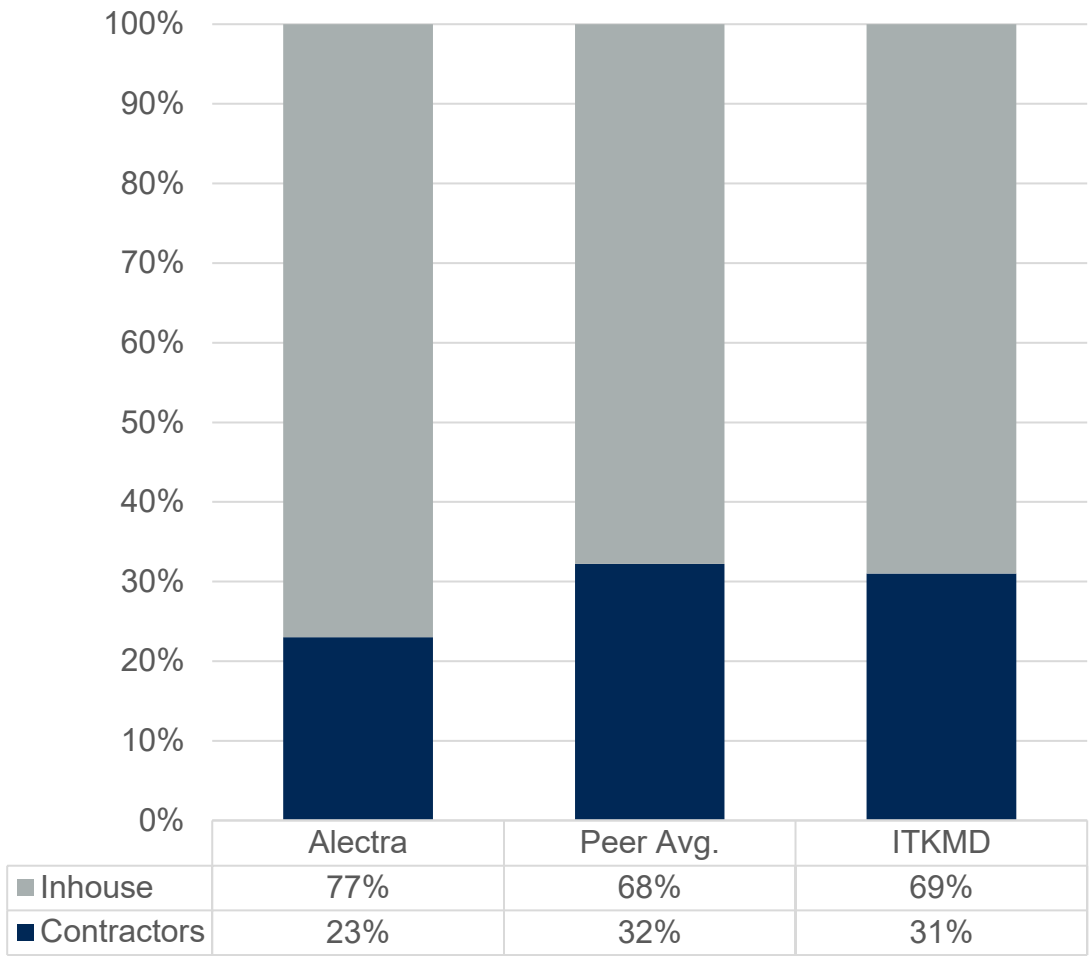
Enterprise View		IT FTEs as % of Total Ees.		IT FTEs Per 100 Employees		
		Alectra Utilities	Peer Avg	Alectra Utilities	Peer Avg	Variance
		6.4%	9.8%	6.40	9.80	(3.40)

Technical View		IT Functional Area Distribution		IT FTEs Per 100 Employees		
		Alectra Utilities	Peer Avg	Alectra Utilities	Peer Avg	Variance
Data Center		4%	8%	0.26	0.78	(0.53)
Voice and Data Network		2%	6%	0.13	0.59	(0.46)
Workplace Services		13%	4%	0.83	0.39	0.44
IT Service Desk		11%	7%	0.70	0.69	0.02
Application Development		29%	27%	1.86	2.60	(0.74)
Application Support		16%	26%	1.02	2.50	(1.48)
Governance & Business Mgmt.		15%	15%	0.96	1.47	(0.51)
IT Security		4%	5%	0.26	0.49	(0.23)
IT Ops Mgmt.		5%	2%	0.32	0.20	0.12
Service Con't. / DR		1%	1%	0.06	0.10	(0.03)
Total		100%	100%	6.40	9.80	(3.40)

The real number of IT FTEs is significantly lower than peers, however, this is somewhat balanced by a higher use of Outsourcing

Most IT domains have fewer IT FTEs than peer organizations. The only exceptions are Workplace Services, IT Operations Management & IT Service Desk

IT FTEs Distribution by Inhouse and Contractor



Observations / Implications

- Alectra leverages Contractors slightly less than the peer group average (23% of IT FTEs versus 32%).
- Leveraging contractors for specialized skills and/or staff augmentation can be an alternative to hiring full-time employees, but it generally costs more and comes with some risk (i.e. sense of team, commitment to organization, knowledge retention, etc.)

Description	• The distribution of IT FTEs (insourced versus contractor) provides a view of the IT staffing strategy. • IT Contract labour or Contractor usage can be an effective approach to maintaining flexibility and agility when business conditions are changing. However, keeping Contractors for extended periods can be costly and limit process standardization.
Definition	Distribution of Contractor FTEs and In House FTEs

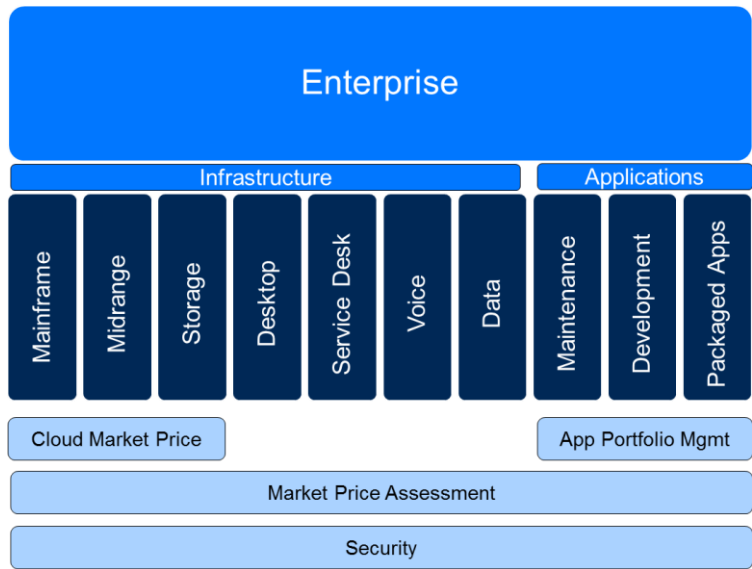
4.0

IT Maturity Assessment Analysis

Alectra's IT Assessment is focused on process maturity and spending & staffing as compared to peer organizations



IT SPENDING AND STAFFING



- IT\$ / Rev
- IT\$ / Opex
- IT FTEs / FTE
- Run/Grown / Transform

+



PROCESS MATURITY

Scope of Work

Current State Assessment of IT Process Areas:

- CIOs (IT Governance, IT Finance, etc.)
- Enterprise Applications
- Data & Analytics
- Infrastructure & Operations
- Security & Risk Management

IT Maturity Assessment Methodology Overview

Gartner used its industry-leading IT maturity models (IT Score) to evaluate Alectra's IT capabilities across the in-scope domains relative to peers. IT Score provides insights on maturity and importance to gain perspective on the highest priority activities to improve.

Maturity

- Measured on a scale ranging from 1 (low) to 5 (high), maturity measures how advanced an activity is relative to Gartner's best-practice research.

Importance

- Measured on a scale ranging from 1 (unimportant) to 5 (critical) based on participants' inputs, importance measures how important each activity is to the overall effectiveness in meeting objectives.

Prioritization

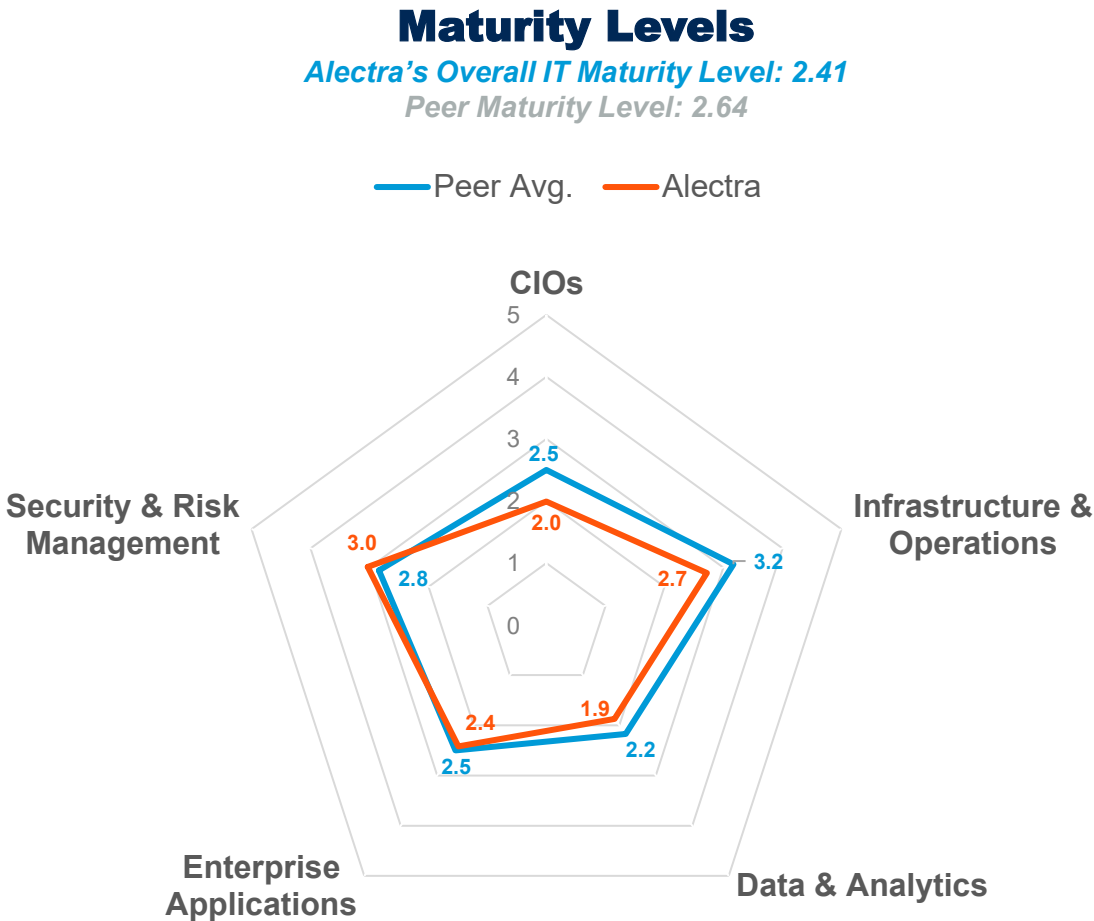
- Activity priority index (API) identifies the activities that should be prioritized for improving maturity. It is defined as the average gap between importance and maturity and is computed for each activity and weighted by its average importance.

Analysis Notes

- Alectra conducted self assessments via Gartner's IT Score surveys to baseline current maturity and importance levels for each in scope domain
- Results were reviewed and calibrated across IT domains in working sessions with Gartner and Alectra's subject matter experts

The IT capability assessments showed that Alectra's maturity across all domains is slightly lower than peers

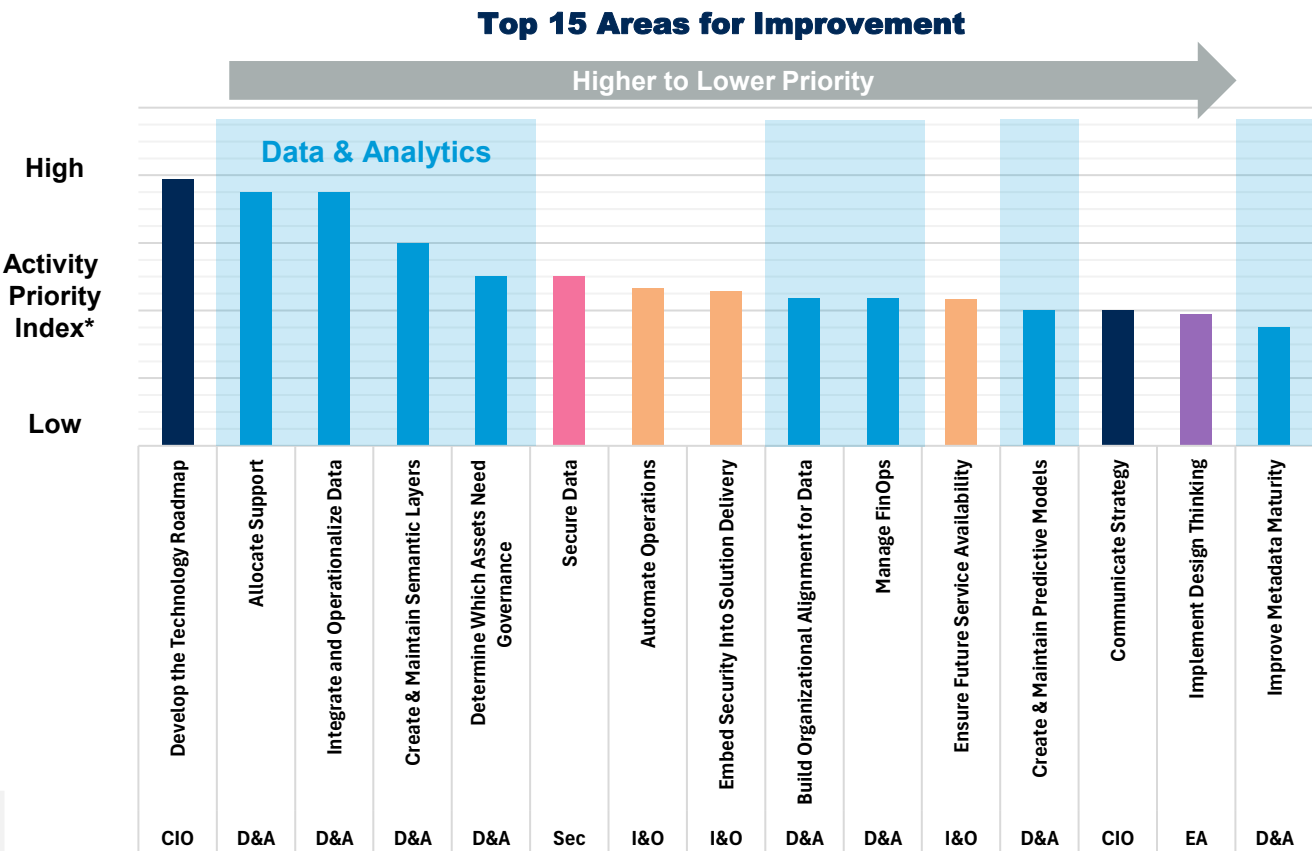
- Alectra was compared to a peer group of 7 to 13 organizations (depending on data available for each IT domain) from the energy and utility industry with similar levels of revenue.
- 128 functional activities across 5 IT domains were assessed by comparing Alectra's current state to Gartner's best practices.
- Alectra's IT maturity level across the 5 in-scope domains was 2.4 compared to 2.6 for the peer group. Higher level of maturity was observed in the Security and Risk Management, and all other domains reflected maturity either very similar or lower than peers.
- Within Alectra, Security and Risk Management was the most mature domain at 3.0. Data & Analytics (D&A) was the least mature at 1.9.
- The low maturity scores for D&A could be attributed to the relatively recent establishment of the Alectra Data Office (ADO) and the Enterprise Architecture practice. Gartner was advised that the IT departments of the legacy utility companies that merged to form Alectra were relatively immature in D&A practice and lacked core IT practices such as enterprise architecture and data management, which are essential for a mature D&A practice.
- Comparing current maturity levels to peer organizations provides external perspective, however it is more important to analyze the gaps between maturity and the importance of the activity for the organization in achieving its overall objectives (see next page)



Maturity scores are assessed on a scale from 1-5, with the score of 5 representing Gartner's best practices for the IT domain

Based on maturity assessment results, opportunities for improvement exist in each domain, however improving Data & Analytics capabilities would add the most value to Alectra

- 103 of 128 functional activities had a positive Activity Priority Index meaning there is value to Alectra in improving the capability; each domain in scope had opportunities for improvement
- 5 of the 5 in-scope domains had a number of functional activities identified in the **Top 15 Areas of Improvement**:
 - Data & Analytics = 8
 - Infrastructure & Operations = 3
 - Chief Information Officer (CIO) = 2
 - Enterprise Applications = 1
 - Security & Risk Management = 1
- When relative importance is considered, improvements to the maturity of the Data & Analytics domain would add the most value to Alectra



Legend

- IT Score for CIOs (CIO)
- Data & Analytics (D&A)
- Security & Risk Management (Sec)
- Infrastructure & Operations (I&O)
- Enterprise Applications (EA)

*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.

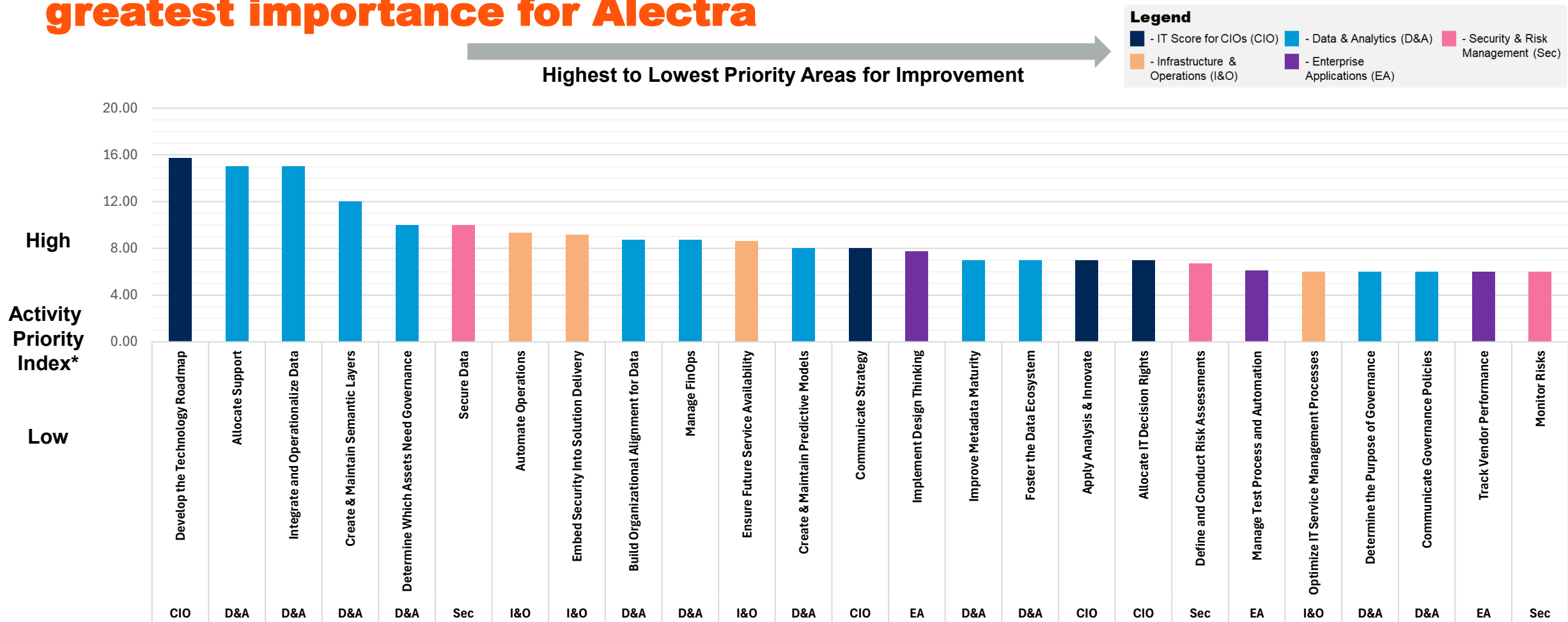
Alectra's survey results demonstrated self-assessed maturity levels ranging from 2 to 3 across all domain areas

Objectives for each Domain	IT Score for CIOs 2-	Infrastructure & Ops 3-	Data & Analytics 2-	Enterprise Applications 2+	Security & Risk Mgt 3
	Engage Business Leadership & Stakeholders 2-	Evaluate, Plan & Design 3-	Manage the Function 2	Build & Customize Products & Applications 1+	Engage & Support Stakeholders 3+
	Perform Strategy & Planning 2+	Measure & Optimize 2	Advance AI Maturity <i>(Out of Scope)</i>	Integrate Platforms, Products & Applications 1+	Manages the Function 3-
	Apply Technology Leadership & Innovate 1+	Transition & Operate IT Services 2+	Create & Maintain Analytics Content 2+	Manage the Product & Application Portfolio 3	Assess & Manage Risk 3-
	Manage IT Governance 2-	Plan & Manage I&O Talent 3	Integrate & Manage Data 1+	Manage Vendor & Sourcing Relationships 3+	Protect the Infrastructure 3
	Manage IT Finance 3-	Manage the Function of I&O 3-	Govern Data & Analytics Assets 1+	Manage the Product & Application Function 3+	Manage Operations 3+
	Develop & Manage Talent 1+				Deliver Assurance 3
	Manage Performance 2-				Manage People & Workforce Strategy 2+



Top 25 Improvement Opportunities: Activity Priority Index (API)

The Activity Priority Index (API) represents an order of priority for the IT functions, based on which below are least mature and of greatest importance for Alectra



*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.



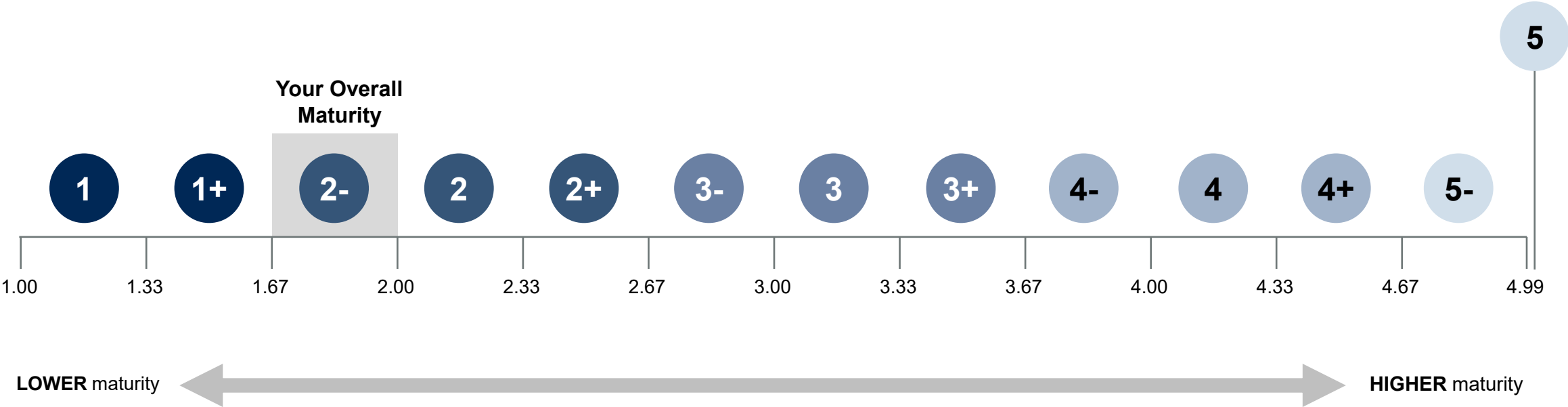
4.1 CIOs

IT Score for CIOs

What is your Overall Maturity Level?

Maturity measures how advanced an organization’s development is in a functional activity relative to Gartner’s best practice research.

- Measured on a scale ranging from **1 (lower)** to **5 (higher)**
- Refined with a **(+)** or **(–)** to indicate intermediate levels of maturity.
- Maturity is best defined as a range. Details are provided in the Methodology & Score Calculation section of the Appendix.



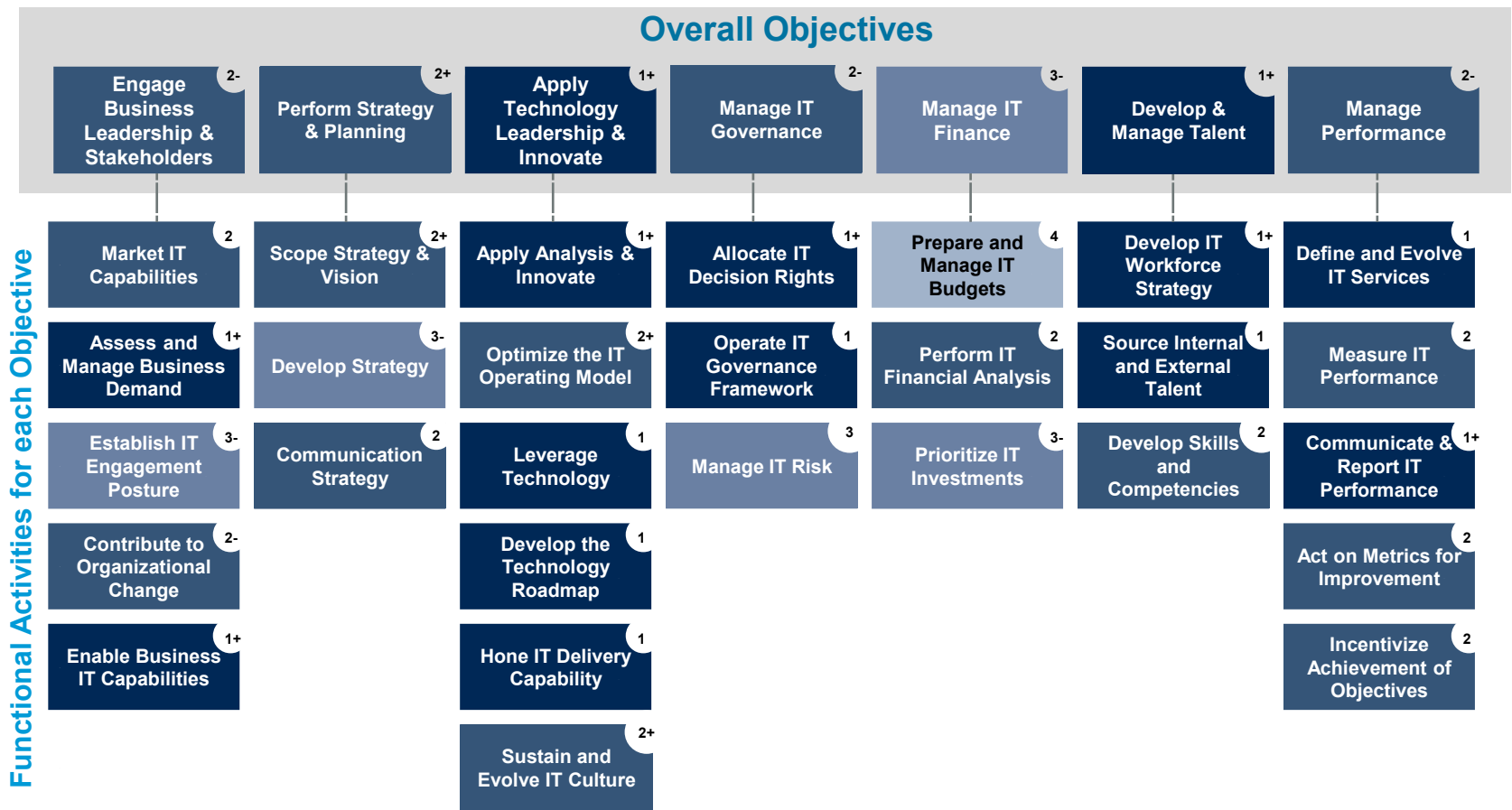
Respondents included in this assessment: **3**

Peer benchmark: **2+**

Participating organizations in the peer benchmark: **7**

IT Score for CIOs

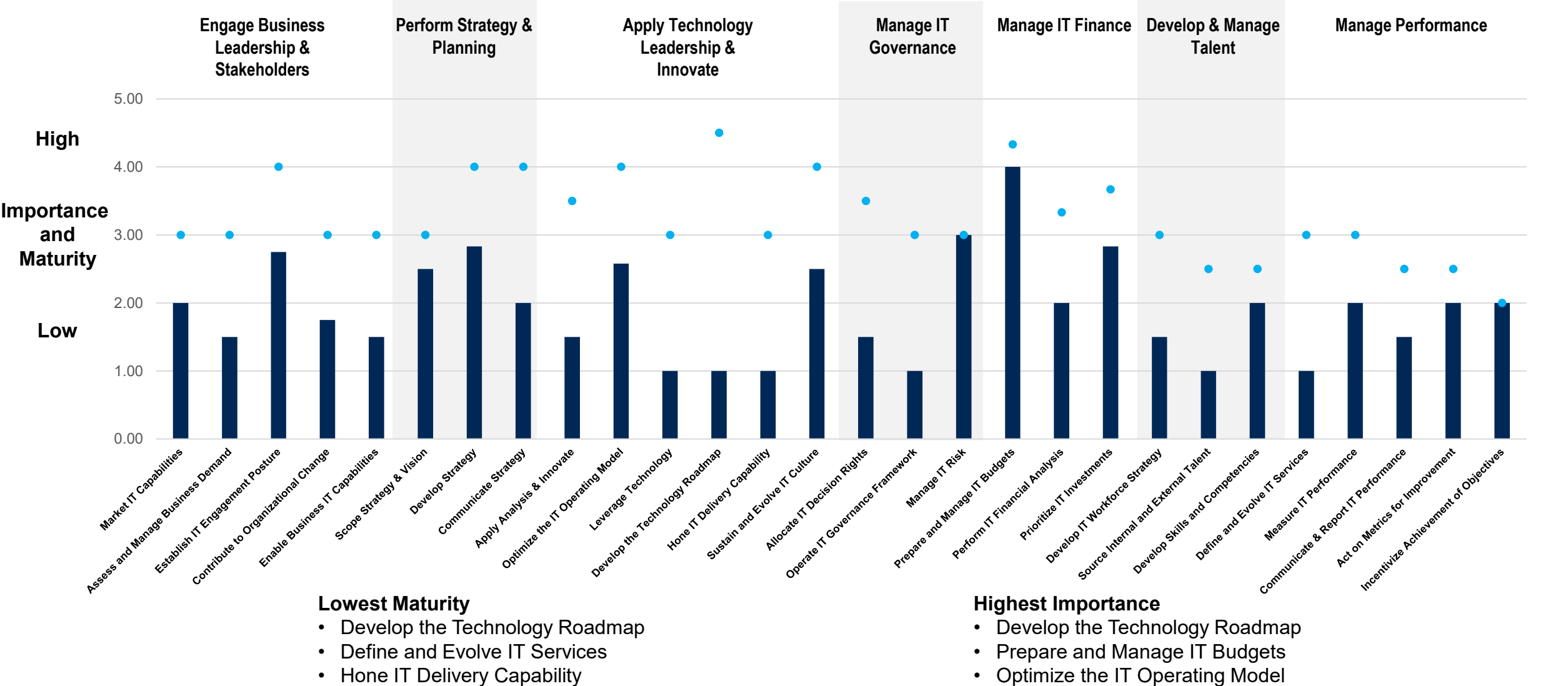
Maturity Levels of Objectives & Activities



IT Score for CIOs

How Do Maturity and Importance Compare?

Maturity Importance Functional Maturity Overall (2-)

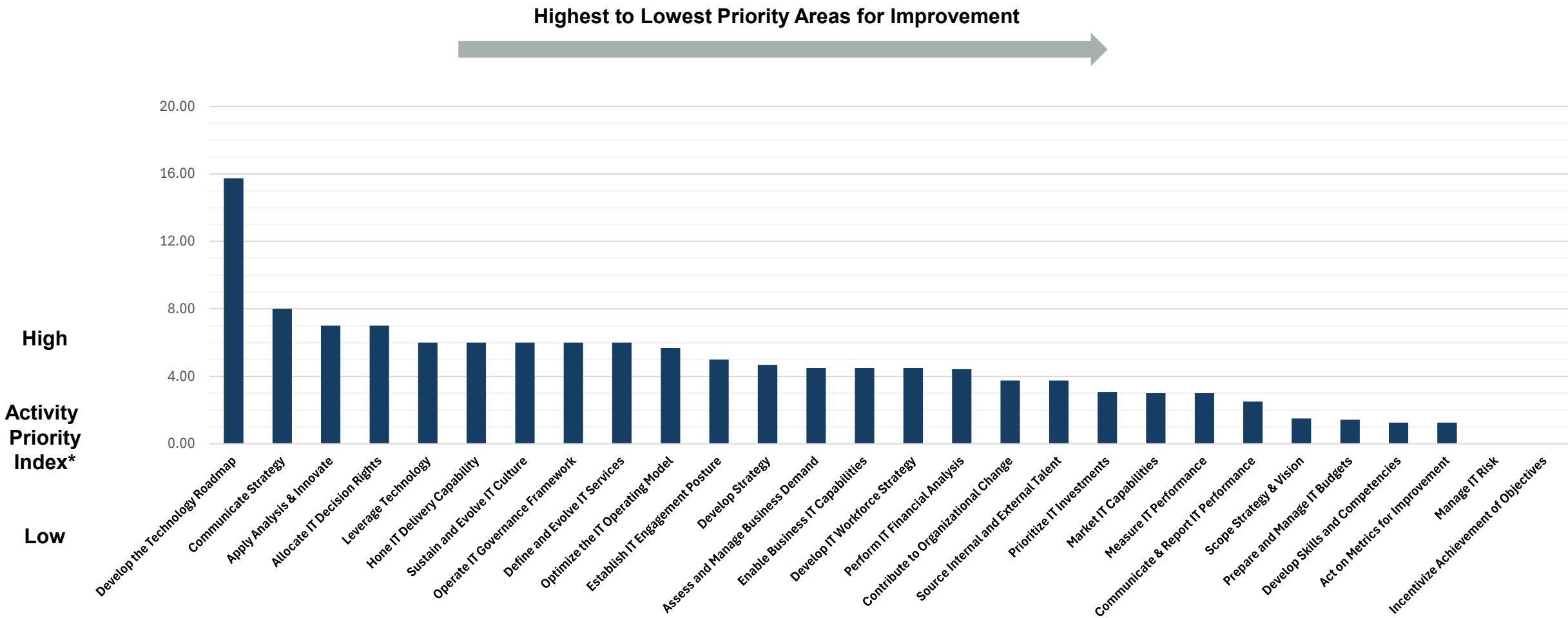


Importance: Measured on a scale ranging from 1 (Not Important) to 5 (Most Important). Importance measures how important each functional activity is to the overall effectiveness of your function in meeting its business objectives.

IT Score for CIOs

Activity Priority Index

The (API) identifies where the function is less mature in activities of greater importance.



*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.

IT Score for CIOs (1 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Engage Business Leadership & Stakeholders	Market IT Capabilities	2.0	2: IT issues regular, standardized communications addressing current issues and operational topics with opportunistic use of different channels.
	Assess and Manage Business Demand	1.5	1: IT assesses and compares competing requests reactively with limited planning horizons and few formal criteria. 2: IT uses formal processes to manage and regulate the intake of demand from business leaders and their teams.
	Establish IT Engagement Posture	2.75	2: IT engages with business partners on operational and project issues. IT is primarily delivered through service desk, project management and reactive demand management (where the business comes to IT with requests or a problem). 3: IT works with business leaders to formally articulate and negotiate IT's position, participation and contributions to all key enterprise leadership teams.
	Contribute to Organizational Change	1.75	1: IT uses ad hoc methods for managing organizational change. 2: IT uses project management methodologies to manage organizational change.
	Enable Business IT Capabilities	1.5	1: IT offers ad hoc assistance to the research, deployment or customization of specific technologies, as requested. 2: IT has a formal process to intake requests for assistance, but focuses on discouraging "shadow IT."
Perform Strategy & Planning	Scope Strategy & Vision	2.5	2: The IT organization participates in strategy by listening to business unit demands and responding by allocating IT resources. 3: The IT organization partners with enterprise leaders and participates in and influences front-office and back-office business strategies.
	Develop Strategy	2.83	2: The IT organization provides an IT plan that lists projects and forecasts how financial, human and physical IT resources will be allocated in response to business demand. 3: IT leaders produce an IT strategic plan that derives from enterprise strategy and focuses on contributing business value
	Communicate Strategy	2	2: The IT organization communicates strategy as requested by business stakeholders, typically reporting the status of projects and initiatives. 3: Strategy communications are bidirectional between IT and business stakeholders. Communications are systematic and support IT strategy development and deployment.

IT Score for CIOs (2 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Apply Technology Leadership & Innovate	Apply Analysis & Innovate	1.5	1: IT technology analysis is ad hoc, made within IT technology domains typically to solve a problem. 2: IT technology analysis is informal, made across IT technology domains in response to business requests.
	Optimize the IT Operating Model	2.58	2: IT assesses and compares competing requests reactively with limited planning horizons and few formal criteria. 3: IT uses formal processes to manage and regulate the intake of demand from business leaders and their teams.
	Leverage Technology	1	1: IT uses technology and tooling for IT asset management.
	Develop the Technology Roadmap	1	1: Where the IT technology roadmap exists at all, it is narrowly defined, procurement-led, technology-domain-centric, short-term and patchy.
	Hone IT Delivery Capability	1	1: The IT organization is structured by hierarchical technology domains. Work is performed via hand-offs between technology domains.
	Sustain and Evolve IT Culture	2.5	2: IT culture is adaptable and IT-process-centric. 3: IT culture is adaptable and focuses on service outcomes and internal customer relationships as well as enterprise strategy. The CIO uses a formal language to communicate cultural values and behavioral expectations.
Manage IT Governance	Allocate IT Decision Rights	1.5	1: IT decision rights are not present in the enterprise. 2: IT decision rights empower IT leadership, are well known, are clearly documented and establish IT control objectives.
	Operate IT Governance Framework	1	1: There is no explicit IT governance framework in the enterprise.
	Manage IT Risk	3	3: The business is accountable for the IT risks it accepts, but accountability is poorly enforced. IT risk decisions are informally based on a business context.

IT Score for CIOs (3 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage IT Finance	Prepare and Manage IT Budgets	4	4: Information and technology (I&T) budgets are aggregated across the enterprise and support products. Budgets are compared with actual performance and revised at least quarterly to accommodate changing business priorities.
	Perform IT Financial Analysis	2	2: IT cost analysis is performed annually and includes an incomplete view of enterprisewide information and technology (I&T) costs. IT spending optimization is undertaken reactively, with a defined set of outcomes over specific time periods
	Prioritize IT Investments	2.83	2: The IT organization prioritizes IT investments reactively, case by case, relying on business case requests for individual initiatives and projects funded from the core IT budget. 3: The CIO and senior enterprise executives prioritize funding in a portfolio using a formal process and specialized business cases at least semiannually for enterprisewide information and technology (I&T) investments before making allocations to business units.
Develop & Manage Talent	Develop IT Workforce Strategy	1.5	1: IT workforce plans are ad hoc. 2: IT workforce plans respond to near-term staffing needs and incorporate plans for skills and competency sourcing and development.
	Source Internal and External Talent	1	1: The IT organization has no consistent framework for making talent sourcing decisions, and sourcing opportunities are approached ad hoc.
	Develop Skills and Competencies	2	2: The IT organization designs specialized managerial and technical skill development and training plans that are based on individual performance reviews.
Manage Performance	Define and Evolve IT Services	1	1: The IT organization has not formally defined its services.
	Measure IT Performance	2	2: IT performance is assessed through technology-focused IT asset and IT operational metrics related to reliability and availability, and IT project performance metrics related to on-time, on-budget delivery.
	Communicate & Report IT Performance	1.5	1: IT performance is assessed through technology-focused IT asset and IT operational metrics related to reliability and availability, and IT project performance metrics related to on-time, on-budget delivery. 2: IT reports IT asset, operational and project performance metrics to IT leaders at a pre-established cadence.

IT Score for CIOs (4 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage Performance	Act on Metrics for Improvement	2	2: The IT organization uses industry standards and reference frameworks — such as ITIL, CMMI, PMBOK and COBIT — to improve individual IT operational processes.
	Incentivize Achievement of Objectives	2	2: The IT organization provides incentives for IT performance through IT operational metrics and IT process outcomes. Employee performance assessment is a corporate standard process conducted once or twice a year.



4.2

Infrastructure & Operations

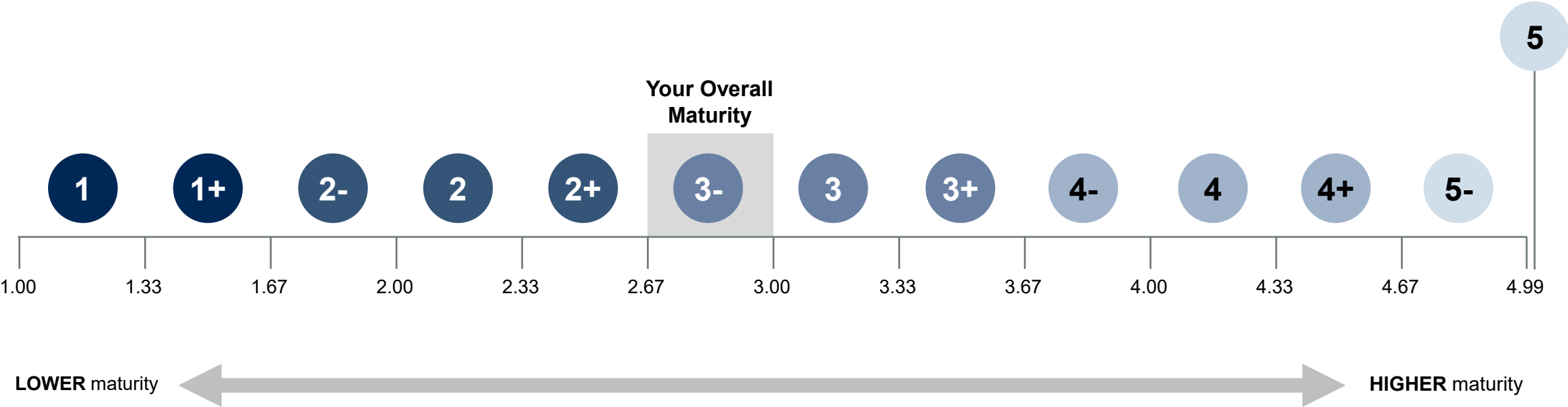


Infrastructure & Operations

What is your Overall Maturity Level?

Maturity measures how advanced an organization’s development is in a functional activity relative to Gartner’s best practice research.

- Measured on a scale ranging from **1 (lower)** to **5 (higher)**
- Refined with a **(+)** or **(–)** to indicate intermediate levels of maturity.
- Maturity is best defined as a range. Details are provided in the Methodology & Score Calculation section of the Appendix.



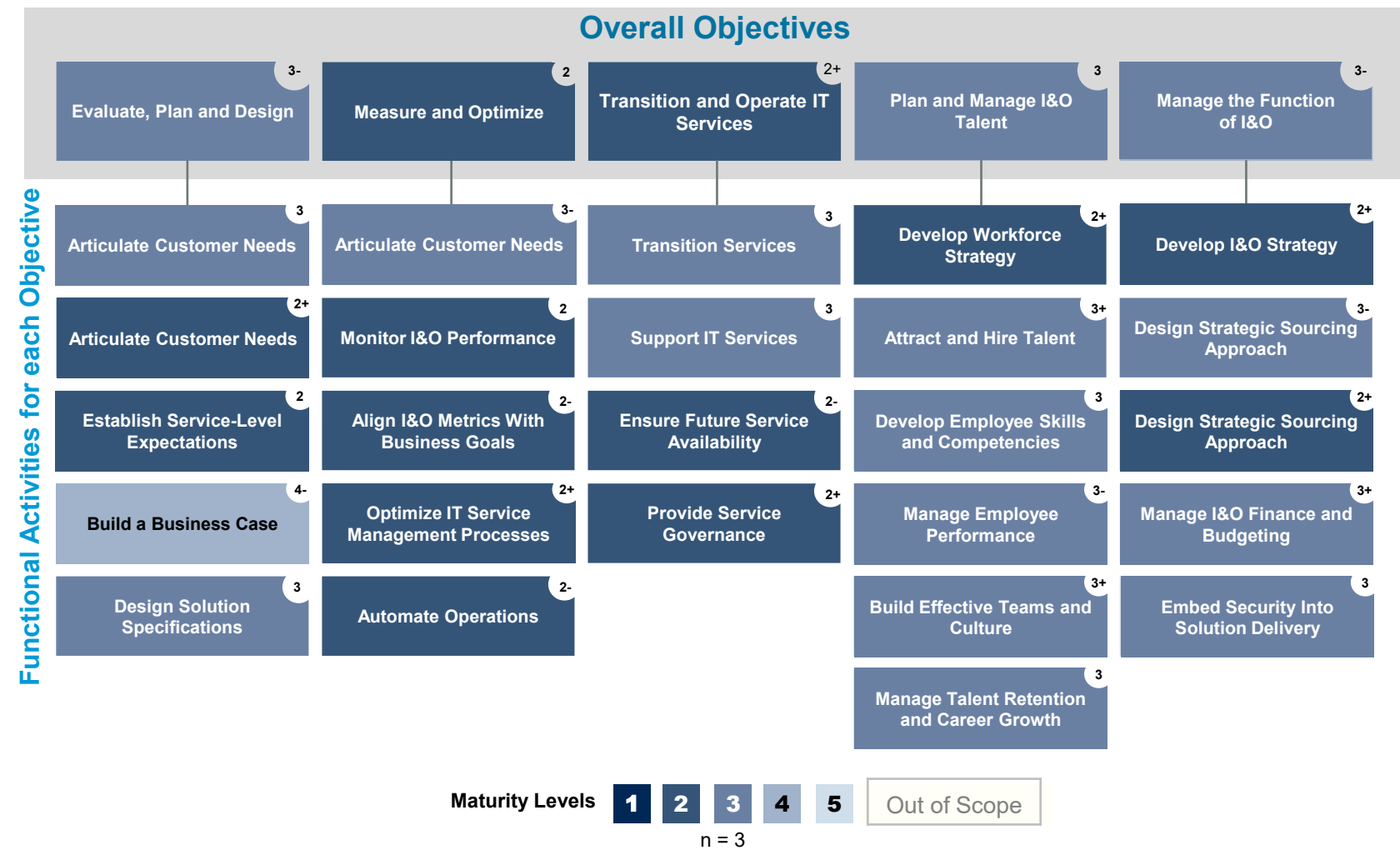
Respondents included in this assessment: **3**

Peer benchmark: **3**

Participating organizations in the peer benchmark: **13**

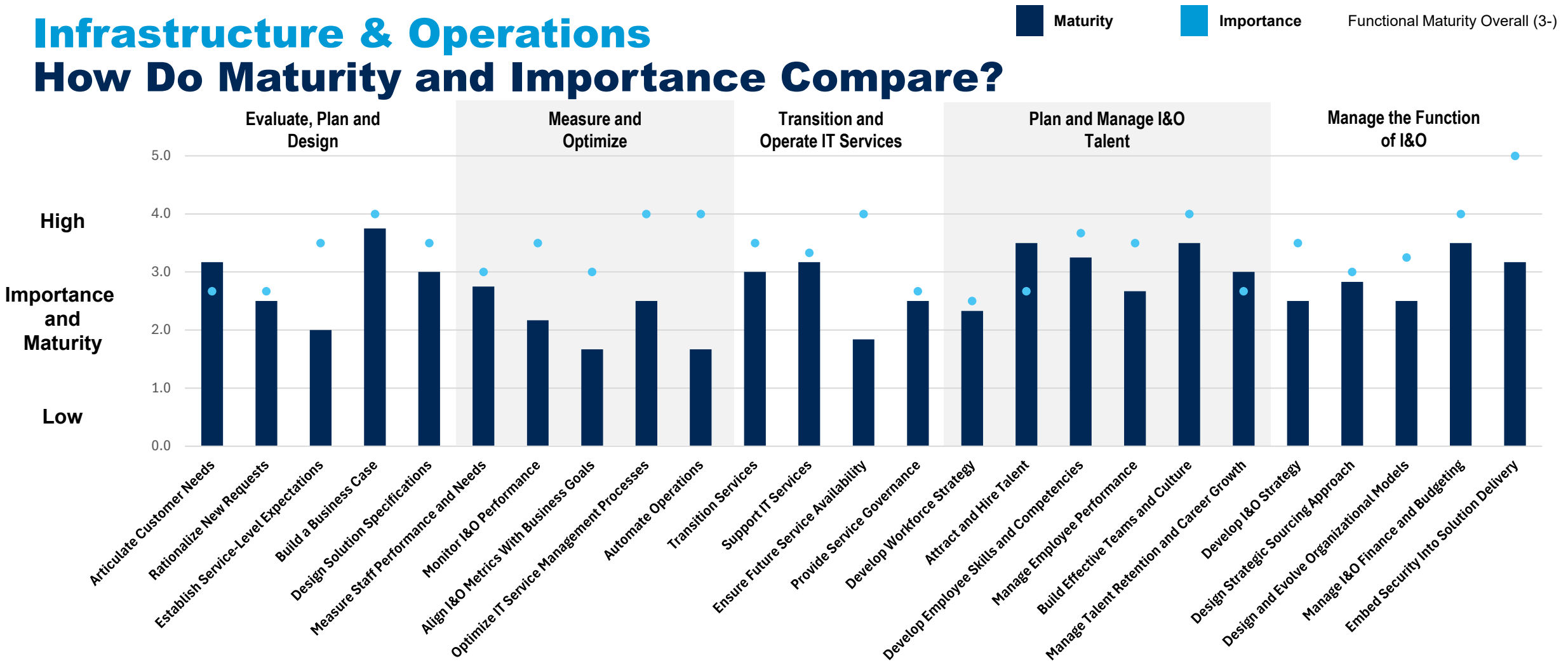
Infrastructure & Operations

Maturity Levels of Objectives & Activities



Infrastructure & Operations

How Do Maturity and Importance Compare?



- Lowest Maturity**
- Automate Operations
 - Align I&O Metrics With Business Goals
 - Ensure Future Service Availability

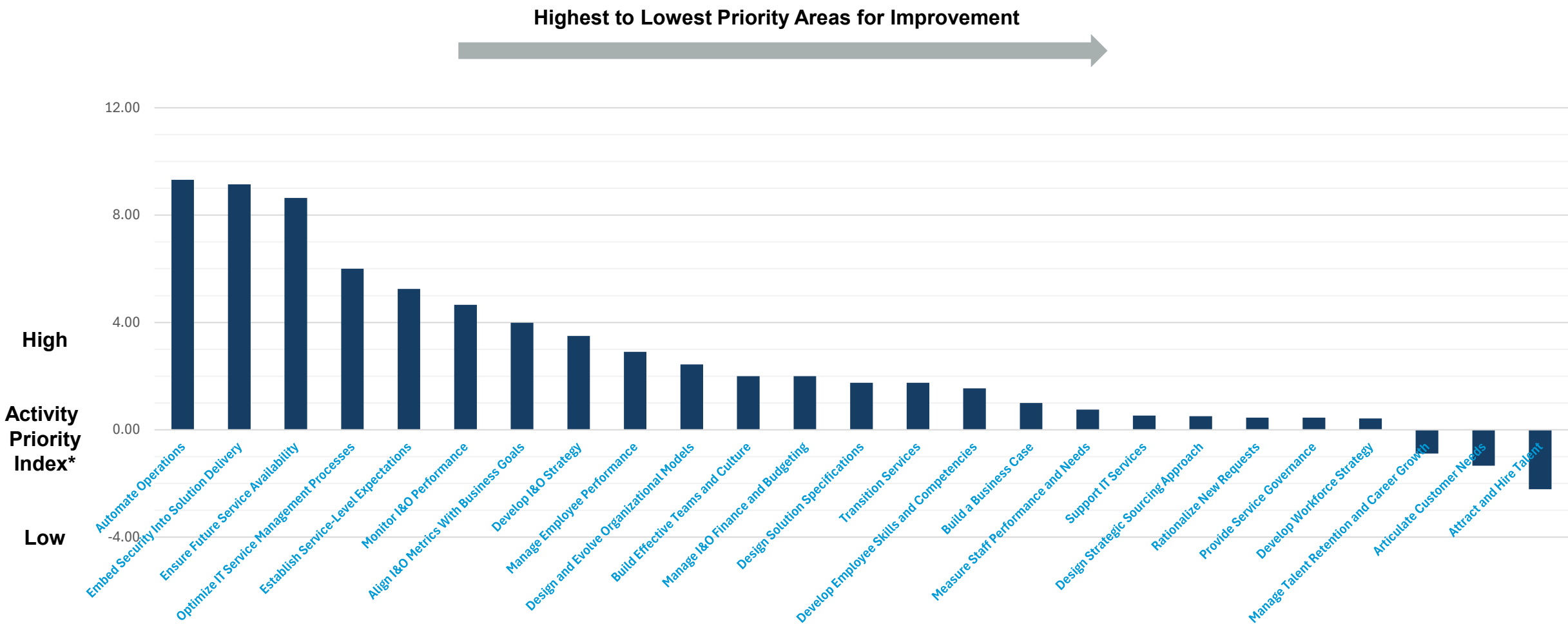
- Highest Importance**
- Embed Security Into Solution Delivery
 - Build Effective Teams and Culture
 - Optimize IT Service Management Processes

Importance: Measured on a scale ranging from 1 (Not Important) to 5 (Most Important). Importance measures how important each functional activity is to the overall effectiveness of your function in meeting its business objectives.

Infrastructure & Operations

Activity Priority Index

The (API) identifies where the function is less mature in activities of greater importance.



*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.

Infrastructure & Operations (1 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Evaluate, Plan and Design	Articulate Customer Needs	3.2	3: Design discussions include some concept of customer need and value. Desired outcomes remain technically focused. Involvement and feedback loops are informal/as needed. 4: Customers are identified for most projects. Business stakeholder and/or product owners' participation is required for major projects.
	Rationalize New Requests	2.5	2: Internal IT discussions and review occur when evaluating technical investments. Only key/major projects are rationalized against current offerings. 3: The process of rationalizing requests against current offerings has some formal structure, but approvals are determined by individual managers.
	Establish Service-Level Expectations	2	2: Service levels are defined and monitored in terms of technology performance parameters (e.g., availability).
	Build a Business Case	3.8	3: A business case is developed for business-impacting projects with a defined resource plan. Determining business value and ROI is difficult. 4: Business stakeholders are actively involved in using feedback loops to create each business case. Project value is expressed in terms of ROI or price for performance.
	Design Solution Specifications	3	3: Solution specifications are done for all projects and coordinated at an enterprise IT level based on business requirements.
Measure and Optimize	Measure Staff Performance and Needs	2.8	2: Staff is assigned to specific technologies or I&O processes, and individuals are measured on criteria specific to those categories. 3: Staff or staff hours are associated with applications or projects, and individuals are evaluated according to objective I&O metrics for which they have some responsibility.
	Monitor I&O Performance	2.2	2: Metrics are defined and monitored within IT technology functions and used primarily for outage detection and troubleshooting, with occasional reporting. 3: Metrics and KPIs are defined according to I&O needs, benchmarked against industry averages and used for resource justification, with automated data collection and reporting.
	Align I&O Metrics With Business Goals	1.7	1: I&O metrics are used strictly internally by the I&O organization. 2: I&O performance goals are linked indirectly to business goals, and I&O reports performance to business units in a reactive manner.
	Optimize IT Service Management Processes	2.5	2: Some basic processes focused on activities are defined within technology silos. 3: IT service management is formalized across the organization with documented responsibilities.
	Automate Operations	1.7	1: Scripting is used tactically by individuals to automate repetitive tasks. 2: Some recurring tasks with predefined workflows are automated within infrastructure silos.

Infrastructure & Operations (2 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Transition and Operate IT Services	Transition Services	3	3: A service-based approach is adopted, but key service-based requirements may not be included due to time, quality or cost constraints.
	Support IT Services	3.2	3: I&O uses a process-based approach, with cross-functional processes and a service desk with a second and third line. Metrics that track IT performance provide governance. 4: I&O uses a service-based approach, with integrated ITSM and operational management tools. Key process owner, service owner and product owner roles are in place.
	Ensure Future Service Availability	1.8	1: I&O is a technology-focused organization, and attention is paid to services, enhancing availability and planning for future growth is informal. 2: IT assets are identified and planning disciplines (e.g., capacity, disaster recovery and monitoring) are in place but unlikely to be standardized across I&O, resulting in outages.
	Provide Service Governance	2.5	2: Processes and metrics are available but are neither comprehensive nor analyzed for trends and patterns. 3: Policies, procedures and standards are defined and in place, along with key governance roles.
Plan and Manage I&O Talent	Develop Workforce Strategy	2.3	2: I&O workforce plans identify short-term staffing needs to inform head count plans for the coming fiscal period. 3: I&O workforce plans respond to staffing needs and incorporate plans for skills and competency development based on skills gap assessments.
	Attract and Hire Talent	3.5	3: I&O leaders partner with HR to update job descriptions and recruitment strategies to target emerging skills needs and promising talent pools. 4: I&O leaders collaborate with IT leaders and HR partners to evolve recruitment and hiring practices.
	Develop Employee Skills and Competencies	3.3	3: I&O employee development practices encourage and support continuous development of both technical and soft skills (e.g., collaboration, leadership and communication). 4: I&O employee development practices include a focus on developing on-the-job coaching and learning experiences.
	Manage Employee Performance	2.7	2: I&O employee performance management involves annual calibration of employee performance against centrally mandated criteria. 3: I&O employee performance management involves regular, two-way discussions on employee performance metrics, defined by role.
	Build Effective Teams and Culture	3.5	3: I&O creates teams with a mix of technical and business skills, fostering an environment of recognition within and across teams and a process-centric mindset. 4: I&O instills a coaching commitment and a culture of knowledge sharing and team empowerment. Teams are not bound by geographical or organizational model constraints
	Manage Talent Retention and Career Growth	3	3: I&O provides career progression information such as sample career paths and basic leadership skills training. Retention planning is formal and systematic.

Infrastructure & Operations (3 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage the Function of I&O	Develop I&O Strategy	2.5	2: Set priorities based loosely on IT-level objectives. 3: Define strategies influenced by business strategy and include forward-looking plans for resources and technologies.
	Design Strategic Sourcing Approach	2.8	2: Make sourcing decisions within silos based on specific project needs. 3: Base sourcing decisions on enterprise needs, cost optimization and categorized vendors. Determine solutions in collaboration with other IT teams.
	Design and Evolve Organizational Models	2.5	2: Promote some level of communication and collaboration across silos and initiate reorganizations based on executive turnover. 3: Pilot cross-functional teams for increased collaboration across silos.
	Manage I&O Finance and Budgeting	3.5	3: Focus on IT objectives and manage the budget based on technology spend requirements. 4: Track I&O spend to specific business outcomes and obtain buy-in for key projects from stakeholders.
	Embed Security Into Solution Delivery	3.2	3: Define controls to comply with security policies and procedures to manage the risk of security infringements. Monitor and manage all systems and services. 4: Proactively work with the information security team to embed security controls, create clear escalation paths for infringements and enforce accountability for security in operations.



4.3

Data & Analytics

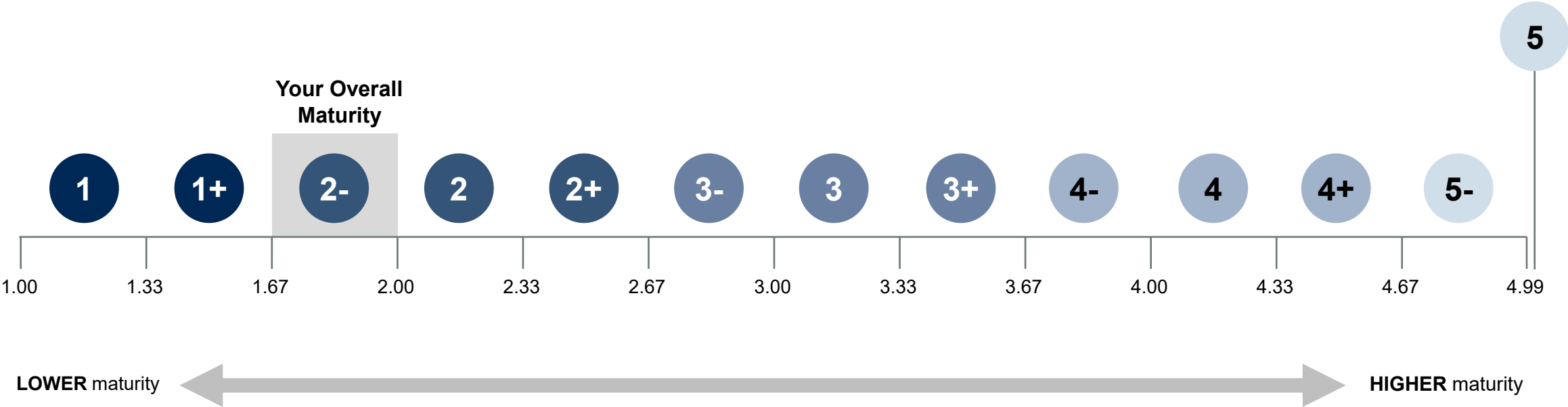


Data & Analytics

What is your Overall Maturity Level?

Maturity measures how advanced an organization’s development is in a functional activity relative to Gartner’s best practice research.

- Measured on a scale ranging from **1 (lower)** to **5 (higher)**
- Refined with a **(+)** or **(–)** to indicate intermediate levels of maturity.
- Maturity is best defined as a range. Details are provided in the Methodology & Score Calculation section of the Appendix.



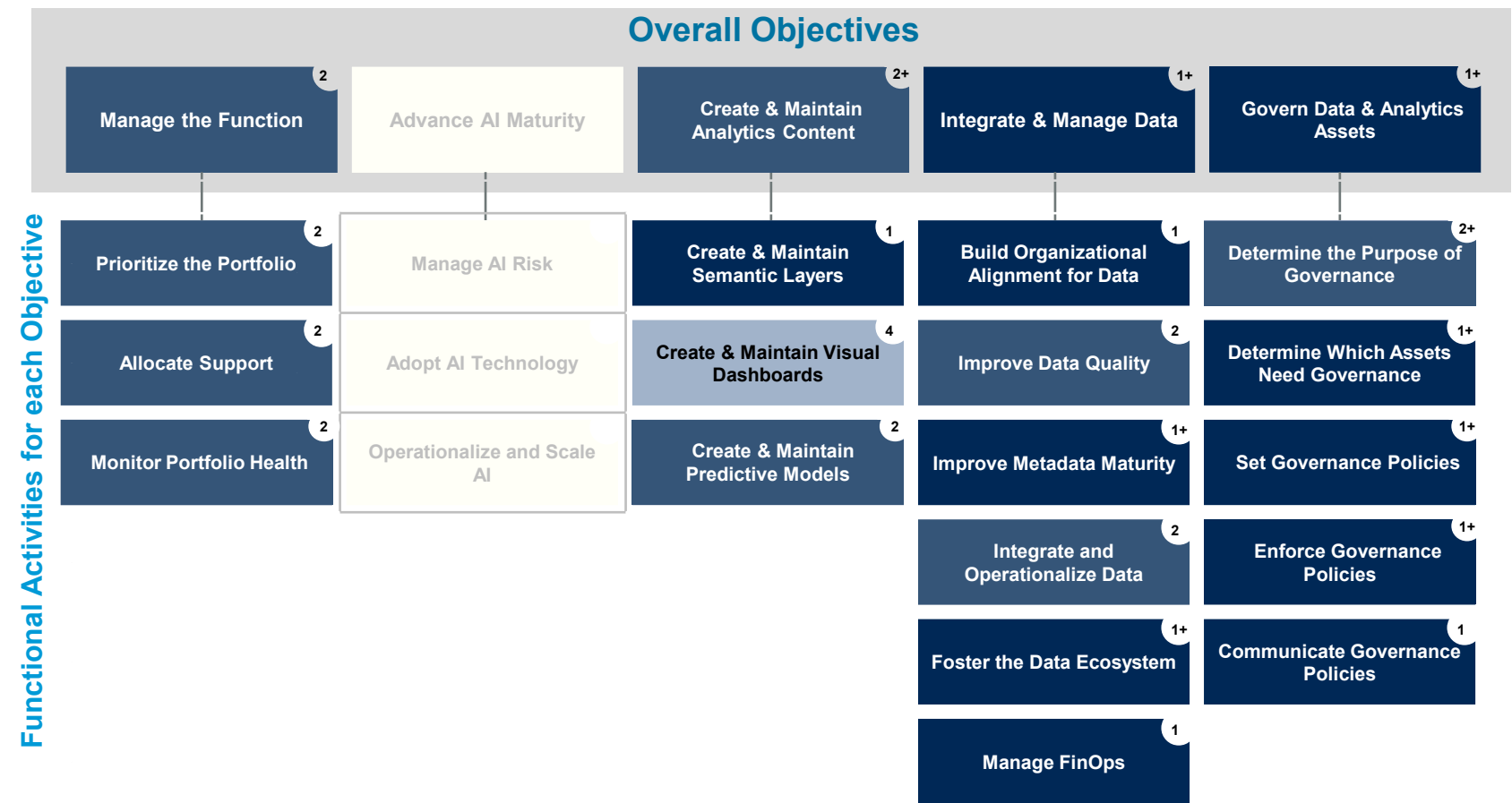
Respondents included in this assessment: **2**

Peer benchmark: **2**

Participating organizations in the peer benchmark: **7**

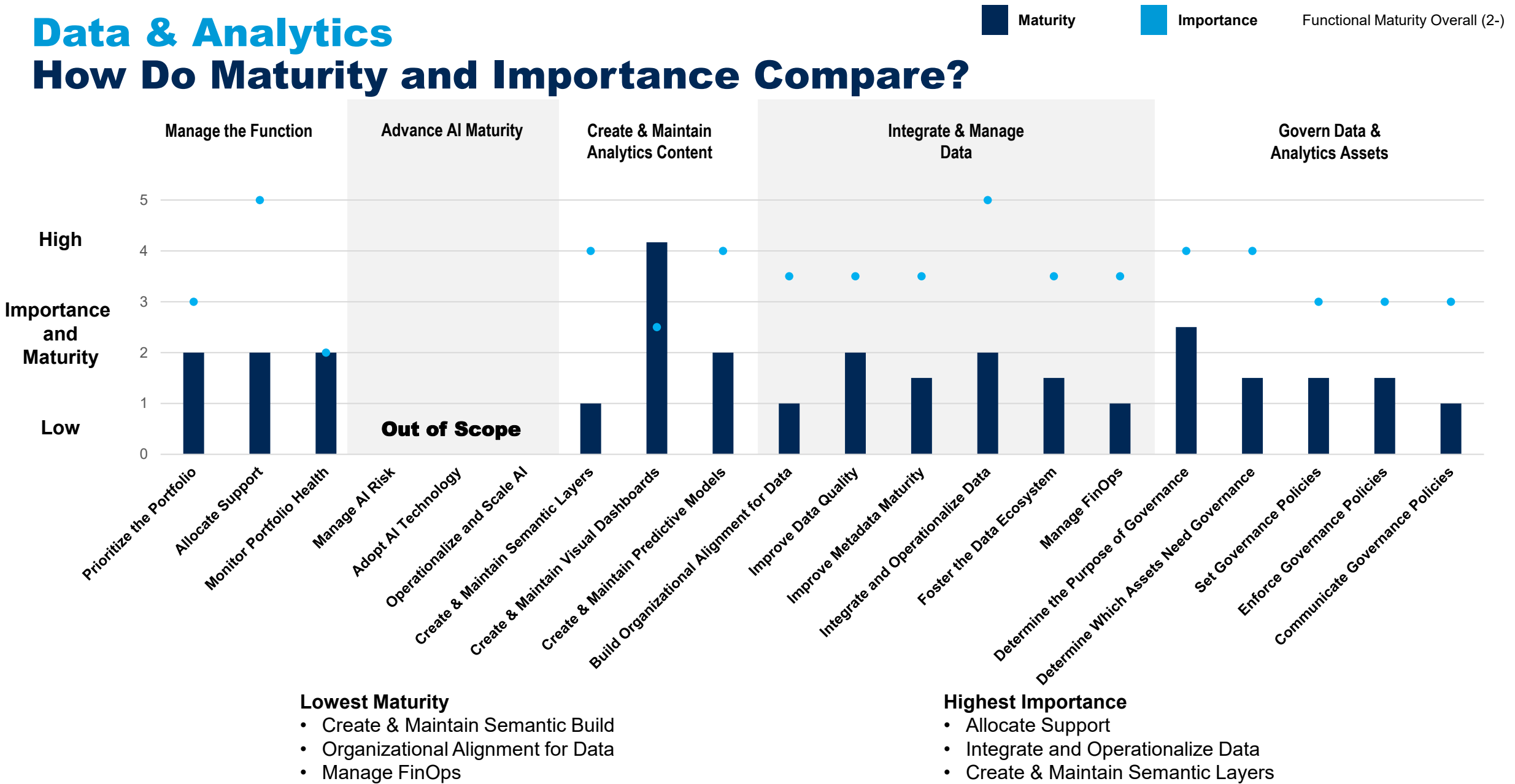
Data & Analytics

Maturity Levels of Objectives & Activities



Data & Analytics

How Do Maturity and Importance Compare?

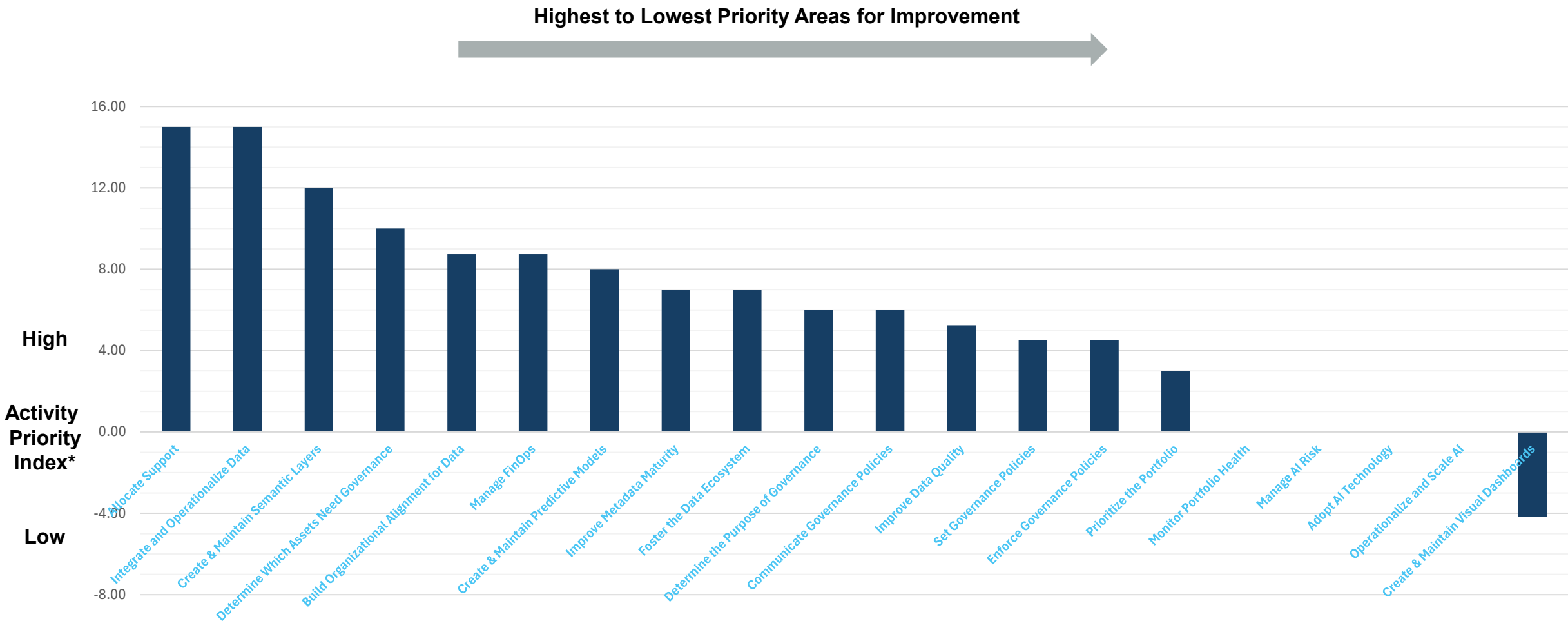


Importance: Measured on a scale ranging from 1 (Not Important) to 5 (Most Important). Importance measures how important each functional activity is to the overall effectiveness of your function in meeting its business objectives.

Data & Analytics

Activity Priority Index

The (API) identifies where the function is less mature in activities of greater importance.



***Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.**

Data & Analytics (1 of 2)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage the Function	Prioritize the Portfolio	2	2: Projects are evaluated to estimate how many full-time equivalents they will require.
	Allocate Support	2	2: Teams are put in place to support D&A projects.
	Monitor Portfolio Health	2	2: Projects are monitored for accomplishment of key milestones.
Advance AI Maturity	Manage AI Risk	-	Out of Scope
	Adopt AI Technology	-	Out of Scope
	Operationalize and Scale AI	-	Out of Scope
Create & Maintain Analytics Content	Create & Maintain Semantic Layers	1	1: There is no metrics store for easy reporting and analysis.
	Create & Maintain Visual Dashboards	4.17	4: Dashboards adopt best practices in data visualization; dashboards are embedded into applications to provide intelligence at a particular point in the workflow of a business process. 5: Dashboards include real-time data integration and predictive analytics.
	Create & Maintain Predictive Models	2	2: Predictive analytics are applied in targeted situations throughout the organization.

Data & Analytics (2 of 2)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Integrate & Manage Data	Build Organizational Alignment for Data	1	1: Data is managed on a use-case-by-use-case basis.
	Improve Data Quality	2	2: Data quality jobs are performed when errors occur via simple data quality tools or homegrown batch jobs.
	Improve Metadata Maturity	1.5	1: Data assets are not cataloged. 2: Data assets are collected and cataloged in a data catalog on an ad hoc basis.
	Integrate and Operationalize Data	2	2: Isolated data integration practices are established by category of use case.
	Foster the Data Ecosystem	1.5	1: Data is limited to a single use. 2: Data can be shared locally with fixed agreed-upon semantics within a single site and context.
	Manage FinOps	1	1: Data ecosystems costs are not being monitored nor planned for. Remediation plans happen as an afterthought.
Govern Data & Analytics Assets	Determine the Purpose of Governance	2.5	2: The data & analytics function recognizes a clear distinction between data governance and data management. Business and IT are starting to talk about issues, mostly at the event or data level. 3: Executive support exists and funding provided for a enterprise effort.
	Determine Which Assets Need Governance	1.5	1: Data governance is mostly reactive when business processes fail. 2: Sporadic plans are set up in response to leaders acknowledging systemic issues in data assets.
	Set Governance Policies	1.5	1: There is no coordination of governance policies. Data problems are "fixed" as a reaction to problems that arise. 2: Governance policies are recognized as discrete decisions. A coordinated effort is made to set governance policies consistently and proactively around the organization.
	Enforce Governance Policies	1.5	1: Because data governance policies are not set properly and there is no enforcement. Data is just "fixed" when something breaks. 2: IT creates its own central team to handle "all things data" such as remediating data and interpreting policy.
	Communicate Governance Policies	1	1: The data and analytics function doesn't communicate about governance activities.

4.4

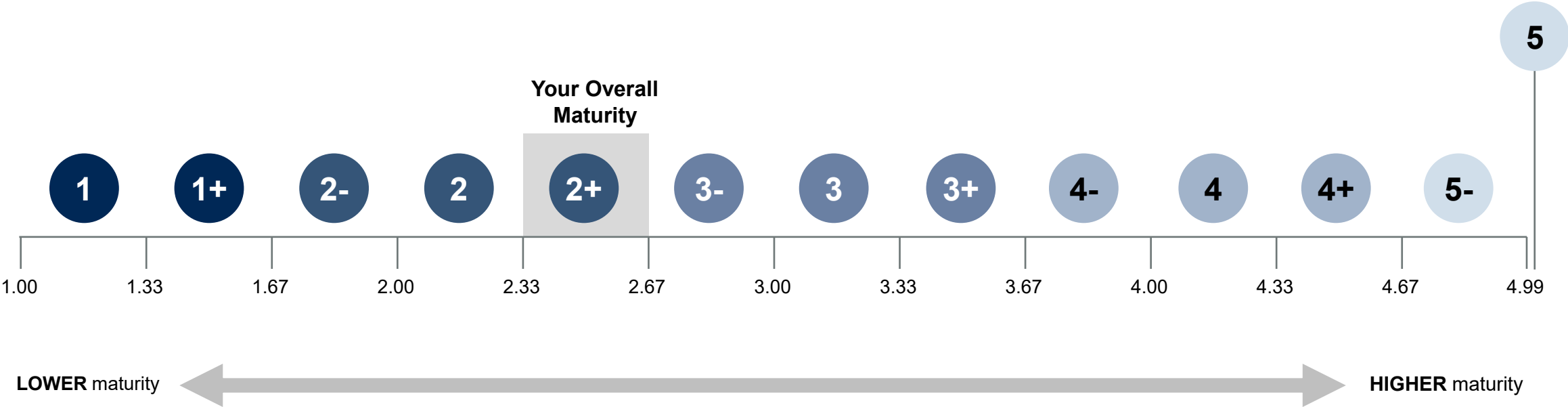
Enterprise Applications

Enterprise Applications

What is your Overall Maturity Level?

Maturity measures how advanced an organization’s development is in a functional activity relative to Gartner’s best practice research.

- Measured on a scale ranging from **1 (lower)** to **5 (higher)**
- Refined with a **(+)** or **(–)** to indicate intermediate levels of maturity.
- Maturity is best defined as a range. Details are provided in the Methodology & Score Calculation section of the Appendix.



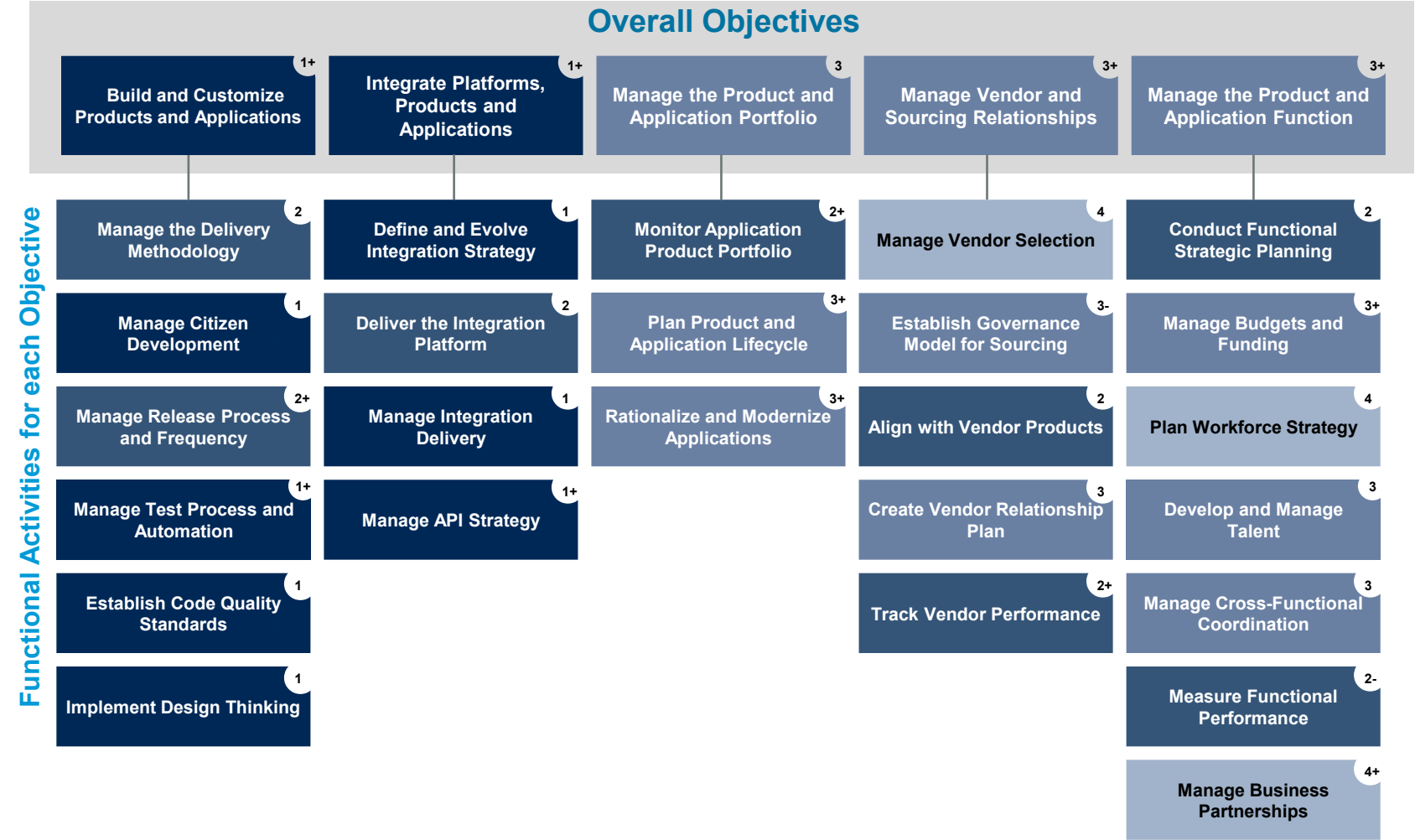
Respondents included in this assessment: **3**

Peer benchmark: **2+**

Participating organizations in the peer benchmark: **12**

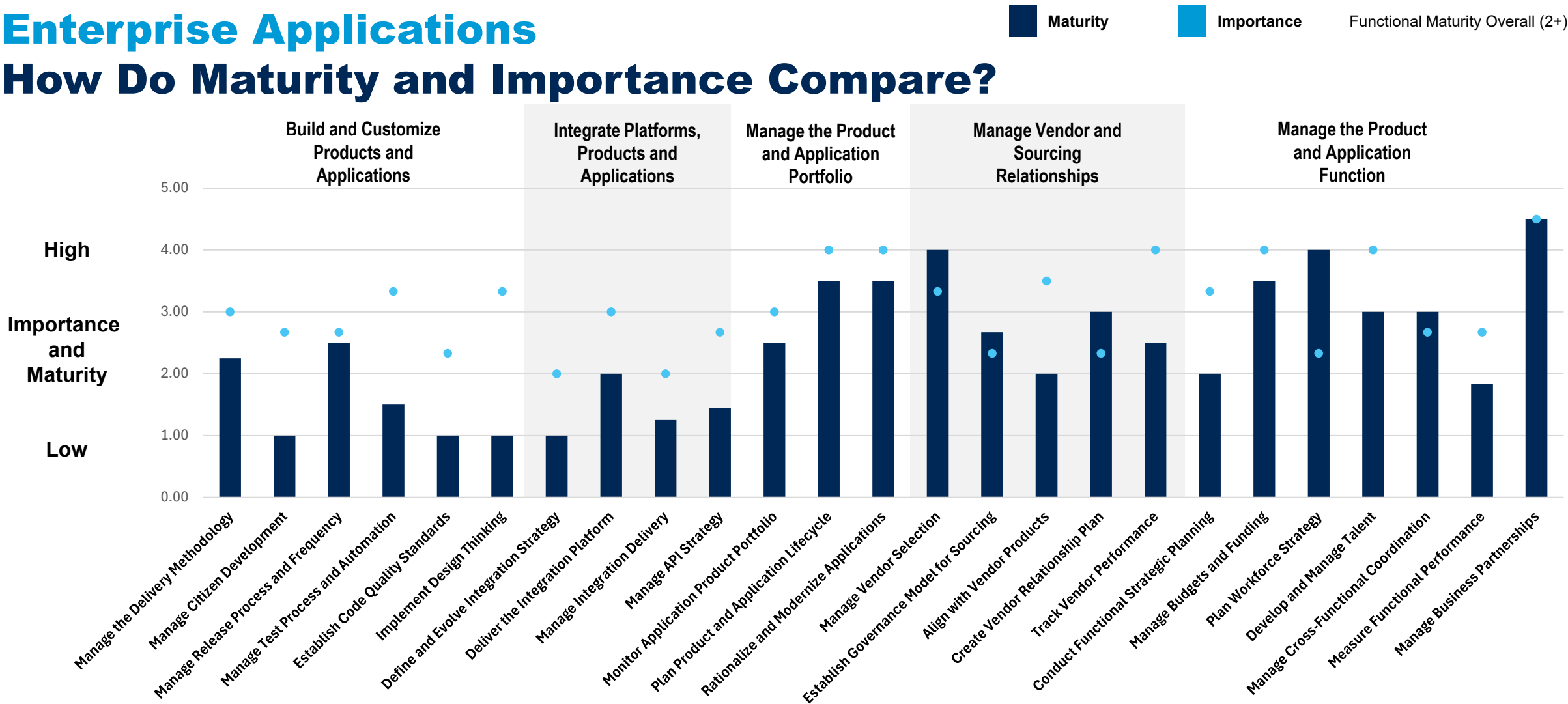
Enterprise Applications

Maturity Levels of Objectives & Activities



Enterprise Applications

How Do Maturity and Importance Compare?



Lowest Maturity

- Establish Code Quality Standards
- Implement Design Thinking
- Define and Evolve Integration Strategy & Manage Citizen Development

Highest Importance

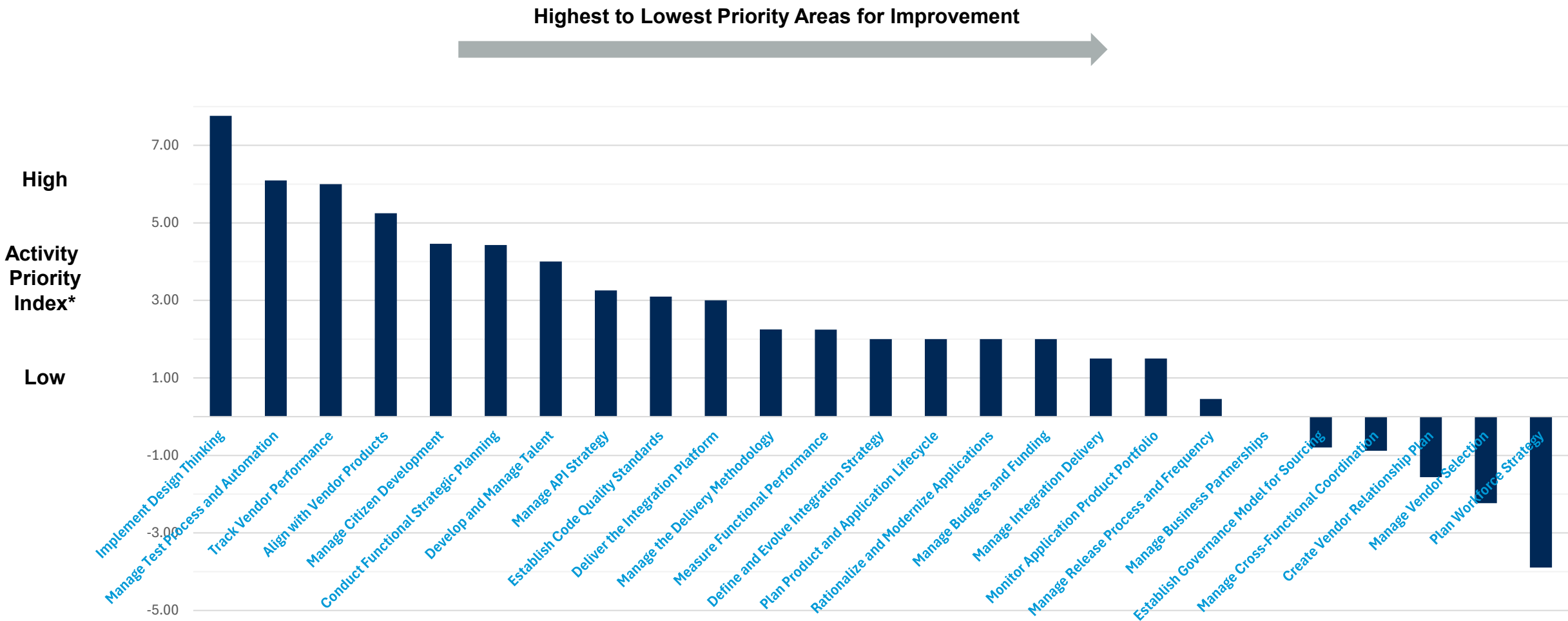
- Manage Business Partnerships
- Plan Product and Application Lifecycle
- Track Vendor Performance

Importance: Measured on a scale ranging from 1 (Not Important) to 5 (Most Important). Importance measures how important each functional activity is to the overall effectiveness of your function in meeting its business objectives.

Enterprise Applications

Activity Priority Index

The (API) identifies where the function is less mature in activities of greater importance.



*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.

Enterprise Applications (1 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Build and Customize Products and Applications	Manage the Delivery Methodology	2.2	2: Application team use common development methodologies with standard selection criteria and provide opportunity to stakeholders to suggest improvement along the development process. 3: Application team uses iterative or agile methods and solicit frequent stakeholder feedback.
	Manage Citizen Development	1	1: IT does not support citizen development.
	Manage Release Process and Frequency	2.5	2: Formal release process with basic release handoffs are in place. 3: Release process follows a regular cadence and partial automation is built into the release and configuration process.
	Manage Test Process and Automation	1.5	1: No formal testing process and no automation. 2: Formal testing processes are established and some testing processes are automated.
	Establish Code Quality Standards	1	1: Formal coding standards do not exist.
	Implement Design Thinking	1	1: Design thinking or UX practices do not exist.
Integrate Platforms, Products and Applications	Define and Evolve Integration Strategy	1	1: There is no formally or informally defined integration strategy.
	Deliver the Integration Platform	2	2: One or more integration tools have been selected and are recommended and supported. Individual application delivery teams decide whether to use these tools or not.
	Manage Integration Delivery	1.2	1: There is no formally or informally defined responsibility for integration delivery. 2: Application delivery teams autonomously address integration issues, optionally using a set of approved products that are supported by an integration platform team.
	Manage API Strategy	1.4	1: APIs are created on an ad hoc basis as an extension of existing SOA or middleware. 2: Common design standards, documented versioning policy and an API mediation layer ensure consistent API usage across the organization.

Enterprise Applications (2 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage the Product and Application Portfolio	Monitor Application Product Portfolio	2.5	2: for specific initiatives. There is an inventory of applications with basic information and the portfolio is evaluated irregularly 3: The monitoring role is clearly assigned, and the portfolio is assessed regularly including assessment of business fitness.
	Plan Product and Application Lifecycle	3.5	3: The product and application roadmaps are aligned with business strategy, take application fitness into account and are linked to business capabilities and business outcomes. 4: The product and application roadmaps include opportunities of emerging technology for the next 2-5 years.
	Rationalize and Modernize Applications	3.5	3: Rationalization and modernization of products and applications is led by a joined business and IT team, and focuses on resolving business related issues and risk within a business domain. 4: Rationalization and modernization initiatives are integral part of business transformations.
Manage Vendor and Sourcing Relationships	Manage Vendor Selection	4	4: Each business unit is represented on formalized vendor selection committee driving the acquisition of vendor products or services. Vendor relationships are handled without cross-unit coordination or enterprise-level negotiations.
	Establish Governance Model for Sourcing	2.6	2: Nonrepeatable, ad hoc processes are used to understand each vendor independently. Vendor interactions are reactive and focused mainly on problem resolution. 3: Vendor engagement relationships are fully defined and understood. Formal templates and documentation are in place to provide the necessary guidance to engage vendors.
	Align with Vendor Products	2	2: A limited, informal, vendor-level documentation exists that allows matching of business requirements and IT capabilities to individual vendor products.
	Create Vendor Relationship Plan	3	3: Vendors are engaged in contractual relationship based on set of predefined requirements. The ability to differentiate vendors by embedded capabilities is implemented through historical analysis of corporate needs.
	Track Vendor Performance	2.5	2: Processes are put in place to identify challenges with vendors that lead to increased costs (both operational and maintenance). 3: A role of vendor manager is established to track group of vendors and associated records. A formal spreadsheets (scorecards) are put in place to ensure consistency of tracking across vendors.

Enterprise Applications (3 of 3)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage the Product and Application Function	Conduct Functional Strategic Planning	2	2: A formal strategic plan for applications that is derived from IT strategy is defined, documented and updated annually.
	Manage Budgets and Funding	3.5	3: The application function uses business and technology roadmaps that include application life cycle costs to make funding decisions, and provides visibility into trade-offs for different investment options. 4: The application function allocates funding at the product level and monitors the value, cost, and risks of current investments and opportunities to reallocate funding and increase ROI.
	Plan Workforce Strategy	4	4: Application workforce plans are based on multiyear talent forecasts and an assessment of labor market availability, and use a framework to determine whether to develop, hire or source to address talent needs.
	Develop and Manage Talent	3	3: The applications function consistently defines applications roles, responsibilities, expectations and competencies that drive regular performance management and professional development activities, including coaching and knowledge sharing.
	Manage Cross-Functional Coordination	3	3: Cross-functional coordination and decision rights are tiered based on the level of risk or value, and partner-functions support delivery teams in adhering to cross-functional requirements throughout delivery.
	Measure Functional Performance	1.8	1: Application performance measurement is limited to operational metrics. 2: Applications performance is consistently measured using high-quality data and includes financial and project performance metrics.
	Manage Business Partnerships	4.5	4: Business engagement is structured around business capabilities and is calibrated to encourage and support business partner leadership of technology projects. 5: Business and IT staff are integrated in organizational and team structures, and partner continuously to identify, prioritize and deliver technology solutions to drive business outcomes.



4.5 Security & Risk Management

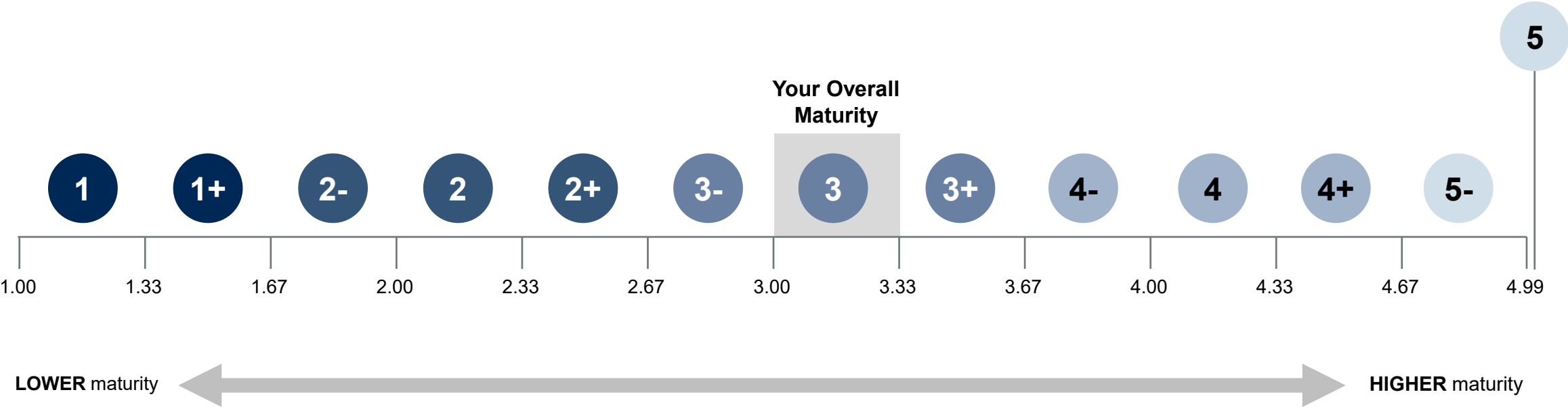


Security & Risk Management

What is your Overall Maturity Level?

Maturity measures how advanced an organization’s development is in a functional activity relative to Gartner’s best practice research.

- Measured on a scale ranging from **1 (lower)** to **5 (higher)**
- Refined with a **(+)** or **(–)** to indicate intermediate levels of maturity.
- Maturity is best defined as a range. Details are provided in the Methodology & Score Calculation section of the Appendix.



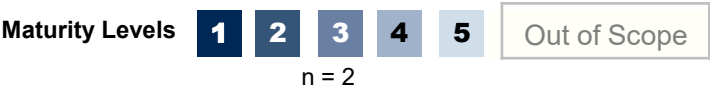
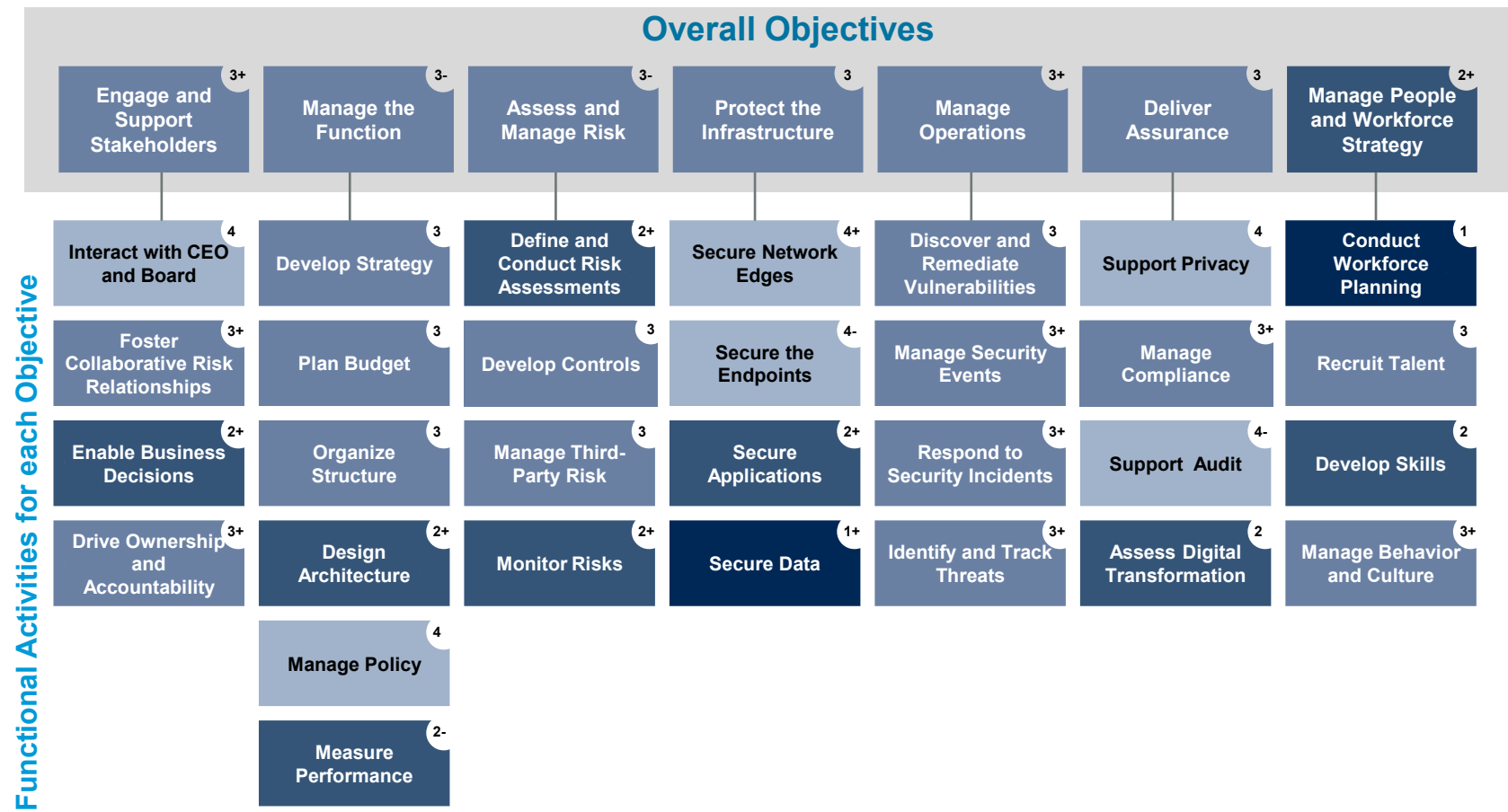
Respondents included in this assessment: **2**

Peer benchmark: **3-**

Participating organizations in the peer benchmark: **10**

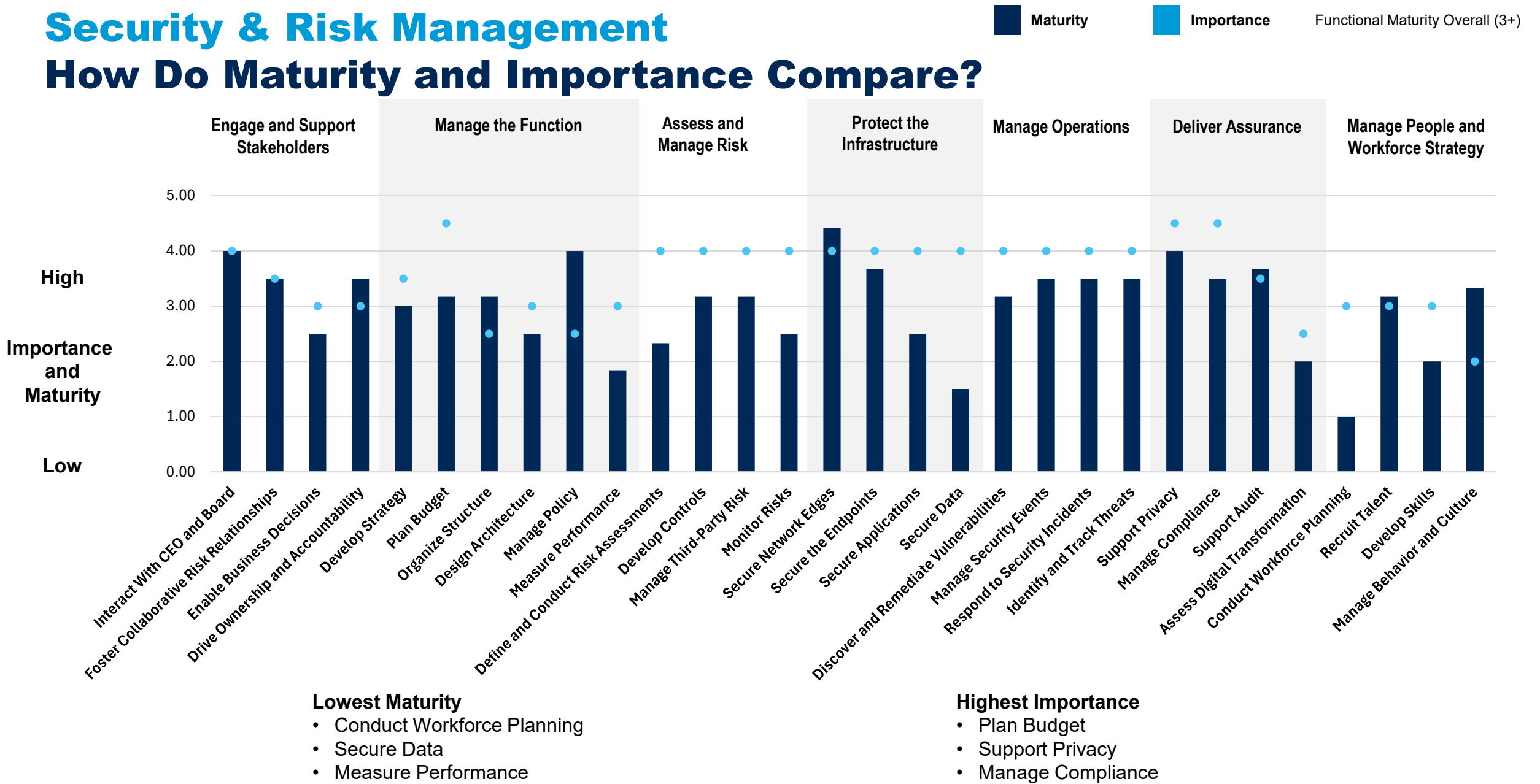
Security & Risk Management

Maturity Levels of Objectives & Activities



Security & Risk Management

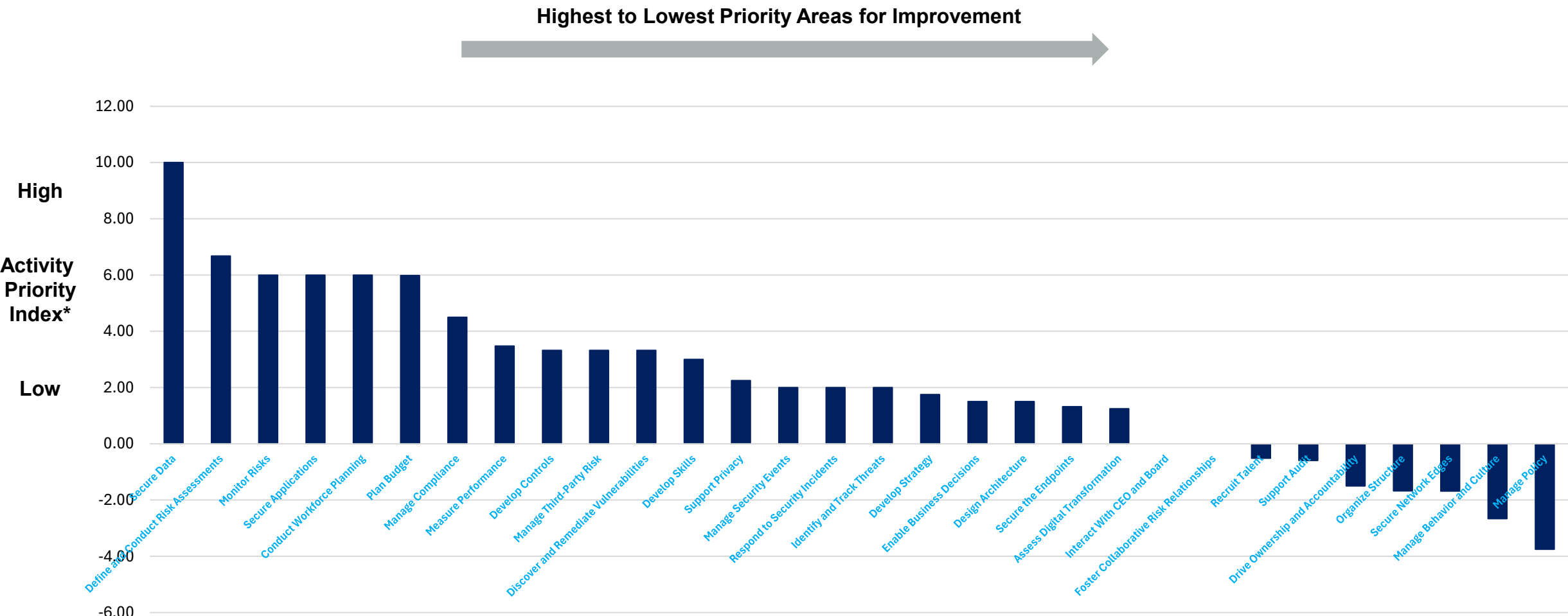
How Do Maturity and Importance Compare?



Importance: Measured on a scale ranging from 1 (Not Important) to 5 (Most Important). Importance measures how important each functional activity is to the overall effectiveness of your function in meeting its business objectives.

Security & Risk Management Activity Priority Index

The (API) identifies where the function is less mature in activities of greater importance.



*Activity Priority Index: Activity Priority Index (API) for an activity is computed as importance minus maturity multiplied by its importance. A higher API score indicates a greater priority for improvement to the organization.

Security & Risk Management (1 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Engage & Support Stakeholders	Interact with CEO & Board	4	4: SRM develops and communicates standardized reports in business-friendly language, aligned to business objectives that are made available to the board and CEO on a regular basis.
	Foster Collaborative Risk Relationships	3.5	3: SRM defines and regularly updates roles and responsibilities for risk management functions and activities that impact multiple stakeholder functions. 4: SRM works with other stakeholders on future challenges and encourages staff across functions to minimize activity duplications and maximize collaboration.
	Enable Business Decisions	2.5	2: The SRM function is invited to contribute to a small subset of business decisions on an ad hoc basis and/or is usually only involved after the business decision has been made. 3: The SRM function has a clear support role in helping stakeholders evaluate and make business decisions that have security implications.
	Drive Ownership and Accountability	3.5	3: The SRM function identifies appropriate business stakeholders and proactively communicates business impacts and risk trade-offs to enable effective risk decisions. 4: The SRM function always identifies and limits decision making to true owners of risks in the business without imposing security's view of the "correct" decision.
Manage the Function	Develop Strategy	3	3: SRM strategy formally prioritizes projects and is approved via a governance structure.
	Plan Budget	3.2	3: The SRM budget is formalized and documented and reflects business strategic plans. 4: The SRM budget extends beyond technology into related security objectives concerning behavior, organization and staffing.
	Organize Structure	3.2	3: There is a defined organizational structure with clear roles and responsibilities and a designated SRM leader that is aligned with IT. 4: The organizational structure shifts to meet growing needs to become closely aligned with the business.
	Design Architecture	2.5	2: SRM determines control requirements from business requirements and cascades them into a clear set of controls. 3: SRM has a clear view of the controls portfolio and documented guidelines for building and implementing controls. Security controls can be directly linked to business context.
	Manage Policy	4	4: Policy framework accounts for variations in business needs (exceptions) and is supported by technology.
	Measure Performance	1.8	1: SRM performance is measured on an informal or ad hoc basis. 2: SRM performance is measured using operational metrics such as availability or delivery against SLAs.

Security & Risk Management (2 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Assess & Manage Risk	Define & Conduct Risk Assessments	2.3	2: The risk assessment process is applied to some new projects and initiatives 3: The risk assessment process is standardized and risks are triaged and appropriately assessed at the enterprise level.
	Develop Controls	3.2	3: SRM creates controls recommendations based on an understanding of the enterprise's risk appetite and adjusts controls design and implementation to meet objectives 4: SRM takes into account the impact of controls on customers' (internal and external) experience when creating controls recommendations.
	Manage Third-Party Risk	3.2	3: SRM develops common processes to manage risks for key supply chain and third parties, when necessary. 4: SRM has a formalized strategy that includes different evaluation methods and real-time monitoring for ecosystem players.
	Monitor Risks	2.5	2: SRM has an ad hoc approach for monitoring and reporting on risk exposure, relying on audit or other functions. 3: SRM has an informal view of organizational risk appetite and a common process to monitor key risks
Protect the Infrastructure	Secure Network Edges	4.4	4: SRM ensures network access and network traffic within networks are controlled and monitored. 5: SRM creates a distributed context-based, logical-access boundary (zero trust network access or ZTNA) to restrict network access to authenticated identities.
	Secure the Endpoints	3.6	3: Endpoint security controls are extended to applications, and admin access is controlled. 4: Endpoint security controls are expanded to include detection and response.
	Secure Applications	2.5	2: SRM implements basic application security assessment, protection and awareness. 3: SRM implements automated discovery and security assessment for applications.
	Secure Data	1.5	1: SRM has ad hoc implementation of data security with no coordination or orchestration of controls. 2: SRM supplements data security with basic controls based on data classification.

Security & Risk Management (3 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage Operations	Discover & Remediate Vulnerabilities	3.2	3: SRM prioritizes vulnerabilities based on business context and monitors patching effectiveness. 4: SRM uses threat intelligence to further prioritize vulnerabilities.
	Manage Security Events	3.5	3: SRM applies elevated monitoring efforts to high-risk systems with clearly defined escalation paths. 4: SRM regularly assesses monitoring effectiveness to increase alert accuracy and uses event and incident data to improve detection accuracy.
	Respond to Security Incidents	3.5	3: SRM regularly performs postmortem reviews, assesses response plans and communication plans, and supports other functions in public communication in an ad hoc manner when incidents rise to the level of crises. 4: SRM works with other functions to formalize all aspects of crisis response plans, maintain detailed response playbooks for a variety of incidents and conduct tabletop tests on plans.
	Identify & Track Threats	3.5	3: SRM uses analytics to identify patterns of threats, reverse-engineers attacks to identify indicators of compromises and considers scenarios of future attacks to tailor detection efforts. 4: SRM combines internal and external data to develop hypotheses of future attacks, applies attribution techniques across multiple platforms and timelines, and compiles common attacker profiles to tailor monitoring of future attacks.
Deliver Assurance	Support Privacy	4	4: SRM helps enforce responsibilities for privacy, regularly assesses the impacts of new regulations, and works with the business and customers to assess the privacy impacts of business changes.
	Manage Compliance	3.5	3: SRM typically tracks current regulations and works closely with internal experts to ensure compliance. 4: SRM centrally tracks current regulations and works closely with internal and external experts to ensure compliance.
	Support Audit	3.6	3: Audit schedules, interviews and data requests are formalized for routine audits. Issue tracking is synced with audit close. 4: Support of audit activities is based on prioritized audit objectives. Partial data collection is based on time and effort analysis to meet audit support requirements.
	Assess Digital Transformation	2	2: SRM is focused on implementing current or near-term technology projects (limited to information security), and minimal effort is placed upon future-planning activities across the full cyber-physical continuum of risks to the organization.

Security & Risk Management (4 of 4)

Current Maturity Levels

Objective	Activity	Current Maturity	Maturity Level: Gartner Description
Manage People and Workforce Strategy	Conduct Workforce Planning	1	1: SRM backfills or adds roles as immediate needs arise.
	Recruit Talent	3.2	3: SRM forecasts short-term talent needs and works closely with HR to tailor standard recruiting efforts to security’s need. 4: SRM works with HR to make hiring requirements and expectations more realistic and hires for legacy and emerging skills.
	Develop Skills	2	2: SRM offers ad hoc support to managers to develop their teams.
	Manage Behavior and Culture	3.3	3: SRM creates campaigns that contain clear, simple instructions about what employees should do and assesses employee awareness on a regular and consistent basis. 4: SRM segments all employees and tailors messages and approaches for each group, taking into account differences in impacts of risky behaviors and psychological drivers of behavior.

Gartner Contacts

Adrian Milczarek

Senior Managing Partner
Gartner Consulting
adrian.milczarek@gartner.com

Vikas Bhardwaj

Associate Partner
Gartner Consulting
vikas.bhardwaj@gartner.com

David Jesseau

Senior Director
Gartner Consulting
david.jesseau@gartner.com

Abhishek Warriier

Consultant
Gartner Consulting
abhishek.warrier@gartner.com



5.0

Appendix - Benchmarking Definitions



IT Budget Benchmark Methodology — Key Definitions

- The IT Budget Assessment follows the Gartner Benchmarking chart of accounts. In order to match the Gartner Benchmark chart of accounts, the data presented in the benchmark will not completely align with the official Information Technology budget or organization. For example, the Gartner Benchmark chart of accounts has historically excluded operational technology.
- IT Budget Definition
 - The total spend for a twelve month budget period for information technology to support the enterprise. IT spend can come from anywhere in the enterprise that incurs IT costs, and it is not limited to the IT organization. It is calculated on an annualized “cash out” basis and therefore contains capital budget, and operational expenses. Gartner definitions for IT spend include all IT services, for example:
 - Hardware, software, personnel (including travel and benefits and training), contractors and consultants, outsourcing, disaster recovery, occupancy, data and voice communications/transmission, associated with supporting information technology within the enterprise.
 - Costs for the facilities being used by the staff supporting the enterprise. Some examples include office space, furniture, electricity, maintenance, property taxes, security, and office supplies. Occupancy costs for space dedicated to IT functions such as the data center and IT service desk are also included.
 - The data center (servers, storage etc), Alectra devices (desktops, laptops, tablets, thin client, handhelds), voice and data networks (including but not limited to voice and data transmission, fixed and mobile telephony, Internet access services), IT service desk, application development and maintenance. IT Support functions such as the office of the CIO, supervisory management, finance and administrative costs, such as purchasing, asset management, process management, and marketing of IT services.

IT Domain Definitions (1 of 3)

Enterprise Computing (Data Center)

- *Compute*: includes the provisioning of the full life cycle management of processing/hosting services on both mainframe and midrange (UNIX, Windows, Linux, iSeries etc.) platforms including acquisition, deployment, maintenance, change management and disposal.
- *Storage*: includes the provisioning of the full life cycle management of storage services utilizing online, near-line and offline technologies including acquisition, deployment, maintenance, change management and disposal.
- *Facilities/Hosting*: includes the full life cycle management of the physical data center premises, and other facilities and services associated with the premises such as furniture, power supply, heat management, climatization services, access security, floor space, office space, design and consulting.
- *Database*: includes the full life cycle management of relational, non-relational and pre-relational databases including the tools for monitoring and diagnosing problems with databases, analyzing and improving the performance of databases, and routine administration of databases, including configuration changes.
- *Middleware*: is the software “glue” that helps programs and databases (which may be on different computers) work together. Its most basic function is to enable communication between different pieces of software. Integration middleware is software that enables independently designed applications, software components or services to work together, by supporting data consistency, composite application and multistep process styles of integration. It includes multi-enterprise (B2B) integration capabilities and internal integration, as well as those products that enable existing applications to become part of a new multistep process. Platform middleware is system software that provides the runtime hosting environment (a container) for application program logic. It uses embedded or external communications middleware to help programs interact with other programs. It also provides resource management services for hosting application program logic at runtime.

Network

- Network (data and voice) is comprised of: Local-Area Network Service (this subservice provides network access within the office premises), Wide-Area Network Service (this subservice helps in the management and supply of inter-site connections and network infrastructure), Remote Access Service (this subservice helps to connect the internal network from a remote location with broadband or phone line access using a security token), Internet Connectivity Service (this subservice provides access to the internet) and Intranet Connectivity Service (this subservice helps in the provision of the global network provided by third parties. This also includes management of network optimization devices).

IT Domain Definitions (2 of 3)

End-User Computing

- End-User Computing includes provisioning of the full life cycle management of desktop, laptop, tablet, thin Alectra, handheld and peripheral assets including acquisition, deployment, maintenance, change management and disposal.

IT Service Desk

- An IT Service Desk is defined as any single location that evenly distributes the receipt and/or placement of technical support calls or contacts to a predetermined group of support staff. The IT service desk assessment examines IT efficiency and effectiveness with respect to the provisioning of remote Tier 0/Tier 1 support provided to end users by the technical support centers (e.g., network, data center, PC and consolidated).
- Because IT service desks may be organized differently across enterprises, you may be required to capture some information that is beyond your specific budget lines to ensure consistent comparisons. Examples include telecommunications equipment used specifically by the IT service desk, transmission expenses attributable to the inbound support calls and remote user support resources that may physically reside in other support groups (e.g. network operations or applications support).

Applications

- *Development*
 - New code for a new application
 - Functional enhancements to current code that take more than two person-weeks or typically add greater than eight function points (see notes below)
- *Support*
 - Programming maintenance of currently operational computer applications. This will include some enhancements to these applications as well.
 - Bug fixes of any size or duration
 - Maintenance of hard-coded data or tables (including field size changes) embedded within the programs (any size or duration)
 - Functional enhancements to current code that take less than two person-weeks and typically add fewer than eight function points
 - Any project that produces no new business functionality for the user

IT Domain Definitions (3 of 3)

Governance & Service Management

- Identifies service-optimized IT organizations which are growth enablers and a source of both operational and strategic differentiation. Here, the IT organizations constructively and proactively engage with the business to improve business operations to enrich enterprise performance.
 - In order to drive business value, these IT organizations themselves run like a business, bringing out front-office capabilities. IT demonstrates financial discipline, transparency, and delivery of business value by managing an integrated view of technology cost and performance against defined business outcomes, which are formally captured in a strategic service portfolio. These IT organizations exhibit the following key characteristics of an implicit business-oriented consumer/provider relationship:
 - Understand customer's needs
 - Manage service and solution life cycle
 - Deliver solutions and services to customers
 - Governs internal IT operations and architecture to ensure strategic success

IT Operations Management

- Provides on-site and/or remote IT Operations monitoring to gain insight into the historical, current and future availability and performance of IT systems, networks and applications, while also performing root cause analysis. Monitoring typically is performed in four categories: IT Infrastructure Monitoring (ITIM), Applications Performance Monitoring (APM), Artificial Intelligence for IT Operations (AIOps) and Network Performance Monitoring and Diagnostics (NPMD).

IT Security

- The discipline of designing, implementing and maturing security practices to protect critical business processes and IT assets across the enterprise. It covers:
 - Developing and maintaining effective program governance
 - Communicating and engaging successfully with all stakeholders
 - Defining a vision promoting desired security, risk management and business outcomes
 - Defining, communicating and enforcing security policies across the organization
 - Planning budgets and resourcing, including talent management and professional services
 - Assessing and improving program maturity and performance

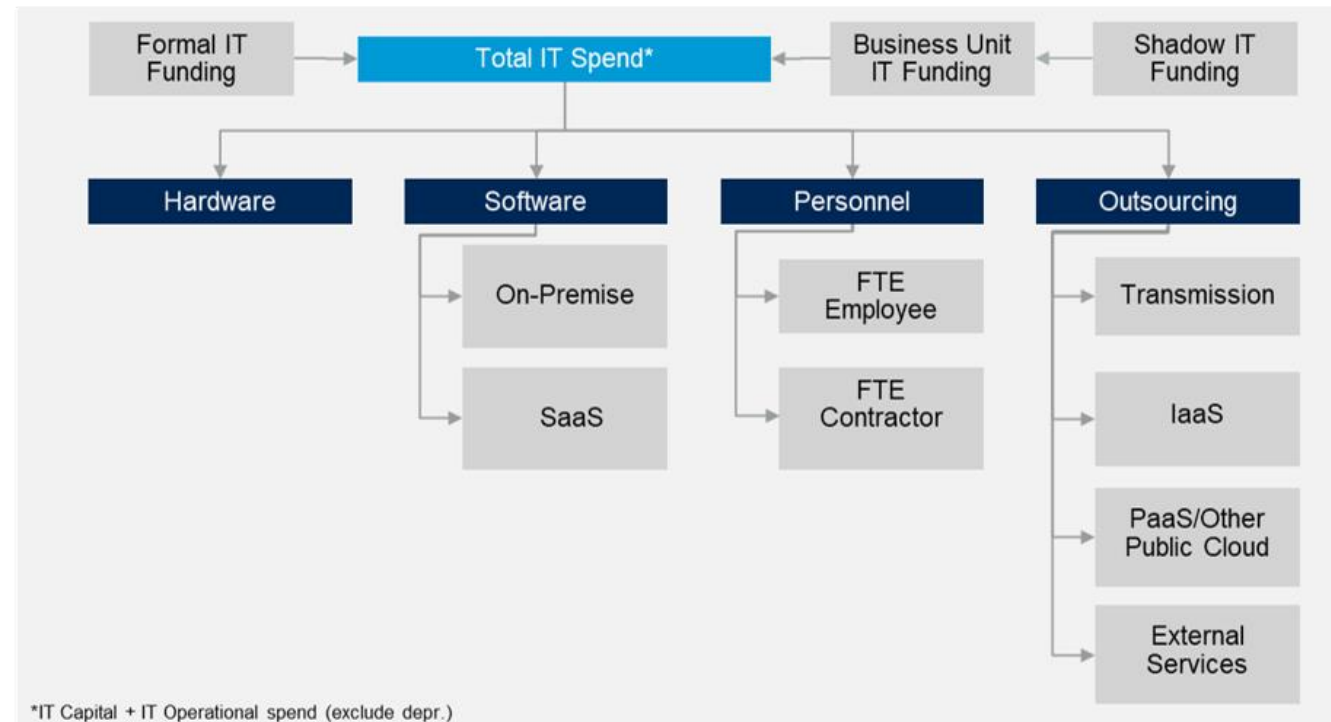
IT Service Continuity/Disaster Recovery

- The use of alternative network circuits to re-establish communications channels if the primary channels are disconnected or malfunctioning.
- The methods and procedures for returning a data center to full operation after a catastrophic interruption (e.g., including recovery of lost data).

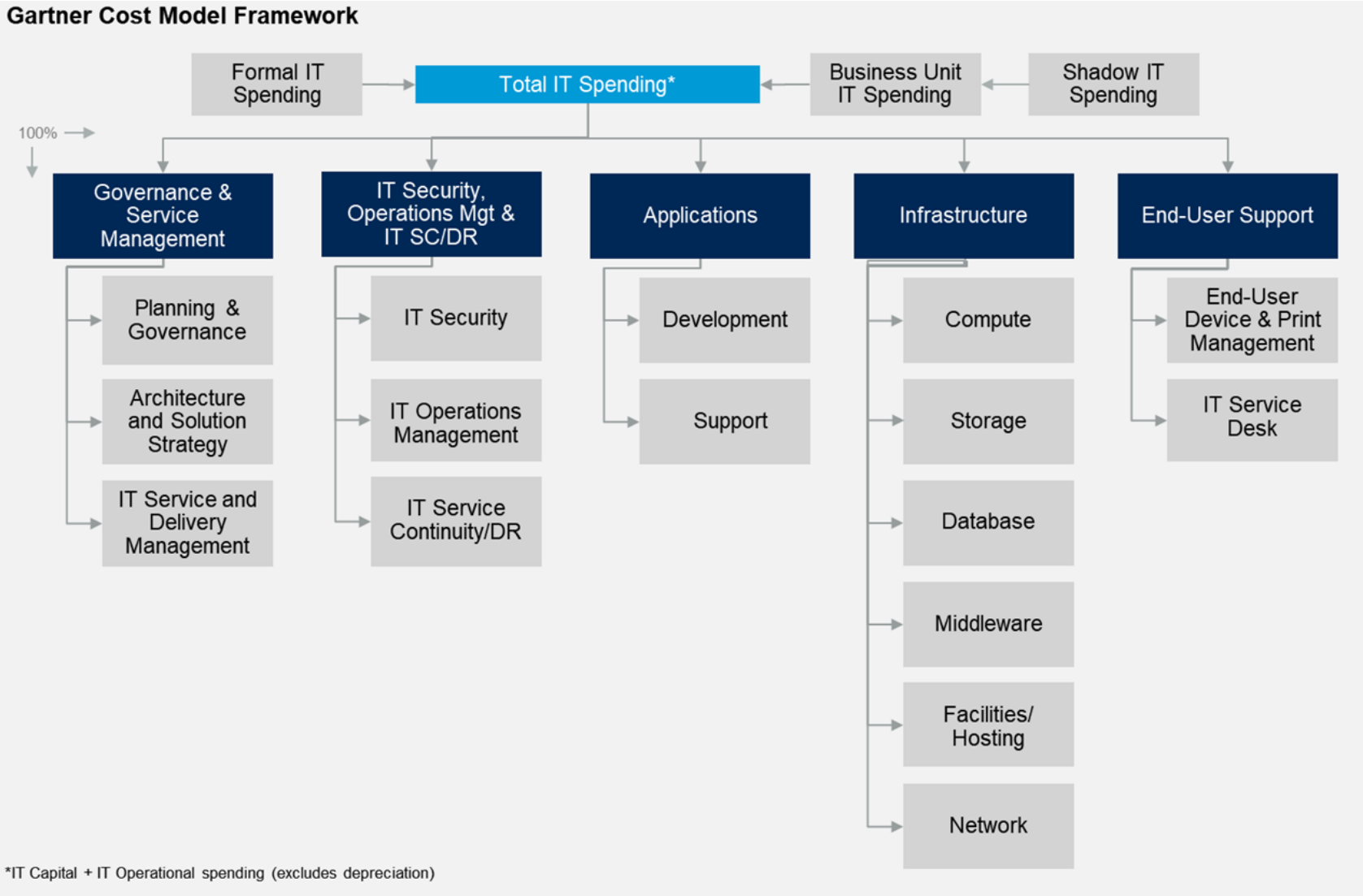
Consensus Model Overview

Total IT Spending: Asset-Based Cost Management View

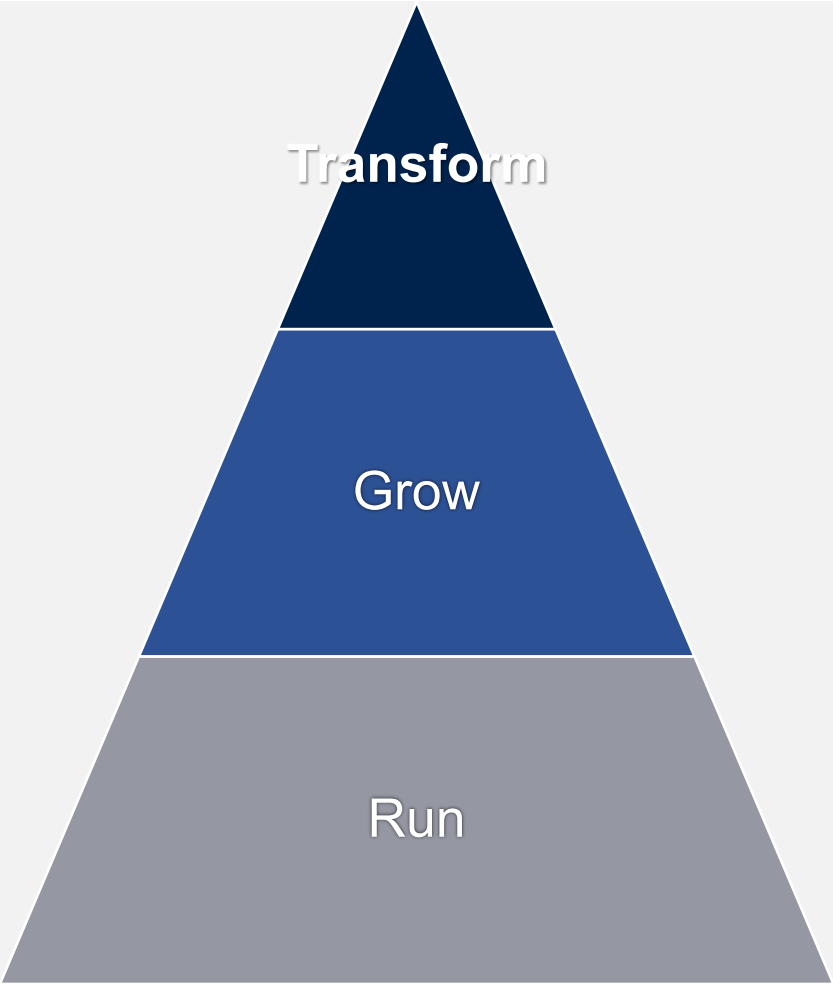
IT Spending includes (From a resource or accounting perspective): Hardware, software, personnel for IT FTEs including IT contractors, network transmission, outsourced IT services e.g., consulting, system integration, infrastructure etc.), public cloud services, occupancy and utilities spending associated data centers, taxes other than value added taxes where it is recovered and refunded to the organization.



IT Total IT Spending: IT Functional Cost Management View



Run, Grow, Transform Describes IT's role



Is it Revolutionary?

For Everyone?	For Alectra?
There is potential for new markets or industries, or displacement or elimination of existing industries.	There is potential to move Alectra's business into entirely new markets or industries

YES → **Transform the Business**

Does it Make Money?

The situation is about enhancing, extending or differentiating existing business capabilities related to products, services, or markets.

YES → **Grow the Business**

Does it Keep the Lights on?

The situation is about supporting or improving essential, non-differentiated business functions that do not directly produce revenue.

YES → **Run the Business**



Data Center



Compute

- Compute includes the provisioning of the full life cycle management of processing/hosting services on both mainframe and midrange (UNIX, Windows, Linux, iSeries etc.) platforms and racks including acquisition, deployment, maintenance, change management and disposal.
- Expenses, staffing and workload related to data center facilities management are included in the Facilities/Hosting service.
- Annual Compute costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of hardware, software and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Personnel	 Outsourcing
▪ Processors (mainframe, servers) ▪ Internal Disk Storage	▪ Operating Systems ▪ Virtualization ▪ System Utilities ▪ Communications ▪ SaaS	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

Storage

- Storage includes the provisioning of the full life cycle management of storage services utilizing online, near-line and offline technologies including acquisition, deployment, maintenance, change management and disposal.
- Annual Storage costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of hardware, software and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Personnel	 Outsourcing
▪ Storage Controllers ▪ Storage Arrays	▪ Storage Maintenance ▪ Replication ▪ Backup/Restore ▪ Archival ▪ Media Handling/ Migration ▪ SaaS	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

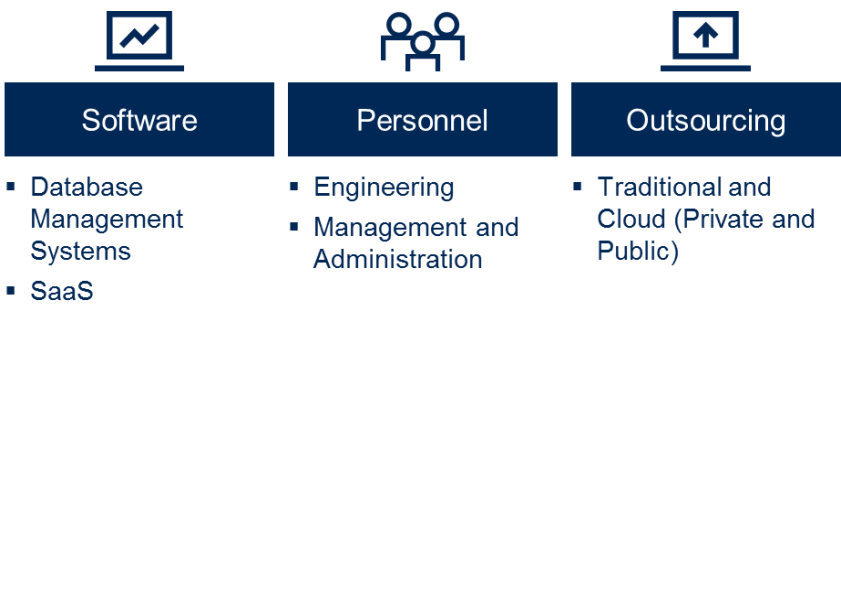
Facilities/Hosting

- Facilities/Hosting includes the full life cycle management of the physical data center premises, and other facilities and services associated with the premises such as furniture, power supply, heat management, climatization services, access security, floor space, office space, design and consulting.
- Annual Facilities costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of hardware, software, utilities and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Utilities	 Personnel	 Outsourcing
▪ Building and Maintenance ▪ Environmental Systems ▪ Electrical Systems ▪ Other Systems	▪ Building Management Systems ▪ Data Center Infrastructure Management ▪ SaaS	▪ Electricity ▪ Gas ▪ Water	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

Database

- Database includes the full life cycle management of relational, non-relational and pre-relational databases including the tools for monitoring and diagnosing problems with databases, analyzing and improving the performance of databases, and routine administration of databases, including configuration changes.
- Annual Database costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of software and outsourcing, in addition to personnel costs.



Middleware

- Middleware is the software “glue” that helps programs and databases (which may be on different computers) work together. Its most basic function is to enable communication between different pieces of software. This includes Integration middleware and Platform middleware.
- Integration middleware is software that enables independently designed applications, software components or services to work together, by supporting data consistency, composite application and multistep process styles of integration. It includes multi-enterprise (B2B) integration capabilities and internal integration, as well as those products that enable existing applications to become part of a new multistep process.
- Platform middleware is system software that provides the runtime hosting environment (a container) for application program logic. It uses embedded or external communications middleware to help programs interact with other programs. It also provides resource management services for hosting application program logic at runtime.
- Annual Middleware costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of software and outsourcing, in addition to personnel costs.

		
Software	Personnel	Outsourcing
▪ Application Integration Suites ▪ Data Integration Tools ▪ Message-oriented Middleware ▪ SaaS	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)



End-User Support



End-User Device and Print Management

- End-User Device & Print Management includes provisioning of the full life cycle management of personal computing devices, peripheral assets and fixed telephones including acquisition, deployment, maintenance, change management and disposal.
- Annual End-User Device & Print Management costs include the annual capital and operational expense, installation and taxes, as appropriate, for all of hardware, software and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Personnel	 Outsourcing
▪ Desktops, Laptops, Tablets, Thin Clients, Smartphones, Handhelds ▪ Local and Shared Printers ▪ Handsets ▪ Videoconferencing ▪ MAC Supplies	▪ PC Operating Systems ▪ Utilities ▪ Print Management Tools ▪ Personal Productivity and Databases ▪ Mobile Device Management ▪ Email and Messaging ▪ Collaboration ▪ Content Services ▪ Softphones ▪ SaaS	▪ Incident Resolution/Prevention ▪ Service Request Fulfillment ▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

End-User Applications

This includes the annual license and maintenance costs, as well as capital costs associated with new purchases and upgrades, for all software specified below:

- Personal Productivity
- Email/Messaging
- Unified Communications & Collaboration
- Mobility Management
- Content Services
- Softphones
- Software as a service (SaaS)
- Other Personal Applications

IT Service Desk

- An IT Service Desk is defined as any single location that evenly distributes the receipt and/or placement of technical support calls or contacts to a predetermined group of support staff. The IT Service Desk consensus model examines IT efficiency and effectiveness with respect to the provisioning of remote Tier 0/Tier 1 support provided to end-users of IT services.
- Web-based self-help / self-healing intranet knowledgebase (T0) enables users to resolve their own problems, submit request for service, reset passwords etc. Fixed IT Service Desk (T1/T2) functions include call-taking agents and supervisors, with potentially tiered structure for passing contacts to more technical root cause investigators within the IT Service Desk team. Function handles all contacts from authorized end-users including calls, emails, web-based queries and requests and chat support for Tier 0 users.
- Annual IT Service Desk costs include the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of hardware, software and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Personnel	 Outsourcing
▪ Automated Call Distribution ▪ Interactive Voice Response ▪ Computer Telephony Integration ▪ Web-based Self-help/Self-healing	▪ Expert Knowledge Tools ▪ Management Tools ▪ Chat Software/Web Software ▪ Voice/IVR Software ▪ SaaS	▪ Agents ▪ Second-line Support ▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)



Network



Wide-Area Network (Data & Voice)

- Wide-Area Network Service: This subservice helps in the management and supply of inter-site connections and network infrastructure.
- Remote Access Service: This subservice helps to connect the internal network from a remote location with broadband or phone line access using a security token.
- Internet Connectivity Service: This subservice provides access to the internet.
- Intranet Connectivity Service: This subservice helps in the provision of the global network provided by third parties. This also includes management of network optimization devices.
- Annual Network cost includes the annual capital and operational expense, maintenance, installation and taxes, as appropriate, for all of hardware, software, transmission and outsourcing, in addition to personnel costs.

 Hardware	 Software	 Transport	 Personnel	 Outsourcing
▪ Routers ▪ WAN Appliances ▪ PBX and IPT	▪ Data and Voice Network Management ▪ IP Address Management ▪ SaaS	▪ MPLS, Internet Access, Ethernet, Hybrid/xDSL/Leased Lines, DWDM/Dark Fiber/Satellite, Secure VPN Access ▪ Outbound and Inbound Usage ▪ Private Voice Networks ▪ Inter-data Center Connectivity	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

Transport

Includes TO:

- Connectivity Bandwidth
- Voice Circuits
- Inbound 0800/0300
- Outbound
- Mobility Plans
- Private Network Connectivity



Hardware

- Routers
- WAN Appliances
- PBX and IPT



Software

- Data and Voice Network Management
- IP Address Management
- SaaS



Transport

- MPLS, Internet Access, Ethernet, Hybrid/xDSL/Leased Lines, DWDM/Dark Fiber/Satellite, Secure VPN Access
- Outbound and Inbound Usage
- Private Voice Networks
- Inter-data Center Connectivity



Personnel

- Engineering
- Management and Administration



Outsourcing

- Traditional and Cloud (Private and Public)

Local-Area Data Network

- Local-Area Network Service: This subservice provides network access within the office premises.

			
Hardware	Software	Personnel	Outsourcing
- Switches and Appliances (Office LAN and Data Center LAN) - Wireless Access Points/Controllers - Load Balancers - Network Management	- Network Management - SaaS	- Engineering - Management and Administration	Traditional and Cloud (Private and Public)



Applications



Application Development & Support

Application Development and Support is comprised of:

- Software
 - Business Functionality Software Traditional Licenses, embedded maintenance and SaaS for software including but not limited to enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM), data management and analytics, and digital and externally focused applications.
 - Development and Support Software Traditional Licenses, embedded maintenance and SaaS for software including but not limited to languages/compilers/databases, development/testing tools and IT management software
- Personnel
 - Personnel includes developers, quality assurance and testing, and management and administration.
- Outsourcing
 - Application Development Outsourcing: Any situation in which the full operational responsibility for IT services is completely handed over to an external service provider.
 - Application Support Outsourcing — Stand-alone maintenance agreements, application management services)

 Software	 Personnel	 Outsourcing
▪ Compilers ▪ Test Databases ▪ Development Tools ▪ Test Tools ▪ SaaS	▪ Developers ▪ Quality Assurance and Testing ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

Application Development & Support

- Application Development and Support examines the efficiency of the IS programming groups that are creating or implementing new applications, adding new functionality to existing applications and providing programming support for these applications after they are installed and running in the production environment.
- Application Development
 - New code for a new application
 - Functional enhancements to current code that take more than two person-weeks
- Application Support
 - Support refers to the programming maintenance of currently operational computer applications.
 - Bug fixes of any size or duration
 - Maintenance of hard-coded data or tables (including field size changes) embedded within the programs (any size or duration)
 - Functional enhancements to current code that take less than two person-weeks
 - Any project that produces no new business functionality for the user.



Governance & Service Management



Governance & Service Management

- Governance & Service Management identifies service-optimized IT organizations which are growth enablers and a source of both operational and strategic differentiation. Here, the IT organizations constructively and proactively engage with the business to improve business operations to enrich enterprise performance.
- In order to drive business value, these IT organizations themselves run like a business, bringing out front-office capabilities. IT demonstrates financial discipline, transparency, and delivery of business value by managing an integrated view of technology cost and performance against defined business outcomes, which are formally captured in a strategic service portfolio. These IT organizations exhibit the following key characteristics of an implicit business-oriented consumer/provider relationship:
 - Understand customer's needs
 - Manage service and solution life cycle
 - Deliver solutions and services to customers
 - Governs internal IT operations and architecture to ensure strategic success

 Software	 Personnel	 Outsourcing
■ Architecture Tools ■ IT Financial Management ■ IT Service Management Tools ■ Project Management and Planning Tools ■ SaaS	■ Planning and Governance ■ Architecture and Solution Strategy ■ IT Service and Delivery Management	■ Traditional and Cloud (Private and Public)

Governance & Service Management (1 of 3)

Governance and service management includes planning and governance, architecture and solution strategy, and IT service and delivery management.

- **Planning and Governance**

- Executive Office & Administration: Office of the CIO, other cross-functional IT executives and their administrative support.
- However, this excludes those IT managers that fit logically within the other Gartner service areas such as the CISO in IT Security, Data Center Managers, Network Managers, End-User Support Managers or Application Development and Support Managers.
- Program Management: Orchestrates an active process of managing multiple workstreams or projects that need to meet business expectations according to a consistent methodology and standards, by focusing on tighter integration, proactive communication, control over resources and priorities.
- Sourcing: Establishes practices and coordinates multiple suppliers of services (business services as well as IT services) and integrates them to provide a single business-facing IT organization. This function acts as the general contractor, and will assume strategic sourcing and vendor management responsibilities, including contract management, procurement policy and procedure administration, negotiation and performance management, including reporting.
- Financial Management: Establishes the transparency of the relationship among cost, quality and business value so that it can be consistently measured and managed. This function is key to running IT like a business ensuring an understanding of IT delivery cost and competitiveness to external market offerings, competitive pricing of offerings, visibility to process and labor costs to price products and services, and communicates the value of IT.

Governance & Service Management (2 of 3)

Governance and service management includes planning and governance, architecture and solution strategy, and IT service and delivery management.

- **Architecture and Solution Strategy**

- Enterprise Architecture & Design: This function develops an overall vision for technology capabilities and requirements that is consistent with business needs and constraints while advancing the agenda of innovation.
- Business Analysis: A key function to the IT business value proposition of the IT organization because of their ability to translate business ideas to implementable requirements. To optimize the effectiveness of this group, it is important to align them into a centralized structure with established standards, processes, and tools that fosters cross-unit knowledge and ideas.
- This function participates in strategic activities such as conducting research, assessing viable innovation opportunities, collecting necessary information for prioritization decisions, managing business expectations during execution, and measuring business benefit after deployment.
- Research and Development: This team performs activities in connection with technology innovation that align with business needs. Working very closely with business teams, other members of the Architecture and Solution Strategy function, as well as the Program Management function, the R&D function is tasked to focus on applied research and development of working prototypes for targeted priorities.
- R&D is not often intended to yield immediate profit, and generally carries greater risk and an uncertain return on investment but aligned to enterprise strategy.

Governance & Service Management (3 of 3)

Governance and service management includes planning and governance, architecture and solution strategy, and IT service and delivery management.

- **IT Service and Delivery Management**

- **Business Relationship Management:** This is a senior team within the IT organization that has extensive business and industry experience. The business relationship managers are embedded in the business, typically aligned to specific business units or geographical regions and locations and expected to be the business optimization and innovation champions for their particular responsibilities, whether BU or location. They maintain a close, trusted relationship with the business to understand and provide input into strategy, plans and needs. They advise on innovation and technology enablement opportunities. In addition, they facilitate matching of business needs to product/service offerings and are catalysts in helping IT evolve its offerings. They work closely with the Planning & Governance office and the Architecture office on direction and planning. They engage the customers throughout the life cycle — from marketing of services/products, through demand and planning process, to delivery and support of product/service. In traditional business terms, they are analogous to an account executive function.
- **Product/Service Management:** While Governance and Architecture functions set the overall direction, the execution of plans, products and services is part of the IT Service and Delivery Management function. This role must ensure that products and services are what the customers actually want and are willing to pay for. This group is responsible for determining the portfolio of products and services that IT will offer and at what price and quality levels to meet the needs of its market (for example, the enterprise). It owns the service portfolio, pricing (for chargebacks), establishes service-level agreements (SLAs), creates and manages the transactional catalog and generally conducts any benchmarking around IT organizational competitive-ness, efficiency and performance that might drive continuous improvement or outsourcing decisions.
- **Performance/Process Management:** As a service broker and a business, IT needs to manage both its own performance and that of its suppliers in delivering needed services/products. This cross-organizational function is key to helping IT optimize change adoption, realize planned for benefits, and help the enterprise get the best possible return on its IT investment. Key responsibilities include improving visibility into service performance and more accurately measuring progress toward defined objectives and ensure compliance to SLAs through continuous assessment, evaluation, and refinement of core IT service processes.
- **Delivery Management:** Delivery management in this context is the high level, executive function which operates cross-functionally to provide functional, technical and process leadership. This group is charged with leading the delivery effort to ensure solutions meet customer time frame, quality and outcome expectations. They collaborate with the Enterprise Architecture office to mitigate cross-platform technical and delivery risks before they become issues while preventing errors, omissions, defects and costly rework.



IT Security, IT SC/DR, IT Operations Management



IT Security

- IT Security is the discipline of designing, implementing and maturing security practices to protect critical business processes and IT assets across the enterprise. It covers:
 - Developing and maintaining effective program governance
 - Communicating and engaging successfully with all stakeholders
 - Defining a vision promoting desired security, risk management and business outcomes
 - Defining, communicating and enforcing security policies across the organization
 - Planning budgets and resourcing, including talent management and professional services
 - Assessing and improving program maturity and performance

 Hardware	 Software	 Personnel	 Outsourcing
- Firewall/Unified Threat Management Devices - IDS/IPS Devices - Radius/Proxy Servers - Encryption Concentrators - Email/Web Security Gateways	- Identity and Access Management - Security Information and Event Management - Antivirus/Anti-spam/Anti-malware - URL/Content Filtering - End-user Encryption - Host IDS/IPS - Firewall Software - Vulnerability and Threat Detection - Application Testing/Scanning/Shielding - SaaS	- Infrastructure Security - Application Security - Vulnerability Management and Security Analytics - Security Governance, Risk Management and Compliance Management - Management and Administration	Traditional and Cloud (Private and Public)

IT Service Continuity & Disaster Recovery (IT SC/DR)

- IT Service Continuity/Disaster Recovery is defined as:
- The use of alternative network circuits to re-establish communications channels if the primary channels are disconnected or malfunctioning.
 - The methods and procedures for returning a data center to full operation after a catastrophic interruption (e.g., including recovery of lost data).
 - Note: For assets to be considered as in-scope for IT Service Continuity/Disaster Recovery (IT SC/DR), they are required to be in an active/passive state whereby production failover occurs to idle standby systems/location.

 Hardware	 Software	 Personnel	 Outsourcing
▪ IT Service Continuity/Disaster Recovery Assets: Mainframes, Servers, Storage, Facilities, Personal Computers and Telephones, Network Circuits and Equipment	▪ IT Service Continuity/Disaster Recovery Testing and Reporting Tools ▪ SaaS	▪ Engineering ▪ Management and Administration	▪ Traditional and Cloud (Private and Public)

IT Service Continuity & Disaster Recovery (IT SC/DR)

IT Service Continuity/Disaster Recovery includes:

- Engineering
 - Functions include producing recovery plans for data center, workplace and network services designed to ensure that, following any major incident or sudden, unplanned calamitous event causing or potentially causing disruption of the service, IT services are provided to an agreed level within an agreed schedule.
 - It should be recognized also that IT SC/DR is only one component of Business Continuity Planning (BCP). The objective is to assist the business and BCP to minimize the disruption of essential business processes during and following a major incident. The process includes such activities as business impact analysis, risk analysis and risk management exercises, maintaining disaster recovery documentation, conducting periodic tests and audits, and negotiating contingency site arrangements for costs/FTEs related to IT personnel.
 - While there are other functions around disaster recovery/business continuity such as developing manual processes, and ensuring business unit personnel are able to function, they are not within the scope of this definition.

IT Operations Management

- IT Operations Management provides on-site and/or remote IT Operations monitoring to gain insight into the historical, current and future availability and performance of IT systems, networks and applications, while also performing root cause analysis. Monitoring typically is performed in four categories: IT Infrastructure Monitoring (ITIM), Applications Performance Monitoring (APM), Artificial Intelligence for IT Operations (AIOps) and Network Performance Monitoring and Diagnostics (NPMD).

 Software	 Personnel	 Outsourcing
- Data Center/Network Management - Application Performance Monitoring Tools - IT Infrastructure Monitoring Tools - SaaS	- Service Monitoring - Remote Monitoring - Management and Administration	Traditional and Cloud (Private and Public)

IT Operations Management

Service Monitoring

- On-site operations monitoring and management including such tasks as system start/stops, monitoring system jobs, responding to console messages, detecting and recording of data center and network incidents and correction of production failures.
- Production control duties which maintain the integrity of the production environment, including turnover of applications from test into production after the systems have been developed and tested, ensuring that systems to be placed in the production environment meet certain standards, providing job procedural documentation such as scheduling requirements and rerun procedures, establishing and adjusting the batch job schedule, providing ongoing job monitoring and reviewing the service level of production jobs to improve quality and/or efficiency.
- Capacity management duties which ensure that adequate data center and network capacity is available at all times to meet the requirements of the business by balancing business demand with IT supply.

Remote Monitoring

- This is the same job description as Service Monitoring above but performed by staff in a remote location.