BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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IN THE MATTER OF ADVICE LETTER NO. 1906-ELECTRIC OF PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ITS COLORADO PUC NO. 8-ELECTRIC TARIFF TO REVISE JURISDICTIONAL BASE RATE REVENUES, IMPLEMENT NEW BASE RATES FOR ALL ELECTRIC RATE SCHEDULES, AND MAKE OTHER TARIFF PROPOSALS EFFECTIVE DECEMBER 31, 2022.	)	**PROCEEDING NO. 22AL-XXXXE**

DIRECT TESTIMONY AND ATTACHMENTS OF MICHAEL O. REMINGTON

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

November 30, 2022

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO**

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**BEFORE THE PUBLIC UTILITIES COMMISSION
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DIRECT TESTIMONY AND ATTACHMENTS OF MICHAEL O. REMINGTON

I. INTRODUCTION, QUALIFICATIONS, PURPOSE OF TESTIMONY, AND RECOMMENDATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael O. Remington. My business address is 414 Nicollet Mall, Minneapolis, Minnesota 55401.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?

A. I am employed by Xcel Energy Services Inc. ("XES"), the service company subsidiary of Xcel Energy, as the Technology Services Regulatory Director, Advanced Grid. XES is a wholly-owned subsidiary of Xcel Energy Inc. ("Xcel Energy"), and provides an array of support services to Public Service Company of Colorado ("Public Service" or the "Company") and the other utility operating company subsidiaries of Xcel Energy on a coordinated basis.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THE PROCEEDING?

A. I am testifying on behalf of Public Service.

Q. PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND QUALIFICATIONS.

A. I am currently responsible for the regulatory aspects of Technology Services' role in the Advanced Grid Intelligence and Security ("AGIS") initiative. I direct and prepare testimony, supporting documents, and discovery responses related to Technology Services in filings before the Colorado Public Utilities Commission ("Commission") as well as for other Xcel Energy operating companies ("OpCos").

Prior to January 31, 2021, I was Director of IT Operations, responsible for managing major incidents, monitoring Information Technology ("IT") infrastructure and applications, disaster recovery planning, and managing several core IT service management processes. In this Direct Testimony, I represent the Xcel Energy Technology Services organization, which performs Xcel Energy's shared IT functions. The key types of activities performed by Technology Services include all enterprise application development and maintenance, management of IT infrastructure, data center operations and architecture, and IT governance. Technology Services provides IT services to Xcel Energy and the Xcel Energy OpCos, including Public Service, primarily on common platforms, with costs allocated to specific utilities and jurisdictions consistent with the Direct Testimony of Company witnesses Ms. Nicole L. Doyle, Mr. Mark P. Moeller, and Mr. Arthur P. Freitas. A description of my qualifications, duties, and responsibilities is set forth in my Statement of Qualifications at the conclusion of my Direct Testimony.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. While Company witness Ms. Megan N. Scheller provides an overview of the Technology Services area and presents overall policy issues and challenges that Technology Services faces, the purpose of my Direct Testimony is to provide more specific support for the types of Technology Services capital additions and operations and maintenance ("O&M") expenses, including those for the AGIS initiative that are allocated to Public Service retail electric and included in the 2023 test year[1] cost of service that is presented by Company witness Mr. Freitas. The Company's last electric rate case was Proceeding No. 21AL-0317E (the "2021 Electric Phase I"), in which a test year ending December 31, 2021 was approved as agreed to in a settlement among the settling parties. I therefore provide support for capital additions placed into service since the Company's 2021 Electric Phase I, from January 1, 2022 through the year-end 2023.

Q. WHAT ARE THE CAPITAL ADDITIONS AND O&M ASSOCIATED WITH TECHNOLOGY SERVICES IN THIS CASE?

A. The Company's Technology Services plant additions since the 2021 Electric Phase I total $398.7 million through 2023. These non-AGIS capital additions are discussed in Section II of my Direct Testimony, which I organize categorically by Cybersecurity, Aging Technology, Enhancing Capabilities, and Customer

[1] As discussed by Company witness Mr. Steven P. Berman, the Company is proposing a test year (the "Test Year") that reflects rate base using a 13-month average convention for the period ending December 31, 2023. Plant balances are based on actual plant additions through June 31, 2022 plus forecasted additions through December 31, 2023. The Test Year also consists of forecasted sales revenue for 2023 and actual O&M expense for the twelve months ended June 30, 2022 with individual adjustments and inflationary increases to reflect a representative level of cost for the period the rates will be in effect.

Experience. Company witness Mr. Moeller has calculated the monthly plant balances to develop the plant-related roll forward, which is in turn used by Mr. Freitas to incorporate the 13-month average plant in service balances into the Test Year cost of service. Finally, Ms. Scheller also supports the Company's proposed IT deferral mechanism for costs associated with the Aging Technology and Cybersecurity capital additions categories.

In Section III, I support the $61.3 million in O&M expense used as the basis for Technology Services' O&M included in the cost of service, including a discussion of the drivers of increased O&M in the Test Year as compared to the level of O&M currently in base rates approved in the 2021 Electric Phase I. Technology Services' O&M in this rate case is based on the twelve months ending June 30, 2022, as adjusted for labor and non-labor costs as discussed and quantified by Company witnesses Mr. Michael P. Deselich and Mr. Arthur P. Freitas.

Additionally, in Section IV, I support the Company's request for capital and O&M cost recovery for the AGIS initiative. Specifically, I explain and support the Company's implementation of, and capital and O&M costs for, the Technology Services components of the AGIS initiative to the extent relevant to this rate case. In addition to my Direct Testimony, Company witness Mr. David C. Mino supports the Distribution Business Area's implementation of AGIS projects. Additionally, Company witness Ms. Marci A. McKoane supports the Company's request to continue the AGIS deferral that was established as part of the AGIS Certificate of

Public Convenience and Necessity ("CPCN") proceeding and continued through the Company's 2021 Electric Phase I.

Q. ARE YOU SPONSORING ANY ATTACHMENTS WITH YOUR DIRECT TESTIMONY?

A. Yes, I am sponsoring the following attachments:

- Attachment MOR-1: Capital Additions January 1, 2021 – December 31, 2023;
- Attachment MOR-2: July 1, 2021 through June 30, 2022 Operations and Maintenance by Cost Element; and
- Attachment MOR-3: July 1, 2021 through June 30, 2022 Operations and Maintenance by FERC Account.

Q. WHAT RECOMMENDATIONS ARE YOU MAKING IN YOUR DIRECT TESTIMONY?

A. As part of approving the Test Year cost of service developed by Mr. Freitas, I recommend that the Commission approve the total budgeted amounts for 2022-2023 Technology Services AGIS and non-AGIS capital additions, Technology Services O&M expenses for the 12 months ending June 30, 2022 used as the basis for Test Year O&M amounts, which are included in the Company's Test Year cost of service presented in this rate case, and described below.

II. TECHNOLOGY SERVICES 2022-2023 CAPITAL ADDITIONS

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. The purpose of this section of my Direct Testimony is to describe the Technology Services non-AGIS capital additions since the Company's 2021 Electric Phase I through 2023. AGIS-related capital additions are discussed separately in Section IV. In this section, I present 2022-2023 capital additions by category for Cybersecurity, Aging Technology, Enhancing Capabilities, and Customer Experience.

A. Overview of 2022-2023 Capital Additions

Q. PLEASE DESCRIBE THE PRIMARY DRIVERS OF THE COMPANY'S INVESTMENT IN TECHNOLOGY SERVICES IN 2022 AND 2023.

A. There are multiple areas driving Company investments in IT. Investment in the customer experience has increased as customer expectations regarding how they interact with service providers have also increased. This has been a key driver in past years and continues to be a driver in 2022, with continued implementations in 2023. In today's evolving technology market, utility customers' expectations are not set exclusively by utility companies; rather, high expectations are being set by companies like Google, Apple, and Amazon, who show customers what is possible and lead them to expect responsive, integrated, and problem-solving interactions with their service providers. Living in an era where customers' expectations are higher than they have ever been, the Company must be prepared to meet our customers' needs to remain a trusted provider of their energy services.

In addition to AGIS and the Company's focus on the customer experience, our aging network infrastructure is a key driver of increased investment and requires attention on an ongoing basis. Network connectivity is a critical operational foundation required for the Company to provide a safe and reliable product. Failure to replace aging network mechanisms would increase the risk of component level failures resulting in systemic outages across service venues.

Specific Technology Services aging projects include replacement of aging network, the DEMS Upgrade aka Dynamic Energy Management System ("DEMS") Environment Phase 4, and the Core Human Resources ("HR") Application, among others, which are all discussed in more detail in the project sections of this Direct Testimony. Future investment levels will depend on the evolving needs of the Company and the emergence of technologies over time.

Q. CAN YOU DEPICT THE TREND OF TECHNOLOGY SERVICES CAPITAL ADDITIONS AFFECTING PUBLIC SERVICE'S RATE BASE SINCE THE 2021 ELECTRIC PHASE I?

A. Yes, and I also provide actual data from 2021 by category to better highlight the drivers of Technology Services investments over the past few years. Table MOR-D-1 below depicts Public Service's non-AGIS Technology Services capital additions (i.e., plant in service) trend from January 1, 2021 to December 31, 2023. Throughout my Direct Testimony, capital additions data from January 1, 2021 to June 30, 2022 represents actual costs, while forecasted capital additions include plant in service for the period beginning July 1, 2022 through December 31, 2023.

Table MOR-D-1 illustrates capital additions, but it is important to note that many technology projects are planned, developed, and implemented (placed into service) over multiple years. As such, capital additions trend information will show larger increases when more or larger projects are placed in service, rather than when the expenditures are made.

TABLE MOR-D-1:
Technology Services 2021-2023 Capital Additions – Non-AGIS
Public Service (Total Company)
(Dollars In Millions)

$ in millions	**2021 Actuals**	**2022**			**2023 Forecast**
		Actuals (1/1-6/30)	**Forecast (7/1-12/31)**	**Total**	
Aging Technology	$61.0	$16.4	$61.7	$78.0	$105.0
Enhance Capabilities	31.0	3.8	30.7	34.4	52.5
Customer Experience	4.7	37.9	29.2	67.1	11.0
Cybersecurity	3.5	6.2	6.2	12.4	8.7
Total*	**$100.1**	**$64.3**	**$127.7**	**$191.9**	**$177.1**
* There may be differences between the sum of the individual category amounts and total amounts due to rounding.					

As indicated, the amounts in Table MOR-D-1 are stated on a Total Company (Public Service) basis, meaning that they include both electric utility-specific projects and common electric/gas projects stated at the total Public Service level. Attachment MOR-1 (2021-2023) also contains Technology Services

capital additions, including the AGIS-related Technology Services capital additions discussed in Section IV of my Direct Testimony.

Q. HOW CAN THE COMMISSION BE CONFIDENT THE COMPANY WILL MANAGE ITS TECHNOLOGY SERVICES-RELATED PROJECTS TO ENSURE THE FINAL, ACTUAL COSTS ARE REASONABLE AND PRUDENT?

A. As discussed in my Direct Testimony, the overall level of Technology Services capital additions for 2022-2023 presented in Attachment MOR-1 are reasonable and necessary to efficiently manage business operations, protect Public Service and Xcel Energy data and information, meet evolving regulatory and legal requirements, keep current with technology, maintain the stability and reliability of the existing IT systems, and provide the tools required to effectively and safely provide service to Public Service's retail customers. The rigorous processes that are followed in evaluating, selecting, and monitoring the execution and implementation of capital projects, as discussed in more detail by Ms. Scheller, ensure that the additions are reasonable and necessary and that the costs are prudently incurred to provide safe and reliable service to Public Service's customers. Therefore, the Company's overall forecasts for 2022 and 2023 can be relied on to set just and reasonable rates for our customers.

B. <u>Cybersecurity</u>

Q. PLEASE DESCRIBE KEY CAPITAL ADDITIONS RELATED TO CYBERSECURITY PROTECTION IN 2022-2023.

A. For 2022-2023, capital additions related to Cybersecurity total approximately $21.1 million. Key Cybersecurity projects are set forth in Table MOR-D-2 below:

TABLE MOR-D-2:
Public Service 2022-2023 Cybersecurity Capital Additions
(Total Company)
(Dollars In Millions)

Cybersecurity Capital Additions	2022			2023 (Forecast)
	Actuals (1/1-6/30)	Forecast (7/1-12/31)	Total	
Security Technology Refresh	$0.0	$0.0	$0.0	$4.5
SailPoint	3.0	0.4	3.4	0.0
SIEM+SOAR	2.1	0.0	2.1	0.2
Verint Security Camera Server Replacement	0.0	0.0	0.0	1.9
Service Account Remediation	0.0	0.4	0.4	1.0
Cybersecurity Small Project	1.1	5.4	6.5	1.2
Total*	**$6.2**	**$6.2**	**$12.4**	**$8.7**

* There may be differences between the sum of the individual category amounts and total amounts due to rounding.

Q. PLEASE DESCRIBE KEY TECHNOLOGY SERVICES CAPITAL ADDITIONS IN 2022-2023 TO ADDRESS EVOLVING CYBERSECURITY THREATS AND REQUIREMENTS.

A. Below are descriptions of key projects listed in Table MOR-D-2 above with capital additions over $1 million (the Cybersecurity small projects are discussed separately below) to address evolving cybersecurity threats and requirements:

- *The Security Technology Refresh*: In 2023, these investments provide prevention, detection, containment, and corrective services to protect the company from security incidents, and assist in the recovery from any adverse events. These refreshes of technology help ensure continued compliance with regulatory requirements for customer data and overall corporate security objectives, while reducing business and customer

exposure to evolving cybersecurity risks and vulnerabilities. I describe investments for 2023 below.

- *SailPoint*: In 2022, this project encompasses a major version upgrade of SailPoint, which the Company utilizes to provide access security to certain applications. Specifically, SailPoint is used to provide identity and access governance to a limited number of applications and associated platforms governed by North American Electric Reliability Council ("NERC") Critical Infrastructure Protection ("CIP") and SOX requirements. This upgrade will minimize compliance risk and will integrate SailPoint with new applications.

- *SIEM+SOAR*: This project will implement and operationalize a combined suite of software products for Security Information and Event Monitoring (SIEM), User Behavior Analytics (UBA), and Security Orchestration, Automation, and Response (SOAR) for the Enterprise Command Center (ECC) that once implemented will increase and establish their cybersecurity capabilities. This project will mature and expand security capabilities and will provide benefits by more effectively and seamlessly protecting the Company from threats to its systems and allow it to better correlate and analyze a growing volume of data within the environment in a fast, accurate, and efficient manner by having the various capabilities of these programs in a common stack.

- *Verint Security Camera Server Refresh*: In 2023, this project will refresh security camera servers at multiple sites enterprise wide due to current servers running non-standard hardware that is presently at end of life. This server replacement refresh project will also involve updating the servers to a new version of the Verint VMS software. Overall, this refresh project will ensure the stability, availability, and system performance for server and storage infrastructure for security cameras and will address security vulnerabilities and related concerns by having up-to-date servers and software.

- *Service Account Remediation*: This project work is necessary to ensure that the Company is compliant with Enterprise Information Security and Technology Standards. This project will implement a comprehensive service account governance framework to ensure compliance with industry standards.

Q. PLEASE BRIEFLY DESCRIBE REFRESH CAPITAL ADDITIONS TO ADDRESS CYBERSECURITY THREATS IN 2023.

A. Other capital additions will be placed in service in 2023 and involve capital projects that will enable the Company to continue to meet security objectives, including:

- *Disaster Recovery – Dell EMC Power Protect Cyber Recovery:* This is a recovery solution for ransomware protection that will set up immutable backup in the IT and OT environment. This project will implement and operationalize a cyber recovery airgap vault with analytic software for identification of anomalies. The solution addresses improved cybersecurity recovery capabilities to mitigate ransomware risk, both operational and financial, and ensures minimal downtime and business productivity impact in the event of an incident.

- *B2B Federation:* This project will implement Business to Business (B2B) foundation services to minimize the risks with life cycle management of vendor accounts.

- *Transitioning Tanium to SaaS:* This project will move Tanium-endpoint security management platform, from on-premise to software as a service ("SaaS"), which will allow improved speed and protection, access from anywhere, and the ability for Tanium to receive updates while fully disconnected from the corporate network.

- *SailPoint Enhancements*: Enhancements to SailPoint include expanding Access Request to support primary and secondary accounts, exporting SailPoint data to BusinessObjects, and expanding SOD control to include detective checks.

- *Grideon:* This project will implement a Common Operation Picture ("COP") and develop a Utility-based SaaS Platform for wildfire management to illustrate the COP for future investments and expansion in to broader application with Xcel Energy. This will enable the management of complete lifecycle of incidents – anticipating threats, preparing for incidents management, adapting to changing incident situations, and learning and Improving incident management post incident.

- *EndPoint Detection and Response:* This project is needed to ensure compliance with the Transportation Security Administration's cybersecurity directives for critical infrastructure. This will reduce the incident response time with cyber threat activities. It will automate, when practicable, the containment and eradication of malicious code detected in our IT

environment, and leverage real-time cyber threat intelligence feeds to aid incident responders.

Q. WHAT ARE THE CYBERSECURITY SMALL PROJECTS?

A. These are projects that are under $1 million in capital spend and are included in Attachment MOR-1 with the larger projects I describe above. Like larger projects, these numerous, smaller projects are also necessary for the Company to ensure the availability, integrity, and confidentiality of our IT systems, compliance with legal and regulatory obligations, and otherwise protect the Company from cyberattacks. These smaller projects include cybersecurity projects such as Analog Security Camera Upgrade, Certificate and Key Management, Terrain Analytics, and other smaller projects for data loss prevention, risk assessment services and platforms, implementation of Operational Technology ("OT") monitoring resources, upgrades to spam filters, and other upgrades to our cybersecurity systems.

C. Aging Technology

Q. PLEASE DESCRIBE KEY TECHNOLOGY SERVICES CAPITAL ADDITIONS RELATED TO REPLACING AGING TECHNOLOGY IN 2022-2023.

A. For 2022-2023, capital additions related to Aging Technology total approximately $183.0 million. Key Aging Technology projects from 2022 through 2023 (those over $1 million in capital additions) are set forth in Table MOR-D-3 below. Within the Aging Technology category, we further divide projects into routine refreshes and specific individual refresh projects.

TABLE MOR-D-3:
Public Service 2022-2023 Aging Technology Capital Additions
(Total Company)
(Dollars In Millions)

Aging Technology Capital Additions	2022			2023 (Forecast)
	Actuals (1/1-6/30)	Forecast (7/1-12/31)	Total	
LFCM Projects	$7.5	$14.3	$21.8	$17.5
DEMS Upgrade aka Dynamic EMS (DEMS) Environment Phase 4	0.0	0.0	0.0	21.0
Technology License	0.0	2.9	2.9	15.1
WAN PSCO	2.1	4.0	6.2	7.0
Core HR Application (Payroll Benefits)	0.0	9.3	9.3	1.0
Infrastructure Modernization	0.1	3.9	4.0	4.7
ISO Interface & Settlement Replacement	0.0	0.0	0.0	7.6
Monitoring Device Management System (MDMS) Replacement	0.0	0.0	0.0	5.7
DR Technology Refresh	0.2	1.1	1.2	4.2
Bentley OpenUtilities Designer (BUD) Upgrade	0.0	5.0	5.0	0.0
Fabric Refresh	0.0	2.9	2.9	0.0
IT INFS Network Refresh	1.1	0.9	2.0	0.6
Click Replacement	0.0	0.0	0.0	2.2
VDI Refresh	0.0	2.2	2.2	0.0

SAS BookRunner Upgrade	0.0	0.0	0.0	2.1
PSCO SONET Upgrade to TDMoE	0.0	0.0	0.0	1.9
Manchief Onboarding	0.0	1.7	1.7	0.0
GOLD Replacement	0.0	0.0	0.0	1.7
Doble DUC Upgrade	0.0	1.7	1.7	0.0
SD-WAN Implementation	0.0	1.7	1.7	0.0
IT Blanket - Core System Modernization	0.0	0.9	0.9	0.7
VoIP Refresh	0.1	0.0	0.1	1.4
Motorola LMR Core Upgrade	0.0	1.5	1.5	0.0
Network Security Orchestrator	0.0	1.5	1.5	0.0
Video Conferencing Enablement	0.0	0.6	0.6	0.9
ESB Modernization	0.0	0.0	0.0	1.2
Oracle Exadata Refresh	1.2	0.0	1.2	0.0
Aging Technology Small Projects	3.9	5.6	9.5	8.4
Total*	**$16.4**	**$61.7**	**$78.0**	**$105.0**
* There may be differences between the sum of the individual category amounts and total amounts due to rounding.				

Q. WHAT ARE ROUTINE REFRESH PROJECTS?

A. Given the breadth and depth of the different equipment Xcel Energy utilizes and manages, Technology Services refreshes smaller components of technology infrastructure on regular cycles. We annually budget for these replacements as

routine refresh projects, which we also refer to as life cycle management ("LFCM") projects. An example of an Aging Technology routine refresh project is the LFCM – End User Enablement project, which replaces approximately 20 percent of personal computers ("PCs") and other end user devices, such as printers, annually as they reach the end of their service life.

Q. HOW ARE ROUTINE REFRESH PROJECTS DEVELOPED?

A. LFCM projects refer to those projects that relate to updating or refreshing day-to-day technology on a routine basis. Budgets to upgrade technology components on an aggregate level are based on the lifecycles outlined by various original equipment manufacturers. Equipment lifecycles can differ based on each category, but generally speaking most of our network, server and end user computing equipment are on an approximately five-year refresh lifecycle. Budgets are therefore based on refreshing approximately 20 percent of most equipment each year. The funding allocated within each specific group/year represents the aggregate of calculations to address two needs: (a) equipment replacement as outlined above; and (b) net new incremental, or "business-as-usual," growth. Routine refresh projects include LFCM – End User Enablement, LFCM – Data Storage, LFCM – Network Services, LFCM – OT Modernization, and LFCM Infrastructure Services. I provide capital additions for these projects for 2022-2023 in Table MOR-D-4 below.

TABLE MOR-D-4:
Public Service 2022-2023 Annual Refresh (LFCM) Capital Additions
(Total Company)
(Dollars In Millions)

Annual Refresh (LFCM) Capital Additions	2022			2023 (Forecast)
	Actuals (1/1-6/30)	Forecast (7/1-12/31)	Total	
LFCM End User Enablement	$2.2	$3.7	$5.9	$6.7
LFCM Data Storage	3.1	2.0	5.2	3.7
LFCM Network Services	0.0	6.9	6.9	1.6
LFCM OT Modernization	1.8	1.4	3.2	1.6
LFCM Infrastructure Services	0.4	0.3	0.8	3.8
Total*	**$7.5**	**$14.3**	**$21.8**	**$17.5**
* There may be differences between the sum of the individual category amounts and total amounts due to rounding.				

Q. PLEASE BRIEFLY DESCRIBE THE ANNUAL REFRESH PROJECTS.

A. Below are descriptions of these annual refresh projects:

- *LFCM – End User Enablement:* The LFCM – End User Enablement project replaces aging desktop and laptop computers, including printers, as well as those that are lost or inoperable. This project also provides devices to new employees.

- *LFCM Data Storage:* The LFCM Data Storage project replaces data storage hardware that is no longer cost-effective to support, or that presents significant risk to operations due to aging components or lack of vendor support.

- *LFCM - Network Services:* This project work involves planned replacement of network devices (switches, routers, radios, channel banks and voice systems) due to aging technology, out-of-support equipment, security vulnerabilities, and to enable new required capabilities.

- *LFCM – OT Modernization:* Lifecycle management for Operational Technology (OT) Modernization will help to replace and/or decommission active end of life equipment. The scope of this work will include LMR Radio replacements, UPS (uninterrupted power supply) remediations and battery replacements. End of life devices leave our network and infrastructure vulnerable; updates not installed can increase security risk.

- *LFCM – Infrastructure Services:* This project involves replacing aging servers prior to failure to support business growth and maintain reliability. Lifecycle management for infrastructure services will help to replace and/or decommission active end of life equipment including the replacement of servers and NetApp licenses.

Q. COMPARED TO ROUTINE REFRESHES, WHAT ARE SPECIFIC REFRESH PROJECTS?

A. Unlike routine refresh projects, which generally address smaller capital replacements on a regular cycle or which are routinely needed, we also must manage larger technology replacements for equipment that is nearing the end of its useful life. Specific refresh projects are often managed over a longer term, reoccur less frequently, and are significantly more complex than routine refresh projects.

Q. CAN YOU PROVIDE SOME EXAMPLES OF SPECIFIC REFRESH PROJECTS?

A. Yes, the DEMS Upgrade Environment Phase 4 project, Technology License, the Wide Area Network ("WAN") Public Service project, the Core HR Application (Payroll Benefits), Infrastructure Modernization, the ISO Interface and Settlement Replacement are examples of these projects.

Q. WHAT IS THE DEMS UPGRADE (AKA DYNAMIC EMS) ENVIRONMENT PHASE 4 PROJECT?

A. DEMS is the Company's critical system for supporting transmission Supervisory Control and Data Acquisition ("SCADA"), Generation, Generation Dispatch, Market Participation and Reliability Coordination. The Public Service phase of this project is part of a five-year effort to replace the Energy Management System ("EMS"), which is a critical technology that is used for the monitoring and management of the bulk electric system by our transmission system. The EMS interfaces with field devices that collect information about the health of the bulk electric system. This real-time, two-way communication provides Transmission and Distribution Operations the ability to remotely control the flow of electricity during outage and maintenance periods, which is a key driver of our ability to maintain efficient and reliable service to our customers.

The DEMS project is primarily driven by a contractual agreement with General Electric ("GE") to upgrade DEMS to a newer version within six years of the executed contract. Without an upgrade, the Company's DEMS system will not evolve with the GE product, which may impact the Company's ability to get vendor support for any software system issues. Additionally, there is a known risk of hardware failure due to equipment and overall infrastructure being at the end of its life. The upgrade will also provide enhanced capability regarding the Transmission Security Model to help reduce risk if/when field communications fail. The upgrade also provides an improved security posture and deploys the Company's new OT network and infrastructure.

The Factory Acceptance Testing has been completed and the issues identified during that process have been resolved. We are working to ready the new infrastructure and environments for deployment; once completed we will start the work through site acceptance testing, parallel testing, and resiliency testing. The first operating company went live at the end of 2021, with the other OpCos, including Public Service, going live in 2023.

Q. WHAT IS THE TECHNOLOGY LICENSE PROJECT?

A. This project for 2022 and 2023 provides annual software license support across enterprise infrastructure and operations. Updating software licenses ensures that system devices are running up-to-date licensed software, which decreases support costs and increases the Company's cybersecurity profile. In addition, in 2023 we have planned a major refresh of licenses for years 2023-2028 with Microsoft to remain current and upgrade to the latest Windows 11 operating system, which totals $14.7 million of the 2023 budget for technology licenses.

Q. PLEASE PROVIDE MORE INFORMATION ABOUT THE MICROSOFT WINDOWS UPGRADE.

A. This operating system upgrade will be similar to our Microsoft Next Generation project that previously upgraded Windows 7 to Windows 10. There will be significant end user enhancements in the Windows 11 operating system and significant work related to application readiness from Windows 10 to Windows 11. During 2023, we will need to secure over 17,000 licenses for 5 years to secure our end user experience related to Microsoft Operating Systems, Microsoft Office, and the accompanying collaboration suite, including Microsoft Teams and SharePoint.

These licenses also secure the platform with the security suite of Bitlocker, Advanced Threat Protection, and Windows Defender.

Q. WHAT IS THE WAN PUBLIC SERVICE PROJECT?

A. This project includes the detail design, planning, installation and commissioning of equipment that comprises an update of the Company's corporate WAN across its service territories. The WAN work includes network infrastructure investments to support connection between the Company's various locations and providing the pathway to enable critical business services. Investments support communication services for our business and substations, including the SCADA connectivity for monitoring and control of the grid. In addition, enterprise services are delivered to enable end users to connect to corporate applications like email, SAP (the General Ledger ("GL") and Work and Asset Management ("WAM") systems), and internet access. Significant factors driving project costs are the age of infrastructure being replaced and the difficult terrain in certain areas where WAN work is taking place. The project focuses on supporting communication assets to mitigate risk of wildfire from Company operations, replacing analog circuits to improve connectivity (retirement of copper circuits), relocating a leased microwave tower to better access, and redesigning WAN connectivity.

Q. WHAT IS THE CORE HR APPLICATION (PAYROLL BENEFITS) PROJECT?

A. This project will replace the multiple existing core HR software systems and vendors at Xcel Energy – PeopleSoft, TIME, myHR, Talent Management, Learning Management System, Workforce Planning, and Workforce Analytics – with a single, integrated software solution that will be determined upon finalizing the

request for proposal ("RFP") for the project. These applications comprise the core human resource system, provide payroll, benefits administration, workforce management, experience layer, and job record tracking to employees and retirees of the Company. The remaining components of the Core HR application are largely forecasted to be complete in 2022, which include major components of recruiting, benefits, talent management, time keeping, the employee portal and HR analytics.

Q. WHAT IS THE INFRASTRUCTURE MODERNIZATION PROJECT?

A. This is a multi-year project that is made up of multiple components that are intended to support the stability, availability, and performance of our overall technology infrastructure by modernizing certain components. Broadly speaking, this project will identify and replace outdated infrastructure equipment, such as Windows servers, Unix servers, storage, and other infrastructure equipment. More specifically, this effort will also institute Tanzu, a container-hosting platform that helps our servers communicate with each other and enable Xcel Energy to modernize both its applications and the infrastructure it runs on. Similar to the way VMware prefers to have vRealize to be synonymous with cloud management and automation, the goal is to have Tanzu be synonymous with modern applications in the enterprise. A primary component of this project is also to support the Company's Kafka investment, which is a VMware Tanzu product. Kafka is an open-source distributed streaming platform that is built for publishing, consuming, storing, and processing streams of records in real time. Streaming data is

consistently generated by many data sources and Kafka enables the Company to handle this streaming data sequentially and constantly.

Q. WHAT IS THE ISO INTERFACE & SETTLEMENT REPLACEMENT PROJECT?

A. In general, Power Costs, Inc. ("PCI") software is used to facilitate transactions with ISOs, among other uses. Current PCI software, however, limits the Company's ability to participate in a market like the Western Energy Imbalance Market ("WEIM") operated by the California Independent System Operator ("CaISo") or the SPP Western Energy Imbalance System ("WEIS") (or other future markets). Public Service and other utilities are currently evaluating whether to participate in markets like these, while some have already committed. The rationale for participation in these markets would be to save customers money while allowing them to use more energy from wind and solar resources. Public Service intends to participate with other utilities in a market like the CaISO WEIM or SPP WEIS. In order to make the Company ready for this participation, this project will replace the existing PCI system with a technology solution that will support dispatch and transactions with markets like WEIM or WEIS, increase efficiencies to ISO interface and settlement operations, increase processing speeds with real-time market bidding process transactions, enable better asset optimization, and enable a robust analysis and reporting function for settlement for all markets.

Q. PLEASE BRIEFLY DESCRIBE OTHER TYPES OF REFRESH CAPITAL ADDITIONS THE COMPANY ANTICIPATES TO REPLACE AGING TECHNOLOGY IN 2022-2023.

A. Examples of other projects with capital additions over $1 million being placed into service in 2022 and 2023 to replace aging technology include:

- *Monitoring Device Management System (MDMS) Replacement:* This project will re-platform existing MDMS capabilities, functions, and data onto a more current and strategic platform. The MDMS is the repository and source of data of all meters and other serialized devices. The current platform is currently out of support and no longer sustainable and MDMS capabilities will be migrated to a supported platform.

- *Disaster Recovery (DR) Technology Refresh:* This project's goal is to mature the disaster recovery environment to keep it up to date as Xcel Energy evolves its cloud environment. The scope includes replacing aging Disaster Recovery hardware for VMware, Linux and Windows environments.

- *Oracle Exadata Refresh:* This project will deploy a new Oracle Exadata platform, which provides optimized functionality needed to run Oracle databases, to replace the existing platform that is at end of life in 2021. It will also upgrade databases to the supported Oracle updated version.

- *Bentley OpenUtilities Designer ("BUD") Upgrade:* This project will replace the existing BUD, which is a distribution system design tool that creates and manages distribution system assets for electric and gas systems, and which is at end of life. The BUD will be replaced with the GE Smallworld Design Manager system, which will ensure that the system is completely upgraded, provide users with more design capabilities, and enable the Company to maintain vendor support allowing for lower cost enhancements in the future.

- *Fabric Refresh:* This project will update Xcel Energy data center fabric with Arista hardware (e.g. switches) and updated VMWare software and will also enable advanced network and hosting capabilities. The project will bring changes that are critical to other project completions, including Customer Resource System ("CRS"), Customer Experience Transformation ("CXT") (described in more detail in the Customer Experience section below), AIX (Unix operating system), and Infrastructure Modernization. Data center fabric is generally a system of switches and interconnections that allows for

a flattened network architecture, which will also better allow for legacy equipment to connect with other components.

- *IT INFS Network Refresh:* This project will provide for the planned and unplanned replacement of Local Area Network ("LAN") and WAN components across the Company. If these components are not replaced, there is an increasing instability, loss of reliability, of increased safety and compliance risks, and mounting technology debt. Work under this project includes, but is not limited to, replacement of components and labor related to microwave radio systems, towers, radios, network infrastructure, switches, routers, firewalls, servers, lab testing, and documentation.

- *Click Replacement:* This project will replace the Company's current Enterprise Resource Planning ("ERP") software with a new software solution for the Industrial Financial System, SAP.

- *VDI Refresh:* The project will refresh, expand, and improve the Company's aging VDI, or Virtual Desktop Interface environment, which will enable a more efficient and stable environment.

- *SAS BookRunner Upgrade:* This project will upgrade the SAS BookRunner Energy Trading Risk Management (ETRM) application, which the vendor is no longer offering, with term license at Xcel Energy. It is a critical application used by the Risk Management area to measure, manage, and report risk for energy trade transactions. SAS communicated in October 2019 that it will retire its product "Book Runner." This project is to implement a new solution that will provide Risk Management with the continued capabilities necessary to support the Commercial Operations to optimize risk management for Xcel Energy's trade model.

- *PSCo SONET Upgrade to TDMoE:* This project will replace end-of-life SONET (Synchronous Optical NETwork) equipment in order to modernize the backbone of the Company's SCADA system, which will result in a more flexible and resilient network. It is critical that the network supporting SCADA be kept up to date and resilient. This project will involving designing and building a parallel network next to the existing SONET rings and ultimately migrate all circuits from the existing rings to the new TDMoE rings.

- *Manchief Onboarding:* This project involves transitioning IT assets at the Manchief Electric Generating Station to Xcel Energy IT assets and will convert applications functionality to Xcel Energy's systems. The project includes hardware purchases, such as data servers, network connections, firewalls, circuits, security cameras, card readers, and workstations for new employees who are transitioning to Xcel Energy from the previous operator.

- *GOLD Replacement:* This project will replace the current GOLD solution with robust SAP-based functionality. The GOLD application is critical to the Distribution group and is used to track assets and facilitate maintenance activities. This project will address the replacement of the current outdated technical solution and provide functionality improvements to maintain accuracy and consistency of asset information. In addition, the new platform will streamline the billing functionality related to the non-metered assets and reduce outage restoration time, improving safety and reducing regulatory compliance risk.

- *Doble DUC Upgrade:* The Doble Universal Controller ("DUC") is the Transient Cyber Asset device required for NERC CIP compliance while performing maintenance work within all Transmission substations, and extending to Distribution level substations. The current DUC environment is on Microsoft Windows 8, which will expire at the end of 2022. NERC CIP Compliance is a significant risk for utilities, and the security hardened devices and compliance and security monitoring services provided by Doble are critical to Xcel Energy. Doble will replace the existing antiquated DUCs with new devices, build the Doble Windows 11 image for the DUCs, and provide other services as needed.

- *SD-WAN Implementation:* The software-defined wide area network ("SD-WAN") solution simplifies the management and operation of the WAN by decoupling the networking hardware from the control system. SD-WAN will be aligned to enhance the Company's network and security. A new SD-WAN solution will be implemented under this project.

- *IT Blanket Core System Modernization project*: These project funds will help ensure that Technology Services is able to meet unanticipated IT needs for the Company in 2022 and 2023. These budgeted funds will help refresh and modernize IT capabilities by funding emerging projects or changes in the scope of previously-planned projects in order to help meet the Company's IT priorities.

- *Voice over Internet Protocol ("VoIP") Refresh:* This project will upgrade Company technologies for the delivery of voice communications and multimedia sessions over the Internet.

- *Motorola Land Mobile Radio ("LMR") Core Upgrade:* When there is no cell phone coverage, the only means of communications for workers out in the field is the LMR system, which is critical to the safety and productivity of Xcel Energy's field personnel. This project will complete all software and hardware updates to the current LMR system to remain in support, which allows for patching, improved support from Motorola, and proper adherence to security standards.

- *Network Security Orchestrator:* This project will involve procurement and installation of a solution from Tufin in order to maintain a secure, compliant, and cost-effective network security environment for Xcel Energy that will centralize firewall policy management via an end-to-end solution. This solution will also integrate with ServiceNow.

- *Video Conferencing Enablement:* This project implemented new collaboration technology and standardized all conference rooms with a small, medium, large, and bay configuration.

- *ESB Modernization:* This project will stabilize, modernize, and improve the resiliency of the Enterprise Service Bus ("ESB") architecture. ESB is an architecture for distributed computing that performs integrations among applications in a standardized and more simple way across an enterprise.

- *Oracle Exadata Refresh:* This project will deploy a new Oracle Exadata database platform that will replace the existing platform, which will reach the end of its life in 2021. Oracle Exadata is a software and hardware computing platform that runs Oracle Database for over 100 applications to store and organize data, which provides IT infrastructure for enterprise grid computing that manages information and applications for the Company in a flexible and cost-effective way. In addition, the Oracle Database will be upgraded to a new version in order to maintain vendor support and security patching. The Oracle Exadata platform also supports many other databases, including critical application databases.

Q. WHAT ARE THE AGING TECHNOLOGIES SMALL PROJECTS?

A. Overall, for the Aging Technologies category, these smaller projects are individually under $1 million in capital spend and are included in Attachment MOR-1 with the projects I describe above for aging technologies that are individually over $1 million. As with larger projects, these smaller projects will enable the Company to keep its systems reasonably upgraded to continue to meet business, reliability, or compliance needs. These smaller projects include projects like software upgrades for applications such as Microsoft, Adobe, and Meridium asset performance management software, license renewals for applications not included

in the overall technology license refreshes, as with Oracle Java, new technologies for generation, and other technology refreshes.

Q. COULD YOU SUMMARIZE WHY REPLACING AGING TECHNOLOGY IS IMPORTANT TO THE COMPANY?

A. Technology Services provides the technologies and supporting services necessary for system reliability and security, operational decision-making, and improved customer support and business capabilities. Technology is constantly advancing and evolving as a foundational aspect necessary to help any business meet its goals and objectives. As I have presented, our aging network infrastructure continues to be a key driver of increased investment and requires attention on an ongoing basis. While Technology Services strives to maximize technology investments by maintaining existing software and hardware until the risk and costs associated with keeping these aging technologies in place require attention, at some point these technologies must be refreshed or replaced.

D. <u>Enhancing Capabilities</u>

Q. PLEASE DESCRIBE KEY TECHNOLOGY SERVICES CAPITAL ADDITIONS RELATED TO ENHANCING CAPABILITIES IN 2022-2023.

A. For 2022-2023, capital additions related to Enhancing Capabiliites total approximately $86.9 million. Key Enhancing Capabilities projects from 2022 through 2023 are set forth in Table MOR-D-5 below:

TABLE MOR-D-5:
Public Service 2022-2023 Enhancing Capabilities Capital Additions
(Total Company)
(Dollars In Millions)

Enhance Capabilities Capital Additions	2022			2023 Forecast
	Actuals (1/1-6/30)	Forecast (7/1-12/31)	Total	
Strategic Fiber Deployment	$0.0	$0.0	$0.0	$25.4
Real Time Scheduling Engine	0.0	11.8	11.8	3.0
Enterprise Synchrophaser Expansion Project	0.0	4.8	4.8	0.0
CIP Substation Compliance Reporting Work Stream 2	0.0	0.0	0.0	4.8
Meter-to-Receipt Resiliency Phase II	0.0	0.0	0.0	4.2
Unmanned Aircraft Systems Program	0.8	0.0	0.8	2.5
SAP Continuous Improvements Placeholder	0.4	1.5	1.9	1.4
Supply Chain Spend Analytics	0.0	0.0	0.0	2.9
Energy Supply APM Phase 2	0.0	1.4	1.4	0.6
EXT Mobile Application	0.0	2.1	2.1	0.0
Trans Frontline Enablement	0.0	0.0	0.0	1.9
Enterprise Data Management Tool	0.0	1.6	1.6	0.0
Renewable Energy Performance	0.0	0.1	0.1	1.5

ServiceNow Enhancements	0.0	1.5	1.5	0.0
Digital Ops Factory	1.4	0.0	1.4	0.0
RPA	0.0	1.3	1.4	0.0
MicroGrid	0.0	0.0	0.0	1.2
Enhance Capabilities Small Project	1.2	4.4	5.6	3.0
Total*	**$3.8**	**$30.7**	**$34.4**	**$52.5**
* There may be differences between the sum of the individual category amounts and total amounts due to rounding.				

Q. WHAT IS THE STRATEGIC FIBER DEPLOYMENT PROJECT?

A. Under this project, the Company will acquire dark fiber optic cable assets in order to support enterprise network connectivity. Acquiring dark fiber allows for more control over technology resiliency, capacity, and architecture. The high availability design of the network makes use of diversity in a couple ways: fiber cabling enters the buildings via two physically separate entrances; and buildings have two fibers available to carry traffic, allowing for one fiber to be cut without an impact to the operation. The Strategic Fiber network design is based on a dual entrance topology solution that will use existing and new dark fiber optic cables in order to maintain operational business partner requirements related to latency (speed of transmission), availability and bandwidth for transmission of information through cables.

Q. HOW WILL THE COMPANY IMPLEMENT THIS PROJECT?

A. The Company will procure and extend dark fiber optic cables to certain sites in the metropolitan Denver area. These sites were identified as having high monthly recurring costs typically due to the lack of connectivity options at these locations coupled with the importance of these locations in Xcel Energy's operations, mandating their perpetual and expensive usage. The project will allow for substantial network growth due to the fiber lines being wholly dedicated to Xcel Energy's usage and are therefore not as dependent upon usage as leased/shared circuits. Another benefit of the Strategic Fiber Deployment project is to provide high speed access to various entities that Xcel Energy has relationships with, like public cloud providers such as Amazon Web Services, Microsoft Azure, Google GCP and various network partners like CenturyLink and Verizon.

Q. WHAT IS THE REAL TIME SCHEDULING ENGINE PROJECT?

A. This work is the second phase of a Company initiative that will automate scheduling processes in the Distribution area and will provide efficiencies and enhance the value that Company employees provide to customers. This project will partner with the newly formed Digital Operations Factory (described below), and will deliver a secure multi-tenant cloud platform as a foundational engine for each of the allowing for reusable data, integrations of data, benchmarking, use with mobile platforms and artificial intelligence. Currently distribution is augmented with outlook for a primary scheduling tool. The Real Time Scheduling Engine project will allow for dependencies of multiple crews, availability of crews and materials, and allow for prioritization of work.

Q. WHAT IS THE ENTERPRISE SYNCHROPHASER EXPANSION PROJECT?

A. This project will allow the Company to expand the collection of Synchrophasor data by installing Phasor Measurement Units and communication paths at various Company facilities. (Synchrophasor measurements are real time measurements to obtain useful information to operate the grid.) This expanded capability will impact business areas for Bulk Electric System analysis, voltage stability analysis, NERC event analysis requests, generation model validation, and will improve wind farm response and voltage control. This project will reduce maintenance and replacement costs of transmission devices and will reduce costs to validate generator models as well as improve the operation of the Bulk Electric System overall.

Q. WHAT IS THE CRITICAL INFRASTRUCTURE PROTECTION (CIP) SUBSTATION COMPLIANCE REPORTING WORK STREAM 2 PROJECT?

A. This project will replace complex, labor-intensive processes, with software automation in order to better support the Company's compliance with CIP standards. In particular, it will provide software automation in the areas of asset management, ports and services, security patch management, and daily management, quarterly inventory review, and annual audit discovery. The project also will reduce labor costs and travel time for Company employees and will improve CIP-related processes as they become automated through document automation and password automation of equipment, which is anticipated to decrease reporting errors and improve compliance.

Q. WHAT IS THE METER-TO-RECEIPT RESILIENCY PHASE II PROJECT?

A. This project will enhance and streamline daily processing performance and billing invoice generation across Xcel Energy as more complex rates and riders are implemented to provide additional options and services for our customers. The project will also include updated architectural components that will ensure the application remains supported, resilient, and secure.

Q. WHAT IS THE UNMANNED AIRCRAFT SYSTEMS PROGRAM?

A. The project will create a managed drone environment that will allow the Company to operate a fleet of drones across all business units, ensuring regulatory compliance and appropriate flight planning, security of drone data, ability to ingest data in to the network and visualize as well as analyze the data on an as-needed basis for each business unit partner. The solution will mitigate the risk of drone use, will enable and accelerate the use of drones across all business units, and will lead to efficiency gains in operations while limiting the potential of injury risk for what otherwise would have been manned activities.

Q. WHAT IS THE SAP CONTINUOUS IMPROVEMENTS PROJECT?

A. SAP is an enterprise application and continuous improvement and investment is needed to fully utilize the benefits of having an enterprise application. This is a multi-year project, with various components placed in service as assets are deployed. Examples of some of the components for this project include the Batch Management Tool that SAP supplied and released that allows for increased traceability of inventory and group management of inventory in our Energy Supply area, the Oracle Database upgrade, which is the primary database for SAP, and

SAP scheduler was upgraded to improve scheduling to monitor and improve inefficiencies to optimize resources.

Q. WHAT IS THE SUPPLY CHAIN SPEND ANALYTICS PROJECT?

A. This project will implement a portfolio of digital tools and solutions to enable what the Company calls the "Supply Chain Transformation" that will build a comprehensive digital structure that will improve data accuracy and transparency in order to generate insights into spend, supplier transactions, and key supply chain performance metrics. This project will also implement an artificial-intelligence ("AI") enabled platform that tracks spend data and performs analytics to help business units better understand spending patterns. The digital Supply Chain Transformation will unlock sourcing and procurement performance by impacting effectiveness, efficiency and employee and customer experience. As part of this project, tools and solutions prioritized to be implemented include master data cleansing/management, P2P system, eCatalogs, eAuction, supplier collaboration portal, spend control dashboard, cost modeling, category analytics, contractor labor management platform, supplier management platform, performance management dashboards, and process automation. The project will also include automated dashboards and tracking of expenditures that will enable real-time insights and will reduce manual touchpoints.

Q. WHAT IS THE ENERGY SUPPLY APM PHASE 2?

A. This Phase 2 work implements various modules in the GE Asset Performance Management ("APM") software, which is a suite of software products that helps the Company optimize asset performance and increase O&M efficiency across

nuclear generation fleet assets. Xcel Energy worked with the vendor, GE, to plan and roadmap during the Phase 1 portion of the project on a staggered implementation of modules based on the highest business priorities under the health, strategy, reliability, and integrity pillars of the APM suite. The benefits of the Phase 2 implementation of APM software will be to bring data and decisionmaking for equipment reliability into one system and process to be implemented as a fleet, to improve power plant reliability, to increase the value of data and to collate data from various sources for equipment health and operational processes, and to integrate work orders (through SAP business processes management software), operational data (OSI PI), and other QIM/MOC information related to inspections and asset criticality and health data in order to generate work notifications and QIM (quality issue management) issues automatically. The project will also provide value by reducing labor resource requirements across engineering and operations organizations, implementing a proactive maintenance strategy to help prevent unplanned outages, lowering work package preparation and maintenance labor costs, automating equipment related regulatory reports, and by supporting the nuclear organization's continued focus on managing O&M costs by optimizing asset expenditures and personnel productivity.

Q. WHAT IS THE EXT MOBILE APPLICATION DEVELOPMENT PROJECT?

A. The EXT program is building mobile applications for employees. The initial focus is on improving the employee experience for our field workers with apps such as Field Time Entry, Electric Outage Restoration, and Gas Emergency Response.

This project is a new platform that will provide "backend" support for all mobile applications within the EXT portfolio. This project will enhance the Company's mobile applications capabilities, providing components such as authentication and authorization services, notification services, logging and monitoring services, integrations, and processes for developer operations. By equipping employees with more modern, convenient mobile apps, it allows them to be more effective in their jobs and improve delivery of services for customers.

Q. WHAT IS THE TRANS FRONTLINE ENABLEMENT PROJECT?

A. This project will enable field operations personnel in the Transmission group to have better access to real-time asset and operation data in order to drive and enable more efficient operations.

Q. WHAT IS THE ENTERPRISE DATA MANAGEMENT TOOL PROJECT?

A. This project will implement a robust data management and governance solution that will better and more efficiently manage data quality across business units. The data governance initiative will increase productivity by using tools designed to efficiently process workflow and monitor quality while also enabling incremental controls and processes that are scalable and more cost-effective.

Q. WHAT IS THE RENEWABLE ENERGY PERFORMANCE PROJECT?

A. This data analytics project involves the procurement and implementation of new analytical tools to forecast, monitor, analyze, and improve the performance of the Company's renewable generation fleet. For the Company's renewable generation fleet to deliver all required performance expectations, a robust, analytical tool is necessary to meet expectations and improve overall performance.

Q. WHAT IS THE SERVICENOW ENHANCEMENTS PROJECT?

A. This project will facilitate IT service delivery, asset management, and regulatory compliance, and is intended to lead to higher IT customer service satisfaction by improving the Company's ability to route information more effectively. The tool also facilitates the adoption of the more efficient industry-standard processes upon which the tool is based. Finally, the project will also help track performance in these areas, in an effort to continually improve IT service delivery and operations management.

Q. WHAT IS THE DIGITAL OPS FACTORY PROJECT?

A. The Digital Ops Factory is a cloud-based, modern data and analytics platform that will enable the Company to make better use of available data to enhance both customer journeys and core operational processes. This project will deliver a secure multi-tenant cloud platform as a foundational engine for each of the following capabilities: reusable data lake; common integrations; analytics workbench; mobile platforms; dashboard framework, and AI models. Once the foundation is built, the project examples include predictive modeling, real time scheduling systems, operations work management, routing and screen of data, work dashboards, and profiles.

Q. WHAT IS THE ROBOTICS PROCESS AUTOMATION (RPA) PROJECT?

A. The Robotics Process Automation ("RPA") project eliminates routine, manual transactions in various areas across the Company's jurisdiction by automating them. More specifically, RPA is a project that employs a suite of automation softwares that will streamline and automate heavily manual enterprise and

premise-related (onsite) field work. The work implemented by this project will benefit customers by expediting services for what are currently time-consuming tasks. Automations that were built under the project include an automation that lets users in the field create work orders and purchase requisitions on a mobile device, an automation that identifies and cleans up past-due material reservations, an automation that completes meter testing, and an automation that updates work order schedules made by Centralized Scheduling.

Q. WHAT IS THE COMMUNITY RESILIENCY INITIATIVE PROJECT (ALSO CALLED THE MICROGRID PROJECT)?

A. The Community Resiliency Initiative Project ("CRI") seeks to support communities throughout Public Service's service area by providing battery energy storage system ("BESS") enabled microgrids in key locations. The BESS systems will be able to provide back-up power to critical infrastructure during outage events while allowing for the energy storage asset to provide grid services during non-emergency operation. The CRI was approved by the Commission in Decision No. R20-0732 (mailed date Oct. 15, 2020) in Proceeding No. 19A-0225E. IT capital additions involve procurement of hardware, and the design, build, and implementation of an integrated system that meets business and security requirements.

Q. WHAT ARE ENHANCING CAPABILITIES SMALL PROJECTS?

A. As in the Cybersecurity and Aging Technologies categories, these smaller projects are also included in Attachment MOR-1 with the larger projects I describe above. These smaller projects, like large projects, also enable the Company to improve

productivity, enhance communications between systems and between people, and use data more efficiently. Examples of smaller enhancing capabilities projects include an initiative to increase the resiliency of the Technology Services area, updates to the Ansible suite of software tools that enables infrastructure as code, implementation of a new thermal monitoring program for the Company's generation plants, implementation of new integrated document management solutions, new software for the Fleet area to manage all Fleet assets, and other projects to take advantage of new capabilities and increase efficiencies.

E. Customer Experience

Q. PLEASE DESCRIBE KEY TECHNOLOGY SERVICES CAPITAL ADDITIONS RELATED TO CUSTOMER EXPERIENCE FOR 2022-2023.

A. For 2022-2023, capital additions related to Customer Experience total approximately $78.1. Key Customer Experience projects from 2022 through 2023 are set forth in Table MOR-D-6 below. As shown, a majority of additions for Customer Experience projects relate to the Customer Experience Transformation, or CXT, program that Ms. Scheller introduced in her Direct Testimony.

TABLE MOR-D-6:
Public Service 2022-2023 Customer Experience Capital Additions
(Total Company)
(Dollars In Millions)

Customer Experience Capital Additions	2022			2023 (Forecast)
	Actuals (1/1-6/30)	Forecast (7/1-12/31)	Total	
Digital Channel Platform	$20.5	$3.6	$24.1	$0.0
Customer Experience Transformation Phase 3	0.0	0.0	0.0	9.4
CRS Tech Stack Upgrade	0.0	8.6	8.6	0.0
Customer Care IVR Upgrades	0.0	8.2	8.2	0.0
Mobile App	0.0	7.9	7.9	0.0
Platform Infrastructure and Technology Maintenance	6.6	0.0	6.6	0.0
Data Analytics and Automation	5.5	0.0	5.5	0.0
Customer Relationship Management	4.7	0.0	4.7	0.0
Electric Vehicles	0.0	0.0	0.0	1.6
Customer Experience Small Project	0.5	0.8	1.3	0.0
Total*	**$37.9**	**$29.2**	**$67.1**	**$11.0**
* There may be differences between the sum of the individual category amounts and total amounts due to rounding.				

Q. WHAT IS THE COMPANY ACHIEVING THROUGH THE CXT PROGRAM?

A. The CXT program is, ultimately, a series of foundational investments in platform infrastructure and data analytics and automation that are intended to improve the Company's digital interfaces with customers. The Company's work to improve the customer experience is divided into four project areas: (1) Digital Channel

Platforms (including MyAccount, the Company's website, Xcel Energy mobile applications, and new customers and real estate developers' initial connections with the Company (Customer Connect); (2) the Customer Relationship Management ("CRM") Platform (currently Salesforce); (3) Platform Infrastructure and Technology Maintenance; and (4) Data Analytics and Automation. The individual projects by the categories identified in Table MOR-D-6 above are provided in Attachment MOR-1 .

Q. WHAT IS THE DIGITAL CHANNEL PLATFORM PROJECT?

A. This project built out, enhanced, and redesigned several components of our customers' digital interactions with the Company. This work includes enhancing and modernizing Xcel Energy's customer-facing online digital platforms and underlying technologies, MyAccount, our mobile application, and website, www.xcelenergy.com. It also involves building out the New Customer Connections channel. Digital channel platform work also included building out our Contact Center capabilities with Interactive Voice Response ("IVR") technology, which I separately describe below.

Q. CAN YOU DESCRIBE THE MYACCOUNT AND XCELENERGY.COM WORK IN MORE DETAIL?

A. Yes. This work provided a new digital presence for Public Service's customer channels, improving optionality, providing more user-friendly interfaces, and offering more capabilities for customer data management. As part of the xcelenergy.com and MyAccount re-design and re-platform, Technology Services conducted a content, user experience, and visual design heuristic assessment to

identify pain points for the customer and optimize the experience for each individual. Customers can now request additional services, see status of any requests, and make appointments for any service issues. The MyAccount re-platform allowed customers to set up their preferences, pay their bills or set up automatic payment options, and receive information on their energy usage. The goal is to share the same usage information a call center representative would see with the customer he or she is assisting, to increase customers' options and to allow them to interact with Xcel Energy in the manner they choose.

Q. PLEASE DESCRIBE THE MOBILE APP PROJECT.

A. This work will provide a new digital presence for Public Service's customer channels, improving optionality, providing more user-friendly interfaces, and offering more capabilities for customer data management. As part of the xcelenergy.com and MyAccount re-design and re-platform, the Mobile App aims to improve our customers' overall digital experience by allowing customers to set up their preferences, pay their bills, sign up for energy saving programs, and to start, stop or transfer their service via mobile devices.

Q. CAN YOU DESCRIBE THE OUTAGES AND NOTIFICATIONS WORK?

A. Yes, I can. Outage work will create a new, multi-channel outage experience for our customers that will display more accurate and timely outage information, including supporting more accurate restoration information. When merged with interval data from AMI meters, a new outage experience will be much more personal and will give customers the information they want when they need it.

Notifications work will provide new capabilities within the CRM platform that will allow the Company to provide more accurate and proactive customer event notifications for billing and payments, outages, product sales, and other customer journeys. A new notifications approach will reduce costs and create more opportunities for communicating with customers. The capability will also enable two-directional text, opening up a new channel for customers to pay their bills and to work with an agent in the future.

Q. PLEASE DESCRIBE THE NEW CUSTOMER CONNECTION WORK.

A. Today, the New Customer Connection ("NCC") applies to trade partners and Company customers who are building new construction and need to engage with the utility for net-new electric and gas services. An online form can be utilized, but will then need to be re-entered to begin the ordering process, with no ability to view the status on any automated channels.

Building out the Customer Connect channel has a better experience for builders, developers, and other larger Commercial & Industrial customers who engage with Xcel Energy to request new, resumed, or stopped service. Specifically, the customer interface will be revamped to provide better information to customers about the phase or status of their line extension process, improve the builders' call line, and improve the process for communicating with parties engaged in that process.

These improvements will allow the Company to better partner with developers, contractors and do-it-yourself homeowners as they manage their projects from start to completion. They will be able to receive and give updates on

their projects in real time, giving them control and transparency to better plan their business needs. Through account preferences, timely and accurate notifications about status, as well as a flexible appointment capability, these enhancements will provide Company employees, trade partners and homeowners with a more seamless and collaborative experience.

Q. PLEASE DESCRIBE THE CRM PLATFORM PROJECT.

A. This project involves building out the existing Salesforce CRM tool and introducing new modules to better understand and serve customers. The redesigned platform will enable tracking of different relationships with customers, whether that is commercial, residential, industrial or on a different basis. It will allow for real-time business updates to mobile applications, automated updates to the customer mobile application without requiring customers to manually update the application itself, and updates to MyAccount with minimal development support, all supporting improved customer and employee experiences.

Better CRM management will enable us to both identify previous searches and efforts taken by Company employees on behalf of the customer, and support a 360-degree view of existing customer location(s), energy applications, and preferences, much of which will be available to the employee efficiently through the Single Screen program. It will also provide insight into customer billing patterns to allow us to serve customers better, by counseling and advising them on conservation options, management tools, and other service options. It will also give customers the ability to have information on our technicians when it is necessary for them to visit the premise, including the technician's name and other

pertinent information and also the status of the technician's location and approximate time he or she will arrive.

Q. IS THE COMPANY CONTINUING TO USE SALESFORCE FOR ITS CRM PLATFORM?

A. Yes. Salesforce was selected through a platform selection process. We evaluated several solutions with similar capabilities, and noting improvements to the platform, ultimately chose to remain with Salesforce because it is the existing platform and therefore offers efficiencies in integration, time to market, and planning that would not be available by starting with a new solution altogether. This is a multi-year project that was initiated in 2019, which also includes some post-implementation and minor enhancement work.

Q. PLEASE DESCRIBE THE CONTACT CENTER WORK (IVR).

A. This program involves redesigning our IVR system for customers and is budgeted to be placed in service in 2022 in several phases. This will assist customers to better resolve their issues without having to speak to a call agent and make it easy to interact with the IVR. Phase I is updating the IVR hardware to stabilize the customer experience and provide a platform where we can build new experiences. The upgraded IVR will connect more seamlessly to the customer data stack and enable omni-channel experiences and add more customer functionality to the IVR. Phase II is the addition of a natural language layer, which will be added to the IVR in 2022, that adds voice functionality for customers, and they can speak to the IVR and complete their task without using touch tones. It will also, if necessary, get to a subject matter expert regarding their issue and resolve the issue more quickly.

This improvement will also reduce the number of times it is necessary for a customer service agent to have to engage or reroute calls. This system will contribute to the agent single screen success by passing more detailed information to our agents, including reason for call and customer information so that agents do not have to ask a customer again for information already provided. Natural language is preferred by customers, provides for more efficient completion of customer tasks, and increases customer call containment in the IVR system to limit high-cost calls from being routed to the contact center if the IVR system would otherwise be able to successfully handle customer calls to their satisfaction.

Q. WHAT IS THE CUSTOMER RESOURCE SYSTEM (CRS) TECH STACK UPGRADE?

A. This project will provide certification and deployment of the various software components necessary to maintain and upgrade stability, reliability, security, resilience, and efficiency of the CRS application. This type of effort happens approximately every three years, if not sooner, depending on various technology drivers. The CRS Tech Stack represents the various software components, that in concert enable the larger application to perform daily service orders, the posting of daily payments, the processing of a typical day's worth of meter reads, the calculating invoices and producing statements, as well as the providing of customer service through agents, the interactive voice response system, the Company's website www.xcelenergy.com, and MyAccount. This upgrade will ensure that the CRS Tech Stack remains supported by various vendors, receives necessary security patches, and remains current with other major market

components, such as Linux (operating system), Java (programming language), Oracle (database management system), WebLogic (web application server), and Genero (application server). This project will also refresh storage and server infrastructure related to this technology.

Q. PLEASE DESCRIBE THE PLATFORM INFRASTRUCTURE AND TECHNOLOGY MAINTENANCE AND DATA ANALYTICS AND AUTOMATION PROJECTS.

A. Xcel Energy's technological architecture has become increasingly intertwined, with core systems running at maximum capacity to support the need for emerging capabilities. To relieve the pressure from these critical core systems, new data layers will be added to aggregate key information and manage extra capabilities, while providing flexibility and added capacity. To accomplish this, we are developing an Application Programing Interface ("API"), which is a set of routines, protocols, and tools for building software applications to ensure software components can "talk" to each other. This infrastructure also includes operations model connectivity and security, and data architecture and governance.

This work will allow the legacy applications to function in the manner they were designed, eliminating significant current customization that is very costly to maintain. API work is being conducted in two phases. Phase 1 of the API and data sets was the first set of the data and integrations that enables and provides functionality for www.xcelenergy.com, and other applications specific to the NCC and core www.xcelenergy.com experiences, including functionality regarding automation and the cloud. The data work specifically provides a new platform and

set of tools that supports the management and quality of customer data under new quality processes and data governance mechanisms. Phase 2 of API continues the work of Phase 1 and brings additional data and integrations to www.xcelenergy.com, MyAccount, mobile app, electric vehicles, and other experiences. Improved data aggregation and storage will allow for more customer functionality across digital channels. Functionality includes billing and payment, product sign-ups, electric vehicle sales, AGIS integration, and general customer service.

Data analytics capabilities will improve dramatically as a result of API layer improvements enabling a new customer data grid that will serve as a single source of information on our customers. Analytics teams will have access to more timely, accurate and rich data to uncover deeper insights and trends to make improved recommendations and deliver better customer service.

Q. PLEASE FURTHER EXPLAIN HOW THESE PROJECTS ALSO DEVELOP DATA ANALYTICS.

A. Work under the Data Analytics and Automation project will add a Customer Data Platform layer to the Company's technological architecture, which will act as a central repository of data from the Company's core systems and third-party vendors. It will also provide expedited consumption of data by other systems and eliminate more legacy point-to-point interfaces. For the customers, the data layer will be where the Company can store data in one location to use on all channels. The data will be accessible from all channels to eliminate the need for redundant input.

This work will also enable querying and running analysis and reporting on information outside of our core applications, such as core ordering and billing systems, which allows core applications to conduct only the transactions they were designed to complete.

Additionally, this project will facilitate analytics to help understand customer personas, preferences, and previous issues of our customers. This will help call center agents assist incoming calls in an expedited fashion with all the information they need, as previously noted with respect to the utility's digital interfaces. Artificial Intelligence and Natural Language Understanding will be used in conjunction with each other, and with data in the CRM, to simplify the customer call experience and reroute the caller to the correct department. This will also help gather all the required information, so that the right solution for the customer will be more easily recognizable to the Company employee.

Q. FOR 2023, WHAT IS THE CXT PHASE 3 PROJECT?

A. In Phase 3 of the CXT program, the Company will implement components with defined outcomes and enhancements that will build on the CXT platform. In 2023, we will place in service the following components:

- *Business Portal:* This project leverages the Residential MyAccount, Salesforce Energy Utility Cloud, and AMI data investments. It enables the realization of AGIS requirements, the Rate Advisor, and Growth Products through information unification and a shared view.

- *Energy Utilities Cloud:* Core CRM is a tool that creates a simple user interface for a collection of data that will help Xcel Energy recognize and communicate with customers in a scalable way. The Core CRM implementation will serve as the foundation for the enterprise as it relates to customer data. This implementation will transition from legacy CRS to a new Salesforce platform – creating a new system of record for customer

data. Part of this implementation involves foundational data and integrations work that will allow for transition and future scalability. The existing multiple data stores today is not scalable, costly to maintain, and limits our ability to report efficiently. Core CRM will support our employees and customers through efficient process and improved self-service capabilities.

- *Agent Console:* This project will create a unified agent experience and enable consistent information, automated processes and immediate information by creating a single view of the customer across the organization, recording all interactions, and easily reporting on activity and cases. This initiative lays the foundation for future customer engagement strategies, including our ability to provide product and service offerings that best match customer needs.

- *Text-to-Pay:* This project will provide customers with the option to pay by text message, which in turn will improve payment processing speed by reducing manual payments via phone, snail mail, bank transfer, etc.

Q. PLEASE DESCRIBE THE ELECTRIC VEHICLES PROJECT.

A. The EV Foundations builds the back-end foundation to support our EV programs. This project includes building the customer facing enrollment experience for EV programs, creating automated workflows to reduce billing errors and improve monthly billing processing, and enabling EV program reporting. Both current EV and future EV customers will benefit from this work as those interested in EV programs will have a simple, easy process to enroll in EV programs, and current customers will receive timely and accurate bills from participation in EV programs.

Q. WHAT ARE CUSTOMER EXPERIENCE SMALL PROJECTS?

A. As in the other Technology Services categories I present above, these smaller projects are also included in Attachment MOR-1 with the larger projects I describe. These smaller projects, like large projects, also enable the Company to improve the customer experience. Examples of these smaller projects include refreshing our mobile handheld collectors that our meter reading team uses to accurately read

customer meters and continuously enhancing our data and integrations architecture to support new capabilities within Salesforce and other platforms.

III. TECHNOLOGY SERVICES O&M

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. The purpose of this section of my Direct Testimony is to support the Company's Technology Services O&M expense through June 30, 2022, as adjusted for labor and non-labor costs as discussed and quantified by Company witnesses Mr. Michael Deselich and Mr. Freitas, as the appropriate level of Technology Services O&M expense in the Test Year. I also describe drivers of O&M cost increases since the 2021 Electric Phase I. As with capital additions, AGIS O&M is discussed in Section IV of my Direct Testimony.

Q. WHAT ARE THE TYPES OF COSTS THAT TECHNOLOGY SERVICES INCURS FOR O&M?

A. I described above the various work that is performed by Technology Services. To perform this work, Technology Services generally incurs O&M costs in seven categories:

- *Application Development and Maintenance:* Costs associated with the development, enhancement, maintenance, and consultation on new or existing IT systems.
- *Software License and Maintenance:* Includes costs for maintenance payments to software vendors pursuant to license agreements associated with various software applications and desktop tools. These fees must be paid to secure vendor support for troubleshooting, enabling access to vendor patches, fixes, and version upgrades.
- *Labor:* Costs associated with all employees in the Technology Services department.
- *Contract Labor/Consulting:* Consists of fees and expenses for consultants or knowledge base experts that are not employees of Xcel Energy.

- *Hardware Maintenance and Purchase*: Includes costs for maintenance payments to hardware vendors pursuant to license agreements associated with various storage, server and miscellaneous hardware. These fees must be paid to secure vendor support for troubleshooting, fixes and minor purchases.

- *Network Services:* Costs related to the maintenance of existing circuits, phones, microwave and radio systems, and other IT communication assets. Network activities provide operations and management of the Company's internal and external data transmission requirements.

- *Other Categories:* Includes Employee Expenses; Mainframe; Donations, Dues, and Fees; Shared Asset Allocation, outsourcing services not included in the other categories, and other small purchases.

Q. WHAT WERE TECHNOLOGY SERVICES ACTUAL O&M COSTS FOR THE 12-MONTH PERIOD ENDING JUNE 30, 2022?

A. The Company's actual Technology Services O&M expenses totaled $61.3 million (including AGIS) for 12-month period ending June 30, 2022. Table MOR-D-7 below, breaks down the amount of overall O&M costs by the categories I discussed above, in addition to AGIS O&M, which is discussed in Section IV. Table MOR-D-7 also provides, for comparison purposes, actual O&M costs in these categories for calendar year 2021. Attachments MOR-2 and MOR-3 provide an accounting of these expenses by Cost Element and FERC account, respectively. As shown below, the Technology Services area does not include any known and measurable adjustments to O&M for the Test Year.

TABLE MOR-D-7:
Public Service Technology Services O&M
(Total Electric)
(Dollars In Millions)

Category	2021 Calendar Year	2022 HTY (12 mos. ending June 2022)	K&M Adjustments	Test Year
Application Development and Maintenance	$6.7	$6.3	-	$6.3
Software License and Maintenance	20.1	21.7	-	21.7
Company Labor	11.4	11.5	-	11.5
Contract and Consulting	2.5	3.0	-	3.0
Hardware Maintenance and Purchase	2.2	2.3	-	2.3
Network Services	7.9	8.0	-	8.0
Other	3.0	1.6	-	1.6
AGIS**	5.7	7.0	-	7.0
Total*	**$59.4**	**$61.3**	**-**	**$61.3**

*There may be differences between the sum of the individual category amounts and total amounts due to rounding.
**The AGIS amounts included in this table do not include direct charges that originated outside of technology services. AGIS amounts depicted in this table include both CPCN and non-CPCN amounts. AGIS O&M is discussed in Section IV.

Q. ARE THE $61.3 MILLION IN O&M COSTS FOR THE PERIOD OF 12 MONTHS ENDING JUNE 30, 2022 FOR TECHNOLOGY SERVICES YOU DESCRIBE ABOVE REFLECTED IN THE COST OF SERVICE PRESENTED BY MR. FREITAS?

A. Yes. The O&M costs for period ending June 30, 2022, along with associated Technology Services labor and non-labor costs discussed and quantified by Company witnesses Mr. Deselich and Mr. Freitas, are reflected in the cost of service in this case.

Q. WHAT ARE THE MAJOR DRIVERS BETWEEN TECHNOLOGY SERVICES' 2021 ELECTRIC PHASE I (CALENDAR YEAR 2021) AND THE O&M COSTS THAT WILL BE REFLECTED IN THE COST OF SERVICE IN THIS CASE?

A. The major drivers are shown in Table MOR-D-8 below.

TABLE MOR-D-8:
Public Service Technology Services O&M Drivers
(Total Electric)
(Dollars In Millions)

Drivers of O&M Expenses from 2021 Calendar Year to Test Year (Dollars in Millions)			
Driver	**2021 Calendar Year**	**Driver Amount**	**Test Year**
Total O&M (adjusted)	$59.4		
Shared Assets		$(1.4)	
Software License and Maintenance		1.6	
AGIS		1.3	
Other		0.3	
Total Electric	**$59.4**	**$1.9**	**$61.3**

Q. CAN YOU PROVIDE MORE INFORMATION REGARDING THE SPECIFIC DRIVERS SHOWN IN TABLE MOR-D-8?

A. Yes. Several drivers explain the $1.9 million O&M increase from the 2021 Calendar Year to the 12-month period ending June 30, 2022 included in the Test Year. First, network equipment shared asset costs decreased by $1.4 million. Shared asset costs occur when employees in two or more of Xcel Energy's OpCos use or share an asset owned by another operating company, which is the case with certain network assets supported by Technology Services. Compared to the 2021 Calendar Year, Public Service's shared asset costs for the 12-month period ending June 30, 2022 (recorded in Federal Energy Regulatory Commission

("FERC") (Account 931 & 902) increased by $0.4 million in shared asset investment across all jurisdictions. However, a $1.8 million Public Service credit received from other OpCos (recorded in FERC Account 922) offsets these costs and results in a net decrease of $1.8 million in Shared Asset O&M.

Ms. Doyle and Mr. Moeller address shared asset allocations in more detail in their Direct Testimonies.

Second, Technology Services experienced a $1.6 million increase in Software License and Maintenance costs, stemming overall from increasing costs in the industry. Software License and Maintenance costs are driven by net new projects and increased licensing costs are driven by users and upgrades. Additionally, maintenance and support must be updated to limit security vulnerabilities.

Third, Technology Services experienced an increase of $1.3 million in O&M expenses in supporting AGIS implementation. Company witness Ms. McKoane discusses the Company's ongoing deferral of expenses related to the AGIS CPCN.

Q. IS THE COMPANY'S ACTUAL TECHNOLOGY SERVICES O&M FOR THE 12 MONTHS ENDING JUNE 30, 2022 A REASONABLE STARTING BASIS FOR ESTABLISHING TECHNOLOGY SERVICES' O&M COSTS FOR THE TEST YEAR?

A. Yes. Technology Services' actual O&M costs for the 12-months ending June 30, 2022 are a reasonable basis on which to establish Technology Services' O&M costs for the Test Year. These O&M expenses are reasonable to ensure safe and

reliable service for our customers while ensuring Technology Services supports utility operations and responds to ever-changing technological needs.

IV. AGIS

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. In this section of my Direct Testimony, I provide support for the level of costs incurred by the Technology Services organization related to the AGIS initiative, including capital additions placed into service since the Company's 2021 Electric Phase I, from January 1, 2022 through the year-end 2023 forecast, as well as the O&M costs included in the Test Year.

Q. DO OTHER WITNESSES IN THIS CASE PROVIDE TESTIMONY RELATED TO AGIS?

A. Yes. Several other Company witnesses provide Direct Testimony related to AGIS: Mr. Mino provides information related to AGIS Distribution costs included in this case; Ms. McKoane supports the Company's request for continued deferred accounting treatment for certain AGIS costs beyond the Test Year; and Mr. Freitas supports the Company's cost of service and revenue requirement associated with AGIS.

Q. PLEASE DESCRIBE THE AGIS INITIATIVE.

A. AGIS is a long-term strategic initiative that will transform the Company's electrical distribution business by enhancing security, efficiency, and reliability, which will enable Public Service to safely integrate more distributed energy resources, and improve customer products and services. Overall, the AGIS platform consists of multiple projects that ultimately work together to support improved distribution technology, empowered customer choice, and improved energy management and savings. The AGIS initiative involves several foundational projects, including the

Advanced Distribution Management System ("ADMS"), including the Geospatial Information System ("GIS"), Advanced Metering Infrastructure ("AMI"), and the Field Area Network ("FAN"), and other intelligent field services such as Integrated Volt-VAR Optimization ("IVVO") and Fault Location Isolation and Service Restoration ("FLISR"), and the Advanced Planning Tool ("APT"). Implementation of AGIS projects involves a coordinated approach between Distribution and Technology Services.

Q. HAS THE COMPANY PREVIOUSLY PROVIDED INFORMATION ON THE AGIS INITIATIVE?

A. Yes. On August 2, 2016, Public Service filed an Application and Direct Testimony in Proceeding No. 16A-0588E (the "AGIS CPCN Proceeding"), requesting that the Colorado Public Utilities Commission ("Commission") grant a Certificate of Public Convenience and Necessity ("CPCN") to implement AMI, IVVO, and the associated mesh network portion of the FAN (collectively, the "CPCN Projects"). The Commission approved the Company's request for a CPCN pursuant to its Application as part of an AGIS CPCN Settlement between the parties in the CPCN Proceeding (the "AGIS CPCN Settlement").[2]

In addition, the Company further discussed other AGIS components in the Company's 2019 Electric Phase I (Proceeding No. 19AL-0268E) and in the Company's 2021 Electric Phase I. As a result of the 2019 and 2021 Electric Phase I proceedings, many of the AGIS costs have already been approved for recovery

[2] Unopposed Comprehensive AGIS CPCN Settlement in Proceeding No. 16A-0588E.

through base rates.

I also note that on June 15, 2021, in compliance with Commission Decisions,[3] the Company requested an amendment to the AGIS CPCN ("Amended CPCN") in Proceeding No. 21A-0279E. Specifically, the Company requested that the AGIS CPCN be amended to allow for the deployment and utilization Distributed Intelligence ("DI") capabilities that are embedded within the AMI meters that are being installed pursuant to the initial AGIS CPCN. Parties in that case reached a settlement agreement, which allows the Company to develop and deploy certain DI capabilities, as well as Home Area Network ("HAN") functionality (the "Amended AGIS CPCN Settlement").[4] The Commission approved the Amended AGIS CPCN Settlement as of March 28, 2022.[5] Details about DI capabilities and HAN functionality were also provided in the Company's 2021 Electric Phase I. I note that DI and HAN costs are not classified under AGIS going forward; rather, they are included in the Technology Services non-AGIS budget as part of the enterprise-wide work related to platform services to enhance IT capabilities. I discuss DI and HAN costs in this section of my Direct Testimony because of their connection with AMI deployment and because they were addressed in the Amended CPCN proceeding, which was associated with AGIS.

The Company's AGIS plans are generally consistent with previously filed AGIS plans. Individual projects, as well as the overall program, are on track as outlined in earlier proceedings. Thus my testimony in this case largely provides

[3] Decision Nos. C21-0176 and C21-0177, both mailed March 19, 2021.
[4] Unanimous Comprehensive Settlement Agreement in Proceeding No. 21A-0279E (February 18, 2022).
[5] Decision R22-0131 (Mailed March 7, 2022).

updates on the specific costs relevant to the AGIS tracker discussed by Company witnesses Ms. McKoane and Mr. Freitas.

Q. WHAT INFORMATION DO YOU PROVIDE IN THIS SECTION OF YOUR TESTIMONY?

A. I first provide a brief overview of the role of Technology Services in AGIS implementation and outline the work that has been completed and in-serviced. I then present Technology Services' IT capital forecasts for AGIS for 2022 and 2023, discussing the specific projects that Technology Services is implementing in 2022 and 2023, which are related to ADMS and AMI, as well the O&M costs related to ongoing support of the AGIS initiative, to illustrate the reasonableness of the Company's overall requests with respect to AGIS costs. I also provide an update on the Company's development and deployment of DI and HAN capabilities, consistent with the Amended AGIS CPCN Settlement.

Q. WHAT IS TECHNOLOGY SERVICES' ROLE IN PROVIDING SUPPORT FOR AGIS IMPLEMENTATION?

A. The Company's AGIS initiative involves a coordinated approach in planning, design, build, deployment, and ongoing support from Technology Services and Distribution. Overall, Technology Services is responsible for the IT integration of AGIS systems and data with other back office applications existing at the Company. By IT integration, I refer to the need to integrate the technical components of the AGIS initiative with other Company applications to allow the efficient, timely, and secure transfer of data between AGIS systems and other Company systems. The goal of integration is to ensure new applications and data

are able to communicate with the Company's existing applications, so Public Service is able to use the data to improve Company operations and provide a better customer experience. This work requires new software and additional server hardware to support the increased data management and data storage requirements, as well as an increase in the number of support staff.

Q. WHAT WORK HAS TECHNOLOGY SERVICES ALREADY UNDERTAKEN IN COLORADO WITH RESPECT TO THE AGIS INITIATIVE?

A. As previously noted, the Company obtained a CPCN for the CPCN Projects (*i.e.*, AMI, FAN, and IVVO) in 2017. Before and after the CPCN was obtained, Technology Services has been working toward implementation of the various components of the AGIS initiative, undertaking scoping, planning, design, RFP, and contracting with respect to a number of the AGIS components. Further, Public Service is already deploying and operating some components and facets of the AGIS initiative. For example, full scale AMI meter deployment began in June of 2021 and will continue through the end of 2024. Technology Services has deployed the AMI head-end software, and interfaces have been built to transfer the data to other applications. For example, Public Service is utilizing these AMI interfaces to provide customers who have AMI meters with more detailed information on their energy use. Additionally, ADMS was implemented in 2020 for Public Service, and was fully in-serviced across all Xcel Energy operating companies in 2022. Public Service has also deployed meters to support IVVO, and is utilizing the FAN to support AMI and IVVO.

I also note that the advanced meters deployed by the Company have embedded DI capabilities. DI involves a localized computer processing capability at the meter itself, which is designed to minimize calculating and feedback time to both the meter and a centralized computing/control system. As noted above, the Amended AGIS CPCN Settlement allows the Company to develop and deploy certain DI capabilities, as well as HAN functionality. The Company has conducted initial testing and validated that the meters can support DI and HAN capabilities, and is continuing to prepare processes to support DI and HAN.

Q. GIVEN THE WORK THAT HAS BEEN COMPLETED TO DATE, WHAT IS THE GENERAL STATUS OF TECHNOLOGY SERVICES' WORK WITH RESPECT TO FULL AGIS IMPLEMENTATION?

A. In addition to the work that has been completed and deployed to date, the Company will continue to deploy the FAN and AMI and add capabilities and functionality to AMI through interfaces and customer systems as AMI is deployed through 2024. The remaining software releases to support these AGIS components is expected to be completed and deployed in 2023; this work will supports the AMI deployment and additional AMI capabilities and will not be in-serviced until 2024, when AMI is planned to be fully deployed. As such, the individual projects I discuss below that will be in-serviced in 2022 and 2023 reflect only a portion of the Technology Services work. Beyond the 2023 Test Year, the Company is requesting continued deferral of AMI, FAN, and IVVO costs, as discussed by Company witness Ms. McKoane. Along with the capital additions in 2024, the AGIS tracker will also reflect an increase in the O&M credits from Xcel

Energy's other OpCos related to use of the AMI software shared asset in other jurisdictions, which offsets the increased capital costs for Public Service related to the AMI software shared asset.

A. Technology Services AGIS Capital Costs

Q. WHAT TYPES OF IT CAPITAL COSTS IS TECHNOLOGY SERVICES INCURRING TO IMPLEMENT THE AGIS PROJECTS?

A. Capital costs incurred by Technology Services include project implementation costs related to software licensing, hardware (servers and network), and implementation labor. Labor costs include requirement specification, design, application configuration, screen display development, network security configuration, testing, and implementation.

Q. WHAT AGIS-RELATED IT CAPITAL COSTS ARE YOU SUPPORTING IN THIS CASE?

A. The Technology Services AGIS IT capital additions I am supporting in this rate case are shown below in Table MOR-D-9. Capital additions for 2022 and 2023 are related to ADMS and AMI implementation. Capital additions through December 31, 2021 have been included in base rates through our 2021 Electric Phase I proceeding.

TABLE MOR-D-9
AGIS Technology Services Capital Additions
Public Service – Total Company

AGIS Program *($ in millions)*	**2021 (Actual)**	**2022**			**2023 (Forecast)**
		1/1 – 6/30 (Actual)	**7/1 – 12/31 (Forecast)**	**Total**	
ADMS	$0.0	$6.3	$0.1	$6.4	$0.0
AMI	$1.1	$0.0	$3.8	$3.8	$19.3
OTHER	$0.2	$0.0	$0.0	$0.0	$0.0
Total	**$1.3**	**$6.3**	**$3.9**	**$10.2**	**$19.3**

Total AGIS IT capital additions are also set forth in Attachment MOR-1 to my Direct Testimony.

Q. WHAT ARE THE KEY PROJECTS REFLECTED IN THE AGIS CAPITAL COSTS FOR 2022 AND 2023 PRESENTED IN TABLE MOR-D-9 ABOVE?

A. The ADMS capital costs are related to the final in-servicing of ADMS across all of Xcel Energy's OpCos. The AMI capital costs are related to the continuing IT integration of AMI with other Company applications, and the hardware necessary to support DI capabilities and HAN functionality. Below, I discuss each of the key projects in 2022 and 2023.

1. ADMS

Q. WHAT IS ADMS?

A. At a high level, ADMS is an integrated operating and decision software and hardware support system to assist control room, field personnel, and engineers with the monitoring, control, and optimization of the electric distribution system. It helps manage the complex interaction of distributed energy resources ("DER"),

outage events, feeder switching operations, and advanced applications such as IVVO and FLISR.

Q. WITH ADMS IMPLEMENTED FOR PUBLIC SERVICE IN 2020, WHAT IS INCLUDED IN THE ADMS CAPITAL ADDITIONS IN 2022?

A. After full implementation for Public Service in 2020, there were limited capital additions in 2021. The forecasted $6.4 million in capital additions in 2022 reflects that ADMS is a system designed for all Xcel Energy's OpCos, and includes revisions and upgrades allocated to Public Service as a result of ADMS implementation in other jurisdictions. Each time ADMS is rolled out in another jurisdiction, there are anticipated associated revisions and updates to the systems that will benefit all customers. The primary components of Technology Services' ADMS capital costs are labor, software, and hardware. The ADMS costs in this case are largely consistent with prior cost estimates related to final implementation of ADMS. As shown in Table MOR-D-9 above, most of these additions were in-service as of June 30, 2022.

2. AMI

Q. WHAT IS AMI?

A. At a high level, AMI is a system of advanced meters, communications networks, and data management systems that enable two-way communication between utilities' business and operational data systems and meters enabling added benefits for customers and the utilities. AMI meters are able to alert on specific operating events, measure and transmit voltage, current, and power quality data and can act as a "meter as a sensor," and for instance can provide near real-time

monitoring between the meter and ADMS. The AMI system must be integrated to other enterprise systems of record to enable end-to-end business transactional processing, and keep information timely, accurate and consistent in support of those business processes. Because AMI consists of both software and hardware and works with other Company systems, IT integration is key to the success of AMI.

Q. WHAT AMI CAPITAL ADDITIONS ARE INCLUDED IN 2022 AND 2023?

A. The AMI forecasted level of capital additions of $3.8 million in 2022 and $19.3 million in 2023 include AMI head-end software, software licenses, and Meter Data Lake to support the AMI meter deployment, as well as the deployment of hardware that was necessary to complete initial AMI testing, including DI and HAN functionality and will support DI capabilities and HAN functionality in the future.[6] Below, I highlight components of this work that each total over $1 million in capital additions for the period 2022-2023.

Q. PLEASE DESCRIBE THE WORK RELATED TO THE AMI HEAD-END SOFTWARE AND INTERFACES IN 2022 AND 2023.

A. As the Company has described in previous filings, the FAN allows intelligent field devices, ADMS, AMI, and other systems to connect and communicate. From the AMI head-end, Technology Services is developing and deploying a combination of new or enhanced interfaces to transfer the data to other applications, such as ADMS, the meter data management system, the billing and customer resource

[6] These costs are consistent with the costs presented in the Company's AGIS CPCN Annual Forecast Report for 2023, Proceeding No. 16A-0588E (October 31, 2022).

system, and the asset inventory management system. Technology Services is continuing this work in 2022 and 2023 as AMI continues to be deployed, with capital additions totaling approximately $8.7 million in 2023 related to the completion of the AMI head-end. Below, I discuss costs specifically associated with integration of the Meter Data Lake.

Q. CAN YOU DESCRIBE THE AMI SOFTWARE LICENSE COSTS IN 2022 AND 2023?

A. Yes. As the Company continues to deploy AMI meters through 2024, Technology Services will continue to incur costs for software licenses necessary for deployment. These licenses are endpoint costs that are billed on a per AMI meter basis. Capital additions for AMI software licenses are approximately $2.1 million in 2022 and $1.7 million in 2023.

Q. PLEASE DESCRIBE THE WORK RELATED TO THE METER DATA LAKE INTEGRATION IN 2022 AND 2023.

A. As the Company has described in previous filings, the Meter Data Lake is the repository and data distribution point for all meter reading and event information from the AMI headend, and the Meter Data Management (“MDM”) system. The data lake also provides reporting and analytics against this high volume, time-series data to support the AMI program. Technology Services is responsible for building and installation of required interfaces between the Meter Data Lake, the AMI head-end and MDM. This also includes costs related to licensing the software necessary to use the Meter Data Lake. Technology Services is continuing this

work in 2022 and 2023, with capital additions totaling approximately $8.9 million in 2023.

Q. PLEASE DESCRIBE THE AMI HARDWARE COSTS IN 2022.

A. The AMI hardware costs totaling approximately $1.6 million in capital additions in 2022 are related to Itron's Managed Application Servers. These servers were necessary to complete initial AMI testing, including DI and HAN functionality. As AMI meters are deployed, they are also now actively utilized to support HAN functionality as required by the Amended AGIS CPCN Settlement, and are being in-serviced in 2022.

Q. HOW WERE THE 2022 AND 2023 AMI FORECASTS DEVELOPED?

A. The AMI forecasts for 2022 and 2023 are largely consistent with budget development discussed in prior proceedings, but have been updated to reflect the revised AMI deployment scheduled discussed by Company witness Mr. Mino in his Direct Testimony. The additions forecasted in 2022 and 2023 were based upon expected purchases of AMI meter endpoint licenses for each period as well as expectations about the completion of the AMI software assets such as the AMI head-end. As discussed above, the majority of Technology Services' AMI costs will be in-serviced in 2024.

Q. TURNING TO DI AND HAN, ARE THERE ANY COSTS SPECIFIC TO THE DEVELOPMENT AND DEPLOYMENT OF DI AND HAN CAPABILITIES INCLUDED IN THE COST OF SERVICE IN THIS CASE?

A. No. Related to DI, as allowed by the Amended AGIS CPCN Settlement, the Company is currently in the early stages of DI development. For example, the

Company is currently exploring several grid-facing DI use cases and anticipates initially piloting these use cases internally to a small subset of meters. However, this work is planned to be in-serviced in 2024. The Company plans to address the grid-facing DI capabilities it deploys through the normal course of business as part of the Distribution System Plan stakeholder process. Related to HAN, the Company has completed the development and deployment of the HAN functionality of the advanced meters, consistent with the provisions of the Amended AGIS CPCN Settlement, but like DI, this functionality will not be in-serviced until 2024. The Company is also working to provide the required reporting elements for DI consistent with the DI Settlement as well. While customers will benefit from these investments as DI and HAN capabilities are deployed in 2022 and 2023, the capital investments will not be in-serviced (*i.e.*, the costs will not be borne by customers) until 2024.

B. <u>Technology Services AGIS O&M</u>

Q. WHAT TYPES OF IT O&M COSTS ARE TECHNOLOGY SERVICES INCURRING TO IMPLEMENT THE AGIS PROJECTS?

A. The types of O&M costs Technology Services is incurring and expects to incur for AGIS include hardware support, data storage, annual software maintenance, external labor for software support, and application support, which includes ongoing testing, review of processes, application of security patches to respond to evolving threats. AGIS O&M costs are shown in Table MOR-D-7 above and in Attachments MOR-2 and MOR-3.

Q. WHAT ARE THE PRIMARY COMPONENTS OF TECHNOLOGY SERVICES' O&M COSTS FOR AGIS COMPONENTS?

A. The primary components of Technology Services' O&M for AGIS components include the following:

- *ADMS* – O&M costs are related to support activities occurring occur after ADMS implementation, including contract labor, ongoing hardware and software maintenance, and warranty.

- *AMI* – As AMI meters are currently being deployed, there are corresponding Technology Services O&M expenses related to supporting these additional meters. For instance, additional AMI meters require additional software licenses to operate associated software. Support activities that will occur after AMI is implemented include contractor labor, maintenance, and warranty, encompassing incremental work related to hardware and software maintenance and licensing, for example, to support the increased data storage and processing related to AMI implementation.

- *FAN* – The primary components of Technology Services' FAN O&M include ongoing field support for devices deployed, hardware maintenance (patches and firmware upgrades), technical support for the network, and network operations center support for monitoring the network.

- *IVVO* – The primary components of Technology Services' IVVO O&M costs include ongoing hardware support, data storage, annual software maintenance, application support, and labor for software support

Q. WHAT DO YOU CONCLUDE FROM THE ABOVE DISCUSSION OF THE AGIS INITIATIVE?

A. AGIS implementation will transform grid operations and monitoring capabilities to enhance the customer experience, enable the design of new and expanded programs and rates for customers, promote energy efficiency and demand reductions, and enhance the Company's system planning capabilities to allow for increased distributed energy resources on the system. Technology Services provides support for the forecasted level of capital in 2022 and 2023 as well as

O&M costs that will enable implementation and maximize the benefits and value of these initiatives for our customers. Based on the support provided in my Direct Testimony, the level of Technology Services' AGIS costs included in the Test Year are reasonable for customers to support.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Statement of Qualifications

Michael O. Remington

Michael O. Remington is the Technology Services Regulatory Director, Advanced Grid, for Xcel Energy Services Inc. Michael is responsible for the regulatory aspects of the XES Technology Services role in the AGIS program. He directs and prepares testimony, supporting documents, and discovery responses related to Technology Services in filings on behalf of XES and its operating company affiliates, including Public Service Company of Colorado.

Michael has 24 years of experience in the field of IT, with 12 of those years in a management role. He joined Xcel Energy in July 2008, after almost eight years at IBM Global Services where he filled IT roles under contract for Xcel Energy. Michael began his career at Xcel Energy as a Senior Manager of IT Service Management and served in that position continuously for 11 years. His team was responsible for the administration of core IT service management processes, as well as compliance with several IT-related North American Electric Reliability Corporation regulatory standards. From October 2013 to January 2015, Michael served on temporary assignment in the XES General Counsel organization where he practiced law on behalf of Xcel Energy. In July 2019, Michael was promoted to Director of IT Operations, and in January 2021, he assumed the role of Technology Services Regulatory Director, Advanced Grid, his current position.

Michael graduated from the University of Minnesota where he earned a Bachelor of Arts degree in Political Science. He earned a Juris Doctor degree from Mitchell Hamline School of Law.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

* * * *

IN THE MATTER OF ADVICE LETTER NO. 1906-ELECTRIC OF PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ITS COLORADO PUC NO. 8-ELECTRIC TARIFF TO REVISE JURISDICTIONAL BASE RATE REVENUES, IMPLEMENT NEW BASE RATES FOR ALL ELECTRIC RATE SCHEDULES, AND MAKE OTHER TARIFF PROPOSALS EFFECTIVE DECEMBER 31, 2022.	)	**PROCEEDING NO. 22AL-XXXXE**

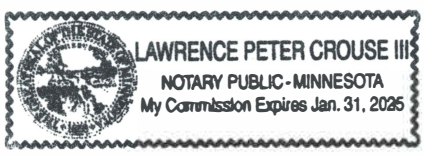
AFFIDAVIT OF MICHAEL O. REMINGTON
ON BEHALF OF
PUBLIC SERVICE COMPANY OF COLORADO

I, Michael O. Remington, being duly sworn, state that the Direct Testimony and attachments were prepared by me or under my supervision, control, and direction; that the Direct Testimony and attachments are true and correct to the best of my information, knowledge and belief; and that I would give the same testimony orally and would present the same attachments if asked under oath.

Dated at Woodbury, Minnesota, this 21ST day of Nov., 2022.

Michael O. Remington
Technology Services Regulatory Director, Advanced Grid

Subscribed and sworn to before me this 21ST day of November, 2022.



Notary Public

My Commission expires 1-31-25