

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

* * * * *

RE: IN THE MATTER OF ADVICE LETTER)
NO. 912-GAS FILED BY PUBLIC SERVICE)
COMPANY OF COLORADO TO REVISE ITS)
COLORADO PUC NO. 6-GAS TARIFF TO)
IMPLEMENT A GENERAL RATE) PROCEEDING NO. 17AL-____G
SCHEDULE ADJUSTMENT AND OTHER)
RATE CHANGES EFFECTIVE ON 30-DAYS)
NOTICE.)

DIRECT TESTIMONY AND ATTACHMENTS OF DAVID C. HARKNESS

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

June 2, 2017

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SUMMARY OF THE DIRECT TESTIMONY OF DAVID C. HARKNESS

1 Mr. David C. Harkness is Chief Information Officer and Senior Vice President
2 of Xcel Energy Services Inc. (“XES”). In this position, Mr. Harkness is responsible for
3 the XES Business Systems organization, which provides Information Technology
4 (“IT”) services to XES and its operating company affiliates, including Public Service
5 Company of Colorado (“Public Service” or the “Company”). Mr. Harkness is also
6 responsible for the corporate Business Continuity function and IT disaster recovery.

7 In his Direct Testimony, Mr. Harkness supports the following Business
8 Systems capital additions for the 2018-2020 Multi-Year Plan (“MYP”):

**Business Systems Capital Additions
Public Service (Total Company Gas)
(Dollars in Millions)**

YEAR	2017	2018	2019	2020
Aging Technology	\$45.2	\$27.1	\$24.3	\$11.3
Cyber Security	\$4.9	\$3.7	\$4.8	\$5.0
Emergent Demand	\$1.7	\$8.1	\$14.0	\$15.5
Enhance Capabilities	\$15.2	\$13.1	\$6.8	\$2.6
Totals	\$67.0	\$52.0	\$49.9	\$34.4

1 Company witness Ms. Melissa L. Ostrom utilizes these capital additions to develop
2 the plant-related roll forward, which is in turn used by Company witness Mr. Steven
3 P. Berman to calculate the 13-month average plant in service balance for each year
4 of the MYP. Mr. Harkness also supports the \$26.1 million in 2016 Operations &
5 Maintenance (“O&M”) expenses that are included in the MYP cost of service, subject
6 to Company-wide O&M adjustments for labor and productivity supported by
7 Company witnesses Ms. Sharon L. Koenig and Mr. Scott B. Brockett.

8 In support of these requests, Mr. Harkness provides a description of the
9 Business Systems organization and the IT services it provides to Public Service; a
10 description of the Business Systems capital budgeting process; support for Business
11 Systems’ capital additions to be placed in-service between 2017 and 2020 that
12 impact Public Service’s cost of service; and presents and supports Business
13 Systems’ O&M expenditures during 2016, which forms the basis of the MYP cost of
14 service.

15 Mr. Harkness recommends that the Colorado Public Utilities Commission
16 (“Commission”) approve the level of capital additions and O&M presented in his

- 1 testimony as reasonable and necessary to support Public Service's ability to provide
- 2 safe and reliable electric service to its customers, and therefore are a reasonable
- 3 basis for the Company's cost of service.

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LIST OF ATTACHMENTS

Attachment DCH-1	Business Systems Capital Additions: 2018-2020
Attachment DCH-2	Business Systems 2016 O&M by Cost Element
Attachment DCH-3	Business Systems 2016 O&M Federal Energy Regulatory Commission Account

GLOSSARY OF ACRONYMS AND DEFINED TERMS

<u>Acronym/Defined Term</u>	<u>Meaning</u>
CIO	Chief Information Officer
CIP	Critical Infrastructure Protection
Commission	Colorado Public Utilities Commission
CRS	Customer Resource System
DMZ	Demilitarized zone
DP	Damage prevention
ESB	Enterprise service bus
ESOMS	Electric Shift Operations Management System
FERC	Federal Energy Regulatory Commission
GIS	Geographical Information System
GL	General Ledger
HR	Human Resources
IEE	Institution of Electrical Engineers
IT	Information Technology
IVR	Interactive Voice Response
LAN	Internal network or local area network
MAOP	Maximum Allowable Operating Pressure
MRAS	Meter Read Acquisition System
MYP	Multi-Year Plan

NERC	North American Electric Reliability Corporation
NMS	Network Management System
NOC	Network Operations Center
O&M	Operation and Maintenance
OEMs	Original Equipment Manufacturers
OMS	Outage Management System
PBX	Private Branch Exchange
PC	Personal computer
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM	Project Manager
Public Service, or the Company	Public Service Company of Colorado
SCADA	Supervisory Control and Data Acquisition
SVP	Senior Vice President
T&D	Transmission and distribution
WAM	Work and Asset Management
Xcel Energy	Xcel Energy Inc.
XES	Xcel Energy Services Inc.

1 **Q. PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND**
2 **QUALIFICATIONS.**

3 A. As the Chief Information Officer and Senior Vice President (“CIO & SVP”)
4 Business Systems, I am responsible for the XES Business Systems
5 organization. Business Systems provides Information Technology (“IT”)
6 services to XES and the Xcel Energy operating companies, including Public
7 Service, primarily on a common platform, with costs allocated to specific
8 utilities and jurisdictions as described by Company witness Mr. Adam R.
9 Dietenberger. I am also responsible for the corporate business continuity
10 function and IT disaster recovery. A statement of my education and relevant
11 experience is set forth following my Direct Testimony.

12 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY AND**
13 **ATTACHMENTS?**

14 A. The purpose of my Direct Testimony is to support Business Systems plant in-
15 service additions for 2017 through 2020 that are included in the Multi-Year
16 Plan (“MYP”) period, forecasted calendar years 2018, 2019 and 2020 (“MYP
17 Test Years”) cost of service that is presented by Company witness Mr. Steven
18 P. Berman. I am also supporting the Company’s 2016 Business Systems
19 O&M expense of \$26.1 million, as adjusted for labor costs and a productivity
20 factor as discussed and quantified by Company witnesses Mr. Scott B.
21 Brockett and Ms. Sharon L. Koenig, as the appropriate level of Business
22 Systems’ Operations & Maintenance (“O&M”) expense for the MYP period. To

1 support this request, I will provide the following information in my Direct
2 Testimony:

- 3 • A description of the Business Systems organization and the
4 information technology services that we provide to the Xcel Energy
5 companies, including Public Service;
- 6 • A description of the Business Systems capital budgeting process that
7 determines which capital projects are selected for implementation;
- 8 • Presentation and support of the Business Systems capital additions
9 that are planned to go into service during 2017, 2018, 2019, and 2020
10 that impact Public Service; and
- 11 • Presentation and support of Business Systems' O&M expenditures
12 during 2016, which form the O&M basis of for the MYP cost of service.

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

15 A. Yes, I am sponsoring three attachments: Attachment DCH-1 (Business
16 Systems Capital Additions: 2018-2020), Attachment DCH-2 (Business
17 Systems 2016 O&M by Cost Element), and DCH-3 (Business Systems O&M
18 by Federal Energy Regulatory Commission ("FERC") Account).

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

21 A. I recommend that the Colorado Public Utilities Commission ("Commission")
22 approve capital additions of the \$52.0 million Total Company Gas in 2018,
23 \$49.9 million Total Company Gas 2019, and \$34.4 million Total Company
24 Gas 2020 as presented in my testimony. These investments are reasonable
25 and necessary to support Public Service's ability to provide safe and reliable

1 gas service to its customers, and therefore are a reasonable basis for the
2 Company's MYP cost of service and are supported by Company witness Mr.
3 Berman. I also recommend that the Commission approve the Company's
4 requested O&M expense as a reasonable level of O&M expense.

5

1 **II. BUSINESS SYSTEMS FUNCTIONS AND ACTIVITIES**

2 **Q. PLEASE PROVIDE AN OVERVIEW OF THE BUSINESS SYSTEMS**
3 **BUSINESS UNIT.**

4 A. Business Systems is XES' centralized IT organization, providing technology
5 services to support all aspects of the operations of the Xcel Energy operating
6 companies, including Public Service. While some IT projects are specific to
7 an individual operating company and/or to electric or gas jurisdictions, the
8 larger majority of Business Systems work is completed on an Xcel Energy-
9 wide basis. In this era, it is hard to identify an aspect of our operations that
10 Business Systems does not support in some manner.

11 **Q. HAVE THERE BEEN ANY CHANGES TO BUSINESS SYSTEMS' KEY**
12 **FUNCTIONS AND RESPONSIBILITIES SINCE THE COMPANY'S LAST**
13 **RATE CASE, PROCEEDING NO. 15AL-0135G ("2015 PHASE I")?**

14 A. Yes. The Enterprise Security Services group was formed outside of Business
15 Systems to increase focus on security threats. Business Systems still
16 supports cyber security IT project delivery in partnership with this new
17 organization. I therefore discuss Business Systems' cyber security efforts,
18 while the Enterprise Security Services costs are part of the other Shared
19 Corporate Business Areas supported by Company witness Mr. Gregory J.
20 Robinson.

1 **Q. PLEASE DESCRIBE BUSINESS SYSTEMS' KEY FUNCTIONS AND**
2 **RESPONSIBILITIES.**

3 A. The key services Business Systems provides include the following:

- 4 • *Foundational Technology Infrastructure:* Support for each employee's
5 hardware and software needs, including the provision and maintenance of
6 hardware such as computers, phones, and servers; maintaining and
7 updating operating systems; and providing sufficient data storage
8 capabilities. Business Systems also provides protection from cyber
9 security attacks, including but not limited to computer viruses.
- 10 • *Systems Control:* Technology support to our generation, transmission, and
11 distribution business areas to enable management and operation of the
12 electric and gas system. One of the systems that we maintain is the
13 Outage Management System ("OMS"), which tracks customer outages
14 and dispatches repair crews to restore service. Business Systems also
15 supports the Supervisory Control and Data Acquisition ("SCADA") system,
16 which is used to monitor the health of the electric and gas transmission
17 and distribution systems.
- 18 • *Customer IT Support:* Hardware and software needed to facilitate
19 interactions with Public Service customers. These activities include
20 maintaining the Xcel Energy website that provides important information to
21 customers about outages, the status of their account, natural gas safety,
22 and Public Service operations. Business Systems also maintains the
23 Customer Resource System ("CRS"), which is our customer information
24 system, and which generates approximately 1.4 million billing statements
25 to Public Service retail customers on a monthly basis. Business Systems
26 also supports the Interactive Voice Response ("IVR") software that
27 enables interaction with customers via telephone keypad or speech
28 recognition.

- 1 • *Corporate IT Support.* Business Systems provides IT support for
2 necessary corporate functions such as Human Resources and Financial
3 Management. This includes maintaining software, like our new SAP
4 General Ledger (“GL”) and Work and Asset Management (“WAM”) system
5 that improves enterprise processes and enables creation, tracking,
6 reporting, and analysis of budget, forecasts, and actual financials, as well
7 as all employee-related information.

8 **Q. HOW DOES BUSINESS SYSTEMS SUPPORT THE FUNCTIONS**
9 **DESCRIBED ABOVE?**

10 A. Along with our day-to-day work with the technology we have deployed,
11 Business Systems makes capital investments and incurs O&M expenses to
12 support other business areas and functions across Xcel Energy. I discuss
13 these capital investments and O&M expenses throughout the remainder of
14 my Direct Testimony.

15

1 **III. BUSINESS SYSTEMS CAPITAL INVESTMENT STRATEGY**

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

4 A. This section of my Direct Testimony provides an overview of the primary
5 drivers of Business Systems' capital additions and discusses Business
6 Systems' project development, project budgeting, and project management
7 processes.

8 **A. Overview of Capital Project Needs**

9 **Q. WHAT ARE THE PRIMARY DRIVERS OF THE CAPITAL ADDITIONS**
10 **THAT YOUR ORGANIZATION PLACES IN SERVICE?**

11 A. The four key areas driving Business Systems investments are:

- 12 • Addressing evolving *cyber security* threats and requirements;
- 13 • Replacing *aging technology*;
- 14 • *Enhancing capabilities* of our business and our ability to service
15 customers; and
- 16 • Responding to *Emergent Demands* for IT services and solutions.

17 **Q. GIVEN THESE BUSINESS DRIVERS, WHAT TYPES OF CAPITAL**
18 **PROJECTS DOES BUSINESS SYSTEMS UNDERTAKE?**

19 A. Business Systems' capital additions include hardware (desktop and laptop
20 computers, servers, routers, phone systems, radio systems, microwave
21 communication systems, and network equipment), software (computer
22 programs), and related technology infrastructure investments, and cyber

1 security solutions that support the Xcel Energy operating companies'
2 business operations.

3 The need for Business Systems investments within a utility company is
4 just as essential as the need for investments in pipelines, meters, and fleet. In
5 today's world, very few large businesses can function in a safe and reliable
6 manner, nor provide appropriate customer service levels, without IT
7 investments.

8 **Q. HOW DOES BUSINESS SYSTEMS PLAN FOR AND ANTICIPATE**
9 **UPCOMING IT NEEDS?**

10 A. The Business Systems area is constantly evaluating existing and emerging
11 technology needs within Xcel Energy, including Public Service. These
12 evaluations consider not only current needs, but also upcoming needs that
13 may evolve from aging technologies, emerging technologies, and potential
14 changes to the way we do business. This process involves review of likely
15 scenarios in future as well as current years, so we can develop a
16 comprehensive but flexible strategy to address the changing IT landscape
17 and support business objectives.

18 Generally speaking, however, our investments typically fall into the
19 categories identified above. To further underscore the importance of these
20 Business Systems investments on behalf of Public Service customers, I
21 describe these categories in more detail below, and also describe the key
22 capital projects within each category.

1 **Q. PLEASE DESCRIBE CYBER SECURITY PROJECTS.**

2 A. Investments in cyber security ensure the availability, integrity, and
3 confidentiality of our IT systems, as well as compliance with legal and
4 regulatory obligations. These investments provide prevention, detection,
5 containment, and repair services to protect the Company from cyber-attacks
6 and to assist in recovery if such an attack occurs. An example of a cyber
7 security project is the Network Security and Protection project, which will use
8 technology to segment, isolate, monitor and control communication to protect
9 critical infrastructure areas.

10 Cyber security does not include physical security investments, such as
11 property security. Physical security is part of Corporate Services and is
12 discussed by Company witness Mr. Robinson.

13 **Q. PLEASE DESCRIBE AGING TECHNOLOGY PROJECTS.**

14 A. IT assets are no different from other physical assets in that they are subject to
15 aging and technical obsolescence. A reasonably up-to-date infrastructure is
16 necessary for the Company to continue to meet current legal and regulatory
17 requirements as well as the service expectations of Public Service customers.
18 Business Systems seek to maximize investments by harvesting the value of
19 existing systems prior to replacing them. However, there comes a time when
20 we must upgrade our aging systems due to business, reliability, or
21 compliance needs. Aging technology projects include routine refresh projects
22 and more specific projects.

1 **Q. WHAT ARE ROUTINE REFRESH PROJECTS?**

2 A. Given the breadth and depth of the different equipment Xcel Energy utilizes
3 and manages, Business Systems refreshes smaller components of
4 technology infrastructure on regular cycles. We annually budget for these
5 replacements as routine refresh projects. An example of an aging technology
6 routine refresh project is the Annual Personal Computer (“PC”) Refresh,
7 which upgrades approximately 20 percent of desktop computers annually.

8 **Q. WHAT ARE SPECIFIC REFRESH PROJECTS?**

9 A. Unlike routine refresh projects, which generally address smaller capital
10 replacements on a regular cycle or which are routinely needed, we also must
11 manage larger technology replacements for equipment that is nearing the end
12 of its useful life. Specific refresh projects are often managed over a longer
13 term, reoccur less frequently, and are significantly more complex than routine
14 refresh projects. An example of a specific refresh project is the Windows 2003
15 upgrade, which will upgrade company servers to a more secure version of
16 windows server.

17 **Q. PLEASE DESCRIBE PROJECTS THAT ENHANCE CAPABILITIES.**

18 A. Technology can offer the opportunity to improve productivity, enhance
19 communications between systems and between people, and use data more
20 efficiently. Business Systems is constantly evaluating new technologies and
21 helping business areas examine ways to increase efficiencies and enhance
22 communications between systems that benefit the Company and our

1 customers. Enhancing capabilities investments are technologies implemented
2 that can offer efficiency benefits that outweigh their implementation costs. An
3 example of an enhancing capabilities project is the Customer Care Interactive
4 Voice Response (“IVR”) project, which is intended to upgrade the existing
5 system to ensure appropriate and efficient response to the approximately 14
6 million customer calls Xcel Energy receives each year.

7 **Q. PLEASE DESCRIBE EMERGENT DEMAND PROJECTS.**

8 A. This category relates to projects that are typically in the early stages of
9 planning. The Emergent Demand Account is an account created to ensure
10 Business Systems is able to meet the aging technology, cyber security, and
11 efficiency needs that inevitably emerge in each year. Given the ever-changing
12 nature of technology and emerging risks, it is frequently not possible to
13 specifically identify all necessary projects that may arise or become critical in
14 a given year. For example, it is not always possible to predict what kind of
15 security risk might be created by hackers as technology continues to develop.
16 In other situations, during detailed project development it becomes clear that
17 additional benefits or long-term cost savings could be captured by expanding
18 the scope of the project. Previously, Business Systems had to delay or cancel
19 planned projects or absorb unplanned work and costs when a new technology
20 or critical need was identified. The Emergent Demand Account is used to fund
21 important and unexpected projects or changes in scope of previously-planned
22 projects.

1 **Q. ARE BUSINESS SYSTEMS CAPITAL NEEDS READILY PREDICTABLE?**

2 A. In some cases they are, but in other cases Business Systems must react
3 quickly to changing information technology risks and needs. For example,
4 replacing the GL system required several years of planning due to the size
5 and complexity of the project. Business Systems also knew about the pending
6 need several years in advance, due to the age of the prior system. Many
7 other needs are not so readily estimated because IT is continuously evolving.
8 New cyber security risks and new technologies are emerging all the time,
9 requiring flexibility within Business Systems to respond to those risks and
10 needs.

11 **B. Business Systems Budget Development and Management**

12 **Q. HOW DOES BUSINESS SYSTEMS IMPLEMENT CAPITAL PROJECTS**
13 **FOR PUBLIC SERVICE?**

14 A. Although Business Systems implements some projects specific to individual
15 operating companies, including Public Service, we achieve efficiencies of
16 scale by performing most activities on a system-wide basis. Accordingly,
17 many of the Business Systems projects are planned and budgeted at the XES
18 level, allocated or assigned to the appropriate operating companies, and
19 implemented throughout the different operating companies. When certain
20 projects, such as the Public Service Dispatch Console Upgrade Project
21 described later in my testimony, are developed and implemented solely for

1 Public Service or other individual operating companies, the costs are directly
2 assigned to that utility.

3 **Q. HOW DO THE SYSTEM-WIDE CAPITAL PROJECTS IMPLEMENTED BY**
4 **BUSINESS SYSTEMS AFFECT PUBLIC SERVICE?**

5 A. Company witness Mr. Adam R. Dietenberger explains the Company's cost
6 allocation and assignment process for appropriately allocating costs to the
7 Public Service Gas utility.

8 **Q. PLEASE DESCRIBE THE PROCESS BUSINESS SYSTEMS USES TO**
9 **PREPARE ITS CAPITAL BUDGETS.**

10 A. Business Systems uses an IT Governance process to evaluate any proposed
11 Business Systems investment. IT Governance is Business Systems' budget
12 development, project prioritization, and project oversight process, which helps
13 to establish budgets that are reasonable, and to manage our capital
14 expenditures accordingly. These budget processes help ensure Company
15 budgets are reasonably reflective of the projects that will be placed in service
16 during the relevant year or years.

17 **Q. HOW DOES THE IT GOVERNANCE PROCESS WORK?**

18 A. As part of the IT Governance process, key Business Systems leaders
19 oversee IT projects as they move from project inception towards in-service,
20 thereby ensuring that projects comply with relevant IT portfolio and project
21 management requirements. Projects are reviewed so that scope and costs

1 are managed from inception through implementation. The IT Governance
2 process oversees IT projects during each phase of the project.

3 **Q. DOES BUSINESS SYSTEMS TAKE STEPS TO MONITOR PROJECT**
4 **VARIANCES BETWEEN ACTUAL EXPENDITURES AND BUDGET?**

5 A. Yes. Project expenditures are monitored on a monthly basis. Any deviations
6 are evaluated and variance explanations prepared. In addition, action plans
7 are developed to mitigate variations in actual to budgeted expenditures.
8 These plans may either reduce or delay other expenditures to support the
9 overall authorized budget. If authorized budget adjustments are required, they
10 are identified and approved at an appropriate level of management. I note
11 that, as described by Company witness Mr. Robinson, Business Systems is
12 required to manage to its overall Finance Council- and Board-approved
13 capital budget.

1 **C. Business Systems Trends and Business Support**

2 **Q. WHAT ARE THE ANTICIPATED LONG-TERM TRENDS IN THE**
3 **COMPANY'S INVESTMENT IN BUSINESS SYSTEMS?**

4 A. Business Systems had a relatively steady level of IT investment prior to 2014,
5 with higher levels of investment since that time. Prior to 2014, Xcel Energy
6 largely focused incremental investments on maintaining existing IT assets
7 and service levels while managing or reducing costs associated with our
8 systems. Consequently, for a number of years we were able to limit our
9 investments while harvesting the value of our assets.

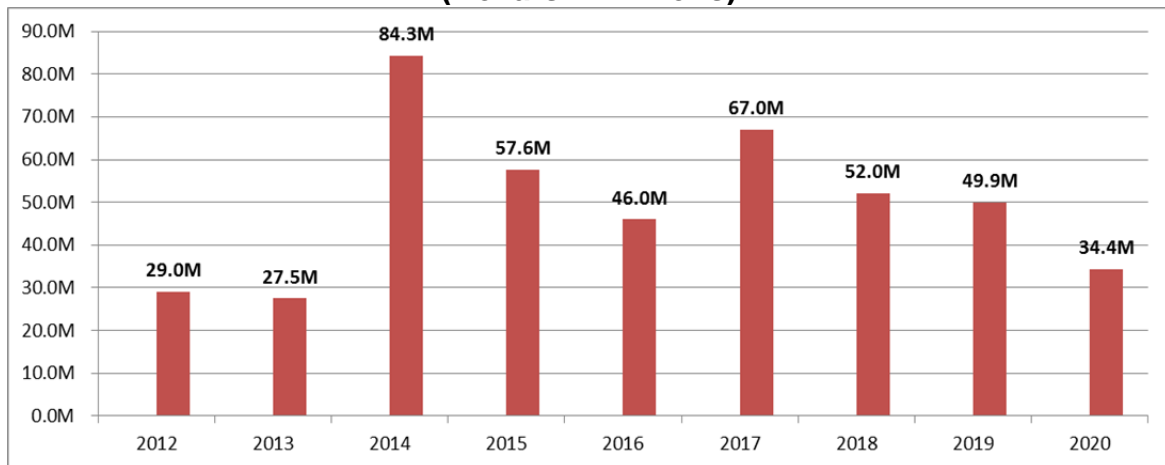
10 However, due to the age of Xcel Energy's IT systems and the ever-
11 changing business and regulatory requirements that affect the Company's
12 and our customers' Information Technology needs, we entered a phase of
13 replacement and upgrade of these systems in the years 2014-2017.
14 Subsequently, Public Service Gas IT expenses are expected to level off in
15 2018-2020, although higher levels of investment will likely be needed in the
16 future when larger systems require major upgrades or replacement.

17 **Q. CAN YOU DEPICT THIS TREND IN TERMS OF CAPITAL ADDITIONS**
18 **AFFECTING PUBLIC SERVICE'S RATE BASE?**

19 A. Yes. Figure DCH-D- 1 below depicts our capital additions trend from 2012 to
20 2020. It is important to be clear that this Figure illustrates when projects are
21 placed in service, and that many technology projects are planned, developed,
22 and implemented (placed in service) over multiple years. As such, capital

1 additions trend information will show larger increases when more or larger
2 projects are placed in service, rather than when the expenditures are made.

Figure DCH-D- 1
Business Systems Capital Additions
Public Service (Total Company Gas)
(Dollars in Millions)



3 **Q. HOW DOES INVESTMENT IN BUSINESS SYSTEMS IMPACT THE OTHER**
4 **BUSINESS AREAS' ONGOING O&M AND SERVICE LEVELS?**

5 A. While some Business Systems projects are simply foundational projects
6 necessary to keep the business running, others contribute to O&M savings for
7 various Business Areas through investments in technology. As discussed by
8 Company witness Mr. Brockett, Public Service is proposing an MYP over the
9 next several years assuming largely flat O&M as compared to 2016, and
10 Business Systems capital investments play a role in that process.

11 Some illustrative projects that are contributing to cost avoidance at
12 Public Service and to containing Company O&M budget growth include:

- 13 • In 2016, Xcel Energy implemented the Business Intelligence (BI)
14 suite to help automate a variety of manual reports. By leveraging a

1 common tool suite and data warehouse, this project helped to lower
2 support costs and make data modeling and data aggregation
3 development easier and faster. The BI tools are also fully aligned
4 with SAP's strategic development roadmap and therefore will help
5 to continue future reporting efficiencies for Xcel Energy companies,
6 including Public Service Gas.

- 7 • In 2017, we are undertaking the project IrthNet combining location
8 assessment and Damage Prevention into a single package. Due to
9 increased technology we will be reducing current maintenance and
10 replacement costs of multiple technology systems, reducing
11 repairs, and improving the process eliminating manual
12 synchronization of locates.
- 13 • In 2017, our Maximum Allowable Operating Pressure ("MAOP")
14 Calculations for Gas System project will improve our ability to
15 calculate the MAOP consistent with Pipeline and Hazardous
16 Materials Safety Administration ("PHMSA") regulations. By
17 deploying new software to calculate MAOP in Geographical
18 Information System ("GIS") SmallWorld without any data
19 translation, and integrating the new tool with other critical systems,
20 the project is expected to contribute to gains in Gas Engineering
21 Support Service and increased efficiencies across engineering
22 groups.
- 23 • In 2020, we are completing a Real Property Asset Management
24 (RPAM) Project, which implements facilities maintenance requests,
25 work assignments, and tracking. This project combined multiple
26 applications and allowed for process improvements, including
27 space moves, additions and changes, as well as facility
28 maintenance. Savings occur from decommissioning one application
29 and simplifying work flows and processes.

1 **Q. WHAT IS THE OVERALL IMPACT OF RECENT BUSINESS SYSTEMS**
2 **INVESTMENTS ON PUBLIC SERVICE'S COST OF PROVIDING UTILITY**
3 **SERVICE?**

4 A. As previously noted, Business Systems' investments affecting the Public
5 Service Gas business have increased in recent years due to the need for
6 greater focus on and attention to IT needs within the Company. At the same
7 time these investments are keeping the Company operating, protecting
8 important data, and supporting customer service, they are also helping to
9 contain the Company's overall O&M levels. Our work can help other areas of
10 the Company avoid cost increases, keeping total costs at reasonable levels.

1 **IV. BUSINESS SYSTEMS CAPITAL ADDITIONS**

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

4 A. This section of my Direct Testimony discusses the major planned investments
5 Business Systems anticipates for 2017 through 2020. Company witness Ms.
6 Melissa L. Ostrom utilizes these capital additions to develop the plant-related
7 roll forwards, which are in turn used by Company Witness Mr. Berman to
8 calculate the 13-month average plant in service balances included in the rate
9 base of the MYP Forecasted Test Years.

10 **Q. WITH FORECAST TEST YEARS OF 2018, 2019 AND 2020, WHY ARE**
11 **YOU PRESENTING TESTIMONY REGARDING 2017 CAPITAL**
12 **ADDITIONS?**

13 A. Since the rate base for a particular year is based on a 13-month average
14 plant-in-service, presenting 2017 data permits a full and transparent look at
15 the major drivers of the Company's capital additions during the forecasted
16 MYP period.

17 **A. Capital Additions Overview**

18 **Q. WHAT MAJOR CAPITAL PROJECTS DOES BUSINESS SYSTEMS**
19 **ANTICIPATE COMPLETING BETWEEN 2017 AND 2020?**

20 A. As described earlier in my Direct Testimony and depicted in Table DCH-D-1
21 below and Attachment DCH-1, we anticipate undertaking major capital

1 projects from 2017 through 2020 to address Aging Technology and Cyber
2 Security, to Enhance Capabilities, and to account for Emergent Demand:¹

**Table DCH-D-1
Business Systems Capital Additions
Public Service (Total Company Gas)
(Dollars in Millions)**

YEAR	2017	2018	2019	2020
Aging Technology	\$45.2	\$27.1	\$24.3	\$11.3
Cyber Security	\$4.9	\$3.7	\$4.8	\$5.0
Enhance Capabilities	\$15.2	\$13.1	\$6.8	\$2.6
Emergent Demand	\$1.7	\$8.1	\$14.0	\$15.5
Totals	\$67.0	\$52.0	\$49.9	\$34.4

3 It is important to be clear that this data reflects capital additions, not
4 expenditures—meaning projects being placed in service, rather than year-
5 over-year spend. In-servicing of projects can vary quite a bit based on
6 Company needs, completion of larger projects, and the like.

7 Some of these projects in these categories, such as Network Strategy -
8 Transmission and Distribution (“T&D”) Substation Connectivity in the Aging
9 Technology category, will continue over multiple years, with portions of the
10 project placed in service as they are put to use each year. The major capital
11 projects Business Systems expects to complete during the plan period are
12 discussed in more detail below, under each MYP Test Year.

¹ These numbers are stated on a Total Company basis, meaning that they include both gas utility-specific projects and common electric/gas projects stated at the total Public Service level.

1 **Q. HOW DID BUSINESS SYSTEMS IDENTIFY ITS MAJOR PLANNED**
2 **INVESTMENTS OVER THE MYP PERIOD?**

3 A. For purposes of supporting the Business Systems MYP budgets in this
4 testimony, we identified projects that were budgeted to cost approximately
5 \$800,000 or more, with a goal of presenting approximately 80 percent of the
6 planned Business Systems investments. Ultimately, the capital additions
7 discussed in this testimony roughly reflect 80 to 90 percent of all Business
8 Systems capital additions placed in service during 2017 and the MYP period.

9 **Q. IS ADDITIONAL INFORMATION PROVIDED IN ATTACHMENT DCH-1?**

10 A. Yes. Attachment DCH-1 provides additional detail regarding the capital
11 additions for the base period of 2017 through 2020. The columns in this
12 spreadsheet provide the following information:

Table DCH-D-2

Column A	Work Order Number	The parent project number used to denote the project.
Column B	Description	A brief description of the project from our budget system.
Column C	Estimated In-Service Date	The date the project is expected to be placed into service.
Columns F, G and H	Activity Years 2018, 2019 and 2020	The annual amount budgeted to be placed into service for each respective year.
Column F	Project Category	The category of project for the particular capital addition workorder.
Column G	Project Name	The project name referenced in testimony.

1 **Q. IN COLUMN C OF ATTACHMENT DCH-1, ESTIMATED IN-SERVICE DATE,**
2 **THERE ARE A NUMBER OF WORKORDERS WITH AN IN-SERVICE DATE**
3 **OF “ROUTINE.” WHY ARE THESE PROJECTS INCLUDED IN THIS**
4 **ATTACHMENT?**

5 A. Some of the projects listed with in-service dates of “routine” represent
6 ongoing projects that occur each year. Routine asset refresh projects are
7 discussed in more detail below in the Aging Technology section of my Direct
8 Testimony.

9 **Q. IS PUBLIC SERVICE REQUESTING TO INCLUDE THESE CAPITAL**
10 **ADDITIONS FOR BUSINESS SYSTEMS IN RATE BASE?**

11 A. Yes. Company witness Ms. Ostrom utilizes the capital additions I describe to
12 develop the plant-related roll forward that Company witness Mr. Berman uses
13 to calculate the 13-month average plant in-service for each year of the MYP.

14 **Q. ARE YOU CONFIDENT THAT THESE PLANNED CAPITAL ADDITIONS**
15 **WILL MEET THEIR CURRENT BUDGETS AND BE PLACED INTO**
16 **SERVICE BY THE END OF THE TEST YEAR?**

17 A. Yes. The IT Governance process is utilized to continually monitor the project
18 portfolio and ensure that in-service and budget commitments are made. If
19 business priorities change, this process also determines appropriate portfolio
20 course corrections to ensure the highest priority investments are made within
21 budget and timeline thresholds.

1 Q. WHAT DO YOU CONCLUDE REGARDING THE FORECASTED COSTS
2 FOR THE BUSINESS SYSTEMS CAPITAL PROJECTS THAT WILL GO
3 INTO SERVICE IN 2017 AND THE MYP PERIOD?

4 A. I conclude that the capital additions have been, or will be, prudently incurred,
5 reasonable in cost and used and useful in supporting Public Service's ability
6 to provide safe and reliable gas service to its customers.

7 **B. 2017 Capital Additions**

8 Q. WHAT CAPITAL ADDITIONS IS BUSINESS SYSTEMS PLANNING TO
9 MAKE IN 2017?

10 A. The total Public Service 2017 capital additions are budgeted to be
11 approximately \$67.0 million Total Company Gas. This capital addition budget
12 includes the capital budget groups, listed below in Table DCH-D-3, that align
13 with the key investment needs described earlier in my testimony.

**Table DCH-D-3
(Dollars in Millions)**

YEAR	2017
Aging Technology	\$45.2
Cyber Security	\$4.9
Enhance Capabilities	\$15.2
Emergent Demand	\$1.7
Total Company Gas	\$67.0

1 **Q. ARE THE BUDGETED COSTS FOR THE BUSINESS SYSTEMS CAPITAL**
2 **PROJECTS THAT WILL GO INTO SERVICE IN 2017 REASONABLY**
3 **REFLECTIVE OF WHAT YOU EXPECT TO BECOME PART OF THE**
4 **RETAIL RATE BASE?**

5 A. Yes. I walk through each budget category and significant individual projects
6 and routine work orders in this next section of my Direct Testimony.

7 1. Aging Technology

8 **Q. WHAT CAPITAL PROJECTS TO REPLACE AGING TECHNOLOGY ARE**
9 **INCLUDED IN THE 2017 BUSINESS SYSTEMS BUDGET?**

10 A. We anticipate that investments in aging technology for 2017 will total \$45.2
11 million Total Company Gas as depicted below in Table DCH-D-4.

**Table DCH-D-4
 (Dollars in Millions)**

2017 Aging Technology Capital Additions	2017 Total
<i>Routine Refresh Projects</i>	
Annual Data Storage Project Refresh	\$2.1
Annual Network Refresh	\$1.8
Annual PC Refresh	\$1.7
Annual Server Refresh	\$4.1
DACS-Channel Bank Refresh	\$1.1
<i>Specific Refresh Projects</i>	
Data Center Core Routing Switching Modernization Phase 2 (and Streamlining)	\$2.7
Demand Response Management System Replacement PROJECT	\$3.7
DMZ Redesign Project	\$6.0
ESB Environment Capacity Project	\$3.8
Network Strategy - T&D Substation Connectivity	\$0.9
Public Service Dispatch Console Upgrade	\$1.6
Public Service Microwave Mountain Range Refresh	\$1.2
Verint Workforce Management upgrade or Replacement Project	\$0.9
VoIP Refresh	\$0.8
Websphere ELA Extension-Project	\$1.4
Windows 2003 Server Upgrade	\$4.1
Wireless Project	\$3.6
Aging Technology Other	\$3.7
Total Company Gas	\$45.2

1 I discuss the projects that account for the majority of the 2017 costs in this
 2 capital budget grouping below. Within Aging Technology, we further divide
 3 projects into routine refreshes and specific individual projects. I begin with a
 4 discussion of routine refresh projects.

1 a. Routine Refresh Projects

2 **Q. WHAT ARE ROUTINE REFRESH PROJECTS?**

3 A. Within the Aging Technology grouping, routine refresh projects refer to those
4 projects that relate to updating or refreshing day-to-day technology on a
5 routine basis. Such projects include the annual data storage project, the
6 annual network refresh, the annual PC refresh and the annual server refresh.
7 Budgets to upgrade technology components on an aggregate level are based
8 on the lifecycles outlined by various original equipment manufacturers
9 (“OEMs”). Equipment lifecycles can differ based on each category, but
10 generally speaking most of our network, server and end user computing
11 equipment are approximately on a 5-year refresh lifecycle. The funding
12 allocated within each specific group/year represents the aggregate of
13 calculations to address two needs: a) equipment replacement as outlined
14 above b) net new incremental, or business as usual (“BAU”) growth. The
15 refresh project budgets and additional information are offered in the following
16 explanations.

17 **Q. WHAT IS THE ANNUAL DATA STORAGE PROJECT?**

18 A. The Annual Data Storage project replaces data storage hardware that is no
19 longer cost-effective to support, or that presents significant risk to operations
20 due to aging components or lack of vendor support. This is routine refresh
21 project budgeted to include \$2.1 million in capital additions placed in service
22 during 2017.

1 **Q. WHAT IS THE ANNUAL SERVER REFRESH PROJECT?**

2 A. The Annual Server Refresh project replaces aging servers prior to failure to
3 support business growth and maintain reliability. This is a routine refresh
4 project budgeted to include \$4.1 million in capital additions placed in service
5 during 2017.

6 **Q. PLEASE BRIEFLY DESCRIBE OTHER ROUTINE REFRESH PROJECTS**
7 **THAT WILL BE PLACED IN SERVICE DURING 2017 TO REPLACE AGING**
8 **TECHNOLOGY.**

9 A. Below are descriptions of other routine refresh projects with capital additions
10 over \$800,000 that will be placed in service during 2017 to replace aging
11 technology:

- 12 • *Annual Network Refresh:* The Annual Network Refresh project replaces
13 network devices (switches, routers, radios, channel banks and voice
14 systems) due to aging technology, out-of-support equipment, security
15 vulnerabilities, and to enable new required capabilities. This routine
16 refresh project is budgeted to include \$1.8million in capital additions
17 placed in service during 2017.
- 18 • *Annual PC Refresh:* The Annual PC Refresh project replaced aging
19 desktop and laptop computers, as well as those that are lost or inoperable.
20 Additionally, this project provides devices to new employees. This is a
21 routine refresh project budgeted to include \$1.7 million in capital additions
22 placed in service during 2017.

1 external network node can access only what is exposed in the DMZ, while the
2 rest of the organization's network is firewalled. This project will complete the
3 design, build-out, and validation of the new cyber secure internet-facing
4 infrastructure. The new infrastructure is designed to be scalable, flexible, and
5 secure for internet facing applications. This project is well into its development
6 cycle. This project is planned to be in-service in 2017 and is budgeted as a
7 capital addition of \$6.0 million.

8 **Q. WHAT IS THE ESB CAPACITY PROJECT?**

9 A. The enterprise service bus ("ESB") is an integrated platform that provides
10 fundamental interaction and communication services for complex software
11 applications via an event driven and standards based messaging engine, or
12 bus, built with middleware infrastructure product technologies. The ESB
13 Capacity Project will upgrade the ESB to the next version to ensure reliable
14 data integrations. This is a multi-year project, with various components placed
15 in service as assets are deployed. This project represents \$3.8 million in
16 capital additions budgeted to be placed in service in 2017.

17 **Q. WHAT IS THE WINDOWS 2003 SERVER UPGRADE PROJECT?**

18 A. The Windows Server 2003 Upgrade project has been initiated for the purpose
19 of eliminating servers using Windows Server 2003 as the operating system.
20 Microsoft stopped supporting the Windows Server 2003 operating system in
21 July of 2015. This project will move the Company to a supported and more
22 secure version of Windows Server. This project is well into its development

1 cycle. This project is planned to be in-service in 2017 and budgeted as a
2 capital addition of \$4.1 million.

3 **Q. WHAT IS THE WIRELESS PROJECT?**

4 A. The Colorado Radio Refresh project involves implementation of a closed
5 Land Mobile Radio (“LMR”) system for Public Service. An LMR is a wireless
6 communications system intended for users (subscribers) in vehicles (mobile)
7 or on foot (portables). Private LMRs are used widely across utility
8 organizations to meet a wide range of communication requirements, including
9 coordination of people and materials, important safety and security needs,
10 and quick response in times of emergency. These systems make these day-
11 to-day activities possible.

12 The primary objective of this program is to deploy secure
13 communications equipment across the metropolitan area crews, allowing
14 them to complete their work for customers with reliable communications
15 between team members as needed. The reliability of the current system is at
16 risk due to aging hardware that has been in service for 15 years. An industry
17 standard life cycle for LMR systems is generally accepted as 10 years. Major
18 components within the system are no longer supported by the OEM or third
19 party parts suppliers, resulting in a ‘high’ risk profile. The legacy system is
20 also deficient in satisfying functional needs due to the increased area of
21 Company operations that are regulation-driven safety improvement
22 requirements, security, and emergency response procedures. This project is

1 planned to be in service in 2017 and is budgeted as a capital addition of \$3.6
2 million.

3 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE**
4 **PLACED IN SERVICE DURING 2017 TO REPLACE AGING**
5 **TECHNOLOGY.**

6 A. Below are descriptions of other projects with capital additions over \$800,000
7 that will be placed in service during 2017 to replace aging technology:

- 8 • *DACS-Channel Bank Refresh*: This project will refresh aging/end-of-life
9 and out-of-support Digital Cross-Connect System ("DACS") and Channel
10 Bank equipment at critical network sites to minimize future marginal
11 device service and device failures, times to resolve, and impacts to
12 network users. These devices are used for "grooming"
13 telecommunications traffic, switching traffic from one circuit to another in
14 the event of a network failure, supporting automated provisioning, and
15 other applications. This project represents \$1.1 million in capital
16 additions budgeted to be placed in service in 2017.
- 17 • *Public Service Dispatch Console Upgrade*: This dispatch console project
18 will replace the Public Service radio dispatch console system that was
19 developed over 20 years ago. The project will expand capability to
20 support mobile and fixed data applications leading to more efficient and
21 safer operations. This project represents \$1.6 million in capital additions
22 budgeted to be placed in service in 2017.
- 23 • *Public Service Microwave Mountain Range Refresh*: This project will
24 replace Company microwave components that are no longer supported
25 by the vendor per end-of-life guidelines. Replacement will help ensure
26 continued reliability, meet communication requirements, reduce safety
27 concerns, and minimize replacement costs. If not replaced on a cycle,

1 there is an increasing risk of failed systems impacting the availability,
2 stability, and supportability of our environment, which could cause loss
3 of data and related business functions. This project represents \$1.2
4 million in capital additions budgeted to be placed in service in 2017.

- 5 • *Verint Workforce Management Upgrade or Replacement:* This project
6 will replace the current Contact Center tool used to support workforce
7 management and Quality Assurance practices aimed at optimizing
8 resource utilization and provide performance monitoring capabilities
9 creating increased modeling capabilities matching resource skills and
10 staffing with call load. Without this project, the Quality Assurance team
11 will remain unable to effectively identify opportunities to increase
12 customer engagement and satisfaction improvements. There is also risk
13 of hardware and software failures as the system was no longer
14 supported by the vendor in mid-2015. This project represents \$0.9
15 million in capital additions budgeted to be placed in service in 2017.

- 16 • *Websphere Enterprise License Agreement Extension:* WebSphere is a
17 core component of multiple critical systems, including the enterprise
18 service bus that enables the integration between multiple information
19 systems. This project will maintain compliance with Websphere software
20 licensing terms and will provide a new version of the family of products
21 outlined within the enterprise license agreement. This project represents
22 \$1.4 million in capital additions budgeted to be placed in service in 2017.

23 2. Cyber Security

24 **Q. ARE ANY CAPITAL PROJECTS TO ADDRESS EVOLVING CYBER**
25 **SECURITY THREATS AND REQUIREMENTS INCLUDED IN THE 2017**
26 **BUSINESS SYSTEMS BUDGET?**

27 A. Yes. We anticipate that investments in cyber security for 2017 will total \$4.9
28 million Total Company Gas as depicted below in Table DCH-D-5.

**Table DCH-D-5
(Dollars in Millions)**

2017 Cyber Security Capital Additions	2017 Total
Network Security and Protection	\$1.1
Security Incident & Event Management	\$2.1
Security Technology Refresh	\$0.8
Cyber Security Other (13 projects)	\$0.9
Total Company Gas	\$4.9

1 **Q. PLEASE BRIEFLY DESCRIBE PROJECTS THAT WILL BE PLACED IN**
2 **SERVICE DURING 2017 TO ADDRESS EVOLVING CYBER SECURITY**
3 **THREATS AND REQUIREMENTS.**

4 **A.** Below are descriptions of projects with capital additions over \$800,000 that
5 will be placed in-service during 2017 to address evolving cyber security
6 threats and requirements:

- 7 • *Network Security and Protection:* The project will create a more secure
8 network utilizing a defense in depth strategy to limit vulnerabilities. The
9 project will use technology to segment, isolate, monitor and control
10 communication within the environment to protect our critical infrastructure
11 areas. This project represents \$1.1 million in capital additions budgeted to
12 be placed in service in 2017.
- 13 • *Security Incident and Event Management:* The Security Incident and
14 Event Management system will allow the Company to increase security
15 visibility with 24x7 automated monitoring, get alerted in real-time and
16 contain threats at network speed, streamline audits and compliance
17 reporting, stop external attacks and internal misuse in their tracks, and
18 perform rapid root cause analysis with built-in or third party intelligence
19 capabilities. This project represents \$2.1 million in capital additions
20 budgeted to be placed in service in 2017.

- 1 • The Security Technology Refresh is a multi-year project continuing
2 through 2020 that will include \$0.8 million in capital additions placed in
3 service in 2017. While we call this a “refresh,” it is an update of security
4 technology rather than a routine annual refresh like those described
5 above. The scope of this project is to update critical cyber security
6 technology including perimeter security, internal infrastructure security,
7 application security, and to implement vulnerability management to
8 protect sensitive customer and business information.

9 3. Enhancing Capabilities

10 **Q. ARE ANY CAPITAL PROJECTS TO ENHANCE THE CAPABILITIES OF**
11 **THE COMPANY AND ITS ABILITY TO SERVE CUSTOMERS INCLUDED**
12 **IN THE 2017 BUSINESS SYSTEMS BUDGET?**

13 A. Yes. Business Systems anticipates that investments in enhancing technology
14 for 2017 will total \$15.2 million Total Company Gas as depicted below in
15 Table DCH-D-6.

**Table DCH-D-6
(Dollars in Millions)**

2017 Enhancing Capabilities Capital Additions	2017 Total
Geospatial Integrations Project	\$4.9
Mobile Computing Infrastructure	\$1.7
SharePoint Upgrade	\$1.6
MAOP Calculations for Gas System Project	\$1.4
eGRC NERC Project	\$0.8
Enhancing Capabilities Other (25 projects))	\$4.9
Total Company Gas	\$15.2

16 I discuss the projects that account for the majority of the 2017 costs in
17 this capital budget grouping below.

1 **Q. WHAT IS THE GEOSPATIAL INTEGRATIONS PROJECT?**

2 A. The Geospatial Integration Project will allow the capability of the new SAP
3 WAM system functions to synchronize asset locations with the GIS. It
4 facilitates and supports the asset life cycle including services performed on
5 the various device types in the field. This project is planned to be in service in
6 2017 and is budgeted as a capital addition of \$4.9 million.

7 **Q. WHAT IS THE MOBILE COMPUTING INFRASTRUCTURE PROJECT?**

8 A. The Mobile Computing Infrastructure project will build a mobile computing
9 framework and support infrastructure that enables Xcel Energy to empower
10 end-users by extending and delivering corporate application and data access
11 to mobile devices regardless of ownership, device manufacturer or operating
12 systems. This project is planned to be in service in 2017 and is budgeted as a
13 capital addition of \$1.7 million.

14 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE
15 PLACED IN SERVICE DURING 2017 TO ENHANCE CAPABILITIES.**

16 A. Below are descriptions of other projects with capital additions over \$800,000
17 that will be placed in service during 2017 to enhance the capabilities of the
18 Company and its ability to serve customers:

- 19
- 20 • *SharePoint Upgrade*: The SharePoint upgrade project will upgrade our
21 SharePoint software from version 2007 to version 2013. SharePoint is a
22 web application that enables employees to collaborate from across all
23 business units and to work more efficiently by letting users share
documents and data while maintaining security and version control.

1 Commission Staff and Intervenors might be familiar with the Company's
2 existing SharePoint system as a discovery and data sharing tool for rate
3 cases and other proceedings. The new version will provide a more
4 powerful platform and enable new capabilities such as enhanced sharing
5 of information in a controlled manner and improved information
6 governance and security. This project represents \$1.6 million in capital
7 additions budgeted to be placed in service in 2017.

- 8 • *Maximum Allowable Operating Pressure Calculations for Gas System*
9 *Project*. This objective of this project is to improve our ability to calculate
10 the MAOP to comply with the current PHMSA regulations.² The project
11 will deploy new software to calculate MAOP in GIS SmallWorld without
12 any data translation, and integrate the new tool with other critical
13 systems. This project represents \$1.4 million in capital additions
14 budgeted to be placed in service in 2017.

- 15 • *eGRC North American Electric Reliability Corporation ("NERC") Project*.
16 This project will assess and build NERC business functions into Archer,
17 Xcel Energy's governance, risk management, and compliance ("GRC")
18 tool. This project will streamline 10 additional business functions
19 including: audit preparation, internal controls, standard
20 development/implementation, and issue evaluation/remediation. This
21 project represents \$0.8 million in capital additions budgeted to be placed
22 in service in 2017.

23 **Q. ARE THERE ANY OTHER PROJECTS YOU WISH TO DISCUSS?**

24 A. Yes. Attachment DCH-1 to my Direct Testimony includes a \$0.7 million
25 project related to the Field Area Network ("FAN") being implemented in 2017.

26 While it is anticipated the FAN may eventually support gas service as well as

² See 49 C.F.R. § 192.619.

1 electric service, in 2017, the FAN is being implemented to support the electric
2 distribution system, including advanced metering and other devices. The
3 Company has therefore made an adjustment to remove this project from
4 Public Service's cost of service during the MYP, as noted by Company
5 witness Mr. Berman.

6 4. Emergent Demand

7 **Q. ARE ANY CAPITAL PROJECTS TO ADDRESS EMERGENT DEMAND OR**
8 **OTHER BUSINESS SYSTEMS NEEDS INCLUDED IN THE 2017**
9 **BUSINESS SYSTEMS BUDGET?**

10 A. Yes. Public Service has \$1.7 million of budget remaining to address emergent
11 demands in 2017. Because Emergent Demand Account is intended to
12 address unpredicted needs that may arise, it is not budgeted for specific
13 projects. However, we typically prioritize aging technology and cyber security
14 projects.

15 **Q. HOW IS THE EMERGENT DEMAND ACCOUNT CALCULATED?**

16 A. When Finance determines budgetary goals for Business Systems on a five-
17 year basis, a significant portion is attributed to unknown needs. Because
18 fewer specific projects are known and planned in the out-years of our rolling
19 five-year budget cycle, which is described in more detail by Company witness
20 Mr. Robinson, the larger portion of the Business Systems budget in those out-
21 years is attributable to Emergent Demand. Over time, more specific project
22 needs are identified and project plans are developed, resulting in the

1 reallocation of Emergent Demand dollars to more specific projects.
2 Consequently, the total dollars in the Emergent Demand Account tend to be
3 smaller in the near-term than they are several years into the future.

4 **Q. HOW IS THE EMERGENT DEMAND ACCOUNT MANAGED?**

5 A. All requests for funds from the Emergent Demand Account must be approved
6 by the IT Governance Board, which evaluates each request to determine
7 whether it is reasonable and necessary. This process provides another layer
8 of oversight for existing projects as they must receive additional approval
9 before being allocated funds from the Emergent Demand Account. As new
10 forecasts are developed, funds from the Emergent Demand Account are
11 allocated to the new or existing parent workorders for the specific projects
12 that are approved to receive these funds.

13 **C. 2018 Capital Additions**

14 **Q. WHAT CAPITAL ADDITIONS IS BUSINESS SYSTEMS PLANNING TO**
15 **MAKE IN 2018?**

16 A. The total Public Service 2018 capital additions are budgeted to be
17 approximately \$53.2 million Total Company Gas. This capital addition budget
18 includes the capital budget groups, listed below in Table DCH-D-7, that align
19 with the key investment needs described earlier in my testimony.

**Table DCH-D-7
(Dollars in Millions)**

YEAR	2018
Aging Technology	\$27.1
Cyber Security	\$3.7
Enhance Capabilities	\$13.1
Emergent Demand	\$8.1
Totals	\$52.0

1 **Q. ARE THE BUDGETED COSTS FOR THE BUSINESS SYSTEMS CAPITAL**
2 **PROJECTS THAT WILL GO INTO SERVICE IN 2018 REASONABLY**
3 **REFLECTIVE OF WHAT YOU EXPECT TO BECOME PART OF THE**
4 **RETAIL RATE BASE?**

5 A. Yes.

6 1. Aging Technology

7 **Q. WHAT CAPITAL PROJECTS TO REPLACE AGING TECHNOLOGY ARE**
8 **INCLUDED IN THE 2018 BUSINESS SYSTEMS BUDGET?**

9 A. Business Systems anticipates that investments in aging technology for 2018
10 will total \$27.1 million Total Company Gas as depicted below in Table DCH-
11 D-8.

**Table DCH-D-8
 (Dollars in Millions)**

2018 Aging Technology Capital Additions	2018 Total
Annual Data Storage Project Refresh	\$2.6
Annual Handheld Mobile Collector Refresh	\$0.2
Annual MDT Refresh	\$0.4
Annual Network Refresh	\$2.1
Annual PC Refresh	\$1.5
Annual Server Refresh	\$1.4
Core HR Application (Payroll Benefits)	\$1.2
Customer Care IVR Upgrades	\$1.4
Emptoris Upgrade Phase 2	\$1.6
Enhanced Customer Outage Experience	\$5.6
ESB Environment Capacity Project	\$0.3
GIS Upgrade	\$1.2
IrthNet Damage Prevention Project	\$1.3
MRAS Consolidation to IEE and RMS	\$1.4
NMS 1 Upgrade	\$1.9
Aging Technology Other (6 projects)	\$2.9
Total Company Gas	\$27.1³

1 a. Routine Refresh Projects

2 **Q. WHAT ARE THE MAJOR ROUTINE REFRESH PROJECTS BUDGETED**
 3 **FOR 2018?**

4 A. There are four major routine refresh projects budged for 2018: Annual Data
 5 Storage Project, Annual Network Refresh, Annual PC Refresh, and Annual
 6 Server Refresh. These routine refresh projects are discussed above, as they
 7 were also included in the 2017 budget. Public Service is budgeting \$2.6
 8 million in Annual Data Storage, \$2.1 million in Annual Network Refresh, \$1.5
 9 million in Annual PC Refresh, and \$1.4 million in Annual Server Refresh
 10 capital additions to be placed in service in 2018.

³ Difference due to rounding.

1 b. Specific Aging Technology Projects

2 **Q. WHAT IS THE ENHANCED CUSTOMER OUTAGE EXPERIENCE**
3 **PROJECT?**

4 A. The Enhanced Customer Outage Experience project will complete an Xcel
5 Energy.com (XE.com) environment assessment that will yield identification of
6 risks and deficiencies in the existing XE.com environment and then deploy
7 technology to address them. Failure to complete this project may result in
8 continued gaps in XE.com performance during critical outage or other high
9 traffic creating events that result in a delayed or denied customer transaction
10 and decreased customer satisfaction. This project will place various
11 components in service as assets are deployed during 2018. Public Service is
12 budgeting \$5.6 million in capital additions to be placed in service during 2018.

13 **Q. WHAT IS THE NMS 1 UPGRADE PROJECT?**

14 A. The upgrade of the Outage Management System (Oracle Network
15 Management System (“NMS”)) will ensure the application remains under
16 long-term vendor support, ensuring operational reliability. It will also provide
17 alignment to the Xcel Energy enterprise standard for key technology
18 components (e.g., JAVA, WebLogic) and eliminate the need for one-off,
19 interim fix-it solutions to maintain critical business functionality (i.e., switch
20 plan deletion). Finally, the upgrade will support the short and long-term
21 outage management system strategy at Xcel Energy. This project is planned
22 to be in service in 2018 and budgeted as a capital addition of \$1.9 million.

1 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE**
2 **PLACED IN SERVICE DURING 2018 TO REPLACE AGING**
3 **TECHNOLOGY.**

4 A. Below are descriptions of other projects with capital additions over \$2.9
5 million that that will be placed in service during 2018 to replace aging
6 technology:

- 7 • *Core HR Application (Payroll Benefits)*: The Core HR Application project
8 is required to maintain functionality of the core human resource system
9 used to provide payroll, benefits administration and job record tracking to
10 employees and retirees of Xcel Energy. The current system (PeopleSoft)
11 will lose vendor support as of October 2017. If this project is not
12 completed, the Company would not be able to provide accurate payroll
13 to our workers or comply with regulatory requirements. This project
14 represents \$1.2 million in capital additions budgeted to be placed in
15 service in 2018.
- 16 • *Customer Care IVR Upgrades*: This project will upgrade Xcel Energy's
17 Customer Care Interactive Voice Response ("IVR") and Contact Center
18 infrastructure to maintain appropriate and efficient response to the
19 approximately 14 million customer calls Xcel Energy receives each year.
20 All 14 million begin in the IVR, approximately 8 million begin in the IVR
21 and are retained and solved within the IVR, the remaining approximate 6
22 million begin in the IVR and route to an agent, based on IVR menu
23 selections. These upgrades will help ensure continued reliability of the
24 private branch exchange ("PBX") phone system, compliance with service
25 level reporting required by our state regulators, and continued
26 integration of the multiple channels customers use to transact business

1 with Xcel Energy. This project represents \$1.4 million in capital additions
2 budgeted to be placed in service in 2018.

- 3 • *Emptoris Upgrade Phase 2*: This project will update Supply Chain's main
4 application for creating contracts (approximately \$3 billion annually) with
5 suppliers and sending requests for proposal to suppliers. This project
6 represents \$1.6 million in capital additions budgeted to be placed in
7 service in 2018.
- 8 • *Geographical Information System Upgrade*: The GIS is a geospatial
9 representation of Xcel Energy's physical transmission and distribution
10 assets. This project will upgrade the GIS Smallworld system to ensure
11 system reliability. This project represents \$1.2 million in capital additions
12 budgeted to be placed in service in 2018.
- 13 • *IrthNet Damage Prevention Project*: This project will combine the current
14 aging IrthNet & Damage Prevention ("DP") into a single package. IrthNet
15 is end of life in 2017 and is coupled with DP to provide underground
16 locating, safety, work assignment, communications, and reporting for
17 regulatory locating and damage prevention programs. This project
18 represents \$1.3 million in capital additions budgeted to be placed in
19 service in 2018.
- 20 • *MRAS Consolidation to IEE and RMS*: Our Meter Read Acquisition
21 System ("MRAS") collects meter readings from multiple sources, stores
22 and manages meter readings in a repository and provides meter reading
23 to customer and billing systems. The primary objective of the MRAS
24 Consolidation project is to eliminate duplicate meter reading data
25 storage and consolidate functions and platforms to provide a long-term,
26 supported solution for the collection, and storage of meter read data.
27 The current MRAS solution is highly customized and an upgrade is
28 necessary given that the vendor support ended in 2015 and an MRAS
29 failure or outage would impact our ability to collect meter reads, bill

1 customers, and access historical data. This project represents \$1.4
2 million in capital additions budgeted to be placed in service in 2018.

3 2. Cyber Security

4 **Q. WHAT CAPITAL PROJECTS TO ADDRESS EVOLVING CYBER**
5 **SECURITY THREATS AND REQUIREMENTS ARE INCLUDED IN THE**
6 **2018 BUSINESS SYSTEMS BUDGET?**

7 A. We anticipate that investments in cyber security for 2018 will total \$3.7 million
8 Total Company as depicted below in Table DCH-D-9.

Table DCH-D-9
(Dollars in Millions)

2018 Cyber Security Capital Additions	2018 Total
Security Technology Refresh	\$3.5
Cyber Security Other (1 project)	\$0.2
Total	\$3.7

9 However, there is only one significant individual project for 2018, which is the
10 Security Technology Refresh project described above. As noted previously,
11 this is a multi-year project. In 2018, we expect to invest \$3.5 million in the
12 Security Technology Refresh project.

13 3. Enhancing Capabilities

14 **Q. WHAT CAPITAL PROJECTS TO ENHANCE CAPABILITIES ARE**
15 **INCLUDED IN THE 2018 BUSINESS SYSTEMS BUDGET?**

16 A. We anticipate that investments in enhancing technology for 2018 will total
17 \$13.1 million Total Company Gas as depicted below in Table DCH-D-10.

**Table DCH-D-10
 (Dollars in Millions)**

2018 Enhancing Capabilities Capital Additions	2018 Total
Electronic Shift Operations Management System (“ESOMS”) Project	\$1.0
Gas Distribution Risk Project	\$1.5
Interval and Complex Billing Project	\$3.4
Mobile Application Customer Engagement project	\$1.5
Multi-Site Customer Portal (billing, payment, energy management) - (“MKT-CX”)	\$1.5
Network Strategy - Gas Operations Connectivity	\$0.1
Transmission Metrics Dashboard	\$0.9
Enhancing Capabilities Other (7 projects)	\$3.1
Total Company Gas	\$13.1⁴

1 I discuss the projects that account for the majority of the 2018 costs in this
 2 capital budget grouping below.

3 **Q. WHAT IS THE INTERVAL AND COMPLEX BILLING PROJECT?**

4 A. The Interval and Complex Billing Project will enhance the interval billing
 5 platform to support the billing of proposed new regulatory mass market and
 6 Commercial and Industrial rates for distributed generation, as well as all other
 7 rates that are being considered across electric and gas services. The project
 8 will enable customer visibility of their usage patterns to drive increased
 9 customer satisfaction, decrease energy consumption, and decrease energy
 10 costs due to new rate structures. This project is planned to be in service in
 11 2018 and is budgeted as a capital addition of \$3.4 million.

⁴ Difference due to rounding.

1 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE**
2 **PLACED IN SERVICE DURING 2018 TO ENHANCE CAPABILITIES.**

3 A. Below are descriptions of other projects with capital additions over \$800,000
4 that will be placed in service during 2018 to enhance the capabilities of the
5 Company and its ability to serve customers:

- 6 • *Gas Distribution Risk Project:* Understanding the threats to gas distribution
7 assets is a fundamental step in Xcel Energy's Gas Distribution Integrity
8 Management Program ("DIMP"). The Gas Distribution Risk Project will
9 replace the existing gas distribution risk analysis software with a new tool
10 that is integrated with other critical applications, allowing utilization of an
11 advanced probabilistic risk algorithm that will incorporate available asset,
12 operational, and maintenance data calculate. The probabilistic risk
13 algorithm assures Xcel Energy compliance with PHMSA regulations (49
14 CFR Part 192.1007). The current application is not compatible with
15 updated critical applications and utilizes a first generation risk algorithm.
16 This project represents \$1.5 million in capital additions budgeted to be
17 placed in service in 2018.
- 18 • *Mobile Application Customer Engagement Project:* The Mobile Application
19 Customer Engagement project will deploy technology that serves as the
20 foundation to support the increasing customer need to access information
21 digitally. This project is well into its development cycle. This project
22 represents \$1.5 million in capital additions budgeted to be placed in
23 service in 2018.
- 24 • *Multi-Site Customer Portal:* This project will deploy new software intended
25 for small business customers that are responsible for managing energy for
26 multiple facilities. The product will help with billing, payment, and energy
27 management across their facilities. This project is in the early stages of

1 development. This project represents \$1.5 million in capital additions
2 budgeted to be placed in service in 2018.

- 3 • *Transmission Metrics Dashboard*: This project will enable the
4 Transmission areas to consolidate, gather and accurately analyze system
5 operational data consistently. Currently, this data exists in multiple
6 systems, which makes issue diagnosis less efficient. This project is in the
7 early stages of development. This project represents \$0.9 million in capital
8 additions budgeted to be placed in service in 2018.
- 9 • *ESOMS*: This project will implement software and associated business
10 processes to prevent accidental startup of hazardous equipment while a
11 worker is in direct contact with the isolated equipment. This project is
12 required for personal safety and is the industry standard in ensuring that
13 dangerous systems are properly shut off and not able to re-start until the
14 work on the isolated equipment is complete and all workers involved are
15 individually accounted for. This project is planned to be in service in 2018
16 and is budgeted as a capital addition of \$1.0 million.

17 4. Emergent Demand

18 **Q. ARE ANY CAPITAL PROJECTS TO ADDRESS EMERGENT DEMAND OR**
19 **OTHER BUSINESS SYSTEMS NEEDS INCLUDED IN THE 2018**
20 **BUSINESS SYSTEMS BUDGET?**

21 A. Yes. Public Service is budgeting \$8.1 million to address emergent demand in
22 2018. As discussed earlier in my testimony, the amount will fluctuate due to
23 timing and ongoing portfolio analysis, and is generally larger in years farther
24 into the future.

1 **D. 2019 Capital Additions**

2 **Q. WHAT CAPITAL ADDITIONS IS BUSINESS SYSTEMS PLANNING TO**
3 **MAKE IN 2019?**

4 A. The total Public Service 2019 capital additions are budgeted to be
5 approximately \$49.9 million Total Company Gas. This capital addition budget
6 includes the capital budget groups, listed below in Table DCH-D-11, that align
7 with the key investment needs described earlier in my testimony.

**Table DCH-D-11
(Dollars in Millions)**

YEAR	2019
Aging Technology	\$24.3
Cyber Security	\$4.8
Enhance Capabilities	\$6.8
Emergent Demand	\$14.0
Totals	\$49.9

8 **Q. ARE THE BUDGETED COSTS FOR THE BUSINESS SYSTEMS CAPITAL**
9 **PROJECTS THAT WILL GO INTO SERVICE IN 2019 REASONABLY**
10 **REFLECTIVE OF WHAT YOU EXPECT TO BECOME PART OF THE**
11 **RETAIL RATE BASE?**

12 A. Yes.

13 1. Aging Technology

14 **Q. WHAT CAPITAL PROJECTS TO REPLACE AGING TECHNOLOGY ARE**
15 **INCLUDED IN THE 2019 BUSINESS SYSTEMS BUDGET?**

16 A. Business Systems anticipates that investments in aging technology for 2019
17 will total \$24.3 million as depicted below in Table DCH-D-12.

**Table DCH-D-12
(Dollars in Millions)**

2019 Aging Technology Capital Additions	2019 Total
Annual Data Storage Project Refresh	\$2.5
Annual Handheld Mobile Collector Refresh	\$0.4
Annual MDT Refresh	\$0.4
Annual Network Refresh	\$1.0
Annual PC Refresh	\$1.4
Annual Server Refresh	\$1.9
Gas SCADA Replacement Project	\$14.1
NOC Refresh	\$1.1
Aging Technology Other (2 projects)	\$1.4
Total Company Gas	\$24.1⁵

1 a. Routine Refresh Projects

2 **Q. WHAT ARE THE MAJOR ROUTINE REFRESH PROJECTS BUDGETED**
3 **FOR 2019?**

4 A. There are three major routine refresh projects budgeted for 2018: Annual Data
5 Storage Project, Annual Network Refresh, and Annual Server Refresh. These
6 routine refresh projects are discussed above. Public Service is budgeting \$2.5
7 million in Annual Data Storage, \$1.0 million in Annual Network Refresh, and
8 \$1.9 million in Annual Server Refresh capital additions to be placed in service
9 in 2019.

10 b. Specific Aging Technology Projects

11 **Q. WHAT IS THE GAS SCADA REPLACEMENT PROJECT?**

12 A. This project will replace the existing Gas SCADA system. Gas SCADA
13 provides gas system operators the ability to monitor and control Xcel Energy's
14 natural gas systems. The existing system is approximately 17 years old and

⁵ Difference due to rounding.

1 requires updated technology and security controls to meet industrial control
2 system standards, which include standards by North American Electric
3 Reliability Council Critical Infrastructure Protection, National Institute of
4 Standards and Technology, Department of Homeland Security, and the
5 Department of Transportation. It is also necessary to upgrade the system to
6 ensure continuing visibility into the Company's gas pipeline infrastructure.
7 DIMP and Transmission Integrity Management Program ("TIMP") regulations
8 require that the Company be proactive in the identification of threats to the
9 gas system and take appropriate measure to prevent failure and mitigate
10 consequences (49 CFR §§192.935 and 192.1007(d)). The Gas SCADA
11 system is one of the industry's most fundamental tools to meet this
12 requirement to help ensure public safety and system reliability.

13 The project will upgrade the security measures, provide additional
14 reporting capabilities, identify maintenance events occurring, and implement
15 redundancy. This project is planned to be in service in 2019 as a capital
16 addition of approximately \$14.1 million.

17 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE**
18 **PLACED IN SERVICE DURING 2019 TO REPLACE AGING**
19 **TECHNOLOGY.**

20 A. Currently there is one significant project that that will be placed in service
21 during 2019 to replace aging technology. The Network Operations Center
22 ("NOC") Refresh project will upgrade both software and hardware technology

1 in the NOC. The NOC oversees complex networking environments that
2 require high availability. NOC personnel are responsible for monitoring
3 Company networks for certain conditions that may require special attention to
4 avoid degraded service that could impact critical operations. This project
5 represents \$1.1 million in capital additions budgeted to be placed in service in
6 2019.

7 2. Cyber Security

8 **Q. WHAT CAPITAL PROJECTS TO ADDRESS EVOLVING CYBER**
9 **SECURITY THREATS AND REQUIREMENTS ARE INCLUDED IN THE**
10 **2019 BUSINESS SYSTEMS BUDGET?**

11 A. We anticipate that investments in cyber security for 2019 will total \$4.8 million
12 as depicted below in Table DCH-D-13.

Table DCH-D-13
(Dollars in Millions)

2019 Cyber Security Capital Additions	2019 Total
Security Technology Refresh	\$4.8
Cyber Security Other (0 projects)	\$0.0
Total	\$4.8

13 There is only one significant individual project for 2019, which is the Security
14 Technology Refresh project described above. As noted previously, this is a
15 multi-year project. In 2019, Business Systems expects to invest \$4.8 million in
16 the Security Technology Refresh project.

1 3. Enhancing Capabilities

2 **Q. ARE ANY CAPITAL PROJECTS TO ENHANCE CAPABILITIES INCLUDED**
3 **IN THE 2019 BUSINESS SYSTEMS BUDGET?**

4 A. Yes. We anticipate that investments in enhancing technology for 2019 will
5 total \$6.8 million as depicted below in Table DCH-D-14.

**Table DCH-D-14
(Dollars in Millions)**

2019 Enhancing Capabilities Capital Additions	2019 Total
Enterprise Asset Analytics	\$4.3
Revenue Analytics and Tools	\$1.3
Network Strategy – Gas Operations Connectivity (gas)	\$1.0
Enhancing Capabilities Other	\$0.2
Total Company Gas	\$6.8

6 I discuss the projects that account for the majority of the 2019 costs in this
7 capital budget grouping below.

8 **Q. WHAT IS THE ENTERPRISE ASSET ANALYTICS PROJECT?**

9 A. The Enterprise Asset Analytics project will develop enterprise level asset
10 analytics to support the collection of asset information. Analytics will improve
11 the ability to operate, support, monitor Xcel Energy assets, and assist in
12 determining priority for investment decisions on company assets. Failure to
13 complete this project may result in decreased reliability of Distribution and
14 Transmission assets, ineffective utilization of field crews, risk of missing
15 reliability compliance targets, inability to utilize advanced analytics capabilities
16 and insights, and continued reliance on reactive asset management and sub
17 optimized prioritization of asset management work. This project is planned to
18 be in service in 2019 and is budgeted as a capital addition of \$4.3 million.

1 **Q. WHAT IS THE NETWORK STRATEGY – GAS OPERATIONS**
2 **CONNECTIVITY PROJECT?**

3 A. This program addresses network communications requirements for Gas
4 Transmission, Distribution and Metering and will connect field devices and
5 backhaul traffic on Xcel Energy owned private networks. Without improving
6 the network infrastructure to enable communications to customer meters,
7 Xcel Energy will be unable to leverage data to engage with customers and
8 efficiently assess and respond to network outages. This is a multi-year
9 project, with various components placed in service as assets are deployed.
10 This project represents \$1.0 million in capital additions budgeted to be placed
11 in service in 2019.

12 **Q. WHAT IS THE REVENUE ANALYTICS AND TOOLS PROJECT?**

13 A. The Revenue Analytics and Tools project will implement a solution to
14 streamline the retail revenue accounting process for calculating the monthly
15 unbilled revenue entries and margin reporting. This project represents \$1.3
16 million in capital additions budgeted to be placed in service in 2019.

17 4. Emergent Demand

18 **Q. ARE ANY CAPITAL PROJECTS TO ADDRESS EMERGENT DEMAND OR**
19 **OTHER BUSINESS SYSTEMS NEEDS INCLUDED IN THE 2019**
20 **BUSINESS SYSTEMS BUDGET?**

21 A. Yes. Public Service is budgeting \$14.0 million to address emergent demand
22 in 2019. As discussed earlier in my testimony, the amount will fluctuate due to

1 timing and ongoing portfolio analysis, and is generally larger in years farther
2 into the future due to the higher quantity of work that will likely be needed and
3 cannot yet be predicted.

4 **E. 2020 Capital Additions**

5 **Q. WHAT CAPITAL ADDITIONS IS BUSINESS SYSTEMS PLANNING TO**
6 **MAKE IN 2020?**

7 A. The total Public Service 2020 capital additions are budgeted to be
8 approximately \$34.4 million Total Company Gas. This capital addition budget
9 includes the capital budget groups, listed below in Table DCH-D-15, that align
10 with the key investment needs described earlier in my testimony.

**Table DCH-D-15
(Dollars in Millions)**

YEAR	2020
Aging Technology	\$11.3
Cyber Security	\$5.0
Enhance Capabilities	\$2.6
Emergent Demand	\$15.5
Totals	\$34.4

11 **Q. ARE THE BUDGETED COSTS FOR THE BUSINESS SYSTEMS CAPITAL**
12 **PROJECTS THAT WILL GO INTO SERVICE IN 2020 REASONABLY**
13 **REFLECTIVE OF WHAT YOU EXPECT TO BECOME PART OF THE**
14 **RETAIL RATE BASE?**

15 A. Yes.

1 1. Aging Technology

2 **Q. WHAT CAPITAL PROJECTS TO REPLACE AGING TECHNOLOGY ARE**
3 **INCLUDED IN THE 2020 BUSINESS SYSTEMS BUDGET?**

4 A. Business Systems anticipates that investments in aging technology for 2020
5 will total \$11.3 million Total Company Gas as depicted below in Table DCH-
6 D-16.

**Table DCH-D-16
(Dollars in Millions)**

2020 Aging Technology Capital Additions	2020 Total
Annual Data Storage Project Refresh	\$2.6
Annual Handheld Mobile Collector Refresh	\$0.4
Annual Network Refresh	\$1.0
Annual PC Refresh	\$1.0
Annual Server Refresh	\$2.0
Fleet Focus Upgrade 2020	\$1.0
Open Text Upgrade	\$1.0
Real Property Asset Management Upgrade	\$1.0
Aging Technology Other (four projects)	\$1.3
Total Company Gas	\$11.3

7 I discuss the projects that account for the majority of the 2020 costs in this
8 capital budget grouping below.

9 a. Routine Refresh Projects

10 **Q. WHAT ARE THE MAJOR ROUTINE REFRESH PROJECTS BUDGETED**
11 **FOR 2020?**

12 A. There are four major routine refresh projects budgeted for 2018: Annual Data
13 Storage Project, Annual Network Refresh, Annual PC Refresh, and Annual
14 Server Refresh. These routine refresh projects are discussed above. Public
15 Service is budgeting \$2.6 million in Annual Data Storage, \$1.0 million in

1 Annual Network Refresh, \$1.0 million in Annual PC Refresh, and \$2.0 million
2 in Annual Server Refresh capital additions to be placed in service in 2020.

3 b. Specific Aging Technology Projects

4 **Q. ARE THERE ANY MAJOR AGING TECHNOLOGY MULTI-YEAR**
5 **PROJECTS WITH CAPITAL ADDITIONS BUDGETED TO BE PLACED IN**
6 **SERVICE IN 2020?**

7 A. No.

8 **Q. PLEASE BRIEFLY DESCRIBE OTHER PROJECTS THAT WILL BE**
9 **PLACED IN SERVICE DURING 2020 TO REPLACE AGING**
10 **TECHNOLOGY.**

11 A. Below are descriptions of other projects with capital additions over \$800,000
12 that will be placed in service during 2020 to replace aging technology:

- 13 • *Fleet Focus 2020 Upgrade*: The project will upgrade the Fleet Focus
14 application and expand reporting and analytics to enable effective
15 management of the fleet vehicle life cycles. This project represents \$1.0
16 million in capital additions budgeted to be placed in service in 2020.
- 17 • *Open Text Upgrade*: The project will upgrade the Open Text Content
18 Management technology we use to manage self-service web and mobile
19 offerings. This technology enables management of large volumes of
20 content, ensures compliance with regulatory requirements, and enables
21 improved mobile and online experiences to stay current with the
22 changing demands of customers and employees. This project
23 represents \$1.0 million in capital additions budgeted to be placed in
24 service in 2020.

- 1 • *Real Property Asset Management Upgrade*: The Real Property Asset
2 Management Upgrade project will upgrade software the Company
3 utilizes to operate and maintain facilities. The objective of this project is
4 to improve decision-making and property management processes,
5 improve facility budget management and provide improved analytics
6 related to property management. This project represents \$1.0 million in
7 capital additions budgeted to be placed in service in 2020.

8 2. Cyber Security

9 **Q. WHAT CAPITAL PROJECTS TO ADDRESS EVOLVING CYBER**
10 **SECURITY THREATS AND REQUIREMENTS ARE INCLUDED IN THE**
11 **2020 BUSINESS SYSTEMS BUDGET?**

12 A. Business Systems anticipates that investments in cyber security for 2020 will
13 total \$5 million Total Company Gas as depicted below in Table DCH-D-17.

Table DCH-D-17
(Dollars in Millions)

2020 Cyber Security Capital Additions	2020 Total
Security Technology Refresh	\$5.0
Cyber Security Other (0 projects)	\$0.0
Total	\$5.0

14 However, there is only one significant individual project for 2020, which is the
15 Security Technology Refresh project described above. As noted previously,
16 this is a multi-year project. In 2020 we expect to invest \$5.0 million in the
17 Security Technology Refresh project.

1 3. Enhancing Capabilities

2 **Q. WHAT CAPITAL PROJECTS TO ENHANCE CAPABILITIES ARE**
3 **INCLUDED IN THE 2020 BUSINESS SYSTEMS BUDGET?**

4 A. Business Systems anticipates that investments in enhancing technology for
5 2020 will total \$2.6 million as depicted below in Table DCH-D-18.

**Table DCH-D-18
(Dollars in Millions)**

2020 Enhancing Capabilities Capital Additions	2020 Total
Network Strategy – Gas Operations Connectivity	\$2.6
Enhancing Capabilities Other (0 projects)	\$0.0
Total Company Gas	\$2.6

6 However, there is only one significant individual project for 2020, which is the
7 Network Strategy – Gas Operations Connectivity project described above. As
8 noted previously, this is a multi-year project. In 2020, we expect to invest \$2.6
9 million in the Network Strategy – Gas Operations Connectivity project.

10 4. Emergent Demand

11 **Q. ARE ANY CAPITAL PROJECTS TO ADDRESS EMERGENT DEMAND OR**
12 **OTHER BUSINESS SYSTEMS NEEDS INCLUDED IN THE 2020**
13 **BUSINESS SYSTEMS BUDGET?**

14 A. Yes. Public Service is budgeting \$15.5 million to address emergent demand
15 in 2019. As discussed earlier in my testimony, the amount will fluctuate due to
16 timing and ongoing portfolio analysis, and is generally larger in years farther
17 into the future due to the higher quantity of work that will likely be needed and
18 cannot yet be predicted.

1 **V. BUSINESS SYSTEMS OPERATIONS AND MAINTENANCE**

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

4 A. This section of my Direct Testimony discusses actual 2016 Business Systems
5 O&M expenditures, which the Company proposes to utilize as the primary
6 basis for establishing Business Systems O&M levels included in rates during
7 the MYP period. I also describe the drivers of O&M cost increases between
8 2014 and 2016.

9 **Q. WHAT ARE THE TYPES OF COSTS THAT BUSINESS SYSTEMS INCURS**
10 **FOR O&M?**

11 A. I described above the various work that is performed by Business Systems.
12 To perform this work, Business Systems generally incurs O&M costs in seven
13 categories:

- 14 • *Network Services* – costs related to the maintenance of existing
15 circuits, phones, microwave and radio systems, and other IT
16 communication assets. Network activities provide operations and
17 management of the Company’s internal and external data transmission
18 requirements.
- 19 • *Software* – includes costs for maintenance payments to software
20 vendors pursuant to license agreements associated with various
21 software applications and desktop tools. These fees must be paid to
22 secure vendor support for troubleshooting, enabling access to vendor
23 patches, fixes, and version upgrades.

- 1 • *Application Development and Maintenance* – costs associated with the
2 development, enhancement, maintenance, and consultation on new or
3 existing IT systems.
- 4 • *Labor* – costs associated with all employees in the Business Systems
5 department.
- 6 • *Distributed Systems Services* – costs related to maintenance
7 agreements on servers and data storage, PC maintenance and help
8 desk services for computer users.
- 9 • *Contract Labor/Consulting* – consists of fees and expenses for
10 consultants or knowledge base experts that are not employees of Xcel
11 Energy.
- 12 • *Productivity Through Technology (“PTT”) Project Implementation Costs*
13 – the costs of implementing the new SAP GL and WAM systems.
14 These systems are described in greater detail by Company witness Mr.
15 Timothy R. Brossart.
- 16 • *Other* – includes employee expenses, mainframe, outsourcing services
17 not included in the other categories, shared asset allocation, small
18 purchases for administrative materials, fleet expenses, and addressing
19 company anti-virus needs.

20 **Q. WHAT WERE BUSINESS SYSTEMS’ ACTUAL 2016 O&M COSTS?**

21 A. Our actual O&M expenditures for 2016 totaled \$26.1 million. Table DCH-D-19
22 below breaks down the amount of overall O&M costs by the categories I
23 discussed above. Attachments DCH-2 and DCH-3 provide an accounting of
24 these expenditures by Cost Element and FERC account.

Table DCH-D-19
2016 O&M
(Dollars in Millions)

Cost Category	Total
Network Services	\$3.4
Software	\$4.8
Application Development and Maintenance	\$5.9
Labor	\$1.2
Distributed Systems Services	\$1.1
Contract Labor/Consulting	\$1.6
Shared Asset	\$5.1
PTT Project Implementation Costs	\$1.1
Other	\$2.0
Total Company Gas	\$26.1⁶

1 **Q. ARE THE \$26.1 MILLION IN 2016 O&M COSTS FOR BUSINESS**
2 **SYSTEMS YOU DESCRIBE ABOVE REFLECTED IN THE COST OF**
3 **SERVICE PRESENTED BY MR. BERMAN?**

4 **A.** Yes. With respect to O&M, the Company is using an indexing approach that is
5 grounded in the 2016 HTY as explained by Company witness Mr. Brockett.
6 Mr. Brockett explains that this indexing approach applies to non-labor O&M
7 expense and labor O&M expense in similar but not identical ways. The
8 Company is utilizing its latest forecast for the MYP for employee benefits
9 expense recorded in FERC Accounts 925 and 926, as discussed by
10 Company witness Mr. Richard R. Schrubbe.

⁶ Difference due to rounding.

1 Q. WHAT ARE THE MAJOR DRIVERS BETWEEN BUSINESS SYSTEMS'
 2 2014 PREVIOUS TEST YEAR AND 2016 ACTUALS SHOWN IN TABLE
 3 DCH-20-D BELOW?

Table DCH-D-20
Drivers of O&M Expenses from 2014 HTY to 2016 Actuals
(Dollars in Millions)

	2014 HTY	Driver Amount	2016 Actuals
Total O&M (Adjusted)	\$21.8		
Shared Assets		\$2.1	
PTT Ongoing Costs		\$0.7	
PTT Project Costs		\$1.1	
Other		\$0.4	
Total Company Gas	\$21.8	\$4.2	\$26.1

4 A. Two major drivers explain the \$4.2 million O&M increase from the previous
 5 2014 test year to the 2016 test year. First, the network equipment shared
 6 assets costs increased between 2014 and the 2016 Test Year by \$3.1 million.
 7 Shared asset costs occur when employees in two or more of the Xcel Energy
 8 legal entities use or share an asset owned by one of the Xcel Energy legal
 9 entities, which is the case with certain network assets supported by Business
 10 Systems. Public Service shared asset costs (recorded in FERC Account 931)
 11 increased due to an increase in total Xcel Energy network equipment capital
 12 additions. However, a large Public Service credit (recorded FERC Account
 13 922) partially offsets the shared costs resulting in an overall net increase of
 14 \$2.1 million for Public Service Gas. Company witness Mr. Adam R.
 15 Dietenberger addresses allocations in more detail in his Direct Testimony.

1 Company Witness Mr. Robinson explains the credit that offsets this
2 transaction in his Direct Testimony.

3 Second, there is an increase of \$1.8 million due to PTT. PTT project
4 implementation costs were \$1.1 million in 2016, as explained by Company
5 witness Mr. Timothy R. Brossart. Ongoing PTT O&M support costs in 2016
6 were \$0.7 million, and fall within the other categories of the Business Systems
7 budget, including the usual costs of maintaining new IT systems, including
8 software licensing, labor, contract labor/consulting, and other employee
9 expenses. While PTT implementation costs will end when the WAM systems
10 are fully in service by the end of 2017, our long-term costs of maintaining
11 these systems will increase as the WAM systems move from implementation
12 to post-implementation status.

13 **Q. WHY IS ACTUAL 2016 BUSINESS SYSTEMS O&M, AS ADJUSTED FOR**
14 **LABOR AND PRODUCTIVITY FACTORS DESCRIBED BY OTHER**
15 **WITNESSES, A REASONABLE BASIS ON WHICH TO ESTABLISH O&M**
16 **COSTS FOR THE MYP PERIOD?**

17 A. Company witness Mr. Brockett discusses how the Company's overall O&M
18 proposal establishes a reasonable level of O&M costs for Public Service.
19 Further, Business Systems expects its costs to increase after 2016 due to the
20 increased costs of operating and maintaining the WAM system as well as
21 other systems maintenance needs. However, the Company is not requesting
22 an adjustment to account for these Business Area-specific cost increases. As

1 it relates to the Business Systems Business Area, our 2016 historical O&M
2 costs provide a reasonable baseline for the MYP period.

3 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

4 **A. Yes, it does.**

Statement of Qualifications

David C. Harkness

David C. Harkness is the Chief Information Officer and Vice President, for Xcel Energy Services Inc. David is responsible for the XES Business System organization, which provides Information Technology (“IT”) services to XES and its operating company affiliates, including Public Service Company of Colorado. David is also responsible for the corporate Business Continuity function and IT disaster recovery.

David has 28 years of experience in the field of IT, with 24 of those years in a management role. He joined Xcel Energy in November 2009, following six years at PNM Resources at Albuquerque, New Mexico, where he first served as Senior Director, Business Process Outsourcing, then as Senior Director of Business Transformation and finally, as Vice President and CIO for more than three years. While in New Mexico, David was also appointed by Governor Richardson to New Mexico’s Information Technology Commission, where he helped establish and direct the IT Strategy for the State of New Mexico. Prior to that experience, David held several IT Leadership roles for McLeod USA, MCI, and Rockwell International, where he began his career in 1986.

David graduated from the University of Iowa where he earned a Bachelor of Science degree in Computer Science and a Bachelor of Arts degree in Applied Mathematics.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

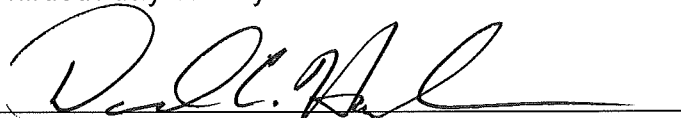
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RE: IN THE MATTER OF ADVICE LETTER)
NO. 912-GAS FILED BY PUBLIC SERVICE)
COMPANY OF COLORADO TO REVISE)
ITS COLORADO PUC NO. 6-GAS TARIFF) PROCEEDING NO. 17AL-___G
TO IMPLEMENT A GENERAL RATE)
SCHEDULE ADJUSTMENT AND OTHER)
RATE CHANGES EFFECTIVE ON 30-DAYS)
NOTICE.

AFFIDAVIT OF DAVID C. HARKNESS
PUBLIC SERVICE COMPANY OF COLORADO

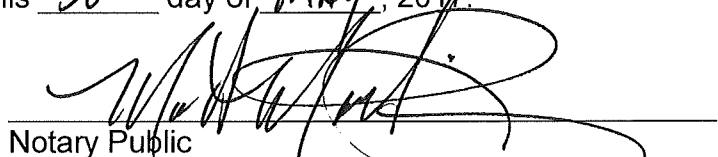
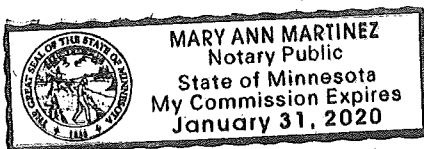
I, David C. Harkness, being duly sworn, state that the Direct Testimony and attachments were prepared by me or under my supervision, control, and direction; that the Testimony and attachments are true and correct to the best of my information, knowledge and belief; and that I would give the same testimony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

Dated at Minneapolis, Minnesota, this Thirtieth day of May 2017.



David C. Harkness
Chief Information Officer and Senior Vice
President of Xcel Energy Services Inc

Subscribed and sworn to before me this 30th day of MAY, 2017.



Notary Public

My Commission expires Jan. 31, 2020