

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

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RE: IN THE MATTER OF THE)
APPLICATION OF PUBLIC SERVICE)
COMPANY OF COLORADO FOR AN)
ORDER GRANTING A CERTIFICATE)
OF PUBLIC CONVENIENCE AND) PROCEEDING NO. 16A-____E
NECESSITY FOR DISTRIBUTION GRID)
ENHANCEMENTS, INCLUDING)
ADVANCED METERING AND)
INTEGRATED VOLT-VAR)
OPTIMIZATION INFRASTRUCTURE)

**VERIFIED APPLICATION FOR AN ORDER GRANTING A CERTIFICATE OF PUBLIC
CONVENIENCE AND NECESSITY FOR DISTRIBUTION GRID ENHANCEMENTS
INCLUDING ADVANCED METERING AND INTEGRATED VOLT-VAR
OPTIMIZATION INFRASTRUCTURE**

I. INTRODUCTION AND OVERVIEW OF REQUEST

Pursuant to §40-5-101, C.R.S., Rules 3002 and 3102 of the Colorado Public Utility Commission (“PUC” or “Commission”) Rules Regulating Electric Utilities, and Rule 1303 of the Commission Rules of Practice and Procedure, Public Service Company of Colorado (“Public Service” or the “Company”) submits this Application requesting that the Commission grant it a Certificate of Public Convenience and Necessity (“CPCN”) for three components of its Advanced Grid Intelligence and Security (“AGIS”) initiative to implement an advanced electric distribution grid. Specifically, the Company is asking for Commission authorization to install (1) Advanced Metering Infrastructure (“AMI”), (2) Integrated Volt-VAr Optimization (“IVVO”) programs, and (3)

associated components of an advanced communications network (known as the Field Area Network or “FAN”)¹ (collectively, the “CPCN Projects”).

The Company is requesting a CPCN for these three projects because they are needed to update and advance Public Service’s electric distribution grid to meet increasing reliability and security standards, meet customer expectations, offer additional customer choice and control over energy usage, implement new rate structures and support new distributed energy resources on our system. AMI meters will measure and transmit voltage, current and power quality data, and can act as a sensor providing near real-time monitoring to the Company and customers, which cannot be done by the Company’s current automated meter reading (“AMR”) meters. The voltage information measured and transmitted by AMI meters will be used by the IVVO application to automate and optimize the operation of the distribution voltage, ultimately allowing the Company to lower voltage across the system. The portion of the FAN for which Public Service is requesting a CPCN in this Application – the Wireless Smart Utility Network (“WiSUN”) – will facilitate the flow of information between the AMI meters and the IVVO devices to the Company’s software and hardware support system that will be implemented through the ordinary course of business.

Together, the deployment of these technologies will give us visibility into the distribution grid that previously was not possible across our entire system. The current electric distribution system was originally designed to accommodate only a one-way flow of electricity and information from the utility to the end use customer. This means

¹ As explained below, the Company believes its installation of the FAN is in the ordinary course of business and therefore does not require a CPCN. We are only requesting a CPCN for those additional components of FAN necessary to accommodate AMI and IVVO.

that beyond the distribution substation, the Company has little insight into the workings of the distribution system or the customer experience. This translates to an inability to efficiently manage the voltage level on the system, limits the Company's ability to identify outages, and does not support the intelligent transfer of energy usage information between customers and the Company. While the Company has previously updated the original design of the distribution system, including upgrading its meters to AMR meters, these upgrades are not sufficient to change the visibility into or control of the existing distribution system. When Public Service deploys AMI and IVVO, the Company will be able to gather near real-time energy usage information through the AMI meter and communicate that information through the FAN to applications such as IVVO that use the data to reduce electricity consumption and increase system reliability.

As noted, the CPCN Projects are components of the AGIS initiative, a broader effort to advance the electric distribution grid by incorporating technological developments that are being deployed elsewhere in the nation. AGIS is a long-term strategic initiative to transform the electrical distribution system to enhance security, efficiency and reliability, to safely integrate more Distributed Energy Resources ("DER"), and to enable improved customer products and services. The overall AGIS initiative consists of both the CPCN Projects, as well as additional applications, communications network enhancement, and field devices that are being implemented in the ordinary course of business, which will all work together to advance the electric distribution grid. The Company's CPCN Application and the AGIS initiative is a critical portion of the Company's Our Energy Future initiative; it will facilitate broader opportunities to reduce electricity consumption, work toward clean energy initiatives, and help the Company

implement rate designs, including time-of-use (“TOU”) rates that give customers appropriate price signals and facilitate energy efficiency and customer choice.

These CPCN Projects will require an estimated capital investment of approximately \$562 million. While the Company is not proposing a cost recovery mechanism at this time, it is proposing reporting requirements to provide information to the Commission and interested parties regarding the CPCN Projects as it moves forward to facilitate the review of costs in subsequent rate proceedings. The Company proposes to begin the AGIS initiative projects in 2016, and complete them by 2022. This is depicted in more detail in the deployment table found in paragraph 12 below.

With this Application, Public Service is filing a direct case, which consists of the testimony and exhibits of the following eight witnesses:

- Ms. Alice K. Jackson, Regional Vice President, Rates and Regulatory Affairs, presents an overview of Public Service's AGIS initiative and this Application for a CPCN to implement AMI, IVVO, and the components of the FAN that are part of the requested CPCN Projects. She explains how these programs are part of the larger AGIS initiative. She also addresses the Company's proposal to keep its stakeholders informed of project status and accrued costs throughout the implementation through regular reporting. Finally, she explains that the Company is not seeking any special cost recover for CPCN Project costs at this time.
- Mr. John D. Lee, Senior Director Distribution Engineering, presents a technical strategy overview of the AGIS initiative, including the CPCN Projects. He describes the Company's current distribution systems and its

limitations. He identifies the need to advance the electric distribution grid and the factors driving that need. He explains Public Service's technical strategy to meet these challenges through the AGIS initiative. Mr. Lee also outlines the overall implementation plan for the AGIS initiative, overall anticipated costs of the CPCN Projects, details supporting program management and change management costs, and alternatives to the AGIS initiative from an overall system perspective.

- Mr. Russell E. Borchardt, Director, Business Operations, describes AMI and the need for that technology in detail. He explains that the Company's AMI proposal is consistent with industry standards. He also provides the implementation plan for AMI and discusses its cost and benefits.
- Mr. Chad S. Nickell, Manager, System Plan & Strategy, describes the following technologies: Advanced Distribution Management System ("ADMS"), IVVO, and FLISR. He explains that the Company's proposal regarding these technologies is consistent with industry standards. He also provides the implementation plan for these technologies and discusses their cost and benefits.
- Mr. Wendall A. Reimer, Director, Telecommunications and Network Services, describes the FAN. He addresses the interdependencies of the FAN components with other proposed infrastructure and technologies. He explains that the Company's FAN proposal is consistent with industry

standards. He also provides the implementation plan for FAN and discusses its cost and benefits.

- Mr. David C. Harkness, Chief Information Officer and Senior Vice President (“CIO & SVP”) Business Systems, describes the Company’s technological components of security protocols. He explains the safety and dependability of the Company’s system. He provides an overview of the business systems and information technology (“IT”) services that will integrate the various components of the AGIS initiative. He explains the IT integration interdependencies and installation, as well as the Company’s technological cyber security protocols for AGIS.
- Mr. Samuel J. Hancock, Manager, Regulatory Project Management, presents and explains the Company’s quantitative cost benefit analysis in support of the CPCN Projects.
- Ms. Jennifer B. Wozniak, Director, Jurisdictional Communication, presents the Company’s advanced grid customer surveys, with a focus on AMI, and the Company’s Customer Education and Communication Plan (“the Education Plan”).

This Application, including the accompanying pre-filed direct case establishes the need for the AMI, IVVO and related FAN CPCN Projects. The Commission should grant a CPCN for these projects.

II. STATUTORY AND LEGAL BASIS FOR THIS FILING

1. Public Service is filing this Application pursuant to §40-5-101(1), C.R.S., the CPCN statute in the Colorado Public Utilities Law. Subsection (a)(III) of this statute exempts from CPCN requirements projects undertaken in “the ordinary course of business,” and Commission Rule 3207(a) specifies that “[e]xpansion of distribution facilities, as authorized in §40-5-101, C.R.S., is deemed to occur in the ordinary course of business and shall not require a certificate of public convenience and necessity.” Given that the CPCN Projects all relate to the distribution system, the ordinary course of business exemption arguably applies to them.

2. Nonetheless, the exemption to the CPCN requirements that applies to distribution facilities is not absolute. With respect to the Company’s SmartGridCity project in Boulder, the Commission required that the Company obtain a CPCN because it was not a project in the ordinary course of business.² By separate order, the Commission concluded that an application should be submitted for any future advanced metering programs.³ The Company determined it should apply for a CPCN for AMI, IVVO and the associated portions of the FAN based on the Commission determinations that advanced metering should require a CPCN, that the IVVO proposal is intertwined with the deployment of AMI by implementing it in tandem because the AMI meters will act as voltage sensors for IVVO, the associated FAN components will provide the ability for AMI and FAN to communicate information necessary for the programs to run, and the large scale of implementing these projects.

² See Commission Decision C09-1446 in Proceeding No. 09AL-299E.

³ See Commission Decision C11-0406 in Proceeding No. 10I-099EG.

3. Notwithstanding our decision to file this Application for the CPCN Projects, the Company believes that several components of the AGIS initiative fall within the ordinary course of business exemption that applies to distribution projects. ADMS will provide an integrated operating and decision software and hardware system to support monitoring, controlling and optimization of the electric distribution system. Fault Location Isolation and Service Restoration (“FLISR”) is an application which involves software and automated switching devices to decrease the duration and number of customers affected by any individual outage. Fault Location Prediction (“FLP”) is a subset application of FLISR that locates a faulted section of a feeder line. Geospatial Information System (“GIS”) provides location and specification information about all physical assets that make up the distribution system. The Company believes all of these projects are properly undertaken in the ordinary course of business, and therefore the Company only addresses them in this Application to provide the context of the CPCN Projects.

In further support of this Application, the Company states as follows:

A. INFORMATION REQUIRED BY RULE 3102(B), (C) AND (D) AND PREVIOUS COMMISSION DECISIONS

1. Information Required for a CPCN for AMI, IVVO and associated components of the FAN Pursuant to Rules 3102(b)(I)
4. Rule 3102(b)(I) request the Company provide information pursuant to Rules 3002(b) and 3002(c). This information is provided in Subsection B below.

2. Facts Relied Upon to Show that the Public Convenience and Necessity Require Granting this Application (Rule 3102(b)(II))

5. In recent years rapid, technological advances in computer-based remote control, automation, and two-way communication technology that have been used for decades in other industries are now rapidly being deployed on electrical grids. The needs and expectations of the Company's customers and stakeholders have also evolved, and they expect a more robust, reliable, and resilient system. Further, the industry is increasing reliability standards. While the Company currently ranks in the first quartile amongst its peers regarding its system average interruption duration index ("SAIDI"), the Company will not be able to maintain that status into the future without implementing the advanced technologies that are part of the AGIS initiative. Finally, it is expected that DER will continue to rise rapidly in the coming years and the Company needs to have advanced visibility and control over the distribution system to enable integrating voltage with these highly variable generation resources.

6. As the testimony in our accompanying direct case demonstrates, the CPCN Projects of the AGIS initiative that are the subject of this Application seek to take advantage of developed and enhanced technology to enhance security, efficiency, and reliability, to safely integrate more DER, and to enable improved customer products and services. While the current distribution system is safe and reliable, the design of the system limits the Company's visibility beyond the substation level, and limits the Company's ability to monitor voltage, identify outages and communicate energy usage information to customers in near real-time. The technology to operate electric grids has advanced and it is now possible to implement equipment that will address the limitations

of the Company's current system, and enhance security and efficiency while safely integrating more DER and enabling improved customer products and services. Moreover, the CPCN Programs consist of grid technologies necessary to facilitate opportunities to reduce electricity consumption, work toward clean energy initiatives, and implement rate design that facilitates energy efficiency and customer choice. Accordingly, the Commission should find that approval of this Application is in the public interest.

3. Description of the Proposed Facilities to be Constructed (Rule 3102(b)(III))

7. AMI meters, which are being requested as part of the CPCN Projects, are able to measure and transmit voltage, current, and power quality data and can act as a "meter as a sensor," providing near real-time monitoring between the meter and ADMS. These meters provide information about customer usage and will enhance the Company's ability to allow for new rate structures that will send price signals, and allow customers to manage their energy usage with near real-time energy usage data. Also, these meters will identify outages without customer reporting, respond efficiently to metering and usage issues, and allow remote service disconnects and reconnects. AMI meters are discussed in more detail in the Direct Testimony of Company witness Mr. Borchardt.

8. As discussed above, IVVO, which is being requested as part of the CPCN Projects, is an application that automates and optimizes the operation of the distribution voltage regulating and VAr control devices to reduce electrical losses, electrical demand and energy consumption, and provides increased capacity to host DERs. IVVO is

included in the CPCN request in this proceeding. IVVO is discussed in more detail in the Direct Testimony of Mr. Nickell.

9. The FAN, which the portions associated with AMI and IVVO are being requested as part of the CPCN Projects, is the communications network that will enable communications between the communications infrastructure that already exists at the Company's substations, the ADMS, and the new intelligent field devices associated with advanced applications as described immediately below. The FAN applies to all aspects of the AGIS initiative, but is designed and built according to the needs of various components, and each has different communication network requirements. The components of the FAN that support AMI and IVVO, discussed immediately below, are being requested as part of the CPCN in this proceeding. The FAN that is implemented separate from those two AGIS components, known as Worldwide Interoperability for Microwave Access ("WiMAX") will be done in the ordinary course of business. The FAN is discussed in more detail in the Direct Testimony of Company witness Mr. Reimer.

10. Underlying all of the CPCN Projects and the other programs in the AGIS initiative are the IT support and cyber security protections necessary to operate a secure, technologically-advanced grid in today's world. IT and cyber security protections are discussed in more detail in the Direct Testimony of Company witness Mr. Harkness.

4. Estimated Cost of the Proposed Facilities to be Constructed (Rule 3102(b)(IV))

11. As reflected in the table below, the total cost of AMI, IVVO, and the associated portions of the FAN and IT is estimated to be approximately \$562 million in costs that the Company will incur over the next five years. The costs reflected are in

2016 capital expenditure dollars, and do not account for escalations in costs due to inflationary pressures. Detailed cost information, with respect to the CPCN Projects, including how the Company arrived at its cost estimates, are presented in the Direct Testimonies of Company witnesses Messrs. Lee, Borchardt, Nickell, Reimer, and Harkness. While the Company is requesting that cost recovery decisions be deferred to the Company's next general rate case, in an effort to keep the Commission and interested parties up to date on project status and costs, the Company proposes filing two annual reports: 1) an annual forecast report filed in the fall (October) of each year with the forecast of the upcoming calendar year; and 2) an annual actuals report filed in the spring (May) of each year containing the actuals from the previous year.

CPCN Capital Costs 2016-2021 (\$M)

Capital (\$Millions)	2016	2017	2018	2019	2020	2021	Total 2016-2021
AMI	0.5	3.5	31.7	117.0	68.6	16.8	238.1
IVVO	0.0	18.2	21.7	20.1	18.5	18.9	97.4
FAN	0.4	10.0	13.0	13.0	2.7	0.2	39.2
IT	3.3	56.9	50.4	4.6	5.6	2.7	123.4
Total	4.1	88.6	116.8	154.6	95.3	38.6	498.1

CPCN O&M Costs 2016-2021 (\$M)

O&M (\$Millions)	2016	2017	2018	2019	2020	2021	Total 2016-2021
AMI	0.4	1.4	2.5	3.5	2.0	0.4	10.2
IVVO	0.0	1.0	1.3	1.7	2.2	2.7	8.9
FAN	0.2	0.6	2.0	3.6	4.7	5.0	16.0
IT	0.1	4.6	7.0	5.8	5.8	5.8	29.2
Total	0.7	7.7	12.8	14.6	14.6	13.9	64.3

5. Anticipated Construction Start Date, Construction Period, and In-Service Date (Rule 3102(b)(V))

12. Due to the integrated nature of the various programs of the AGIS initiative, certain components must be placed in-service prior to others because they provide the necessary foundational elements for later components. The AGIS initiative will not be completed in a single project effort or within a single year. Instead, the necessary facilities will be constructed and placed in-service over time, and the system will grow and layer additional capabilities and functionality that will deliver value to customers. Public Service anticipates implementing the CPCN Projects between 2016 and 2021, as reflected in the table below. Company witness Mr. Lee discusses this in more detail.

PROGRAM	DEPLOYMENT TIMELINE
ADMS	Installation: Detailed design 2016 System implementation 2017-2018
AMI	2018 Anticipated installation of first AMI meter in Install 95% of AMI meters by end of 2020.
FAN	2021 WiMax and backhaul infrastructure 2016-2018 WiSun (mesh network) implementation 2018-
IVVO	Installation: Anticipated 2017-2022
FLISR	Installation: 2016-2022

6. General Vicinity Map (Rule 3102(b)(VI))

13. Maps showing the general area where facilities will be constructed, population centers and major highways for each proposed program in the AGIS initiative, including the CPCN Projects are attached to Company witness Mr. Lee's Direct Testimony as Attachment JDL-1.

7. Electric One-Line Diagram (Rule 3102(b)(VII))

14. An electric one-line diagram of the CPCN Projects of the AGIS initiative is not applicable.

8. Alternatives Studied (Rule 3102(b)(VIII))

15. Rule 3102(b)(VIII) provides that an application for a CPCN should include, “as applicable,” information on alternatives studied, costs for those alternatives, and criteria used to rank or eliminate alternatives. As explained in the Direct Testimonies of Company witnesses Messrs. Borchardt, Reimer, and Nickell, the company considered individual technical alternatives to each CPCN Project. Company witness Mr. Lee also discusses alternative from an overall system perspective in his Direct Testimony. The alternatives presented in Mr. Lee’s testimony include the use of Demand Side Management (“DSM”) programs as alternatives to the relevant components of AGIS, completing each AGIS component through stand-alone applications instead of the integrated applications chosen, implementing only certain programs or components of AGIS, and not upgrading the current distribution system infrastructure.

9. Prudent Avoidance Measures (Rule 3102(b)(IX)) and Other Information Required by Rule 3102(b)(X), (c) and (d)

16. Rule 3102(b)(IX) provides that an application for a CPCN should include, “as applicable, a report of prudent avoidance measures considered and justification of the measures selected to be implemented.” The concept of “prudent avoidance” appears to apply only to CPCN applications to construct or extend transmission facilities. Likewise, Rules 3102(b)(X), 3102(c) and 3102(d) only apply to “construction

or extension[s]” of transmission facilities. Accordingly, with respect to the Company’s CPCN Projects, these Rules are not applicable.

B. ADDITIONAL INFORMATION REQUIRED BY COMMISSION RULE 3002(b) and (c)

1. Name and Address of Applicant (Rule 3002(b)(I))

17. Public Service is an operating public utility subject to the jurisdiction of this Commission, engaged, *inter alia*, in the transmission, distribution, and purchase of electricity and gas in various areas in the State of Colorado. The name and address of the Applicant is:

Public Service Company of Colorado
1800 Larimer Street, Suite 1400
Denver, Colorado 80202-5533

2. Name Under Which Applicant Will Provide Service in Colorado (Rule 3002(b)(II))

18. All operations conducted by the Company in Colorado are conducted under the name of Public Service Company of Colorado, under the trade name of Xcel Energy.

3. Representatives to Whom Inquiries Concerning the Application Should Be Made (Rule 3002(b)(III))

19. Please send copies of all inquiries, notices, pleadings, correspondence, and other documents regarding this Application to:

Alice K. Jackson
Regional Vice President, Rates and
Regulatory Affairs
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4. Agreement to Comply with Rules 3002(b)(IV)-(VI) (Rule 3002(b)(VII))

20. Public Service has read, and agrees to abide by, the provisions of subparagraphs (b)(IV) through (VI) of Rule 3002.

5. Description of Existing Operations and General Colorado Service Area (Rule 3002(b)(VIII))

21. Public Service's existing operations and general service areas in Colorado are set forth in the Company's tariffs on file with the Commission.

6. Location of Hearing (Rule 3002(b)(X))

22. Public Service requests that any hearings in this proceeding be held at the Commission's offices in Denver, Colorado.

7. Acknowledgment (Rule 3002(b)(XI))

23. Public Service acknowledges that the Company has read and agrees to abide by the provisions of 4 CCR 723-3002(b)(XI)(A) through (C).

8. Statement Under Oath (Rule 3002(b)(XII))

24. Company witness Ms. Alice K. Jackson states under penalty of perjury that the contents of this Application are true, accurate, and correct to the best of her knowledge. Her affidavit is attached to this Application.

9. Information Required by Rule 3002(b)(IX) and (c)

25. Pursuant to 3002(c) of the Commission's Electric Rules, Public Service incorporates by reference the following information, on file with the Commission in Docket No. 06M-525EG:

- A copy of Public Service's Amended Articles of Incorporation, which was last filed on October 3, 2006;
- The name, business address and title of each of Public Service's officers and directors, which was last filed on June 13, 2016;
- The names and addresses of affiliated companies that conduct business with Public Service, which was last filed on June 13, 2016;
- The name and address of Public Service's agent for service of process, which was last filed on October 3, 2006.
- A copy of Public Service's most recent audited balance sheet, income statement, and statement of retained earnings was last filed on June 13, 2016.

III. CONCLUSION

WHEREFORE, Public Service Company of Colorado respectfully requests the Commission grant this Verified Application and issue an order granting Public Service's request for a CPCN for the implementation of AMI and IVVO, as well as the

components of the FAN that are necessary to support AMI and IVVO. The Company also requests that the Commission approve its semiannual reporting plan, by which the Company will keep the Commission and interested parties informed regarding project implementation and accrued costs.

Dated this 2nd day of August 2016.

Respectfully submitted,

By: /s/ William M. Dudley
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**ATTORNEYS FOR PUBLIC SERVICE COMPANY
OF COLORADO**

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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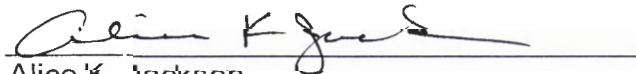
VERIFICATION

STATE OF COLORADO)

CITY AND COUNTY OF DENVER) SS:

I, Alice K. Jackson, being duly sworn, do hereby depose and state that I am the Regional Vice President, Rates and Regulatory Affairs, of Xcel Energy Services Inc., Applicant in the foregoing Application; that I am an authorized agent for Public Service Company of Colorado for the purposes set forth in this Application.

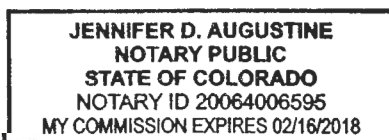
I have read the foregoing Application and the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

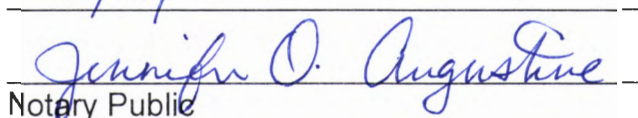


Alice K. Jackson
Regional Vice President, Rates and Regulatory Affairs
Xcel Energy Services Inc.

Subscribed and sworn to before me this 2nd day of August, 2016.

My Commission expires:



2/16/18

Notary Public