

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF COLORADO

\* \* \* \*

IN THE MATTER OF THE APPLICATION OF	)	
PUBLIC SERVICE COMPANY OF	)	
COLORADO FOR AN ORDER APPROVING	)	Docket No. 10A- ____E
A SMARTGRIDCITY™ CPCN	)	

**VERIFIED APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO**

Introduction

Pursuant to C.R.S. §40-5-101, Rules 3002 and 3102 of the Commission's Rules Regulating Electric Utilities, and Rule 1303 of the Commission's Rules of Practice and Procedure, and Decision Nos. C09-1446 and C10-0137, Public Service Company of Colorado ("Public Service" or "Company" or "Applicant") hereby applies for a certificate of public convenience and necessity ("CPCN") for its SmartGridCity™ project in Boulder. In this first of a kind pilot project, the Company has integrated and deployed emerging "smart grid" technologies in a comprehensive manner in a small municipality. While other utilities have undertaken limited deployments of such technologies, SmartGridCity™ is unique in its scope, and has been designed to give the Company a true assessment of the feasibility and capabilities of these technologies. The Company is currently estimating that the costs of the project, which is now largely complete, will be \$44.8 million.<sup>1</sup> The Company is requesting that the CPCN for this project be granted on a retroactive basis.

<sup>1</sup> This figure is slightly higher than the \$42.1 million estimate that the Company used in its recent Phase I rate case, Docket No. 09AL-299E. The Company gives detail behind this updated estimate in this application.

Public Service is submitting the testimony of the following four witnesses in support of this application:

- Ms. Mary Fisher, who discusses the Company's rationale for pursuing the SmartGridCity™ project, and explains both the benefits that the Company has already seen from the project and additional benefits it hopes to achieve. Ms. Fisher also discusses the scope of the Company's request in this proceeding.
- Mr. Randy Huston, who identifies and describes the facilities and equipment, including computer software systems, that the Company installed as part of its SmartGridCity™ project; describes the four phases of the project; discusses certain key decisions or alternatives relating to the project that were considered (namely the decision whether to partner and location); discusses intellectual property arrangements relating to the project; and describes how SmartGridCity™ facilitates the integration of distributed generation.
- Mr. Lynn L. Worrell, who provides more detailed information regarding the distribution system in Boulder and how the SmartGridCity™ project improves the Company's capabilities on the distribution system there. Mr. Worrell provides additional information on how SmartGridCity™ will aid with the integration of distributed generation.
- Mr. Christopher R. Haworth, who will provide information regarding the costs of SmartGridCity™.

~~There is currently a pending investigatory docket, Docket No. 10I-009EG, where the Commission is considering various smart grid deployment and implementation issues. The Commission in Decision No. C10-0137 also clarified that its decision to require a CPCN for the SmartGridCity™ project was based on the size and scope of the project, and was not aimed at more limited deployments of smart grid technology that the Company might undertake in the normal course of business. In this connection, the Company believes that it would be useful if the Commission would clarify in this proceeding when CPCNs may be required for new projects deploying smart grid technologies and in what circumstances installation and deployment of smart grid technologies may be treated as being in the normal course of business. To that end, as discussed by Ms. Fisher in her testimony and further below in this application, the Company in this application is requesting both a CPCN for SmartGridCity™ and clarification that a CPCN is not required for certain other deployments of smart grid technologies.~~

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

Information Required by Rule 3002(b)

Name and Address of the Applicant (Rule 3002(b)(I)):

Public Service Company of Colorado  
1225 17th Street, Suite 1000  
Denver, CO 80202-5533

Name under which Applicant provides service in (Rule 3002(b)(II)): The Company conducts its operations in Colorado under the trade name of Xcel Energy.

Representatives to whom inquiries concerning the Application should be made (Rule 3002(b)(III)): Please send copies of all inquiries, notices, pleadings, correspondence, and other documents regarding this filing to:

Robin Kittel  
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Mr. Daniel J. James  
Manager of Pricing and Planning  
Xcel Energy Services Inc.  
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and

William M. Dudley, #26735  
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Denver, CO 80202  
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E-mail: bill.dudley@xcelenergy.com

Agreement to comply with Rule 3002(b)(IV)-(VI) (Rule 3002(b)(VII)): Public Service has read and agrees to abide by the provisions of subparagraphs (b)(IV) through (VI) of Commission Rule 3002(b).

Description of existing operations and general Colorado service area (Rule 3002(b)(VIII)): Public Service provides electric and gas public utility service in numerous areas throughout the State of Colorado. The Company also provides steam utility service within the downtown area of Denver. A full listing of Public

Service's existing operations and service area is set forth in Public Service's tariffs on file with the Commission.

Financial Information (rule 3002(b)(IX)): A copy of Public Service's most recent audited balance sheet, income statement, and statement of retained earnings was last filed on April 2, 2009 in Docket No. 06M-525EG.

Location of hearing (Rule 3002(b)(X)): If the Commission sets this application for hearing, Public Service requests that the hearing be held at the Commission's offices in Denver, Colorado.

Acknowledgment required by Rule 3002(XI)(D): Public Service acknowledges that the Company has read and agrees to abide by the provisions of Rule 3002 (b) (XI) (A) through (C).

Statement Under Oath (Rule 3002(b)(XII)): Mr. Daniel J. James, Manager of Pricing and Planning, states under penalty of perjury that the contents of the Application are true, accurate, and correct to the best of his knowledge. His affidavit is attached to this application.

Information Required by Rule 3002(c)

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

- a. A copy of Public Service's Amended Articles of Incorporation, which was last filed on October 3, 2006;
- b. The name, business address and title of each of Public Service's officers and directors, which was last filed on January 8, 2010;

c. The names and addresses of affiliated companies that conduct business with Public Service, which was last filed on January 8, 2010;

d. The name and address of Public Service's agent for service of process, which was last filed on October 3, 2006.

Information Required by Rule 3102(b)

Information required by Rules 3002 (b) and (c) (Rule 3102(b)(I)): This information is provided above.

Statement as to why the CPCN should be granted (Rule 3102(b)(II)):  
Company witnesses Fisher, Huston, and Worrell through their direct testimonies provide information that supports the decision of the Company to undertake SmartGridCity™.

In summary, the Company does not contend that the SmartGridCity™ project is needed or required in the same way that the Company normally needs a new facility. The Company's retail customers in Boulder were receiving adequate and reliable distribution service prior to the deployment of smart grid technologies in Boulder as part of the project. SmartGridCity™ has resulted in enhanced capabilities.

The SmartGridCity™ was conceived as a demonstration or pilot project to enable the Company to gain experience with the integration of emerging smart technologies into the distribution system and to enable the company to assess the feasibility and benefits of those technologies. Prior to SmartGridCity™ certain smart technologies had been developed and deployed in the industry on a limited basis. However, these technologies had not been deployed by any

utilities on a comprehensive basis. This was true even though there were significant developments in the industry that made it desirable to assess the full potential of smart technologies. The Company believes that the hesitancy in the industry to invest in smart grid technologies was due to what the Company views as a “chicken and egg” type of problem – that is, the capabilities of smart technologies were being hypothesized but no utilities were willing to make the investment in smart technologies absent an actual demonstration of benefits. It was in this context that the Company decided to undertake the SmartGridCity™. The Company wanted to develop a project that was limited in size, but at the same time large enough to give it a fair assessment of smart technologies.

Before proceeding with the SmartGridCity™ project, the Company did not perform any traditional cost-benefit types of analyzes. Rather, the Company developed a lengthy list of “value propositions” – including reliability improvements, fuel savings through the reduction of losses, avoidance of reliability issues, improved customer satisfaction, improved ability to support advanced pricing structures, and the improved ability to integrate distributed energy resources – that it could assess by pursuing the project. There was recognition that some of the value propositions would result in benefits, but that some may not. The full list of value propositions is included as Exhibit No. MJF-2 to Ms. Fisher's testimony. The Company is presently in Phase 4 of the SmartGridCity™ project, which among other things involves the development of tests to validate various of the value propositions.

Notwithstanding that the tests to validate the value propositions have yet to be designed, the Company is already seeing benefits from the project. These include:

- A drop in customer complaints related to voltage.
- Identification of numerous processes and standards that the Company can improve (e.g., the Company is investigating using the actual voltage measurements for the premise with the largest loss to set the feeder voltage rather than simply relying on a model based solution for setting feeder voltage).
- Reports from equipment that has been installed of outages from the Company's distribution system and the ability to respond to them before receiving customer calls.
- Ability for Customer Service Representatives to ping a smart meter to check its status and current reading.
- Ability for planning personnel to see the actual load on all monitored transformers and to deal with them before they fail.
- Ability for field personnel to obtain information on all monitored devices from their vehicles while in the field so that they can deal with them more efficiently.
- Change in Dispatch Center processes to look for nested outages electronically, enabling the Company to avoid duplicative service calls and truck rolls.



- Information on portal design that can be applied to the Company's enhanced Online Account Management project and customers in its greater service territory.

The Company does not presently have any plans to duplicate SmartGridCity™ elsewhere in its service territory: to do so would be premature until the value propositions can be tested. However, the Company has already learned a tremendous amount of information from the project that it can utilize elsewhere on its system through more limited deployments of equipment. Moreover, the Company is utilizing SmartGridCity™ for other pilot projects – specifically, a pricing pilot (DSM program, and filed as Docket No. 09A-796E), the In-Home Smart Device Pilot (DSM program), and the Company's Online Account Management portal project.

For all of these reasons, the Company believes that its decision to proceed with SmartGridCity™ was in the public interest – not just from the perspective of its customers in Boulder, but all of its customers throughout its system – and that its request for a CPCN should be granted on a retroactive basis.

Description of facilities (Rule 3102(b)(III): Public Service witness Huston describes the facilities that were installed as part of SmartGridCity™ in detail in his testimony. To provide a high level summary, the project included the installation of monitoring devices on approximately 4,600 transformers and four substations with upgrades to approximately 24,000 meters, as well as the installation of various power quality and switching devices on selected

equipment. The Company then installed a communications system, consisting primarily of Broadband over Power Line with fiber backhaul, to interconnect the monitoring and control components. The Company connected this community communication system back to its primary data center and then into new and existing systems and applications.

Estimated cost (Rule 3102(b)(IV)): Mr. Haworth provides detailed information regarding the costs of the project. In addition to identifying the costs of the different components of the project, Mr. Haworth explains the cost increases that the Company has experienced.

The total capital cost of SmartGridCity™ is estimated to be \$44.8 million. The Company's original estimate for the project was approximately \$15 million. It is also slightly higher than the estimate (\$42.1 million) accepted by the Commission, but made subject to refund, in Decision No. C09-1446. As the Company's effort in Boulder is a comprehensive test of smart grid technology, processes, and possibility, the technologies being deployed have not necessarily been used in the way they are being used in Boulder—many have not been used in combination with others, some being developed for the first time as part of this initiative. As a result, there have been components of the effort that were more complex than originally anticipated, and therefore, more costly.

In particular, the Company encountered more complexity in the deployment of the communications infrastructure. The Company had to install far more underground fiber than initially projected, substantially increasing the cost associated with the fiber installation. The Company also ran into

unexpected construction conditions (such as having to drill through granite and remove huge boulders) and costs related to distributed generation increased.

The Company's current \$44.8 million estimate includes the addition of the following items: a favorable license purchase of Ventyx software to avoid ongoing annual fees, 2010 system testing and tuning, and 2010 AFUDC and the deduction of a cash credit received from a partner, Current Group, none of which were known at the time of the rate case. The Company does not expect to recover these costs in the Docket No. 09AL-299E proceeding, which is still ongoing, but would expect to recover these costs in its next case.

Construction dates (Rule 3102(b)(V)): Public Service witness Huston discusses how the construction of SmartGridCity™ was planned to be undertaken in four phases. The first three phases have already been completed, which is why the Company must request a CPCN on a retroactive basis in this application. The first three phases are as follows:

- Phase 1 – the construction of the core infrastructure, which served as the necessary foundation for the work to be completed in the other phases. Phase 1 began the first week of April 2008. The majority of work was completed by August 2008, with some follow up activities continuing for approximately 90 days thereafter.
- Phase 2 – completion of the build-out of the core infrastructure along with the development of the new integrated application environments. Phase 2 construction began in late August 2008 and achieved its key milestones

the first week of August 2009 with the successful go-live of the final major systems.

- Phase 3 – the clean up, testing, and process maturity period. The third phase of construction began in August 2009 and continued through the end of the year.

The project is presently in Phase 4, which focuses primarily on the deployment of the remaining premise level equipment. This is the phase where the Company is focusing on completing its value proposition analysis, which Ms. Fisher discusses in her direct testimony. Phase 4 began the first week of January 2010 and will continue through the middle of November 2010.

Maps and one-line diagram (Rule 3102(b)(VI) and (VII)): In support of its application, Public Service submits the following maps and diagrams:

- Worrell Exhibit LLW-1 (Confidential) – a map showing the electric distribution system and communication network for SmartGridCity™ within Boulder.
- Huston Exhibit RH-1 – three one-line diagrams showing substation interconnections, premise connections, and feeder and control monitoring.

In addition, Mr. Huston included two diagrams in his direct testimony, Figure 1 (SmartGridCity™ Overview) and Figure 2 (SmartGridCity™ Component Diagram), which are intended to help the Commission and interested parties understand the nature of the equipment that was installed).

Alternatives studied (Rule 3102(b)(VIII)): As noted by both witnesses Fisher and Huston, the SmartGridCity™ project was not the type of project that

lended itself to a typical analysis of alternatives. Given that the whole purpose of the project was to evaluate the feasibility and effectiveness of emerging smart grid technologies on a comprehensive basis, the main decision was either to undertake the project or not. The Company believes that its decision to go forward with the project is consistent with the public interest.

As Mr. Huston discusses, there were two key decisions that needed to be made as part of the project. One of the decisions was whether to partner with vendors in this project. In order to create a program large enough to provide valid answers while minimizing the cost to its customers, the Company decided to assemble a group of companies that could provide a range of expertise and resources for the SmartGridCity™ project. Numerous companies were interviewed to find those that had the vision, desire, and technology to be part of the project. At the end of the process, a small group of companies (Ventyx, Accenture, GridPoint, OSISoft, SmartSynch, Schweitzer Engineering Laboratories, TIBCO, and Current Group) came together to form a consortium with each company bringing the best that it had to offer.

A second key decision was where to locate the project. Xcel Energy concluded that it would be best to complete the project in Boulder through Public Service. Key factors behind this decision included the expression of interest by Boulder and the expected level of support the Company expected to receive from Boulder, the suitability of the electrical grid in Boulder, the number of customers in Boulder (a large enough sample size to conduct statistically valid tests, but not so large as to negatively impact the Company's ability to interact) and the

associated demographics of those customers (which included entities that potentially provided collaborative opportunities), and the location of Boulder.

Rule 3102(IX) and (X): Inapplicable to this CPCN application.

#### Other Information

In the direct testimony submitted in support of this application, the Company has addressed two areas of concern regarding SmartGridCity™ that were raised by Commission Staff and intervenors in Docket No. 09AL-299E: intellectual property arrangements and the concern that the equipment being installed as part of SmartGridCity™ is or will be obsolete.

Mr. Huston is the witness who addresses these two issues. With respect to the intellectual property arrangements, Mr. Huston explains that the Company opted for an approach whereby the partners retained the intellectual property they developed as part of the project, but the Company reserved the right for it and other Xcel Energy utilities to be able to use the intellectual property elsewhere on their systems. The Company opted for this approach because it believed it would help encourage partners to come in and participate in the project. The Company believes that this approach did in fact make the partners more willing to work together in the project.

Mr. Huston also addresses in detail the concern regarding obsolescence. Listing all of the major components of SmartGridCity™, Mr. Huston explains why the concern regarding obsolescence is not well-founded. The only area where the Company believes there may be a concern about obsolescence is home

automation systems. However, the Company has mitigated this possibility by delaying its field deployment of this equipment.

Requested Ruling

~~The focus of this application is primarily on the City's SmartGridCity™ project. Even though the Company has largely completed this project, the Commission directed that the Company obtain a CPCN for this project in Decision Nos. C09-1446 and C10-0137.~~

~~At the same time, the Commission is aware that smart grid enabled technologies are becoming more commonly available and are being deployed by the Company and other utilities in Colorado. To that end, the Commission granted the Company's request for clarification that those orders should not be interpreted to encompass more routine, smaller scale deployments of smart grid equipment — see Decision No. C10-0137, ¶24 — and has opened a new investigatory docket — see Decision No. C10-0188 opening Docket No. 10I-099EG). In this context, the Company believes that it would be appropriate for the Commission not only to grant a CPCN for SmartGridCity™, but to clarify situations where the Company will not need to obtain new CPCNs.~~

~~Specifically, the Company is requesting the following rulings in this proceeding:~~

- ~~• The Company clearly understands that if it were to duplicate SmartGridCity™, it would need to file a CPCN request to do so; however, that is not the Company's current plan. In this regard, the~~

~~Company proposes that the Commission in this docket: grant a GPCN for the SmartGridCity™ project;~~

- ~~• Confirm that the Company does not need to obtain a GPCN for deployments of smart grid enabled technologies or equipment in the following circumstances: (1) where the Company replaces old equipment with new smart grid enabled equipment when it conducts maintenance activities on its system; (2) where the Company installs smart grid enabled equipment to enable it to better monitor grid conditions to enhance operations, efficiency or to resolve problems; (3) where the Company utilizes smart grid enabled equipment when it extends service to new areas or premises, including new subdivisions; (4) where the Company intends to upgrade old equipment in the normal course of business; and (5) where the Company integrates smart grid enabled equipment into its IT architecture in circumstances similar to what it described above.~~
- ~~• If the Company conducts limited pilots of smart grid technologies having a cost of less than \$5 million: as an example, to test utilization of a limited wireless communication network or in home device technology to enhance meter data information available to customers, etc. The Company believes that the Commission could and should allow for a limited pilot to test the feasibility of such equipment without requiring that the Company ask for a GPCN.~~



~~The Company believes the requests it is making in the second and third bullet are consistent with the clarification provided in Decision No. G10-0137, ¶24. As smart grid enabled technologies become more standard, the Company will need to have the flexibility to obtain and deploy those technologies in the normal course of business.~~

Conclusion

WHEREFORE, Public Service Company of Colorado respectfully requests that the Commission enter an order approving the SmartGridCity™ CPCN requested by the Company in this Application. ~~The Company further requests that the Commission clarify that the Company may undertake the future deployments of smart technologies identified in this Application without obtaining a CPCN.~~

Dated this 10<sup>th</sup> day of March, 2010.

Respectfully submitted,

By: 

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BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF COLORADO

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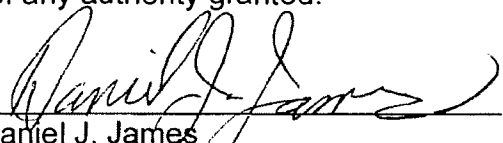
IN THE MATTER OF THE APPLICATION OF  
PUBLIC SERVICE COMPANY OF  
COLORADO FOR AN ORDER APPROVING  
THE SMARTGRIDCITY™ CPCN

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VERIFICATION

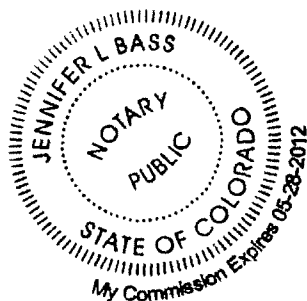
STATE OF COLORADO )  
CITY AND COUNTY OF DENVER ) SS:

I, Daniel J. James, being duly sworn, do hereby depose and state that I am Manger, Pricing & Planning, Xcel Energy Services Inc., agent for Public Service Company of Colorado, Applicant in the foregoing Application; Under penalties of perjury, I declare that all statements made in the Application are true and complete to the best of my knowledge. I understand that any statement made in violation of this oath shall constitute grounds for the dismissal of the Company's Application, or revocation of any authority granted.

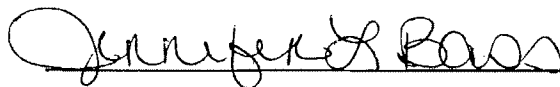
  
Daniel J. James  
Manger, Pricing & Planning  
1225 17<sup>th</sup> Street, Suite 1000  
Denver, Colorado 80202

Subscribed and sworn to before me this 2nd day of November 2009.

My Commission expires:



05-28-2012



## **CERTIFICATE OF SERVICE**

I hereby certify that on this, the 11th day of March 2010, an original and ten (10) copies of the foregoing **APPLICATION FOR COMMISSION APPROVAL OF THE SMARTGRIDCITY™ CPCN** were served via hand delivery on:

Doug Dean, Director  
Colorado Public Utilities Commission  
1560 Broadway, Suite 250  
Denver, CO 80202

and a copy was hand delivered to:

William Levis  
Director, Office of Consumer Counsel  
1560 Broadway, Suite 200  
Denver, CO 80202

A handwritten signature in black ink, appearing to read 'W. Levis', is written over a horizontal line.