Decision No. R24-0009

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

PROCEEDING NO. 23M-0466EG

IN THE MATTER OF THE COMMISSION'S EXAMINATION OF THIRD-PARTY PROVISION OF GAS DEMAND RESPONSE SERVICES, VIRTUAL POWER PLANTS, AND NEIGHBORHOOD ELECTRIFICATION IN PUBLIC SERVICE COMPANY OF COLORADO'S ELECTRIC AND NATURAL GAS SERVICE AREA PURSUANT TO DECISION NO. C23-0413.

RECOMMENDED DECISION OF HEARING COMMISSIONER TOM PLANT ISSUING CERTAIN GUIDANCE FOR REQUESTS FOR PROPOSALS TO BE ISSUED BY PUBLIC SERVICE COMPANY OF COLORADO

Mailed Date: January 5, 2024

I. STATEMENT

1. By Decision No. C23-0628, issued on September 18, 2023, the Commission opened this administrative Proceeding to explore third-party implementation of certain pilot programs in the electric and natural service areas of Public Service Company of Colorado (Public Service or Company) in accordance with Decision C23-0413.[1]

2. This Proceeding was intended to facilitate the development and implementation of requests for proposals (RFPs) for third-party implementation of three pilot programs: (1) virtual power plants (VPPs); (2) natural gas demand response; and (3) neighborhood electrification.

3. The Commission stated that the main objectives of this Proceeding included: (1) identifying the core objectives and timelines for the three pilots; (2) setting the main technical, cost and time parameters for the RFPs; (3) establishing milestones for the RFPs; and (4) setting operational and reporting milestones for the pilots.

4. The Commission designated Tom Plant as Hearing Commissioner, pursuant to § 40-6-101(2), C.R.S., in Decision No. C23-0628.

5. In Decision No. R23-0637-I, issued on September 20, 2023, Hearing Commissioner Plant requested responses to numerous questions related to the development and implementation of RFPs for the three pilots contemplated in the Strategic Issues Decision. Also by Decision No. R23-0637-I, Hearing Commissioner Plant set a procedural schedule, including a workshop held on October 11, 2023.

[1] Decision No. C23-0413, issued on June 22, 2023, Proceeding No. 22A-0309EG (Strategic Issues Decision).

6. Responsive comments to Decision No. R23-0637-I were received on or around October 4, 2023 from participants, including: Enerwise Global Technologies, LLC, d/b/a CPower Energy Management (CPower); Serious Controls; MISSION:DATA COALITION, INC.; Copper Labs, Inc.; Zero Net Energy Alliance; the Colorado Renewable Energy Cooperative; the Colorado Solar and Storage Association, and the Solar Energy Industry Association (together, COSSA/SEIA); Public Service; SunRun Inc.; Advanced Energy United; and Recurve Analytics, Inc.

7. On October 11, 2023, Hearing Commissioner Plant held a workshop focused on mechanisms for designing a VPP program, investigating ways to pursue gas demand response, and the potential design of a neighborhood electrification program. Numerous stakeholders attended and provided oral comment at the workshop.[2]

8. Following the workshop, Commissioner Plant issued Decision No. R23-0719-I which included an additional series of questions as follow up from the initial workshop.

9. On or about November 3, 2023, responsive comments were received from participants, including: Serious Controls; Southwest Energy Efficiency Project (SWEEP); Recurve Analytics, Inc.; Electron; SunRun Inc.; Piclo Energy; CPower; Copper Labs, Inc.; COSSA/SEIA; EPEX SPOT SE; NODES AS; Enphase Energy, Inc.; Sense Labs, Inc.; Schneider Electric; and Public Service.

10. On November 21, 2023, Commissioner Plant held a final workshop which numerous stakeholders attended.[3]

[2] Video recordings of the October 11, 2023 workshop are available on the Commission's website.
[3] Video recordings of the November 21, 2023 workshop are available on the Commission's website.

11. On or about November 30, 2023, final comments were received from Public Service; Serious Controls; and COSSA/SEIA.

12. By this Decision, the hearing Commissioner Tom Plant issues certain guidance for Public Service's upcoming requests for proposals related to virtual power plants and gas demand response.

II. DISCUSSION, FINDINGS, AND CONCLUSIONS

A. Neighborhood Electrification Pilot

13. In Decision No. C23-0628, issued September 18, 2023, the Commission stated its intention to explore a third-party neighborhood electrification pilot. However, in Public Service's initial comments (filed October 4, 2023), it highlighted its neighborhood electrification proposals in Proceeding No. 23A-0392EG (Clean Heat Plan Proceeding). Public Service states that in the Clean Heat Plan Proceeding, it presents a Memorandum of Understanding for a neighborhood residential market transformation project.[4] Public Service asserts that the inclusion of the proposed pilot in the Clean Heat Plan proceeding fulfills the needs envisioned by the Strategic Issues Decision. As part of the proposed pilot, Public Service will conduct an RFP for third-party implementation services and may use multiple implementation partners to test different strategies or approaches to customer engagement. Public Service states that the pilot objective is to identify strategies to hasten the implementation of electrification.[5]

14. From the outset, Public Service maintained it wanted to avoid creating a neighborhood electrification pilot through this process and requested the Commission defer the

[4] *See* Hrg. Ex. 101, Attachment JWI-3 in Proceeding No 23A-0392EG.
[5] Public Service Initial Comments, pp. 34-35.

development of a pilot program to the Clean Heat Proceeding, where a fully litigated process will inform the development of a pilot. While this Proceeding continued to seek input from participants regarding a neighborhood electrification pilot program, the comments received did not provide a sufficient record to develop a pilot here. I therefore find it appropriate to defer consideration of a third-party neighborhood electrification pilot to the Clean Heat Plan Proceeding.

B. Virtual Power Plant Pilot

1. Overview

15. In the Strategic Issues Decision, the Commission indicated its interest in exploring third-party VPP concepts available from the private sector. The Commission also stated that such interest is consistent with the recent legislative changes prioritizing beneficial electrification adoption, limiting gas and electric infrastructure investments, and reducing greenhouse gas emissions.[6]

16. Exploration of private sector VPP concepts is becoming increasingly important as Colorado moves from a traditional baseload, intermediate and peaker resource model to one in which greater percentages, and ultimately nearly 100 percent of generation capacity will be intermittent. The ability to dynamically manage demand and supply will become increasingly more critical to cost effective operation of the grid.

17. In the Company's concluding Electric Resource Plan (ERP) proceeding (Proceeding No. 21A-0141E)),[7] Public Service will move from approximately 42 percent renewable capacity to 78 percent in the short period from 2026-2028.[8] While the Commission has

[6] SI Decision, ¶ 207.

[7] The Commission's oral deliberations concluded on December 20, 2023 and the written "Phase II Decision" is pending in Proceeding No. 21A-0141E.

[8] *See* Public Service's 120-Day Report filed on September 18, 2023 in Proceeding No. 21A-0141E.

approved energy storage resources in the ERP Proceeding to assist with management of the supply side of the equation, the Company still needs to establish the capacity to dynamically manage the demand side. This means development of advanced distribution management capabilities in very short order. Furthermore, the Company does not have the luxury of piloting this effort in a long, drawn-out process. Over the next approximately five years, not only will the company's supply-side resources change dramatically, but advancement of building and transportation electrification technologies through state policy combined with the federal incentives of the Inflation Reduction Act will transform the demands on the distribution grid.

18. The combined impact of these transformational changes to both the supply and demand sides of the energy system requires a focused and comprehensive effort to increase the company's capability to efficiently and effectively manage resources on the distribution system both to operate within the local capabilities of the distribution system and also to match intermittent demand with intermittent supply. To that end, this Decision is intended to provide direction stemming from the information gained in the workshops and provided comments in this Proceeding for an RFP for a Distributed Energy Management System (DERMS) platform and the pilot programs for implementation of a VPP.

2. Defined Terms

19. It was evident from the workshop discussions and comments that a common understanding of certain relevant terms is helpful for the discussion of VPPs. VPPs are a relatively new concept, and like other new concepts, such as "smart grids," they can mean many different things to many different people. When there are references in this Decision to a specific term, the definitions below establish the meaning of those terms for use in this Decision. The following

defined terms are not meant to establish a universal Commission-wide understanding of these terms, but rather a common definition for this Decision.

20. **Virtual Power Plant** – A virtual power plant (VPP) refers to the collective management of dispatchable demand and supply of resources on the distribution grid. Ultimately, the role of the VPP is to maximize the efficiency of the operation of the distribution grid through the management of distribution-based energy resources. However, a VPP can also deliver targeted demand reduction services to reduce grid peaks, targeted events that shift demand to reduce costly curtailment of resources, management of behind-the-meter (BTM) generation and storage resources to provide ancillary grid services and localized generation resources at critical times, and the management of multiple simultaneous loads on a substation, feeder or transformer. The VPP is a dynamic resource that can respond to variations in demand and supply through remote communications signals that provide reliable and predictable services.

21. **Distributed Energy Resources** – Distributed Energy Resources (DER) may be associated with controllable demand, supply, or storage with a remote communications signal to trigger dispatch of a reduction or increase in demand or supply on the distribution system.

22. **DER Aggregator** – DER Aggregators are companies or organizations that ensure a customer's devices are set up with the appropriate technology to communicate with and deliver resources to a VPP upon demand. The DER Aggregator is also responsible for ensuring customers understand both the compensation to them and the services required of them for participation in a VPP program. The DER Aggregator must operate a system that can manage device-level activity and deliver information to the utility or market platform in such a way that there can be a thorough measurement and verification of the services provided, the number of customers, and types of

devices participating in events and the compensation due to the participating customers. The DER Aggregator may also manage payment for performance.

23. **Advanced Distribution Management System** – An Advanced Distribution Management System (ADMS) is a system that provides smart management of the utility resources on the distribution system. An ADMS can have various capabilities, including VoltVar optimization, Conservation Voltage Reduction, Fault Location, Isolation and Restoration, Supervisory Control, and Data Acquisition (SCADA). An ADMS is a critical component for a fully operational Distributed Energy Management System because it can be used to match the distribution system needs with distribution system resources.

24. **Distributed Energy Management System** – A Distributed Energy Management System (DERMS) is the operating system that manages the communication of events to DER Aggregators and direct participation customers and the measurement and verification of services delivered by those customers. A DERMS will also track the operation of the distribution architecture through the ADMS to target the usage of the resources to maximize the efficiency and effectiveness of the system. The mature DERMS system can dynamically manage both dispatchable demand and dispatchable supply on the distribution system for maximum efficiency and effectiveness of the operation of a VPP. Arizona Public Service has summed up DERMS, as a "holistic solution" that operates as a "system of systems" comprised of ADMS, Aggregators, Forecasting Systems, Communication Pathways/Infrastructure, DER devices, DR devices, and line devices. The DERMS is the functional nervous system of a VPP.

25. **Demand Response Management System** – A Demand Response Management System (DRMS) is a system that allows a utility to respond to peak demand on the bulk grid and manage demand to reduce the impacts of those peaks. The DRMS is a much more restrictive use

case than a DERMS, although a DERMS can include the services of a DRMS. DRMS is pronounced with each letter, while DERMS is pronounced as a word. It can be confusing.

26. **Prosumer** – Prosumer is a concept raised during the workshops in contrast to the term "consumer". A Prosumer is a consumer that also provides resources to the grid. While this Decision does not use the term "prosumer" to refer to all participants in a VPP, is useful to distinguish a traditional customer from someone participating in a VPP. This differentiation may be beneficial when designing specific tariffs and programs for those who can reliably provide a certain capacity level upon utility dispatch. That threshold of capacity and control may be used to distinguish a prosumer from a consumer in future programs.

27. **Performance-Based Compensation** – This term refers to rewarding a customer based on their level of performance in the VPP. This compensation may be a stand-alone payment or credit structure, or may be combined with another incentive that could be a device or capacity payment received upfront through rebates or credits. It is anticipated that these payments will be derived from a percentage of the savings offered through the services provided by the VPP.

3. Participant Comments

28. The commission received input from various companies and entities within the state, the country, and internationally. There were some issues upon which there was broad agreement among the Company and other stakeholders, including:

1. A program should be structured to allow third-party aggregators to participate in a utility-established market.
2. Communication signals should be provided through open-sourced communication protocols to allow for maximum participation opportunities for providers.
3. There should be a streamlined process for authorization of third-party participants.

4. Participants should be rewarded for participation in the program through performance payments. However, these payments may be paired with participation or other upfront incentives.

29. The structure of the pilot had some differing opinions. Some participants who generally represented specific technologies favored a simple tariff approach targeted toward participants who had their technologies managed by a DRMS.[9] However, many participants cited the opportunities of multiple DER technologies to deliver various grid benefits, and for this, an open market that communicated through a DERMS platform was the agreed-upon approach.[10] Furthermore, many participants expressed that an open market platform provider who serves as a conduit between the utility and the aggregators was a beneficial approach for a scaled program.[11] A helpful way to think about this approach that the utility's role is as a buyer of services while the role of aggregators or other participants is as sellers of services, with a market platform provider serving as an enabler of the market between the buyer and the seller.[12]

30. However, recognizing the importance of getting pilots up and operating quickly, these same participants suggested that a pilot program could be developed using a DERMS that is licensed to the utility and operates the pilot programs directly and that the issue of establishing a market platform could be left for a more comprehensive docket to launch a system-wide program. It should be noted that the Company strongly opposed the establishment of a market platform provider and prefers to be the entity managing the DERMS, communicating directly with DER aggregators and other VPP participants.[13]

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[9] *See e.g.*, SunRun November 3, 2023 Comments, p. 7; Enphase Energy November 6, 2023 Comments, p. 3.

[10] *See e.g.*, Recurve November 3, 2023 Comments, p. 4; SWEEP November 3, 2023 Comments, p. 2.

[11] *See e.g.*, Recurve November 3, 2023 Comments, p. 4; SWEEP November 3, 2023 Comments, p. 2.

[12] An example of this is the California Flex Market Platform. (https://aceee2022.conferencespot.org/event-data/pdf/catalyst_activity_32422/catalyst_activity_paper_20220810190514288_728dbc6a_5c45_41b1_ae2e_4967b0a8b530).

[13] Public Service November 13, 2023 Comments, p. 3.

4. Findings and Conclusions

31. In light of the timing concerns of implementing a full open market type system, and acknowledging the Company's concerns, this Decision supports the Company issuing an RFP for a DERMS platform that can be licensed to the utility. The Decision also suggests components of an RFP, including Measurement and Verification (M&V) capability and objectives for pilots implemented through the DERMS platform.

32. We do not intend for the DERMS platform pilot to slow or replace the Company's Battery Connect program. DRMS programs are well established (see Connected Solutions as an example) and do not require the same discovery of capabilities that the DERMS program identified here would. However, the Commission anticipates that any DERMS solution would interface effectively with the Company's Battery Connect program and be scalable to integrate seamlessly with the existing DRMS within the VPP.

a. Components of DERMS RFP

33. As the Company conducts an RFP for a DERMS provider, many technical requirements and components will need to be considered before issuing the RFP. This Decision does not attempt to fully articulate all of the components of the RFP here, but rather to establish core principal objectives for a successful RFP. I find that a DERMs RFP should adhere to certain core components, based off the discussions at the workshops and written comments received.

- A DERMS RFP should allow for streamlined access for DER Aggregators and individual participation that is technology-neutral and focused on achieving specific demand and capacity objectives of individual events.
- A DERMs RFP should also optimize device response based on the capabilities of different participants' technology solutions.
- It should utilize standardized open communication architecture and OpenAPI for third-party communication (such as OpenADR or Gravity Connect).

- The utility will ensure secure access to data to enable the pilot (customer data and network topology) as well as all necessary interfaces with utility control center.
- The DERMs provider should have the ability to integrate legacy systems as well as those designed with DER communication in mind.
- It should also have the ability to direct, track, and compensate participation based on bulk grid requirements as well as distribution system optimization.
- It should utilize open M&V protocols (such as OpenEEMeter).
- The DERMS provider should maximize AMI meter capabilities.
- It should separate solar net meter participation with VPP participation so that customers are not precluded from participating in the VPP simply due to being a net metered customer and also allow battery participation based on inverter-delivered power at specified times aligning with events.

- The DERMS provider should have the ability to implement performance-based payment for aggregator and customer either separately or in combination with upfront incentives through a variety of tariffs and have the ability to track event, customer, and technology participation and evaluate the performance of the VPP through various metrics.
- The RFP should include the ability to scale the DERMS system to full deployment in the future. It is possible the Company may be able to structure the RFP to indicate if certain performance metrics are achieved, the piloted DERMS solution would be continued into a full-scale deployment.

b. Technical Parameters of the RFP

34. Similarly, as the Company conducts an RFP for a DERMS provider, many technical requirements will need to be considered before issuing the RFP. This Decision does not attempt to fully articulate all of the components of the RFP here, but rather to establish core technical parameters for a successful RFP, based off the discussions at the workshops and written comments received. The scale of the pilot should be targeting a minimum of 50MW of capacity in aggregate that would be available in dispatch to the utility utilizing 3rd party aggregators and direct consumer participants in the program.

35. The DERMS provider should have the ability to:

- Process customer enrollment applications;

- Verify customer qualifications;
- Schedule, deliver, and receive dispatch signals in real time to VPP aggregators and/or customer devices;
- Measure, validate and verify performance of device, customer, aggregator;
- Leverage open-source advanced M&V product with established methodologies, metrics and replicable procedures;
- Transmit, record, and store data in secure manner;
- Handle settlements to aggregators and customers in streamlined manner;
- Address and manage system constraints;
- Forecast;
- Optimize the distribution system in both efficiency and operations;
- Communicate simply and effectively with program participants and aggregators; and
- Address operational constraints such as permitting delays and contractor availability.

c. Objectives of the Pilot Programs

36. The VPP pilot program is meant to accomplish several various objectives in concert, including facilitating the delivery of demand response, enhancing the customer experience, shaping load to better conform with supply, distribution system load management, and operational savings and efficiency. I address these objectives in turn below.

37. One prominent service a VPP can facilitate is the delivery of demand response. The VPP aggregator will manage these differing approaches while communicating the savings to the utility DERMS. The Company should design the pilots to evaluate demand response capabilities using different technologies and environments over various periods. The DR pilot should include residential, commercial, and industrial applications, as appropriate. It will also be helpful to identify winter load management capabilities to prepare for potential times when distribution system peaks may shift with the addition of electric vehicles and heat pump heating devices.

38. The pilot programs should also be evaluated through a customer experience lens. This type of evaluation would include participation levels, responses to the program from participants, compensation levels, and impacts on the customer's experience. For example, the type of technologies delivering demand response may appear differently to the consumer. A customer may adjust the thermostat for an air conditioner to reduce energy consumption from the grid. However, those savings may be delivered to the grid using a battery to provide electricity to the air conditioner instead of the grid. In the first instance, the customer may experience the event's impact on comfort level; in the latter example, the customer would not experience the event directly but would still deliver the benefit to the grid. The different customer experiences triggered by different interactions with the program through different technologies and aggregators should be captured and evaluated.

39. Shaping Load to Supply: This type of dynamic load management may not be tied directly to peaks but to supply levels from intermittent resources. An example event that shapes load to supply may include events that pre-heat a water heater before a reduction in supply, then reduce that demand as the supply level falls. The objective here is to evaluate the ability of dynamic load management to shift loads to match supply, minimizing curtailment events and maximizing the efficiency of generation to serve load.

40. Another objective of the pilot is in managing distribution system load Management. This objective is to identify the capabilities and requirements of a program that can manage multiple high loads on a feeder or other distribution equipment that may be capacity-constrained but for which management of the load could manage that constraint. For example, on a cold winter evening, multiple electric vehicles charging and heat pumps running simultaneously could stress

the capacity of a feeder. The ability to manage those loads within the feeder may allow greater capacity utilization while deferring costly upgrades.

41. The VPP should be evaluated for ramping capacity—while curtailment is sometimes seen as a challenge to the belly of the duck curve, this would be the opposite issue of fast ramping requirements represented in the neck of the duck curve. While typically either addressed by a dispatchable fossil resource or batteries, the pilot could evaluate the capabilities of managing fast ramp requirements through a combination of distributed batteries and demand response as well as integration of solar and batteries behind the meter and a shifting of delivery of distributed solar generation to a later period.

42. It is possible a VPP Pilot that is monitoring power quality can more quickly respond to variations in that quality with distributed resources, identify potential constraints, and deliver volt-var services to the system, providing power quality advantages.

43. One objective of the pilots should be to identify appropriate compensation structures and rate designs that deliver value to the ratepayers while compensating the aggregators and the program participants. Program structures may be entirely opt-in or opt-out, with participation in a minimum number of events required. The compensation system should be simplified and easily understandable for all participants.

44. The implementation of the DERMS should optimize the efficiency of the distribution system and therefore provide operational savings that would be quantified and incorporated into the performance payments for participants.

45. The DERMS system should allow the Company to identify the locational value of specific DERs or DER profiles that may be used in the future to promote participation to address specific system objectives.

46. The Company should develop a pilot that contemplates methods to engage and enroll disproportionately impacted communities (DIC) and Income Qualified (IQ) customers. These methods may include additional incentives to aggregators to sign up DIC/IQ customers, partnering with the state weatherization program, Energy Outreach Colorado (EOC) or others to ensure recipients of weatherization services are able to enroll in a pilot program and includes equipment that could participate in the pilot program, possibly with an identified aggregator as a facilitator of enrollment and participation.

47. All data from the pilot shall be stored and maintained and available for future review, assessment or audit.

48. The VPP pilot program will test a tariff concept that would establish a "Prosumer" as a utility customer that met a certain capacity level of available dispatch. These would be residential, commercial, and industrial customers with relative capacity levels that they can deliver to the grid. There would be differing capacity levels in establishing Prosumer qualifications for each rate class to be determined by the utility.

A.) Prosumer levels should be identified by the Company to maximize the most beneficial combined DERs that could deliver capacity services to the grid.

B.) Prosumer tariffs should be designed to be attractive financially to the participant such that the option to qualify for the tariff would be an incentive for the participant to invest in more DERs that would advance electrification and provide reliability services to the grid.

C.) Opting into the Prosumer Tariff would give the participant a rate that would have a higher fixed cost combined with a lower volumetric rate.

D.) In exchange for this beneficial rate, the participants could not opt out of events, which would provide additional reliability and certainty of dispatch to the utility.

E.) This participation would be constrained within specific parameters - for example, not going below 40 percent charge on a battery or not changing a thermostat setting more than 3 degrees. These parameters would be designed to ensure a reasonable access to capacity during events for the utility without disproportionately devaluing the benefits of the customer investment.

F.) The objectives of this tariff would be:

i) to provide an incentive for those who are investing heavily in electrification;

ii) to provide an incentive for potential participants to increase levels of electrification;

iii) to provide the utility with certainty of the participation and capacity levels;

iv) to increase the overall resource reliability profile of the VPP; and

v) to increase the overall capacity of the VPP.

d. Stakeholder Engagement

49. The utility should establish a stakeholder group to help identify ways to achieve the objectives of the pilots and contribute to additional ideas the utility may want to include in the pilot programs. The Company should update the group, at minimum, quarterly on the status and performance of the pilots and the RFP, however, they could meet more frequently as needed. This stakeholder group could be a part of the existing DSM group, an offshoot, or a separate group that would participate in the development of the pilots.

e. Timeframes and Proposed Schedule

50. At the outset of this Proceeding, the Commission indicated its intention to move quickly in order to ensure that the pilots are useful to Public Service's next strategic issues application proceeding for demand-side management (DSM) and beneficial electrification (BE) required to be filed in 2025.[14] Participants (except for the Company) agreed that a DERMS platform licensed to the utility (instead of a full market platform approach) pilot could be up and operational by fall 2024. This time would allow the Company to conduct the pilots for the winter of 2024-25 and the summer of 2025 before submitting its 2025 DSM/BE/DR Strategic Issues filing. It is anticipated that the pilots will run through 2026.

[14] Decision No. C23-0628, ¶ 5.

51. A fully operational DERS program should be able to be in place by the summer of 2027, preceded by a fully litigated proceeding that would look at how to maximize benefits based on the results of the pilot, the structure of a fully implemented program, including input and recommendations from aggregators who have participated in the pilot program, customer benefits, and cost recovery provisions.

52. It may be necessary to establish a system of anonymous feedback from aggregators to avoid potential conflicts of interest while still gaining honest assessment from the participants on the operations of the program and ways in which the program can improve prior to full implementation.

53. The Company has indicated that they cannot get a pilot program off the ground until the summer of 2025. This is inadequate and not consistent with the testimony we received from participants in the workshops in this miscellaneous Docket. In alignment with that testimony, I propose the following timeframe:

a. Approximately February 2024 (60 days from final Commission Decision): Issuance of RFP that includes 2 months response time;
b. Approximately April 2024 (within 60 days of issuance of RFP): Selection of DERMS provider;
c. Approximately April - July 2024: Design of VPP/DERMS and market for aggregators;
d. Approximately July - September 2024: Enrollment of Initial Aggregators and Pilot participants;
e. October 2024 - October 2025: Initial Year of Pilot;
f. November 2025: Report to Commission on initial year results;
g. October 2025 - October 2026: Second Year of Pilot; and
h. November 2026: Report on Pilot Results, Recommendations for full scaled program.

C. Gas Demand Response Pilot

54. The Commission indicated its interest in exploring a gas demand response pilot in the Strategic Issues Decision.[15] Through this Proceeding, comments were solicited and received on the design and function of a gas demand response (Gas DR) pilot.

1. Participant Comments

55. While participation in the workshops on behalf of the Gas DR pilot was less robust than that of the Virtual Power Plant, we received valuable feedback regarding the objectives and timing of a Gas DR Pilot.

56. Instrumental was the participation of Copper Labs, which focused their responses on the Gas DR pilot instead of the VPP pilot or the neighborhood electrification pilot.[16]

57. Recurve is the company responsible for development of the California Flex Market Platform. In California, it has incorporated the market platform design with both VPP and Gas DR programs. Recurve suggested ways in which this could be done in Colorado, but due to the time constraints of the pilot program relative to the target of incorporating results into the 2025 DSM/DR/BE Strategic Issues docket, the market platform approach was determined to not be appropriate for the pilot phase of this or the VPP programs. However, this may be a program design element to consider for further scaled roll out of the Gas DR program.[17]

58. The Company shared a Brattle Report summarizing a selection of utility Gas DR programs.[18] Four of the 14 programs highlighted in the report have been terminated, and ten are ongoing. Most of these programs center around a bring-your-own thermostat (BYOT) program

[15] Strategic Issues Decision, ¶ 207.
[16] *See* Copper Labs Comments, dated October 4, 2023; November 3, 2023.
[17] Recurve Comments, October 4, 2023.
[18] Public Service October 4, 2023 Comments, pp. 4-5.

for residential and commercial performance based programs targeting high gas users. While pilots are continuing, there have been some trends that are evident in the programs:

a. For BYOT Programs:

- Event times limited to 4 hours;
- Set back temperatures between 1 degree and 4 degrees;
- Holidays and weekends are exempted;
- 2 - 10 events per year (there are some outliers);
- Best results had participation rates of 74percent and .035 Dth/device (Washington Gas and Light); and
- Incentives were generally upfront enrollment incentive, year-end payment for participation. Combinations were about $100 per participant on average.

b. For Performance based programs:

- Anywhere from $20 - $193/Dth reduction payment;
- Payments were frequently tied to a commitment level and didn't commence until at least 25 percent of the commitment was achieved; and
- Best performance was from National Grid's Load Shedding DR program which achieved 1,259 Dth/Hour and a participation rate of 95 percent.

59. In the Company's comments, it suggested that numerous questions should be answered through the implementation of a pilot program, including:[19]

- What is the potential reduction of peak natural gas demand usage through DR program designs and technologies, including but not limited to, different temperature setbacks, elevations, and different weather conditions?
- Are there commercially available technologies and program designs that can successfully reduce peak natural gas demand usage on either a localized distribution level or bulk-system level?
- How willing are customers to enroll in a natural gas DR program?
- What incentive amounts and structures do customers require to enroll and remain in this type of program?
- How often will customers opt out of individual events that are called and for what reasons?
- What can be done to improve overall satisfaction with the program and boost enrollment/event participation?

[19] Public Service October 4, 2023 Comments, pp. 32-33.

- If new equipment is required, does it perform as expected and deliver the results that were needed to facilitate the DR program?
- What are the effects of thermostat schedules and leveraging proper messaging to advise customers to modify?
- How does pre-heating affect event performance and customer satisfaction?
- Including snap-back, is there a net reduction of natural gas used during an event?
- What is the value of the program for the mass market vs targeted constrained areas?

2. Findings and Conclusions

60. The Gas DR program is primarily designed to avoid costly investments in gas infrastructure, particularly in light of the state's objectives to increasingly electrify energy uses and phase out the use of fossil fuels. However, there can also be safety concerns with excess capacity—in Massachusetts, for example, increased pressure on gas lines caused fires and explosions in the Merrimack River Valley.[20]

61. As such, one primary objective of the pilot program is targeted on areas of capacity constraint which may present safety concerns or be initial candidates for investment in capacity expansion. These regions would also have the highest potential to leave stranded assets as electrification expands. As such, cost effectiveness should include any customer savings and emissions reductions benefits, but also avoided infrastructure investments, reduced leakage benefits, and upstream savings.

62. One dynamic observed in Gas DR programs has been the concept of "snapback." This refers to the customer's response post event to restrictions in gas use during a demand response event. For example, programs that reduce temperature settings during an event, may experience a customer accelerating heating to get back to their desired temperature after an event, causing a net balancing of gas use. While this doesn't achieve climate objectives of reduced

[20] https://en.wikipedia.org/wiki/Merrimack_Valley_gas_explosions

consumption, by shifting usage to times when there is not a peak demand, it could still maintain the benefits of avoiding capacity constraints, depending on the level of snapback experienced. At the other end of the event may be "pre-heating" either as a customer driven anticipation of a coming event, or as a purposeful component of a program, such as pre-heating water heaters prior to an event.

63. While the company may include a BYOT program in their pilot, they should examine ways in which they can utilize aggregators to recruit participants in a technology neutral and performance-oriented approach that could be integrated into the DERMS platform designed with the VPP in mind.

64. Several core objectives that should be met by the gas DR pilot can be summarized from comments made by participants in the workshops, including:

- Avoidance of investments in additional infrastructure to alleviate existing capacity constraints.
- Reduction in greenhouse gas emissions.
- Improve the reliability and resiliency of the gas system.
- Evaluate DR reductions for a given measure across multiple timeframes, including weather and high-interval consumption data pre- and post-event.
- Quantification of snapback effects and net impact if any on capacity reductions at peak. Quantification should evaluate cost benefits with and without snapback.
- Qualitative analysis of overall impacts on the gas system in the context of system constraints, both current and future.
- Evaluation of variables in the program, including thermostat set-points, indoor temperatures, hot water usage, occupancy, and building-specific characteristics like age, size, insulation levels, etc.
- Data driven feedback embedded in the design of the program.
- M&V should be capable of doing a comparative analysis to a control group of non-participants.
- Applications focused on addressing those who can least afford technologies, live in disproportionately impacted communities, and face the greatest energy burdens. This may push the programs toward those that don't require Wi-Fi connectivity or in combination with efforts to expand Wi-Fi access.

65. In addition to the core objectives of the Gas DR listed above, there are several technical data requirements that should be part of the pilot. The pilot should: (1) enable the sharing of meter IDs; (2) be capable of sharing real-time (or near real-time) data collection; (3) facilitate connection to AMI meters or AMR meters, as applicable; (4) collect data on the timing and duration of DR events; (5) have a measurement and verification methodology for the pilot; and (6) have communication protocols in place and Application Program Interfaces (APIs) from the utility.

a. Targeted Regions

66. Since capacity constrained areas are the primary focus of a Gas DR program, those should be prioritized in selecting pilot regions. However, because the Public Service territory covers so many diverse climates within Colorado, a diversity of climate regions would also be productive for evaluation of impacts of a pilot program. There should also be an effort to evaluate capabilities of hybrid heat pump systems – the ability to remotely adjust trigger set points on the heat pumps (temperatures at which the heat pump switches from electric to gas) and other mechanisms to reduce gas usage in hybrid systems. Finally, while workshop participants did not cite this as a requirement of a successful gas DR program, there was an acknowledgement that combining these pilots within the DERMS program of the VPP would allow for efficiencies in participation for customers and aggregators. However, the targeted nature of the Gas DR program may or may not lend itself to this kind of optimization for the purposes of this pilot.

b. Stakeholder Engagement

67. As with the VPP Pilots, the utility should establish a stakeholder group—this could be a part of the existing DSM group, an offshoot, or a separate group that would participate in the development of the pilots, help to identify ways to achieve the objectives of the pilots and contribute to additional ideas the utility may want to include in the pilot programs. The Company

should update the group quarterly (or more frequently, if needed) on the status and performance of the pilots and the RFP.

c. Timeframes

68. The Company should implement the gas demand response pilot to be up and running in time to collect valuable data during the 2024-2025 heating season to contribute to the 2025 DSM/DR/BE Strategic Issues docket at the end of 2025. As a result, the program should be up and running by early fall 2024 to collect information from the 2024-2025 heating season.

III. ORDER

A. It Is Ordered That:

1. In accordance with the discussion above, this Decision advances the development and implementation of virtual power plants in the service area of Public Service Company of Colorado (Public Service). This Decision supports the issuance of a Request for Proposals (RFP) for a Distributed Energy Management System (DERMS) platform and sets forth objectives for pilots to be implemented through the DERMS platform.

2. This Decision supports the development and implementation of a gas demand response pilot targeted on areas of capacity constraint which may present safety concerns or be initial candidates for investment in capacity expansion, consistent with the discussion above.

3. Commission consideration of a third-party neighborhood electrification pilot is deferred to Public Service's Clean Heat Plan proceeding (Proceeding No. 23A-0392EG).

4. This Recommended Decision shall be effective on the day it becomes the Decision of the Commission, if that is the case, and is entered as of the date above.

5. As provided by § 40-6-109, C.R.S., copies of this Recommended Decision shall be served upon the parties, who may file exceptions to it.

(a) If no exceptions are filed within 20 days after service or within any extended period of time authorized, or unless the decision is stayed by the Commission upon its own motion, the recommended decision shall become the decision of the Commission and subject to the provisions of § 40-6-114, C.R.S.

6. If exceptions to this Decision are filed, they shall not exceed 30 pages in length, unless the Commission for good cause shown permits this limit to be exceeded.

(S E A L)

THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

TOM PLANT

Hearing Commissioner

ATTEST: A TRUE COPY

Rebecca E. White,
Director