ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

1407 W North Temple, Suite 330
Salt Lake City, Utah 84114

November 13, 2018

VIA ELECTRONIC FILING

Utah Public Service Commission
Heber M. Wells Building, 4th Floor
160 East 300 South
Salt Lake City, UT 84114

Attention: Gary Widerburg
Commission Secretary

RE: Docket No. 16-035-36 - In the Matter of the Application of Rocky Mountain Power to Implement Programs Authorized by the Sustainable Transportation and Energy Plan Act

Rocky Mountain Power hereby submits for filing its Application to Modify Funding Amounts Previously Authorized by the Sustainable Transportation and Energy Plan Act, and to Allocate Additional Funds to the Solar and Storage Technology Project.

Rocky Mountain Power respectfully requests that all formal correspondence and requests for additional information regarding this filing be addressed to the following:

By E-mail (preferred): datarequest@pacificorp.com
jana.saba@pacificorp.com
daniel.solander@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, OR 97232

Informal inquiries may be directed to Jana Saba at (801) 220-2823.

Sincerely,

Joelle Steward
Vice President, Regulation

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Attorneys for Rocky Mountain Power

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE APPLICATION OF ROCKY MOUNTAIN POWER TO IMPLEMENT PROGRAMS AUTHORIZED BY THE SUSTAINABLE TRANSPORTATION AND ENERGY ACT	))))))	Docket No. 16-035-36

APPLICATION TO MODIFY FUNDING AMOUNTS PREVIOUSLY AUTHORIZED BY THE SUSTAINABLE TRANSPORTATION AND ENERGY PLAN ACT, AND TO ALLOCATE ADDITIONAL FUNDS TO THE SOLAR AND STORAGE TECHNOLOGY PROJECT

Rocky Mountain Power, a division of PacifiCorp ("Company" or "Rocky Mountain Power"), hereby submits this application ("Application") to the Public Service Commission of Utah ("Commission") pursuant to Utah Code Annotated ("U.C.A.") § 54-20-101, *et seq*., also known as Senate Bill 115 - the Sustainable Transportation and Energy Plan Act ("STEP"), signed into law March 29, 2016, requesting authorization to modify funding amounts previously authorized by the Commission to implement programs authorized by STEP, and for authority to allocate additional funds to the previously approved solar and storage technology project.

The Company is seeking authorization from the Commission specifically in this Application: (1) to revise the funding for projects associated with the Clean Coal Technology Program ("CCTP") pursuant to U.C.A § 54-20-104; (2) to increase the limit of STEP funding for

the Commercial Line Extension Pilot Program ("Line Extension Pilot"); and (3) to increase funding for the Solar and Storage Technology Project ("SSTP") in southern Utah.

In support of its Application, Rocky Mountain Power states as follows:

1. Rocky Mountain Power is a division of PacifiCorp, an Oregon corporation, which provides electric service to retail customers through its Rocky Mountain Power division in the states of Utah, Wyoming, and Idaho, and through its Pacific Power division in the states of Oregon, California, and Washington.

2. Rocky Mountain Power is a public utility in the state of Utah and is subject to the Commission's jurisdiction with respect to its prices and terms of electric service to retail customers in Utah. Rocky Mountain Power's principal place of business in Utah is 1407 West North Temple, Suite 310, Salt Lake City, Utah, 84116.

3. Communications regarding this filing should be addressed to:

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In addition, Rocky Mountain Power requests that all data requests regarding this application be sent in Microsoft Word or plain text format to the following:

By email (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, Oregon 97232

Informal questions may be directed to Jana Saba, Utah Regulatory Affairs Manager, at (801) 220-2823.

Background

4. In March 2016, the Legislature enacted and the Governor signed into law the Sustainable Transportation and Energy Plan Act, now codified, among other places, at U.C.A. §§ 54-7-12.8, 54-20-101, *et seq*.

5. Expenditures under STEP are subject to Commission review to ensure they are prudent and accord with the purposes of the program. *Id*. at §§ 54-20-103(2), 54-20-104(2), § 54-20-105(2).

6. The Company filed an application on September 12, 2016, to implement the various programs under STEP ("Original Application"). Because the Original Application involved numerous issues, the adjudication was bifurcated into several phases. This Application addresses items originally approved by the Commission in Phase One on December 16, 2016, and in Phase Two on May 24, 2017.

7. Based on its experiences in implementing the programs, the Company recommends the Commission approve modifications to the CCTP, Line Extension Pilot, and the Innovative Technologies Program. The Company believes the proposed modifications will help the STEP program achieve its objectives.

Clean Coal Technology Program Funding Reallocation

8. The Company's STEP Clean Coal research proposal under U.C.A. § 54-20-104 consists of seven projects, two of which were approved in STEP Phase One, and five of which were approved in STEP Phase Two.

9. The Company has since implemented all of the projects, with the exception of the integrated solar thermal capture technology and the Alternative NOx Project.

10. The Alternative NOx Project, which was approved on May 24, 2017, commenced with issuing a request for information from technology providers on May 16, 2017.

11. The results of the technical and commercial proposals showed that none of the vendors would be able to meet the project's criteria for a cost effective and innovative technology for a demonstration test. Each of the vendor proposals were outside the project's budget or proposed a technology that was known and established.

12. Rocky Mountain Power concluded, based on the results of the Request for Proposals ("RFP"), that the STEP funding would be better utilized in furthering other Clean Coal Research projects already approved by the Commission over demonstrating a non-innovative NOx control technology with a known emission reduction capability.

13. The Company communicated the proposal to abandon the project in the March 12, 2018 STEP Project Update meeting, and it was also included in the First STEP Annual Report in Docket No. 18-035-16 ("STEP Report Docket").

14. In the STEP Report Docket, the Division of Public Utilities ("Division") supported the Company's conclusion to abandon the project and possibly use the funds for another STEP program.[1] The Office of Consumer Services ("Office") agreed that abandonment of the project

[1] *See* Docket No. 18-035-16, Division's Action Request Response, July 12, 2018, p. 9.

was reasonable, but further stated that the funds should only be reallocated to the extent that the use of such funds provides customer benefits and is in the public interest.[2] The Commission order on the STEP Annual Report, issued August 3, 2018, found the proposal to abandon the Alternative NOx Project to be reasonable, and that the Company would need to file and receive approval for redeployment of funds.[3]

15. Rocky Mountain Power hereby requests approval to transfer $1,161,501 of the remaining STEP funding previously approved for the Alternative NOx Project to the recommended projects described below. Additional details of the proposal are provided in Attachment A.

16. The projects to receive the proposed funds have been previously approved as meeting the statutory requirements of the STEP legislation. These projects were selected because they represent demonstration projects that, once implemented, would reduce carbon dioxide ("CO_2") emissions in Utah.

17. The proposed Clean Coal Research projects/studies, type of project and project category to receive the additional funding are identified in Table 1.

Table 1: Clean Coal Research Proposed Project & Studies and Classification

Project/Study	**Type of Project**	**Category**
Co-Firing Test of woody-waste (biomass) materials-Hunter 3	Demonstration	CO_2 reduction & Particular matter (PM) reduction associated with wildfires and avoided coal burn
Funding of long term availability test of sustainable energy solutions; Cryogenic Carbon Capture™ technology	Demonstration, co-funding	CO_2 Sequestration

[2] *See* Docket No. 18-035-16, Office's Comments, July 12, 2018, p. 5.
[3] Docket No. 18-035-16, Order issued August 3, 2018, p. 7.

18. Key research objectives of the projects/studies are summarized in Table 2.

Table 2: Clean Coal Research – Proposed Project Additions and Key Research Objectives

Project/Study	**Key Additional Research Objectives**
Co-Firing Test of woody-waste (biomass) materials-Hunter 3	1. Substantially increase the amount of biomass material processed by AEG Coalswitch to extend the number of hours in the test burn. 2. Increase the measurements taken during the test to gain a better understanding of boiler operation during the co-firing. 3. Hire a 3rd party engineer with extensive biomass experience to assist with project planning and execution.
Funding of long term availability test of sustainable energy solutions; Cryogenic Carbon Capture™ technology	1. Simultaneously drying and cooling the flue gas to the CO_2 frost point. 2. An alternative cooling and solid-liquid separation system for the contact liquid. This will also include the development of a pollutant removal system for SOx and NOx built into this separations system and the CO_2 purification system. 3. Investigate unit operation scalability

19. The original budget for the Alternative NOx Project was $1,415,821. The Company has spent a total of $170,356 for the RFP and the owner's engineer services for the technical evaluation of the RFP responses received. The Company requests $1,161,501 be transferred to other clean coal technology projects with the remaining $83,964 be left unallocated.

Table 3: Proposed Funding Change

Clean Coal Project	**Original**	**Reallocate Remaining Funds Alt. NOx**	**Proposed Funding**
Woody Waste Co-Firing	$ 789,873	$ 748,980	$ 1,538,853
CO2- Capture (CCC)	1,174,857	412,521	1,587,378
Alternative Nox	1,245,465	(1,245,465)	-
Unallocated Funds	0	83,964	83,964
Total	$ 3,210,195	$ -	$ 3,210,195

1. Woody Waste (Biomass)

20. PacifiCorp proposes to expand the co-firing test of processed woody waste (biomass) at the Hunter Unit 3 boiler. The project expansion would increase the amount and type of sensors and measurements taken during the test burn, facilitate a longer test burn by increasing the amount of Coalswitch biomass material purchased, and add funding for an owner's engineer to assist with project planning and performance assessment.

21. Expansion of the amount and type of sensors and measurements would provide a clearer picture of aspects of boiler operation, characterization of fuels, measurement of gas species, and deposition sampling. Increasing the amount of Coalswitch processed woody waste material from approximately 432 tons to approximately 2,000 tons would allow the test burn conducted with 10 percent biomass to 90 percent coal to be increased from 18 hours to approximately 90 hours for the Coalswitch product. PacifiCorp has communicated with an owner's engineer consultant that has extensive biomass experience and could provide input into the test burn plan and help troubleshoot any problems that might arise. The Company requests an additional $748,980 in funding to expand the project.

22. The schedule for the test burn has been moved from 3rd quarter of 2018 to 1st quarter of 2019 to accommodate the approval process for the requested project expansion and provide the time plan, procure, and prepare for the expanded scope of the test burn.

2. Cryogenic Carbon Capture Technology Additional Research

23. The Company requests authorization from the Commission to expand the Cryogenic Carbon Capture ("CCC") project. The additional funds will go to plan for the next scale of CCC operation and will explore the scalability of these and related unit operations as part of this investigation. This project includes one task for each of three major systems. These systems require major changes to the current skid operation in contrast to the incremental changes supported by the

current Department of Energy project.

24. For more detailed information, please refer to confidential Appendix B of Attachment A, which provides the proposal and a detailed budget submitted by Sustainable Energy Solutions.

25. The expanded scope of these projects will build upon current objectives and include: demonstration projects that will result in measurable reduced emissions; investment in promising technologies and applications that may advance technologies that when fully developed and applied in utility scale will allow for coal-fired generation resources to operate with reduced carbon emissions; funding and providing opportunities for industry-targeted areas of research that can be performed by Utah industries; and promotion of Utah's clean energy technology companies.

Commercial Line Extension Pilot Program

26. The Company respectfully requests approval to raise the incentive limit to $250,000 from the currently approved amount of $50,000 for the Line Extension Pilot.

27. The Line Extension Pilot is implemented through Electric Service Regulation No. 13, Sustainable Transportation and Energy Program (STEP) Commercial Line Extension Pilot Program ("Regulation No. 13"), which was approved by the Commission in its Phase Two Report and Order issued May 24, 2017. Regulation No. 13 provides an incentive that reduces the developer's costs when they install primary voltage backbone facilities. Currently, the incentive is 20 percent of the project cost or $50,000, whichever is less.

28. In the initial assessment the Company had limited knowledge of the number and size of developments that would qualify and how developers would respond to this program. The incentive limit was requested at that time due to concerns that a very large developer could use up all the funds allocated by STEP for a given year in two or three projects.

29. Over the past year, the Company has provided incentives to just nine developments. The total cost of backbone facilities in the nine developments to-date range from $13,035 to

$102,670, with the corresponding 20 percent STEP fund incentive ranging from $2,607 to $20,534. In 2017, the Company provided only $13,676 in incentives and approximately $100,000 has been spent or committed to-date in 2018, well below the initial budget of $500,000 per year.

30. Based on this experience, the Company believes that raising the incentive limit to $250,000 from $50,000 will expand the Line Extension Pilot to a variety of projects, helping move the objectives of the program forward with larger developers.

31. The Company believes the proposed change described above and shown in Attachment B, which is a redlined Regulation No. 13, is just, reasonable, and in the public interest, as well as consistent with the original goal of promoting the use of electric vehicles by facilitating installation of electric vehicle charging stations program.

Solar and Storage Technology Program

32. The Company respectfully requests approval to authorize an additional $1.75 million of Innovative Technology STEP funding to complete the previously approved SSTP.

33. The SSTP was approved by the Commission on December 29, 2016. The project included using $5 million in STEP funds to install an energy storage technology to resolve voltage issues on a radial transmission line in southern Utah. An additional $2 million from Blue Sky community project funds was approved to install a Company-owned solar project at the same location. The original budget for the project was a total of $7 million.

34. The Company has received competitive market proposals in response to a RFP for the SSTP that result in a revised overall project cost estimate of $8.75 million. For the reasons described in Attachment C, the Company believes that the bid is reasonable, and implementing the project is in the interest of its customers.

35. Historically, during summer peak loading periods, the Sevier-Panguitch 69 kilovolt transmission line voltage drops to 0.92 per unit of the nominal voltage and is forecasted to drop below the required American National Standards Institute standard of 0.90 per unit by 2019. In addition to the value of the battery storage study, this project could reduce, defer, or eliminate the capital investment that is needed to remedy the voltage issues. The estimated cost of resolving the voltage issue using traditional capital investments in the form of poles, wires, and/or substations has been revised, based on current cost estimates, from $8.0 to $8.75 million. The cost for the SSTP helps to resolve the voltage issues on the line and offers the additional benefits of enabling a greater understanding of innovative solutions to make the grid more progressive as described in Attachment C.

36. The SSTP will continue to achieve the same goals as when originally approved of reducing, deferring or eliminating the need for traditional capital investments on the radial transmission line, while also providing the Company with valuable information on the design, operation, commissioning, and maintenance of these new technologies being connected to the distribution system.

Conclusion

37. The Company respectfully requests that the Commission approve the following changes to STEP projects:

a) $1,161,501 in Clean Coal Technology funds previously approved for the Alternative NOx be transferred to the Woody Waste Co-Fire and Cryogenic Carbon projects in the amounts of $748,980 and $412,521, respectively;

b) The incentive limit for the Line Extension Pilot be increased to $250,000 from the currently approved amount of $50,000; and

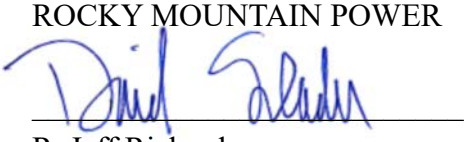
c) The approved budget of $7 million for the SSTP be increased by $1.75 million to $8.75 million.

WHEREFORE, Rocky Mountain Power respectfully requests that the Commission approve this Application and the proposed changes to the STEP programs and tariff sheets, as filed, with an effective date of February 11, 2019.

DATED this 13th day of November, 2018.

Respectfully submitted,

ROCKY MOUNTAIN POWER



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Attachment A

Sustainable Transportation Energy Plan (STEP)

Clean Coal Research

Funding Transfer Request Outline:

1. Executive Summary

Rocky Mountain Power's STEP Clean Coal research proposal was approved by the Utah Public Service Commission on June 28, 2017. The original Clean Coal research program consisted of seven projects. The approved projects were:

a) a co-firing test of woody-waste (biomass) materials at the Company's Hunter Unit 3,
b) co-funding of a long term availability test of Sustainable Energy Solutions' cryogenic capture technology at either the Hunter or Huntington Plant,
c) co-funding of USTAR's (CarbonSAFE) Phase 1 effort to perform pre-feasibility study for commercial sequestration sites with co-funding by the United States Department of Energy,
d) a study to evaluate the potential for CO_2 to be used for regional enhanced coal bed methane recovery with sequestration,
e) a study to evaluate the performance and cost effectiveness of integrating solar thermal capture technologies at Hunter 3,
f) the application of an advanced neural network control system at Huntington Unit 2 for the reduction of nitrogen oxides ("NOx"), and
g) implementation of a utility scale demonstration of alternative technologies that result in material decreases in NO_x emissions without the use of Selective Catalytic Reduction (SCR).

Rocky Mountain Power has since implemented all of the projects with the exception of the integrated solar thermal capture technology[1] and the implementation of utility scale demonstration alternative technology for NO_X emissions. The alternative NOx emission technology demonstration test began with the issuing of a request for information ("RFI") from technology providers on May 16, 2017. The response to the RFI were then shortlisted based on a criteria of:

a) Innovated design that can be used in conjunction with other technology to achieve the emission reduction target;
b) Focus on technology that does not have a substantial history of implementation on a utility boiler; and
c) Can be demonstrated at Huntington Unit 1 in a cost effective manner.

Four shortlisted vendors were then requested to participate in a request for proposal ("RFP") to perform a utility scale demonstration test at Huntington Power Plant. The RFP was issued to the APCS, AECOM, General Electric and Fuel Tech on August 25, 2017. The responses were received on October 9, 2017 and the technical evaluation was completed on November 16, 2017. The results of the technical and commercial proposals resulted that none of the vendors were able to meet the

[1] Integrated solar thermal capture technologies at Hunter Unit 3 is scheduled to begin in the first quarter of 2019.

project's criteria for a cost effective and innovated technology for demonstration test. Each of the vendor proposals were outside the projects budget or proposed a technology that was known and established.

Rocky Mountain Power concluded, based on the results of the RFP, that the STEP funding would be better utilized in furthering other Clean Coal Research projects over demonstrating a non-innovated NO_X control technology with a known emission reduction capability. The recommendation for deferment of the project is located in Appendix C. The project then completed a full scale technology cost estimate for future consideration and suspended all contract work.

The remainder of the proposal outlines the recommended Clean Coal Research project in which the alternative NOx demonstration technology funds would be better utilize to further the STEP objectives in Utah. The two recommended Clean Coal Technology projects to receive the requested fund transfer are:

a) Co-firing test of woody-waste materials at Hunter 3
b) Cryogenic Carbon Capture technology funding for long term availability test

Rocky Mountain Power requests approval to transfer approximately $1.12 million of STEP funding to the recommend projects.

2. Purpose and necessity

The proposed projects to receive the additional STEP funding have been previously approved as meeting the statutory requirements of the STEP legislation. These projects were selected as they represent demonstration projects that, if implemented, would reduce CO_2 emissions in Utah.

The proposed Clean Coal Research projects/studies, type of project and project category to receive the additional funding are identified in Table 1.

Table 1: Clean Coal Research Proposed Project & Studies and Classification

Project/Study	**Type of Project**	**Category**
Co-Firing Test of woody-waste (biomass) materials-Hunter 3	Demonstration	CO_2 reduction & Particular matter (PM) reduction associated with wildfires and avoided coal burn
Funding of long term availability test of sustainable energy solutions; Cryogenic Carbon Capture™ technology	Demonstration, co-funding	CO_2 Sequestration

Key research objectives of the projects/studies are summarized in Table 2.

Table 2: Clean Coal Research – Propose Project Additions and Key Research Objectives

Project/Study	**Key Additional Research Objectives**
Co-Firing Test of woody-waste (biomass) materials-Hunter 3	1. Substantially increase the amount of biomass material processed by AEG Coalswitch to extend the number of hours in the test burn. 2. Increase the measurements taken during the test to gain a better understanding of boiler operation during the co-firing. 3. Hire a 3rd party engineer with extensive biomass experience to assist with project planning and execution.
Funding of long term availability test of sustainable energy solutions; Cryogenic Carbon Capture™ technology	1. Simultaneously drying and cooling the flue gas to the CO_2 frost point. 2. An alternative cooling and solid-liquid separation system for the contact liquid. This will also include the development of a pollutant removal system for SOx and NOx built into this separations system and the CO_2 purification system. 3. Investigate unit operation scalability

4. Project description

Co-Firing Test of woody-waste (biomass) materials-Hunter 3 Additional Research

PacifiCorp proposes to use available STEP Clean Coal funding to expand the co-firing test of processed woody waste (biomass) at the Hunter Unit 3 boiler. The project expansion would increase the amount and type of sensors and measurements taken during the test burn, facilitate a longer test burn by increasing the amount of Coalswitch biomass material purchased, and hire an owner's engineer to assist with project planning and performance assessment. Expansion of the amount and type of sensors and measurements would provide a clearer picture of aspects of boiler operation, characterization of fuels, measurement of gas species, and deposition sampling. Increasing the amount of Coalswitch processed woody waste material from approximately 432 tons to approximately 2,000 tons would allow the test burn conducted with 10% biomass to 90% coal to be increased from 18 hours to approximately 90 hours for the Coalswitch product. PacifiCorp has communicated with an owner's engineer consultant that has extensive biomass experience and could provide input into the test burn plan and help troubleshoot any problems that might arise.

The additional sensors and measurements proposed in the project expansion include:

- Extensive characterization of the fuels used (both blended and pure) during the demonstration. The proposed analyses include Hardgrove Grindability Index, Ultimate Analysis, Proximate Analysis and Ash Elemental Analysis.
- Measurement of the incident flame radiation at multiple (two or three) locations in the boiler region, between the top elevation of burners and the furnace exit plane. These measurements will be performed using a novel radiometer developed by the University of Utah. This methodology will be validated during the pilot-scale combustion performance evaluation in Task 6.
- Measurement of gas species using an FTIR gas analyzer near the location where the particle samples are collected, and at a location where there would be low-temperature flue gas. The low-temperature measurement will be performed by extracting gas using a sampling manifold owned by PacifiCorp that is designed to average across a grid of sample locations. Extraction of sample for the high temperature measurement will be performed through a newly-developed sampling lance. The FTIR is calibrated to report the following gas species of interest: NH_3, CO_2, CO, HBr, HCl, HCN, HF, CH_4 NO, NO_2, SO_2 and H_2O.
- Efforts will also be made to further develop the deposition sampling probe to report the time-resolved accumulation of mass on the probe. This probe will be tested prior to the demonstration using cold lab tests, but will not be verified under hot conditions until the baseline testing at Hunter Unit 3 commences.
- System modeling of Hunter Unit 3 will be performed to facilitate analysis of plant data obtained during the co-firing demonstration.

The additional cost for these measurements will be approximately $748,000 and the effort described above will be performed by both the University of Utah and Brigham Young University. PacifiCorp proposes spending the additional funds to increase the supply of Coalswitch biomass from 432 tons to approximately 2,000 tons to extend the test burn from approximately 18 hours to approximately 90 hours. The cost of additional Coalswitch fuel can be directly adjusted by increasing or decreasing the length of the test and the tons of fuel required. Amaron, the other fuel processor, has production constraints that limit their ability to produce significantly more material than the original 432 tons in the project scope within the schedule of the project.

The schedule for the test burn has been moved from 3rd quarter of 2018 to 1st quarter of 2019 to accommodate the approval process for the requested project expansion and provide the time plan, procure, and prepare for the expanded scope of the test burn.

Funding of long term availability test of sustainable energy solutions; Cryogenic Carbon Capture™ (CCC) technology Additional Research

As SES improved the reliability of skid unit operations under the existing CCC project, SES also innovated technologies that have the potential to replace existing unit operations with reliability and energy efficiency benefits. SES is also actively planning for the next scale of CCC operation and will explore the scalability of these and related unit operations as part of this investigation. This project involves one task for each of three major systems. These tasks are numbered A1, A2, and A3 to avoid confusion with the tasks in the existing RMP project. These systems require major changes to the current skid operation in contrast to the incremental changes supported by the current Department of Energy project.

Task A1. Gas Drying and Cooling

The objective of this task is to mature the direct-contact cooling and drying systems to the point they can be tested in the skid.

The deliverable for this task includes (a) a functional, stand-alone, direct-contact drying/cooling system prototype, (b) technical reports analyzing data from this system and projecting its benefits for the overall CCC process, and (c) integration of the system for at least some testing using the existing skid.

Task A2. Solid-Liquid Separation and Purification System

This task develops a liquid-solid separation device that produces high-purity (>90 %) solids while cooling and purifying liquids sufficiently that they can be reinjected into the desublimating heat exchanger, including the initial evaluation and design of a pollutant removal system that will be placed in the separations system or in the CO_2 purification system.

The deliverable for this task includes (a) a functional, solids-liquid separation and purification system, (b) technical reports analyzing data from this system and projecting its benefits for the overall CCC system, and (c) the initial experiments and design for a system for further pollutant removal with possible demonstration during this project.

Task A3. Unit Operation Scalability

This task will investigate unit operation scalability to both pilot and commercial scale operation.

The deliverables from this task include technical analysis and tropical reports discussing scalability of innovative unit operations in the CCC process, including those developed in Tasks A1 and A2 of this amendment.

For more detailed information, please refer to Appendix B, "RMP Cryogenic Carbon Capture Project Amendment" which has a copy of the proposal and budget submitted by Sustainable Energy Solutions.

5. Benefits, Public Interest Justification and Compliance with SB115

The two projects have been identified and the budgets proposed. These projects were reviewed and determined by the Rocky Mountain Power to be the ones in which the additional funds would be best utilized. The projects have previously meet the SB115 definition of Clean Coal technology and its objectives. The benefit of each projects expanded scope are identified in the previous section.

The selected project are intended to build upon their current objectives and include:

a) Demonstration projects that will result in measurable reduced emissions;

b) Investment in promising technologies and applications that may advance technologies that when fully developed and applied in utility scale that will allow for coal-fired generation resources to operate with reduced carbon emissions;
c) Fund and provide opportunities for industry-targeted areas of research that can be performed by Utah industries, and
d) Promotion of Utah's clean energy technology companies.

6. Alternatives Considered

The approved STEP projects that were considered to receive additional funds from the advance NO_X emission control technology demonstration test were:

a) Phase II of the Carbon SAFE work
b) Extended neural network at Huntington
c) Further biomass firing
d) Cryogenic capture support
e) Blue Sky Solar projects
f) Additionally funding for Gadsby Curtailment

The STEP rules required that funds allocated to the Clean Coal Research should remain in that category and therefore the Blue Sky Solar Project and Gadsby curtailment was removed from consideration. The Phase II Carbon SAFE work was considered to receive funding if the Phase II application was awarded by the Department of Energy. Unfortunately, the Phase II award did not occur and the Carbon SAFE Phase II project stopped. A review of the neural network project at Huntington found that the project was fully funded and was in no need of additional funding.

7. Major Project Milestones

The major project milestones for Cryogenic capture project can be found in Appendix D.

8. Program Closure, Retirement and Removal Information

Rocky Mountain Power has committed to at the end of the 5-year period, 2021, will report back to the Utah Public Service Commission regarding the actual expenditures made for each project, provide a report summarizing the overall study objectives, work performed, findings and results, lessons learned and recommendations for future action. Including the additional work proposed herein. In cases where a project is completed earlier than 2021 (i.e. the Woody Waste Co-firing demonstration at Hunter 3), a report will be prepared and submitted within 120 days of the completion of the project.

9. Planned Budget

Table 3: Clean Coal Research – Proposed Project – Estimated Annual Expenditure and Fund Transfer

	2018	2019	2020	2021	Total
Advance NO_X Controls	$194,090[2]	$775,000	$195,411	$0	$1,164,501
Woody Waste Co-firing	$538,980	$210,000	$0	$0	$748,980
CO_2-Capture (CCC)	$95,249	$317,272	$0	$0	$412,521
Totals (Adv NOx –(WW-Cofiring + CCC))	($440,139)	$247,728	$195,411	$0	$0

10. Accounting

Cost for each individual project will be monitored and tracked separately. The individual projects will continue to roll up to the Clean Coal Research project created by the company's accounting round under the Sustainable Transportation and Energy plan.

11. Procurement and Project Delivery Status

The STEP funding transfer requested will be utilized using existing contracts awarded during the start of each study or project. The typical Rocky Mountain Power contractual terms and conditions will continued to be applied during the additional work. Each outside contract will be issued a change order against their existing agreement following the applicable company governance policies.

12. Appendices

Appendix A – Biomass Co-firing Additional funding Proposal

Appendix B – Cryogenic CO_2 Capture Testing Additional Funding Proposal – Sustainable Energy Solutions

Appendix C – Advanced NO_X Emission Control Deferment Recommendation Memorandum – Rocky Mountain Power

Appendix D – Major Project Milestones

[2] Uncommitted 2018 funds.

Appendix A

Biomass Co-firing Additional funding Proposal

Addendum to

Technical Assistance in Support of Biomass Co-firing Demonstration

(P.O. 3300000705)

Motivation

Task 4 and Task 5 in the original Scope of Work indicate that the only measurements that will be performed by the University of Utah (UofU)/Brigham Young University (BYU) team at Hunter Unit 3 during the biomass co-firing tests are: measurement of the real-time entrained particle-size distribution at a location near the superheat pendent, collection of size-segregated entrained ash particles for chemical analysis and measurement of the deposition rate on two air-cooled probes in that same region. While these measurements are necessary for comparing the behavior of ash between baseline coal operation and coal/biomass co-firing, they do not provide a clear picture of many other aspects of boiler operation that would be of interest to PacifiCorp. Since this program is already investing substantial effort and expense to perform a full-scale demonstration of biomass co-firing, it makes sense to collect as much relevant data as possible. Therefore, an expansion of the budget for this program should include funding for additional measurements as noted below.

Additional Scope of Work

The additional measurement and engineering work that we propose includes:

- Extensive characterization of the fuels used (both blended and pure) during the demonstration. The proposed analyses include Hardgrove Grindability Index, Ultimate Analysis, Proximate Analysis and Ash Elemental Analysis.
- Measurement of the incident flame radiation at multiple (two or three) locations in the boiler region, between the top elevation of burners and the furnace exit plane. These measurements will be performed using a novel radiometer developed by the University of Utah. This methodology will be validated during the pilot-scale combustion performance evaluation in Task 6.
- Measurement of gas species using an FTIR gas analyzer near the location where the particle samples are collected, and at a location where there would be low-temperature flue gas. The low-temperature measurement will be performed by extracting gas using a sampling manifold owned by PacifiCorp that is designed to average across a grid of sample locations. Extraction of sample for the high temperature measurement will be performed through a newly-developed sampling lance. The FTIR is calibrated to report the following gas species of interest: NH_3, CO_2, CO, HBr, HCl, HCN, HF, CH_4 NO, NO_2, SO_2 and H_2O.
- Efforts will also be made to further develop the deposition sampling probe to report the time-resolved accumulation of mass on the probe. This probe will be tested prior to the demonstration using cold lab tests, but will not be verified under hot conditions until the baseline testing at Hunter Unit 3 commences.

- System modeling of Hunter Unit 3 will be performed to facilitate analysis of plant data obtained during the co-firing demonstration.

Period of Performance

The period of performance for the current contract concludes on June 30, 2019. However, this initial schedule assumed that the co-firing demonstration at the Hunter plant would take place in late summer or fall of 2018. The remaining time after completion of the testing was to allow for analysis of all the data and the samples obtained during testing, and then compiling a final report.

Appendix B

Cryogenic CO_2 Capture Testing Additional Funding Proposal – Sustainable Energy Solutions

APPENDIX B IS CONFIDENTIAL IN ITS ENTIRETY AND IS PROVIDED UNDER SEPARATE COVER

Appendix C

Advanced NO_X Emission Control Deferment Recommendation Memorandum – Rocky Mountain Power

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

To: Chad Teply

From: Mike Saunders
Richard Goff

Cc: Glen Pinterich
Larry Bruno
Greg Betenson
Quinn Healy
Mark Rutherford
Michael Dayton
DeAnne Garcia

Date: January 12, 2018

RE: Utah Sustainable Transportation and Energy Program Alternative NO_X Technology Demonstration Test

Introduction:

This memorandum recommends that the Utah Sustainable Transportation and Energy Program ("STEP") Alternative Nitrogen Oxides ("NO_X") Technology Demonstration Test be deferred in support of funding other STEP projects. The evaluation team has completed a competitive request for proposals ("RFP") from four NO_X control technology vendors. The four vendors were evaluated and none were capable of meeting the project's objectives below within budget:

1. Assess alternative options for implementation of one or more NO_X reduction technologies that in combination achieve similar emissions rates expected from a Selective Catalytic Reduction ("SCR") system.
2. Select one or more NO_X emissions technologies that appear to be capable of meeting the primary objective, and where indicated and further testing is required, install a slip stream or full stream demonstration of the technology.
3. Assess the economic feasibility of full scale implementation of the technologies compared to other available NO_X emissions control options for Hunter and Huntington plants.

Two of the evaluated vendors meet these objectives, but there testing costs were not within the budget set under the Utah STEP program. The other two vendors did not meet the innovation or the emerging technology objective.

The remainder of this memorandum summarizes the Company's evaluation of the vendors proposed technologies, provided a technical summary, presents a company of the proposal, offers a recommendation and lists anticipated next steps.

Evaluation Process for Short-Listed Bidders

The evaluated vendors were selected from the results of a Company issued request for information ("RFI") process. The vendors selected for the short-list RFP were picked from the RFI responses. The Company then issued a RFP for performing a technology demonstration test on Huntington Unit 1. The Company then evaluated the RFP responses using a project team agreed upon and pre-approved evaluation matrix. Each vendor was evaluated on the criteria listed in Table 1.

Table 1: Demonstration Test RFP Evaluation Criteria

Description / Criteria	**Scoring Parameter**
Price and pricing schedule	Least Cost Provider
Technology compatible with Huntington Power Plant	Go / No Go
STEP initiative criteria met	Go / No Go
Demonstration test expected NO_X reduction related to permit limit (30-day rolling average):	1 point per 0.01 lb./MMBTU NOX reduction
Plant Modifications Required	Rating Scale: 0-2 for permanent modification that affect plant operation and major changes required to plant power and/or water systems; 3-5 for permanent modification or major changes to plant power and/or water systems that do not affect plant operation; 6-8 for temporary and removable modifications; 9-10 for no modifications
Technology Implementation History: Has the technology been implemented before on other coal fire boilers?	Rating Scale: Technology has never been implemented or used 0-2; Technology only been utilized in bench testing 3-4; Technology has been utilized in slip stream pilot testing 5-6; Technology has been utilized on a full scale boiler 7-8; Technology has been permanently installed/utilized on at least one coal fired utility boilers 9-10.
Detail Work and Test Plan: Has the respondent provided sufficient information to demonstrate their understanding of the scope of the RFP and provided information so the company can make an informed decision regarding test modifications and equipment. Has the respondent met the criteria of the RFP?	Rating Scale: Demonstrates marginal understanding and information 1-3; Demonstrates adequate understanding and information 4-6; Demonstrates not only understanding of requirements but shows additional though, creativity and understanding of risks and issues 7-10.

Auxiliary Power and Utility Needs: Do the utilities required for the demonstration test pose a risk to operation of the unit (be it auxiliary power consumption, demineralized water, steam or other)?	Rating Scale: Rank based on cost of utilities to plant for demonstration. Highest costs for supply reagent(s), power, water, etc. 0-3; Additional costs for reagent(s) 4-7; Lowest cost (i.e. bringing a generator) 8-10.
Schedule: Has the respondent submitted a schedule that the company can utilize for scheduling of demonstration testing?	Rating Scale: No schedule provided 0; provided high level schedule with limited duration information 0-3; provided schedule with enough information to plan demonstration test 3-7; provided schedule detailed enough for company planning of demonstration test 8-10
Other Emission Sources Created from Test: Will the reagent used in the test cause other regulated emissions to be generated?	Rating Scale: New source pollutants created 1-3; additional non-regulated emissions created 4-7; No new emissions created 8-10

The commercial and technical sections of the evaluation matrix were weighed at 50 percent each towards the complete evaluation. The vendors were requested to supply a proposal based on the technology provided in RFI. The short-listed vendors and requested test technology is listed in Table 2.

Table 2: Invited RFP Vendors and Requested Test Technology

Vendor	Technology
GE / Alstom	Umbrella Selective Non-Catalytic Reduction ("SNCR")
APCS	Advance SNCR (50% Urea and 50% Hydrogen Peroxide)
Fuel Tech	SNCR (Urea Injection)
AECOM	LoTOx^{TM} (Ozone injection)

SNCR's vendors were added to the RFP as a price check against emerging technology. The RFP was issued on August 4, 2017 and responses were received on October 9, 2017.

Technical Summary

The technical evaluation was performed by a team consisting of Sargent and Lundy (acting as owner's engineer), the Huntington engineering manager, and the Advanced NOx Control Technology project manager. Attachment A to this memorandum contains the evaluation matrix and Sargent and Lundy's technical evaluation. Table 3 below outlines the final technical scoring of the four vendors.

Table 3: Final Technical Evaluation Summary

Rank	**Vendor / Technology**	**Technical Score**
1	General Electric (Umbrella SNCR)	9.56
2	AECOM (Ozone Injection)	8.80
3	APCS (Peroxide and Urea injection)	7.49

4	Fuel Tech (traditional SNCR)	N/A

A technical evaluation summary is listed below of the NO_X reduction level, major concerns and issues with the vendor proposals.

Common to all vendors:

- All evaluated vendors require an outage in which to install modifications to the boiler or flue gas path ductwork and to install additional material required for testing. The outage requirement can be achieved during Huntington's fall 2018 overhaul.
- Company to provide water, electricity, and testing support. The level of required support varies with vendor.

General Electric

- SNCR technology proposed by General Electric is not considered an emerging technology in the utility industry. However, General Electric's approach was considered innovative enough to warrant further evaluation.
- General Electric predicts a 30 percent reduction in NO_X emissions with the Umbrella SNCR.
- Umbrella SNCR's have been installed in coal fired boilers outside of the United States.
- General Electric did not provide load following capability for the test demonstration. If load following is pursued by the Company, then additional cost would be added to the testing.
- Injection of Urea could impact carbon monoxide emissions and could create ammonia slip issue.

AECOM

- AECOM's ozone injection met the STEP requirements and is considered innovative and emerging.
- AECOM predicted a 70 percent reduction in NO_X emission that is capable of meeting SCR type performance.
- Significant and permanent modifications to the existing facility are required for the AECOM test. The work is to be carried out by the Company and at its cost. This work includes, but is not limited to, installation of injection ports, lining of the flue gas path ductwork, installation of distribution baffles, auxiliary power modifications, piping, supports, cooling water supply, and supply of oxygen for testing.
- AECOM requires approximately 1.7 Megawatts of power to operate the ozone generator.
- Ozone injection has not been tested previously at this scale.
- It is unknown if the injection of ozone into the flue gas desulphurization system would result in a release of other pollutants such as SO_2 and SO_3.

- AECOM's co-funding support includes a "claw-back" provision in which if the Company does not install a full scale system within two years then an additional charge would be applied.

APCS

- APCS estimates a 60 percent reduction in NO_X emissions with the peroxide urea injection.
- Modifications to the unit includes use of sootblower openings and new boiler water wall openings for injection locations. Additional injection locations would be identified after a computational fluid dynamic model is performed.
- The injection medium has not been tested beyond bench scale phase.
- Minimal information was received as to the water and power requirements needed for the demonstration test. APCS does require auxiliary steam in the temperature range between 1,000 - 1,200°F.
- Injection of Urea could impact carbon monoxide emissions and ammonia slip.

Fuel Tech

- SNCR technology proposed by Fuel Tech is not considered an innovative or emerging technology and is widely implemented throughout the utility industry. A decision was made to exclude Fuel Tech from consideration as it doesn't meet the STEP innovation criteria.
- Fuel Tech's technical and commercial proposal additionally did not meet other RFP requirements.

Commercial / Cost Summary

The budget for the Advance NO_X control emission technology STEP program is $1.415 Million. Currently, the project has committed approximately $225,000 in owner's engineer and other costs. Company labor cost are being held under a separate STEP order. The remaining amount of $1.190 Million is available for the demonstration testing. Table 4 below summarizes the initial proposal cost provided by the vendors plus a proposal adder to conform to the performance specification. The proposal adders are based off responses to RFP questions issued to the vendors for proposal clarifications.

Table 4: **Demonstration Test Cost Summary**

Vendor	Initial Proposal	Proposal adder to Conform	Total
General Electric	$1,085,585	$376,298	$1,461,883
AECOM	$2,344,000	$2,070,900[1]	$4,414,900
APCS	$3,476,875	Undetermined	$3,476,875
Fuel Tech	$430,000[2]	Undetermined engineering costs	$430,000

[1] Includes claw-back provision amount
[2] Fuel Tech initial proposal cost is based off their RFI response. Fuel Tech declined to provide a full RFP response.

Based on the provided cost from the vendors, only Fuel Tech, which was eliminated technically, was low enough to perform a demonstration test with the funding available. It is anticipated that there will be additional costs from APCS to perform the test once the design is completed. The General Electric testing price could be reduced if the Company decides to forgo the load following testing provision requested in the RFP. If not, then Company would only know how the SNCR performs at full load and low load.

Based on the above proposals General Electric was the only vendor that was close to the STEP budget. The remaining vendors were well above budget and Fuel Tech did not meet the STEP requirements.

Recommendation

Each of the vendors that supplied a proposal fell short in meeting both the commercial and technical requirements. Table 5 summarizes the evaluation on both a commercial and technical side.

Table 5: Commercial and Technical Evaluation Summary

*Legend: (-) borderline acceptable, x – does not meet requirements, ✓ - meets requirement

Vendor	Commercial	Technical	Overall
General Electric	-	-	-
AECOM	x	✓	X
APCS	x	✓	X
Fuel TECH	✓	x	X

Upon review of the commercial and technical evaluation, it is recommended that the Company forgo the alternative NO_X emission control technology demonstration test and utilize the target STEP funding to further support one or multiple other STEP projects. Utilizing the STEP funds on other projects would be of a higher value to the Company's customers than performing a demonstration test with a technology that is already well established like SNCR.

Next Steps

The following is are the next steps identified for the project:

- Approach the Utah Public Service Commission with a formal request to utilize STEP funds for one or more of the other STEP projects.
  - The recommended additional funding projects:
    - Phase II of the Carbon SAFE work;
    - Further biomass firing; or
    - Further carbon dioxide cryogenic capture support.

- Complete the technical report summarizing the cost for a full scale implementation of the Alternative NO_X emission control technology.

Attachments:

Attachment 1: Sargent and Lundy Technical Evaluation, November 16, 2017.

Appendix D

Major Project Milestones

Appendix D: Cryogenic CO_2 Capture Testing Additional Work

	Milestone Title Description	Estimated Date
Q7	SES will deliver a report containing the following: **Task A1** – Finalized integrated dryer design. Results of experiments used to validate design. Equipment sourced. **Task A2** – Final selection of the solid-liquid system to be tested. Finalized design and record of system ordered. Assessment of pollutant removal options and modeling of basic design of system.	11/15/2018
Q8	SES will deliver a report containing the following: **Task A1** – Record of dryer system equipment being ordered. **Task A2** – Description of assembled solid-liquid system. Designs and parts ordered for the pollutant removal system.	2/15/2019
Q9	SES will deliver a report containing the following: **Task A1** – The receipt of the system and initial results of both assembly and dryer testing. **Task A2** – Results of initial testing and subsequent iteration on solid-liquid separations system. Description of assembled pollutant removal system.	5/15/2019
Q10	SES will deliver a report containing the following: **Task A1** – Results of further test results including using real flue gas and initial integration with skid system. Final Reporting. **Task A2** – Results of testing the finalized designs. Final Reporting. **Task A3** – Assessment of scale-up potential of innovative unit ops including dryer and solid-liquid separations.	8/15/2019
Q7	SES will deliver a report containing the following: **Task A1** – Finalized integrated dryer design. Results of experiments used to validate design. Equipment sourced. **Task A2** – Final selection of the solid-liquid system to be tested. Finalized design and record of system ordered. Assessment of pollutant removal options and modeling of basic design of system.	11/15/2018

Attachment B

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE REGULATION NO. 13

STATE OF UTAH

Sustainable Transportation and Energy Program (STEP)

Commercial Line Extension Pilot Program

APPLICABLE: All new commercial and industrial developments and the non-residential portion of new mixed residential and non-residential developments.

PURPOSE: Reduce developer's costs within developments for which they are requesting installation of primary voltage backbone facilities. Promote use of electric vehicles by facilitating installation of electric vehicle charging stations.

DESCRIPTION: For primary voltage backbone within the development for non-residential loads, for which the developer is paying an advance under Regulation 12, Section 4(b). This portion of the developer's advance will be reduced by 20%, or $250,000, whichever is less.

PROVISIONS OF SERVICE: To be eligible for the 20% reduction in their advance the developer must enter into a line extension contract as provided in Regulation 12. If the development is to be constructed in phases, the backbone request must be for installation of the backbone for that phase, otherwise it must be for installation of the backbone for the entire development. In either case the design will include capacity for future development. Developers that are building on lots are required to install conduit from either Company or Developer power sources to future electric vehicle charging locations on their property for not less than 2 percent of their parking spaces.

The 20% reduction will be applied to all applicable backbone costs for as long as funds are available to provide the 20% payment, but not for applications completed after December 31, 2021.

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE REGULATION NO. 13

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The 20% reduction will be applied to all applicable backbone costs for as long as funds are available to provide the 20% payment, but not for applications completed after December 31, 2021.

Attachment C

Sustainable Transportation Energy Plan (STEP)

Solar & Storage Technology Project

Additional Funding Request

Purpose

Rocky Mountain Power (the Company) requests approval to authorize an additional $1.75 million of Sustainable Transportation and Energy Plan (STEP) funding to complete the pre-approved Utah solar and storage technology project.

Summary

Rocky Mountain Power's Solar and Storage technology project, under the STEP program, was approved by the Utah Public Service Commission on December 29, 2016. The project included using $5 million in STEP funds to install an energy storage technology to resolve voltage issues on the Sevier-Panguitch 69 kilovolt transmission line. An additional $2 million from Blue Sky community project funds was approved to be utilized to install a company-owned solar project at the same location. The Company has received competitive market proposals for the solar and storage project that result in a revised overall project estimate of $8.75 million. The estimated cost of resolving the voltage issue using traditional capital investments in the form of poles, wires and/or substations has been revised from $8.0 to $8.75 million, based upon current market costs using 2018 dollars. The solar and storage technology project will be installed on the Panguitch distribution system and is expected to reduce, defer or eliminate the need for traditional capital investments. The solar and technology solution will primarily provide the Company with critical learnings on the design, operation, commissioning and maintenance of these new technologies being connected on the distribution system.

The Company continues to expect the STEP solar and storage project to provide benefits to the Company and its customers. These include but are not limited to the following:

- The loading on the 69-12.5 kilovolt power transformer at Panguitch substation will be reduced, thereby ensuring the line voltage on the Sevier-Panguitch 69 kilovolt transmission line does not drop below the voltage compliance limit of 0.90 per unit.
- The Company will obtain first-hand operational experience with control algorithms and efficiency levels associated with energy storage combined with solar. The experience gained will prepare the Company in advance of large scale integration of such technology/projects that are now becoming readily available options for customers as price declines.
- The Company is in the process of striving to make the grid more progressive and this program will enable a greater understanding of these innovative solutions.
- The Company will become familiar with and utilize innovative technologies to provide customers with solutions to power quality issues.
- The project will provide Blue Sky customers with a "steel in the ground" physical solar asset.

As part of the project execution process, the Company has taken several steps in an effort to successfully implement the project. These include:

- Initiated a Request for Qualification (RFQ) and Request for Proposal (RFP) to identify an Owners Engineer (OE). As part of the process, Power Engineers Inc. was identified as the most qualified vendor and a contract was executed to assign Power Engineers as the Owners Engineer. The responsibility of the OE is to provide technical engineering guidance to define the scope of services, identify risks, anticipate challenges, and propose technical solutions.
- The OE developed a model to re-investigate the solution proposed by the Company to resolve the voltage issue. The model validated the Company's proposal to solve the voltage issue by installing a 650 kilowatt solar and 1 Megawatt / 5 Megawatt-hour energy storage project.
- The OE developed detailed technical specifications that will be required to be complied by the project developer.
- The Company submitted interconnection requests for both the solar and energy storage projects. Both interconnection requests received approvals in April 2018.
- The Company purchased land in the designated area where the project is expected to be installed. The Company has also engaged with community leaders to help them understand the value of this project for the community.
- The Company released an RFP to nine pre-qualified vendors that have previous experience in executing Engineer-Procure-Construct (EPC) contracts for energy storage and/or solar projects. The Company received an affirmative response from two vendors. Subsequently, both vendors were allowed to submit their final bids through the Company's e-auction process, however only one vendor submitted a detailed bid. The contractor with the winning bid shall engineer, design, procure, construct, test and commission to provide the Company with a complete Battery Energy Storage System and Photovoltaic operational facility. It shall include, but not be limited to, providing detailed engineering and design services, furnishing all equipment and materials, providing construction, testing and commissioning services with all labor, supervision, administration, and management, construction equipment, materials, test equipment, vehicles, on-site facilities and services necessary to perform all necessary work.
- The Company negotiated with the EPC contractor to determine contract terms and final pricing. As part of this effort, the Company has successfully reduced cost of the overall bid by making modifications to engineering design and material sourcing.

The Company has been able to secure cost savings; however the overall price of procuring and installing the solar and energy storage system is higher than the estimated prices from the Company's 2016 funding request. A few factors were identified that have caused the increase in costs from previously estimated costs. These include, but are not limited to, impact of trade tariffs, increase in contractor costs for project solar and storage integration and commercial risks, increased cost for battery storage due to high demand and limited supply, and higher construction due to low unemployment and higher labor costs, as well as any other costs that might not have been considered in the previous cost estimate.

Timely approval of additional funding of $1.75 million, will allow this innovative project to be delivered by the end of 2019 under current competitive market pricing and commercial terms. The underlying drivers and benefits of this project remain unchanged.

CERTIFICATE OF SERVICE

I hereby certify that on this 13th day November 2018, a true and correct copy of Rocky Mountain Power's **Application to Modify Funding Amounts Previously Authorized by the Sustainable Transportation and Energy Plan Act, and to Allocate Additional Funds to the Solar and Storage Technology Project** was served by email and/or overnight delivery on the following:

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