

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF COLORADO  
DOCKET NO. 08R-424E**

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**IN THE MATTER OF PROPOSED AMENDMENTS TO THE RULES OF THE  
COLORADO PUBLIC UTILITIES COMMISSION RELATING TO THE  
RENEWABLE ENERGY STANDARD.**

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**Initial Comments of CoSEIA  
30 October 2008**

**Introduction**

The following comments are in response to Decisions No. C08-1001 and R08-1124-1 and constitute Colorado's Solar Energy Industries Association's (CoSEIA) initial comments. We anticipate providing a second round of comments after release of the Commission's draft rules on 10/31/2008.

CoSEIA represents and serves energy professionals and renewable energy users. We promote the use of solar energy and conservation to improve the environment and create a sustainable future. CoSEIA represents the solar heating and solar electric industry in Colorado. Our more than 150 members representing at least a thousand employees provide both residential and commercial solar system products and services to consumers and businesses. Other CoSEIA members include solar manufacturers, educational and informational organizations, and concerned individuals and companies.

CoSEIA is the Colorado state chapter of the national Solar Energy Industries Association (SEIA), and was organized in 1989.

While our members install, manufacture, and/or supply small, medium, and large-scale solar installations for both on-site and centrally located systems, the majority of our members focus on small and medium sized systems.

CoSEIA represents both the solar heating and solar electric industries. As Colo. Rev. Stat. § 40-2-124 is a renewable electricity standard – that is it does not include solar heating systems – these comments will address solar electricity only. For the rest of these comments, when we say “solar” we mean “solar electricity”.

Passage of Amendment 37 in 2004, and the start of solar rebate programs in 2006, pushed Colorado’s solar industry into high gear. CoSEIA thanks all the parties involved in helping make this remarkable transition and growth of an industry occur. Special thanks are due to the Public Utilities Commissioners and staff, the state’s investor owned utilities Xcel Energy and Black Hills Energy, the legislators that worked on the first three incarnations of a renewable energy standard, Governor Ritter and the legislators that doubled the standard in 2007, and the numerous others that have made our industry glow.

But most importantly CoSEIA thanks the people of Colorado for passing Amendment 37. A37 literally changed the rules of how electricity is generated in Colorado and as a law passed by the people of Colorado is the purest political expression of the people’s will. The tremendous growth of Colorado’s solar industry is a testament to that will.

To fully realize the will of the people of Colorado, the goals and potential of the New Energy Economy, and as the costs of solar systems inevitably come down, we believe that solar will eventually be installed on nearly every roof.

Prior to 2006, solar installations in Colorado could be measured in the hundreds. We are now installing in the thousands of systems, expecting around 1200 small and medium systems this year alone. As costs fall, we will grow to being able to install tens of thousands, and then possibly even to hundreds of thousands of systems per year.

CoSEIA is proud to be a bright spot in an otherwise gloomy economy. And we are working hard to bring the best possible systems to our customers while bringing costs down.

### **Lower Costs by Streamlining the Process**

Lowering costs will benefit consumers and the solar industry while moving Colorado closer to its renewable energy goals. The quickest and most certain way to *lower costs right now* and to accelerate the growth of small and medium installations is by streamlining the process. We look forward to working with commission staff and Colorado's utilities as we examine every requirement and process to find ways to eliminate or streamline as many contracts, requirements, and procedures as are not essential or cost-effective.

The areas where the commission can reduce the costs the most are the interconnection and rebate processes. Equipment costs and installation costs of that equipment are outside the Commission's control. However, the Commission can create significant savings by reducing administrative overhead, particularly for small systems where overhead costs are a significant percentage of total costs.

Our members tell us that the typical overhead due to inefficient processes and complicated forms and contracts may exceed \$1000 per system. Depending on the size of a system, this represents roughly 4% to 30% of the consumer's out-of-pocket cost of a small solar system. Many of our members have full-time employees that do nothing but deal with the rebate and interconnection paperwork. The cost to CoSEIA members in time, customer aggravation, and lost sales is very high. We suspect that much of the time of the five Xcel Energy employees working on the utility side of the interconnection and rebate process is also spent on regulatory formalities that add little value.

While every step of the current process has a purpose, procedural steps should be eliminated and prohibited if their costs outweigh their benefits. When assessing costs, the commission should

consider the costs of everyone involved, including utility employees, administrators, solar installers, and our shared customers' time.

In addition, provisions in the current process that cannot be enforced on a non-discriminatory basis should be eliminated.

### **Rule 3665: Streamlining Small-System Interconnection**

*Background.*

*Prohibit utilities from requiring small-system AC Disconnects.*

*Eliminate small-system insurance requirements.*

*Streamline or eliminate the interconnection agreement.*

*Other issues in rule 3665.*

#### *Background*

In the last few years there have been billions of dollars of venture and corporate capital invested in new and improved solar electric products, technologies, and cost-reductions. This investment will soon radically expand the ability of consumers to generate electricity at home without regulatory oversight.

Most CoSEIA members install roof or ground mounted PV systems. However, in addition to rooftop systems, we are beginning to see “plug and play” solar electric devices that are often not installed by CoSEIA members. For example, photovoltaic (PV) panels are becoming a popular addition to recreation vehicles (RVs). It is quite likely that an RV parked and plugged in will back-feed electricity into the grid.

It is likely that we will soon see plug-n-play utility sheds, awnings, even umbrellas with built-in PV and inverters. It is easy to imagine the ad copy for a PV umbrella:

They laughed at me when I plugged in my new umbrella. But they stopped laughing when they saw my electric bill.

Some of these are already available or nearly available.

<http://www.solarframeworks.com/powerumbrella.html>



What these plug-n-play PV appliances mean to a utility is that they cannot expect that all PV systems will have AC disconnects. Not all PV systems will have home or small business owner insurance. There is no practical way for a utility to enforce provisions on these plug-n-play devices on the customer's side of the meter.

Other devices that back-feed into the grid will soon include plug-in hybrid or straight electric vehicles (EV). Although conventional thinking assumes that an EV's battery in a vehicle-to-grid (V2G) situation would be under utility control, the owner of an EV might choose to set their vehicle up to back-feed electricity to, for example, take full advantage of Time of Use rates.

Technology is rapidly bringing us to a major shift in what constitutes normal use of the customer-side of the meter. This soon-to-come change in what is "normal" is a part of the reason we are recommending changes to the AC disconnect requirement, insurance requirement and interconnection agreement.

### *3665: Prohibit Utilities From Requiring AC Disconnects*

Most Colorado utilities require solar installers to install an AC disconnect. We believe that maintaining the safety and integrity of the grid and the people that work on the grid is of supreme importance. However, we believe that for three main reasons, AC disconnects do very little to enhance safety for small systems.

There is precedent that the requirement for AC disconnects may be safely eliminated. For example, PG&E, California's largest utility, no longer requires the AC disconnect for systems under 30 kW in part because the logistics of using them were prohibitive. The National Renewable Energy Laboratory (NREL) conducted a study on AC disconnects.

<http://www.nrel.gov/docs/fy08osti/42675.pdf>

The report documents that 8 states “specifically waive the requirement for small systems.” It is interesting to note that in some cases < 2 MW qualifies as “small.”

The first reason that an AC disconnect does not enhance safety is that the IEEE standards and UL listings that grid-tie inverters must have are sufficient to provide the safety needed. The National Electric Code (NEC) already requires IEEE and UL listings for grid-tie inverters and State and local building inspectors already inspect and enforce the NEC. CoSEIA has provided testimony on the technical aspects of islanding and the IEEE and UL inverter requirements in previous dockets, and is willing to do so again if requested. A newly released study titled Utility External Disconnect Switches (UEDS) : Practical, Legal, and Technical Reasons to Eliminate the Requirement states:

In fact, for properly designed and installed Code-compliant (NEC) PV systems, the UEDS provides little, if any, additional safety, beyond what is already present. Indeed, utilities increase their risk of liability when they require the UEDS for safety during maintenance or emergency.

[http://www.solarabcs.org/utilitydisconnect/ABCS-05\\_studyreport.pdf](http://www.solarabcs.org/utilitydisconnect/ABCS-05_studyreport.pdf)

Second, it is poor practice to rely on safety measures that may look good on paper but are so cumbersome they are impractical. We believe that linemen do not and will not have sufficient

time or equipment to use AC disconnects rigorously. And if they are not used rigorously, they serve no protective function.<sup>1</sup>

In order to effectively use AC disconnects, linemen would have to:

1. Accurately identify exactly which addresses in an area to be worked on have PV systems.
2. Have enough locks on the truck for all the possible AC disconnects in an area (could be 100% of meters).
3. Find and open and lock and find again and unlock and close each AC disconnect before starting work.

We think steps one and two are not currently being met, but even if they are, step three would be quite time consuming. It would take at least 5 minutes for a lineman to find, turn off, and lock the AC disconnect at each address, and 5 more to turn it back on. This is a significant time drain in a neighborhood with one or two PV systems, and will take hours as the solar market grows and more houses have PV systems. For example, the Wonderland Lake neighborhood near Boulder has solar penetration rates near 30%, and some new developments have 100% solar penetration – the Geos neighborhood being built in Arvada will have 300 solar buildings in it.

<http://www.discovergeos.com/>.

Alternatives to AC disconnects include pulling the meter and/or grounding the line that is being worked on. We have been told by many sources that utility linemen pull the meter in preference to using the AC disconnects anyway.

We are fast approaching hundreds of thousands of inverters installed in the world. We are not aware of a single case where a small inverter has continued to provide power to the grid when the grid is down.

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<sup>1</sup> There are times when AC disconnects are installed to protect the safety of *solar installers* (not utility personnel) that are working on the inverter itself – for example when a supply-side tap is used to interconnect the inverter to the grid. Supply-side taps are not common.

Third, as consumers buy more plug-n-play solar devices, there will be a growing number of undocumented power sources connected to the grid. It is unlikely that plug-n-play umbrellas, RVs, etc are going to appear in a utility's database of systems, and unlikely that they will have any kind of formal AC disconnect at all. No utility person is ever going to climb through every backyard and driveway looking for these plug-n-play devices. It is much easier, faster, and much safer to just pull the meter(s).

The costs of AC disconnects vastly outweigh their benefits. The part itself is about \$40. At about 2 hours for an electrician (\$60 per hour) to wire one in, the cost is roughly \$160 each. If just in Xcel Energy's territory 1200 systems per year are installed that is \$192,000 per year. If this provided a reasonable margin of safety to utility personnel it would be money well spent. It doesn't.

The interconnection standards for small systems need to be changed to prohibit a utility requirement for an AC disconnect.

*3665: Eliminate small-system insurance requirements.*

Rule 3665 currently requires proof of insurance from small-system owners. This requirement is discriminatory, is of high cost and unlikely to be followed up on by the utilities as we move to tens of thousands of PV systems.

Common everyday events such as driving a car, planting a tree, flying a kite, or owning a cat regularly cause harm to the safety and integrity of the grid and the people that work for utilities. Yet the utilities do not require proof of insurance for any of those activities.

CoSEIA is not aware of a single recorded example of harm to the safety and integrity of the grid from a properly installed solar system, yet solar system owners must provide proof of insurance. This serves no purpose.

In addition, plug-n-play PV appliances will be installed by the public without notice to the utility. It is discriminatory to require insurance from some PV systems and not from others.

Either the Commission should require proof of insurance for all common everyday activities such as planting trees or installing a solar system, or they should not require any proof of insurance for any common homeowner or small business activity that occurs on the customer side of the meter.

Like trees, cars, kites, and cats, any damage done to the grid by PV systems – plug-n-play or installed by a solar pro – will need to be absorbed by the utility as a cost of doing business.

The cost of providing the proof of insurance is not much for a single system. However, almost everyone that buys a system asks the solar sales rep or calls the utility to ask why they must provide proof of insurance. Let's estimate 10 minutes of a sales rep or utility rep's time for the question. Figure another 5 minutes for the utility to take the piece of paper, file it properly, and check the correct boxes. Figure 10 minutes for the homeowner to figure out the right piece of paper and get it faxed (many people need to go somewhere else to fax it). 25 minutes per system... 1200 systems per year... so close to a half a person-years effort per year.

Perhaps because of concerns about identity theft, many people are very reluctant to release any information that they do not absolutely have to provide. This sometimes translates to long discussions between customers, sales reps, and utility reps on why the utility needs to have a customer's insurance information.

Finally, as we approach tens of thousands of systems it is very unlikely that utilities are going to spend the time needed to update tens of thousands of proofs of insurance. Without updates this information quickly becomes out-of-date providing no useful insurance protection for utilities and no savings for all ratepayers.

Rule 3665 needs to be changed to prohibit any kind of insurance requirements for small systems.

*3665: Eliminate or streamline the small-system interconnection agreement.*

CoSEIA believes the interconnection contract should be eliminated or at least vastly streamlined. In its current form we believe the interconnection agreements used by Xcel Energy and other utilities is unreasonably burdensome to small system owners. The interconnection agreement is very expensive to administer and discourages solar installation. Finally, the interconnection agreement cannot be applied to plug-n-play PV appliances and is therefore discriminatory.

Colo. Rev. Stat. § 40-2-124(e) states in part

The qualifying retail utility shall not apply unreasonably burdensome interconnection requirements in connection with this standard rebate offer.

The existing interconnection agreements are too complicated for most consumers to understand. Some potential customers decide not to go through with a transaction they do not understand. This hurts the solar industry and, more importantly, harms the environment and thwarts the intent of Amendment 37. Most customers ask the sales representative to explain the interconnection agreement. This consumes the sales representatives' time and thereby drives up costs.

The interconnection agreement requires a copy of the one-line diagram for the solar system. Few customers are qualified to understand if the one-line is accurate or not.

The costs to the customers, to CoSEIA members to explain to the customer why the contract is needed, and to the utilities to administer tens of thousands of these contracts would be very high – particularly if customers in fact pay lawyers to explain the contract to them. We understand some utilities have vice presidents sign the contracts. In addition, the maintenance of these agreements becomes very difficult as there get to be tens of thousands of small-systems and buildings are sold and resold.

It will be expensive for a utility to enforce a perceived violation of an interconnection agreement, especially if it required litigation to do so. The expense of lawsuits is extremely high. To our knowledge, the utilities have no desire to police these agreements. The fact that a utility is

unlikely to enforce an interconnection agreement suggests there is only limited value in requiring the agreement. Finally, the citizens that install plug-n-play PV appliances are not likely to be contacting a utility at all and hence will not sign this agreement. This discriminates against small-system owners that take the time to do it right and should be prohibited.

Rule 3665 needs to be changed, within the limits of the commission's authority, so that the interconnection agreements that utilities use are eliminated or vastly streamlined.

*Other issues in Rule 3665*

Error in Small Generating Facility Information

The Commission's sample Small Generating Facility Information document included in Rule 3665 has a technical error just above the blank for the customer's signature. It currently states:

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree to abide by the Terms and Conditions for Interconnecting an Inverter-Based Small Generating Facility No Larger than 10kW and return the Certificate of Completion when the Small Generating Facility has been installed. I further agree to relinquish my claims to any REC that will be generated with my equipment as part of this agreement.

Signed: \_\_\_\_\_

The sentence:

I further agree to relinquish my claims to any REC that will be generated with my equipment as part of this agreement.

is inappropriate and should be deleted because RECs can only be acquired by purchasing them from an on-site solar system's owner. This sample document is only for interconnection - not for REC purchase.

### 15% Peak Load Limitation for Small-Systems

The level 1 small-systems process states:

(A) For interconnection of a proposed small generating facility to a radial distribution circuit, the aggregated generation, including the proposed small generating facility, on the circuit shall not exceed 15 percent of the line section annual peak load as most recently measured at the substation or calculated for the line section. A line section is that portion of a utility's electric system connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line.

CoSEIA does not have a technical objection to the 15% requirement at this time. However, we will point out that as we approach “nearly every roof” there will be distribution circuits that will exceed that 15% level. A small-system customer is unlikely to understand this arbitrary-to-them requirement. We can anticipate that customers will take political action at that time. Perhaps a better approach is to identify what circuits are likely to have the 15% limit exceeded by small-systems and begin steps now that will make this requirement unnecessary.

### Requirement for One-Line Diagram for Interconnection

Some utilities, including Xcel Energy, require a one-line diagram of the system for interconnection. For a UL and IEEE based inverter, these look almost identical – pretty much if you've seen one one-line diagram for small PV systems you've seen them all. There are significant costs to CoSEIA members for providing one-lines – some installers have full-time employees doing nothing but technical drawings. While one-lines are often required to obtain building permits, many building departments do not require them. For example, areas covered by state inspectors do not require one-lines. This is another example of a step in the small-systems application process where a document that has no useful function for the utility is required. There are significant costs for producing and submitting the one-line to the utility and for the utility to track it particularly when multiplied by thousands of systems.

Note that there is a value to the solar installers for creating a one-line beyond the permit process in that it lays out the number of strings and panels that will be in each string – but this information serves no use to the utility.

Utilities should not be able to require one-line diagrams for small solar systems.

### Requirements for IEEE and UL Listings

The requirement for IEEE and UL Listing for inverters and panels is very well covered by the National Electric Code (NEC). The NEC is enforced by state and local building inspectors. Utility requirements for IEEE and UL listings are redundant to the NEC requirements – particularly given that inspectors are actually likely to look for the UL listings on the equipment itself whereas utilities are likely to only require a relatively unverifiable paper trail.

There are additional cost savings to be had by prohibiting utilities from requiring proof of UL and IEEE listings.

### **Rule 3658: Standard Rebate Offer**

#### *Require Industry involvement in changes in the rebate and REC purchase offer*

Changes in the rebate levels must be handled very carefully in order to prevent chaos in the small-system market and to reduce complaints from voters.

Experience from California and New Jersey (and now Colorado) show that great care must be taken in how changes are announced to the public and how much the dollar amount of changes are. For example, announcement of changes made too early are likely to be ignored by customers until the very end of the time period, while announcements made too quickly will be viewed as unfair by people who were close to having their application completed.

We strongly urge the Commission to require CoSEIA and other key stakeholder involvement in the timing and amount of changes.

*Simplify the small-system REC purchase contract.*

The REC Purchase Contract can be simplified a great deal. The current REC purchase contract that Xcel Energy uses is very complex, difficult for customers to understand, and takes significant time and effort from customers, installers, and utility personnel. Xcel Energy's REC Purchase Contract can be viewed at:

<http://www.xcelenergy.com/SiteCollectionDocuments/docs/retail/conmrkts/SolarRewardsContract-v2.pdf>

In addition, we believe that a number of the provisions in the current contract probably cannot be enforced at all, or could be enforced at a cost far higher than any reasonable expectation of value.

We believe that the contract needs to cover:

1. The basic information in Exhibit 1 of the current contract.
2. A statement of the dollar amounts of the rebates.
3. That the rebate applies to new equipment with at least 5-year warranties only.
4. A short statement about what a REC is and that in exchange for the rebates the utility now owns the RECs until 20 years from now.
5. Paragraph 4(u) of the current contract regarding Xcel's need to share customer information regarding REC sales.

Some of the items in the current contract that are not needed are:

1. Net metering statement (paragraph 4(e)). Net metering is provided independently of REC purchase. In other words a customer does not need to sell their RECs to receive net metering. Including this language here clouds the situation about what it takes to get net metering and makes the REC contract longer and more complicated than need be.
2. The assignment to new sellers provisions (paragraphs 4(d) and (t)). This provision is very costly and confusing, easily forgotten by the current owner when they sell the house a few years from now, and impractical to enforce. While the owner may actually remember the assignment, it may be difficult for them to get the new owner to sign the assignment and no reasonable way for the old owner to require them to sign. No provision is made for what happens then. The current rules prohibit the original owner from removing and

taking the panels with them. The requirements of A 37 would not be met if the original owner were moving out of state with the system.

We believe most people will forget this contract within a very few years. Enforcement against a seller that forgot to assign the contract would require Xcel Energy to detect that the home was sold and then sue the old owner. We believe Xcel Energy has no mechanism in place for reliably detecting that a problem has occurred. Additionally, the cost to pursue a lawsuit would far exceed any likely benefit, there is no reasonable expectation that Xcel Energy would prevail which by 4(n) means Xcel's ratepayers may have to pay all costs, and finally, the public relations costs would be high for Xcel and the Commission would experience a loss of face and trust by consumers.

We believe the right approach is the one shown by Rule 3659(k):

If an on-site solar systems of ten kW or below has received a one-time REC payment from a QRU under rule 3658, the QRU shall be entitled to count the anticipated SO-RECs purchased by the one-time REC payment for compliance with the renewable energy standard even if the on-site solar systems is removed or becomes inoperable

This rule recognizes that the costs of literally making sure that all of these small systems are running properly by Xcel Energy will be very high as we have thousands of small systems, exceeds any possible benefit, and that Xcel Energy should not be a policeman for small systems.

So long as these systems have significant value, most customers will want to keep them running. Since the panels are by far the most expensive components, and most panels have 25-year warranties, it is a reasonable expectation that these systems will be operational in 20 years time. And if some future owner decides to remove the panels for whatever reason, it is likely that they will be installed on some other person's house. Since this will be a used system it will not qualify for a rebate preventing double counting of the RECs produced.

3. While we do not object to the concept of requiring the customer to maintain the system (4(1)), there is no reason to include this paragraph unless Xcel Energy is prepared to enforce this provision. The same arguments about cost of enforcement versus limited value as made in the “assignment” section above apply.

Generally, we believe that except for the specifics of the REC purchase itself, the REC Contract should not be allowed to specify what the customer does on their side of the meter. We are asking the Commission to write a new section in rule 3658 that limits the contents and complexity of the REC Purchase contract.

## **Other Issues**

### Tracking RECs

There needs to be some consistent mechanism to not only track RECs from a particular system within one utility, but to allow other utilities and entities to know that the RECs associated with a particular system have been purchased already. We believe that the purpose of 3659 (l), (m), and (n), is to track RECs for compliance with 40-2-124 requirements and prevent either unintentional or intentional double counting. We are not sure of the status of REC tracking systems.

A statewide or regional small-system REC tracking system is the only practical way to prevent an individual from double-selling their RECs.

In addition, the suggestions for portability that others have made, if adopted, will make it even more important to track RECs rigorously.

### Streamline Costs by Requiring That All New Meters be Net Meters

Given that “nearly every roof” will eventually be achievable, one way to significantly reduce costs is to have all new and replacement utility meters be net meters. Over time this will eliminate the separate trip that the net meter installation requires. If we assume 1200 systems per

year and that a meter replacement takes one hour per small-system we are likely looking at a person-year of effort per year of savings. The more systems per year, the bigger the savings. This is also a savings for CoSEIA members as the process for exchanging regular meters for net meters is managed by our members and takes time.

#### Consider a Rebate For Small System Utility Interactive Batteries

A PV system can time-shift its output to better match a utility's peak load profile by using a relatively small battery bank. Currently, few if any utilities can take advantage of this battery capability (though perhaps Xcel Energy could by using the same general mechanism as its SaverSwitch program). In order to have enough battery systems in place to take advantage of eventual smart or semi-smart grid technology we believe it would make sense to have an incentive program for batteries now.

We are suggesting perhaps 2 kWh of battery storage for every kW of small-system capacity to be encouraged by a \$50 to \$100 per kWh incentive.

In addition to making the penetration of PV systems and helping achieve voter intentions of "maximum practicable extent" (Rule 3651) more feasible these systems could be used in the future to avoid expensive utility peaking capacity.

#### **Conclusion**

CoSEIA thanks the Commission for this opportunity to help improve RES rules. The rules have proved workable, but much can be done to reduce complexity and costs.

And lower costs will benefit ratepayers.

We look forward to working with the Commission, staff, and other interested parties to refine these ideas and to suggest specific rule language.

Thank you very much.

Sincerely yours,

Ken Regelson  
On behalf of CoSEIA  
Five Star Consultants  
303 449 4890  
regelson@mac.com

Beth Hart.  
Executive Director  
CoSEIA  
841 Front Street  
Louisville, CO 80027  
303-333-7342  
[director@coseia.org](mailto:director@coseia.org)

**ATTACHMENT – XCEL ENERGY INTERCONNECTION AGREEMENT**



## SMALL GENERATION SYSTEM INTERCONNECTION AGREEMENT (10 kW OR LESS)

### Interconnection Agreement, Terms, and Conditions

This Small Generation System Interconnection Agreement (10 kW or less) (“Agreement”), is made and entered into this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between PUBLIC SERVICE COMPANY OF COLORADO d/b/a Xcel Energy, a Colorado Corporation, having a mailing address of P.O. Box 840, Denver, Colorado, 80201, hereinafter referred to as (“Company”), and \_\_\_\_\_, (“Customer”) whose service address is \_\_\_\_\_, Colorado. Customer’s mailing address is: \_\_\_\_\_.

### WITNESSETH:

WHEREAS, Company is a public utility engaged in the business of generating, transmitting and distributing electric power and energy to various areas in the State of Colorado under the Rates, Rules, and Regulations of the Company’s Electric Tariffs (“Electric Tariffs”) which are on file with and subject to the jurisdiction of the Public Utilities Commission of the State of Colorado (“Commission or PUC”); and

WHEREAS, Customer is interconnected with, and receives electric service from Company’s electric distribution system under the terms and conditions of Company’s Electric Tariffs; and

WHEREAS, Customer owns, operates, and maintains on its premises a Small Generation System with a design capacity rating of 10 kW alternating current (“AC”) or less, by which it generates electric energy from renewable resources, or is a FERC-Qualified Facility (QF), for the Customer’s exclusive use; and

WHEREAS, Customer desires to operate such Small Generation Facility in parallel with the Company’s electric distribution system.

NOW THEREFORE, in consideration of the premises and the mutual covenants and promises of the parties hereto, it is agreed as follows:

#### 1. Definitions.

“Commission” means the Public Utilities Commission of the State of Colorado.

“Electric Tariffs” means the Company’s electric tariffs as in effect and on file with, and approved by, the Commission, as the same may be changed from time-to-time.

The Company expressly retains the right to seek Commission approval to change its tariffs, at its sole discretion.

“Governmental Authority” includes the United States of America, the State of Colorado or any of its agencies or political subdivisions.

“Interconnection Facilities” include the Company’s Interconnection Facilities and the Customer’s Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Small Generating Facility and the Point of Interconnection, including any modification, additions, or upgrades that are necessary to physically and electrically interconnect the Small Generating Facility to the Company’s System. Interconnection Facilities are sole-use facilities and shall not include Distribution Upgrades.

“Small Generating Facility” (SGF) means the Customer’s device for the production of electricity identified in the Interconnection Request, but shall not include the Interconnection Facilities not owned by the Interconnection Customer, as schematically depicted on Attachment A, attached hereto and incorporated herein by this reference.

“System” means the facilities owned, controlled, or operated by the Company that are used to provide electric service under the Tariffs.

“Point of Interconnection” (POI) means the point where the Customer’s Interconnection Facilities connect with the Company’s system. The location of the Point of Interconnection will be determined by the Company in accordance with standard industry practice or as individual circumstances may dictate.

## **2. Service to be Provided.**

Company shall deliver and sell to Customer, and Customer shall receive and purchase from Company, during the term of, and subject to, the provisions of this Agreement, all electric power and energy as may be required by Customer in addition to the electric power and energy produced by the Small Generating Facility. All electric power and energy delivered by the Company to the Customer at the Point of Interconnection shall be paid for by the Customer at the applicable Rates, and subject to the Rules and Regulations in Company’s Electric Tariffs.

## **3. Term.**

This Agreement shall be in full force and effect for an initial period of one (1) year from the date hereof, and shall remain in full force and effect each year thereafter, unless terminated by either party as set forth below.

**4. Facilities Provided by Company.**

Company shall install, own, operate and maintain the electric distribution facilities up to the Point of Interconnection. This policy is applicable to service rendered from either overhead or underground facilities. All such facilities will be installed in accordance with the Company's Line Extension Policy and Rules and Regulations, as contained in its Electric Tariffs.

**5. Facilities Provided by Customer.**

Customer shall, own, operate, and maintain all facilities on the load side of the Point of Interconnection necessary to enable Customer to take and use the electric energy provided by Company in accordance with the Company's Electric Tariffs. Such Customer facilities shall include the generation unit and all appurtenant equipment necessary to own, operate, and maintain the Small Generating Facility. Customer shall provide suitable space on Customer's premises for Company's meters and metering equipment. A utility accessible and lockable switch to disconnect the Generation System must be properly labeled and installed at or near the customer's meter panel and labeled with an engraved yellow placard with permanent adhesive designed for outdoor use to ensure adhesion over time through extreme weather conditions.

**6. No Construction of Facilities.**

No construction of facilities by the Company shall be required in order to accommodate the installation or operation of the Small Generating Facility.

**7. Compliance with Commission Rules.**

Customer shall comply with all specifications and requirements set forth in the Commission's rules regarding "Small Generation Interconnection Procedures" as the same may be revised from time to time.

**8. Design, Construction, Operation.**

Customer is responsible for design, construction, installation, operation, maintainance, and replacement or repair of the Small Generation System and the Customer's Interconnection Facility Equipment so that, at all times, the Customer complies with the Company's "Safety, Interference, Interconnection Guidelines for Co-Generators, Small Power Producers and Customer Owned Generators" as set forth in the Electric Tariffs, as well as all relevant Rules of the Colorado PUC. Customer shall also install, operate, and maintain the Small Generation Facility and Interconnection Facility in a safe manner in accordance with the rules for safety and reliability set forth in the National Electrical Code, other applicable local, state, and federal codes, and prudent electrical practices.

**9. Design Review.**

Customer shall provide the Company an electrical one-line diagram and a relaying and metering one-line diagram prior to completion of detailed designs, unless the Customer is installing a package system that is pre-certified to IEEE 1547.1 and UL 1741 standards. Packaged Systems pre-certified under IEEE Standard 1547.1 and UL Standard 1741 will not require a relaying and metering one-line diagram. The submitted application and diagrams will be processed, reviewed, and acted upon in accordance with the Level 1 Process Rules of the Commission.

**10. Inspection and Testing.**

Prior to parallel operation of the Small Generating Facility, the Company may inspect the Small Generating Facility for compliance with industry standards, the Company's Tariffs, and the Rules and Regulations of the Commission. The Company's inspection may include a witness test and the Company may schedule appropriate metering replacement, if necessary. If the witness test is not satisfactory in the sole judgment of the Company, the Company has the right to disconnect the Small Generating Facility. The Customer shall have no right to operate in parallel until a witness test has been performed, or previously waived in writing by the Company. The Company must complete the witness test within ten (10) business days of receipt of a "Certificate of Completion" by the Customer.

**11. Commissioning Tests.**

Commissioning tests of the Customer's installed Generation System shall be performed pursuant to applicable codes and standards, including IEEE 1547.1. The Company must be given at least five (5) business days written notice, or as otherwise mutually agreed to by the Parties, of the tests and may be present to witness the commissioning tests.

**12. Confidentiality.**

All design, operating specifications, and metering data provided by the Customer shall be deemed Confidential Information regardless of whether it is clearly marked or otherwise designated as such. Confidential Information shall not include information previously in the public domain or required by governmental authorities to be publicly submitted or divulged. All Confidential Information obtained by the Company shall be handled in accordance with Commission Rules and Regulations, except as otherwise agreed in writing by the parties.

**13. No Company Warranty of Small Generation Facility.**

Any approval or acceptance by the Company of Customer's designs, analyses, operating and maintenance procedures, instructions, drawings, specifications, and installation shall not

be construed as confirming or endorsing the design or operation of the Small Generation Facility or as a warranty of its safety, durability, reliability, or fitness for the purpose intended. The Company shall not, by reason of such review or failure to review, be responsible or liable for the Small Generation Facility in any manner, including, but not limited to, the strength, details of design, adequacy, safety, capacity, or fitness for the purpose intended.

**14. Future Design Changes.**

No changes to the Small Generation Facility's Interconnection Facility Equipment shall be made without the prior written approval of the Company. If changes are made without the Company's written approval, the Company may, at its sole discretion and upon reasonable notice to the Customer, require the Customer to conform the Small Generation Facility to specifications set forth in the Company's Electric Tariffs at the Customer's sole expense within thirty (30) days after informing the Customer of the required changes, or the Company may disconnect the Small Generation Facility from the Company's System and terminate this Agreement.

**15. Right to Locate Facilities.**

Customer hereby grants to Company the right to use the premises of Customer for the purpose of providing the Company's System and Interconnection Facilities necessary to connect the Customer's Small Generation Facility to the System, and agrees to provide any required rights-of-way by separate instrument without cost, if so requested by Company.

**16. Access.**

The Company shall have access to the disconnect switch and metering equipment of the Small Generating Facility at all times. The Company shall provide reasonable notice to the Customer when possible prior to using its right of access.

**17. Disconnection.**

The Company may temporarily disconnect the Small Generating Facility upon the following conditions:

**17.1** For scheduled outages per notice requirements in the Company's Tariffs or pursuant to Commission Rules.

**17.2** For unscheduled outages or emergency conditions pursuant to the Company's Tariffs, or Commission Rules.

**17.3** If the Small Generating Facility does not operate in a manner consistent with the provisions of this Agreement, the Company's Tariffs or Commission Rules.

**17.4** The Company shall inform the Customer in advance of any scheduled disconnection, or as soon as is reasonable after an unscheduled disconnection.

**18. Billing and Payment.**

Customer shall reimburse Company for all of the costs that the Company incurs under this Agreement in accordance with the Company's Tariffs on file with the Commission. Company agrees that, when performing or causing to be performed any work for Customer's account, Company will use the same degree of care and diligence in controlling and minimizing the costs of the work it performs as if the work were being performed for the Company's own account. Company shall invoice Customer for reimbursement of the Company's costs, from time to time, as those costs are incurred, but no more frequently than once each month. Payment shall be due within thirty (30) days of the date of the Company's invoice. If payment in full is not made by the Customer within that time, the unpaid balance shall bear interest at the rate of one and one half percent (1.5%) per month. If the Customer is more than ninety (90) days delinquent in reimbursing the Company's costs, Company may, in its sole discretion, terminate this Agreement, in which event the Customer shall be liable for all costs of the Company has incurred to the date of termination of this Agreement. If the Company must bring a legal action to obtain reimbursement of its costs from Customer, Company shall be entitled to recover from Customer its reasonable attorney's fees, expenses, and court costs.

**19. Force Majeure.**

The Company shall not be liable for failure or fault in the delivery of electrical energy to the Customer or for total or partial interruption of service caused by accidents, breakdown of equipment, acts of God, floods, storms, fires, strikes, riots, war, terrorist attacks, sabotage, labor disputes, shortage of materials, the forces of nature, the authority and orders of government, and other causes or contingencies of whatever nature beyond the reasonable control of Company, or which reasonably could not have been anticipated and avoided by the Company.

**20. Indemnification.**

Each party shall save and hold harmless the other party, its officers, employees, agents, affiliates, and subsidiaries from any and all damages, losses, judgments, claims, including claims and actions relating to injury or death of any person or damage to property, demand,

suits, recoveries, costs, and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other party's actions or inactions in performing its obligations under this Agreement on behalf of the indemnifying party, except in cases of gross negligence or intentional wrongdoing by the indemnified party. In the event of concurrent negligence on the part of each party, there shall be contribution in the percentage of each party's respective negligence; and, provided further, that each of the parties hereto shall be solely responsible for injury or damage, wherever occurring, due solely to any defect in equipment installed, furnished, or maintained by such party.

**21. Limitation of Liability.**

Each party's liability to the other party for any loss, cost, claim, injury, liability, judgment or expense, including reasonable attorney fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party from any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever.

**22. Insurance.**

Customer shall, at its own expense, secure and maintain in effect during the term of this Agreement, liability insurance with a combined single limit for bodily injury and property damage of not less than \$300,000 per occurrence. Such liability insurance shall not exclude coverage for any incident related to the subject Small Generating Facility, its installation, maintenance, operation, repair, or replacement. The Company shall be named as an additional insured under the liability policy unless the system is installed on a residential premise and has a design capacity of 10 kW or less. The insurance policy shall include a provision that written notice shall be given to the Company at least thirty (30) days prior to any cancellation or reduction of any coverage. A copy of the liability insurance certificate must be received by the Company prior to the date of interconnection of the Small Generating Facility. The liability insurance shall include as an endorsement to the policy, that the Company shall not, by reasons of its inclusion as an additional insured, incur liability to the insurance carrier for the payment of any premium of such insurance.

Certificates of insurance evidencing the requisite coverage and provision(s) shall be furnished to the Company and attached to this Agreement and appended hereto as an attachment prior to the date of interconnection of the Generation System. The Company shall be permitted to periodically obtain proof of current insurance coverage from the generating customer in order to verify proper liability insurance coverage. Customer will not be allowed to commence or continue interconnected operations unless evidence is provided that satisfactory insurance coverage is in effect at all times.

**23. Termination.**

This Agreement may be terminated by the Customer with thirty (30) days written notice to the Company. In the event Customer terminates this Agreement, the Company shall have a reasonable amount of time to remove its facilities as described in Sections 15 and 16 of this Agreement. This Agreement may be terminated by the Company for non-performance by the Customer under the terms of this Agreement, the Company's Tariff, or for violation of any Commission rule. The Customer shall have thirty (30) days from the date that the Company sends written notice to the Customer to remedy the item of non-performance. Upon expiration of the thirty (30) day remedy period and if the item of non-performance has not been corrected, the Company may terminate this Agreement. Unless terminated early by the Customer or the Company as described in this Article, this Agreement shall terminate when the Small Generation Facility is permanently removed from service or becomes inoperative for a period in excess of one year.

**24. Miscellaneous.****24.1 Governing Law, Regulatory Authority, and Rules**

The validity, interpretation, and enforcement of this Agreement and each of its provisions shall be governed by the laws of the state of Colorado, without regard to its conflicts of law principles. This Agreement is subject to all applicable laws and regulations. Each party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.

**24.2 Amendment**

The Parties may amend this Agreement by a written instrument duly executed by both Parties.

**24.3 No Third-Party Beneficiaries**

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any person, corporation, association, or entity other than the parties hereto, their successors and assigns and the obligations herein assumed are solely for the use and benefit of the parties, their successors in interest and, where permitted, their assigns.

**24.4 Waiver**

The failure of a party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right or duty of, or imposed upon, such party.

Any waiver at any time by either Party of its respective rights relating to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Customer shall not constitute a waiver of the Customer's legal rights to obtain an interconnection from the Company. Any waiver of this Agreement shall, if requested, be provided in writing.

#### **24.5 Multiple Counterparts**

This Agreement may be executed in two or more counterparts, each of which is deemed original but all constitute one and the same instrument. The Parties agree that a facsimile copy of a signature will be deemed original and binding.

#### **24.6 No Partnership**

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the parties or to impose any partnership obligation or partnership liability upon either party. Neither party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other party.

#### **24.7 Severability**

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the parties shall negotiate in good faith to restore insofar as practicable the benefits to each party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

#### **24.8 Subcontractors**

Nothing in this Agreement shall prevent a party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each party shall remain primarily liable to the other party for the performance of such subcontractor.



The creation of any subcontract relationship shall not relieve the hiring party of any of its obligations under this Agreement. The hiring party shall be fully responsible to the other party for the acts or omissions of any subcontractor the hiring party hires as if no subcontract had been made; provided, however, that in no event shall the Company be liable for the actions or inactions of the Customer or its subcontractors with respect to obligations of the Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such party.

The obligations under this article will not be limited in any way by limitation of subcontractor's insurance.

**24.9 Reservations of Rights**

The Company shall have the right to make unilateral filing with the Commission and any other regulatory agency to modify this Agreement with respect to any rates, terms and conditions, charges, classifications of service, rule or regulation under relevant provisions of law, and the Customer shall have the right to make a unilateral filing with such regulatory agency to modify this Agreement; provided that each party shall have the right to protest any such filing by the other party and to participate fully in any proceeding before such regulatory agency in which such modifications may be considered.

**24.10 Jurisdiction.**

All of the rates for electric power and energy supplied by the Company under this Agreement are subject to Company's electric tariff and the jurisdiction, rules, and regulations of the Commission.

**24.11 Notices.**

Notices to be given hereunder shall be deemed sufficiently given and served after receipt of notice sent by United States certified mail, return receipt requested and respectively addressed as follows:

Customer \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_, CO \_\_\_\_\_

Company Xcel Energy  
Manager, Area Engineering  
1123 W. 3<sup>rd</sup> Avenue  
Denver, CO 80223

**24.12 Assignment-Consent.**

This Agreement shall be binding upon and inure to the benefit of the successors and assigns of the respective parties hereto, and shall not be assigned by either party without the written consent of the other party, which consent shall not be unreasonably withheld.

**24.13 Total Agreement.**

Subject to the Company's lawful tariffs, this Agreement, together with its Attachments, represents the entire agreement between the parties relating to the rates, terms, and conditions for electric service provided to Customer by the Company and to electric energy supplied to the Company by the Customer.

**24.14 Binding Effect.**

This Agreement, as it may be amended from time to time, shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives, assigns, affiliates and subsidiaries.

**24.15 Breaches Ongoing.**

All breaches of this Agreement shall be considered ongoing breaches until such breaches are remedied or until there may be a written waiver of the breach by the nonbreaching party.

**24.16 Remedies for Breach.**

This Agreement and the respective rights and duties of the parties are unique and of such a special nature that it is enforceable through the remedy of specific performance and injunctive relief, in addition to any other remedies that may exist at law or in equity.

**24.17 Disputes.**

In the event of a dispute related to this Agreement, including but not limited to a breach of the provisions of the Agreement, the parties shall follow the dispute resolution guidelines set forth in the Commission's Renewable Energy Standards. However, in the event the parties choose not to use the dispute resolution proceeding set forth in the Renewable Energy Standards or the dispute is not resolved under the dispute resolution guidelines, either party may exercise whatever rights and remedies it may have at law or in equity consistent with the the terms of this Agreement. The prevailing party shall be entitled to recover from the nonprevailing party its reasonable attorney



1225 17<sup>th</sup> Street  
Denver, CO 80202

fees, expenses, and costs of any civil legal action brought for the purpose of resolving the dispute or enforcing its rights under the Agreement.

IN WITNESS WHEREOF, the Parties have caused this Interconnection Agreement, Terms, and Conditions Agreement to be executed in their respective names by the proper officers hereunto duly authorized as of the date and year first above written.

**Public Service Company of Colorado  
d/b/a Xcel Energy**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
as authorized agent for Public Service Company of Colorado

\_\_\_\_\_  
Customer Name

By: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_



1225 17<sup>th</sup> Street  
Denver, CO 80202

## ATTACHMENTS

*Small Generation Facility Oneline Diagram*



1225 17<sup>th</sup> Street  
Denver, CO 80202

*Relaying and metering diagram if applicable*



1225 17<sup>th</sup> Street  
Denver, CO 80202

***Insurance certificate***