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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking on the Commission's Own Motion to improve distribution level interconnection rules and regulations for certain classes of electric generators and electric storage resources.	Rulemaking 11-09-011 (Filed September 22, 2011)

ADMINISTRATIVE LAW JUDGE'S RULING SETTING SCHEDULE FOR COMMENTS ON STAFF REPORTS AND SCHEDULING PREHEARING CONFERENCE

As contemplated by the assigned Commissioner's Scoping Memo issued on May 13, 2014, the Commission's Energy Division has prepared the following staff reports: (1) Cost Certainty for the Interconnection Process, and (2) Issues, Priorities, and Recommendations for Energy Storage Interconnection. The staff reports are Attachments A and B to today's ruling.

These staff reports will be the starting point for the evidentiary record on these two topics. If any party would like the Energy Division Staff to conduct a workshop to discuss and explain these reports, that party should contact Jamie Ormond, Jamie.Ormond@cpuc.ca.gov, to request that a workshop be scheduled. Parties may file and serve comments and reply comments on the staff reports pursuant to the schedule below, and a prehearing conference will be held on October 2, 2014, to set any further procedural steps.

EVENT	DATE
Parties request that Energy Division staff schedule workshop on staff reports	Within 10 days of today's ruling
Workshop	To be set by Energy Division staff
Parties file and serve comments on staff reports	September 12, 2014
Parties file and serve reply comments on staff reports	September 26, 2014
Parties meet and confer regarding procedural schedule recommendations	No later than September 30, 2014
Prehearing Conference Commission's Hearing Rooms 505 Van Ness Avenue San Francisco, California	October 2, 2014, at 10:00 a.m.

IT IS SO RULED.

Dated July 29, 2014, at San Francisco, California.

/s/ TIMOTHY J. SULLIVAN for MAB
Maribeth A. Bushey
Administrative Law Judge

ATTACHMENT A

Cost Certainty for the Interconnection Process

Staff Proposal

July 18, 2014

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I. Summary

Providing more certainty in interconnection cost estimation and related Rule 21 interconnection processes remains a critical issue for resolution in Rulemaking (R.) 11-09-011. Providing more cost certainty during the interconnection process is an essential element necessary to accomplish the goals of the proceeding, including timeliness, cost effectiveness, transparency and non-discrimination.

After consideration of several proposals on this topic from parties to the proceeding, Energy Division Staff proposes a hybrid mechanism for improving cost certainty for interconnection customers. This staff proposal combines elements of a joint utility proposal and a process used by the State of Massachusetts, as described herein.

Because more than a year has elapsed since initial proposals from the parties were vetted via workshop and comments, there will be a round of comments on this Staff Proposal. Furthermore, this proposal contains a few additional enhancements to the overall interconnection processes, all designed to increase the predictability of the overall interconnection process.

This proposal is not a decision, and it does not speak for the CPUC. Instead, the review of issues and recommendations is intended to elicit comments in order to inform and help the CPUC make its decisions. If there are errors and omissions in various parts of the Staff document, parties' comments will clarify and improve the record.

Once adopted by the Commission, any changes to Rule 21 that will provide cost certainty for the interconnection process will likely require the utilities submit revised Rule 21 tariffs, and associated Interconnection Agreement documents. A Commission decision on this topic would likely order the utilities to file updated tariff language (in compliance with the decision) as Advice Letters.

II. Statement of the Problem

Providing more certainty in the estimation of the costs associated interconnecting a new facility to the distribution grid is critical. There are a few types of costs that interconnection applications must contend with: (1) interconnection application fees, (2) interconnection study costs, and (c) distribution grid upgrade costs determined by the interconnection studies.

When applicants submit an interconnection application, utilities study the impact that the facility could have on the distribution grid. Based on the studies, the utility provides the applicant with an estimate of the costs associated with the distribution grid upgrades required to interconnect and integrate the facility to the grid at the requested point of interconnection.

The utility determines that distribution grid upgrades needed in part by the export capacity of the facility, the need to mitigate the challenges of intermittent energy exported onto the grid, and the requirement to maintain safe and reliable electricity delivery to all customers. The applicant is required to fund the cost of the upgrades under the logic that the entity triggering the need for distribution system upgrades is required to pay for the upgrades.

Interconnection applicants are studied serially based on when an interconnection application is submitted and deemed complete. Facilities interconnected early on do not always trigger upgrades. Only when the distributed energy penetration surpasses a threshold does the next generating facility trigger the

need for upgrades. Once the distribution upgrades are performed, the next applicants can take advantage of the increased capacity and additional projects will not trigger upgrades until the next threshold is reached.

As a result of the serial study process, when an applicant in the interconnection queue triggers upgrades but withdraws, changes project specifications, or delays, those choices affect project but also later queued projects already involved in the interconnection process. Any interconnection process changes made by an applicant with interconnection upgrades associated with the project can have a ripple effect on later queued applicants.

Applicants with facilities that do not fit Net Energy Metering program eligibility apply to interconnect the facility using either the Fast Track interconnection process[1] or the Detailed Study Interconnection Review Process[2]. Both Fast Track Process and Detailed Study Process Review require that interconnection applicants make payments to the utility at every step in the interconnection process: pay an interconnection application fee, pay for study expenses, and pay for costs associated with distribution grid upgrades and the construction process. Payments must be made prior to the commencement of the study process or the construction process.[3] These pauses in the process for the exchange of a cost estimate and payment increase timing uncertainty for the applicant and later queued applicants.

Similarly, if an applicant makes project modifications mid-interconnection process, these modifications can trigger the need to restudy the impacts of the facility on the grid which can also change estimated upgrade and construction costs. Modifications can add additional time and uncertainty to the process for the project at issue as well as later queued projects.

Interconnection process cost uncertainty also accrues because a project can be studied by different personnel at the same utility, and by different groups at the same utility. Different people and different groups come up with different associated costs because they use different assumptions and study methodologies. Conversations between applicant and utility at the Interconnection Agreement phase can result in lower or higher cost estimates as a result of in depth negotiations.

Cost estimate changes and time delay uncertainties create uncertainty in an applicant's ability to plan a business. Moving through a complex process without being able to communicate cost certainty to collaborating parties increases project costs all around. These increased project costs potentially are negatively impacting ratepayers who, as off takers in a PPA, may end up paying higher energy costs resulting from this uncertainty.

A project applicant with a signed Interconnection Agreement, with agreed-to distribution upgrade costs find that the utility can issue additional charges in the middle of construction. The utility can halt construction until payment is received without disclosing any reasoning in written communications for the change in cost estimate. This type of experience leads to confusion, delays and frustration.

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[1] Rule 21 Sec. F.2.

[2] Rule 21 Sec. F.3.

[3] And when construction runs off course mid construction process, the utility will present an updated cost estimate and halt work until the new payment is received.

After grid upgrades are complete and the facility interconnected, often the difference between the cost estimate and the actual costs results in a refund to the applicant.

The utility, on the other hand, is not negatively affected when a project fails to interconnect at a known price in a timely manner.

In summary, distribution grid upgrade cost estimates can fluctuate greatly throughout the interconnection process due to a variety of factors, such as:

- Changing grid conditions,
- Project modifications,
- Decisions made by prior-queued project developers,
- Estimates derived using differing methodologies, made by different personnel using different assumptions, by different utility groups using different methodologies, and
- Issues that crop up during the construction process leading to mid-construction unexpected expenses.

The above factors contribute to the likelihood that the initial distribution grid upgrade cost estimate differs from the final (trued-up against actual costs) cost of interconnecting a new facility onto the distribution grid.

The interconnection process, however, can work more smoothly as demonstrated by Net Energy Metering (NEM) eligible facilities requesting interconnection services. The biggest difference between the process as described above and the process that enables NEM eligible facilities to easily interconnect to the grid is that costs have been removed from the interconnection process under the NEM program creating a frictionless process. Please note, this document does not remove cost responsibility for interconnection applicants. The use of NEM program eligible facilities and the ease by which they access interconnection services is to be seen as illustrative.

Small distributed energy systems that qualify under the Net Energy Metering program are exempt from the costs associated with the interconnection process. Applicants of NEM eligible facilities do not pay costs associated with: application fees, study expenses, and costs associated with distribution grid upgrades triggered by NEM eligible facility installations.[4] The NEM program inoculates NEM eligible

4 Public Utilities Code 2827 (e) established that utilities should process an interconnection request within 30 days. PU Code 2827(e) reads: (e)(1) Every electric utility shall ensure that requests for establishment of net energy metering and net surplus electricity compensation are processed in a time period not exceeding that for similarly situated customers requesting new electric service, but not to exceed 30 working days from the date it receives a completed application form for net energy metering service or net surplus electricity compensation, including a signed interconnection agreement from an eligible customer-generator and the electric inspection clearance from the governmental authority having jurisdiction. (2) Every electric utility shall ensure that requests for an interconnection agreement from an eligible customer-generator are processed in a time period not to exceed 30 working days from the date it receives a completed application form from the eligible customer-generator for an interconnection agreement. (3) If an electric utility is unable to process a request within the allowable timeframe pursuant to paragraph (1) or (2), it shall notify the eligible customer-generator and the ratemaking authority of the reason for its inability to process the request and the expected completion date.

With the exception in customer interconnection demand spikes, the utilities have generally been in compliance with these timelines for Net Energy Metering customers. Once the utilities receive a complete interconnection application, they can

Footnote continued on next page

facility applicants from the rule that the triggering applicant pays for the associated interconnection costs. As a result of this program, the NEM eligible applicant need not pay money to the utilities in order to move a facility through the interconnect process. Instead, the utilities run the NEM eligible facility through all of the standardized study screens without stopping, without negotiating and collecting money, just enabling the interconnection process to move quickly from application to the completion of the interconnection process.[5] This frictionless movement through the interconnection process should be achieved for all interconnection types.

Outside of the NEM program, utilities will not move interconnection process forward until the Fast Track or Detailed Study Review applicant pays for utility created cost estimates. Often, the applicant questions the utility about the cost estimates. Those conversations and meetings cause delays and inefficiencies (process breakdowns) in the interconnection process for the applicant and future queued applicants.

Mid-process process breakdowns caused by cost estimate changes are not felt by NEM eligible facility applicants. As a result of this cost-related lack of process certainty in the interconnection process, *all applicants* push to have their facilities eligible under the NEM program and avoid cost-related discussions throughout the interconnection process which cause inefficient delay and frustration.

Under the proposals presented herein, staff expects that there will be improved cost certainty that can help level the playing field between utilities and prospective project applicants and mirror the frictionless interconnection process enjoyed by NEM program eligible applicants. This proposal includes components that will establish new ground rules for assessing and charging distribution grid upgrade costs. Entities that trigger needed upgrades will still be responsible for paying these costs, under this proposal. The utilities, however, will no longer be inoculated against the effects of the financial uncertainty created by their uncertain cost estimates that result from various changing circumstances.

Adopting a more predictable and enforceable methods for utility cost estimation will further the proceeding's goals of achieving increased timely, cost effective, transparent, and non-discrimination interconnection policies and procedures. Achieving these goals will help the State achieve its aggressive renewable energy and climate reduction related goals.

III. Procedural Background

The Commission adopted Order Instituting Rulemaking (OIR) on distribution level interconnection rules on September 22, 2011 (referred to as the Interconnection rulemaking or R.11-09-011). The Interconnection rulemaking seeks to ensure that the interconnection process is timely, non-discriminatory, cost-effective, and transparent.[6]

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interconnect the system quickly. The utilities have not faced any monetary penalties for failing to meet the 30 day timeframes envisioned by PU Code 2827(e).

[5] NEM eligible facilities can interconnect to the grid, from application to completion, in less than a week.

[6] Order Instituting Rulemaking (OIR), 11-09-011, September 27, 2011.

Phase II of the Interconnection Proceeding made headway towards stabilizing interconnection costs by creating a Distribution Group Study Process (DGSP) so that project applicants looking to interconnect a project in the same electrical area could share grid study and upgrade costs among the group. As a result of D.14-04-003, April 10, 2014, projects requesting interconnection services in the same electrical area will be studied together in a group. The DGSP mirrors the cluster study used under the FERC jurisdictional Wholesale Distribution Access Tariff (WDAT) interconnection process. Hopefully, the Rule 21 DGSP will enable a more equitable division of distribution grid upgrade costs among triggering facilities in a group.[7] Energy Division staff has also worked with the utilities to create an Interconnection Quarterly Report, and generally investigate the interconnection processes.[8]

For participants that will not end up in a distribution group, the Phase II Amended Scoping Memo asked parties to comment on the implementation of interconnection cost certainty and submit potential proposals.[9] Stakeholder proposals on the implementation of interconnection cost certainty were submitted to the record on October 25, 2012. A Cost Certainty workshop to discuss the proposals was held on March 5, 2013.

IV. Summary of Staff Proposal

Energy Division staff proposes a cost certainty regime for the interconnection process. As a result of the Rule 21 Revision, distribution grid interconnection projects apply to either of two interconnection processes: smaller projects apply to the Fast Track process[10], and larger, more complicated projects follow the Independent Study Process[11], one of the three types of Detailed Study Interconnection Review.[12] Each of these processes requires the imposition of cost certainty but each would benefit from a different approach. Hopefully, the Distribution Group Study Process (DGSP) will introduce some aspects of cost certainty into the interconnection process for projects being studied as a group in a similar electrical area because projects studied in the same group will divide the grid upgrade costs among group members.[13]

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[7] For more information, please see: http://www.pge.com/mybusiness/customerservice/nonpgeutility/generateownpower/egi/; https://www.sce.com/gridinterconnection; http://www.sdge.com/generation-interconnections/electric-rule-21.

[8] Public versions of the Quarterly Interconnection Data Report can be found at: http://www.cpuc.ca.gov/PUC/energy/Procurement/LTPP/rule21.htm.

[9] Assigned Commissioner's Amended Scoping Memo and Ruling Requesting Comments, September 26, 2012.

[10] Rule 21 Sec. F.2. The eligibility threshold for generators is 3 MW in PG&E and SCE territory and 1.5 MW in SDG&E territory. Rule 21 Sec. E.2.b.i: Interconnection Request Submission Process, Fast Track Eligibility.

[11] Rule 21 Sec. F.3.d.

[12] Rule 21 Sec. F.3.: The Detailed Study Interconnection Review Process describes a more detailed look at the impact that a facility may have on the grid using two study processes: a System Impact Study and then a Facilities Study. A facility can go through these two studies independently, under the Independent Study Process (ISP), in a group under the Distribution Group Study Process (DGSP), or with facilities that impact the transmission grid under the Transmission Cluster Study Process. All three study processes include two steps – the system impact study and then the facilities study.

[13] D. 14-04-003, April 10, 2014. The first Distribution Group Study Process application window will open on September 15, 2014. For more information, please see: http://www.pge.com/mybusiness/customerservice/nonpgeutility/generateownpower/egi/; https://www.sce.com/gridinterconnection; http://www.sdge.com/generation-interconnections/electric-rule-21.

The Joint Proposal submitted by Pacific Gas and Electric, Southern California Edison and joined by San Diego Gas and Electric offered a cost certainty option for Fast Track Projects only. The Joint Proposal did not address the projects that applied to the Independent Study Process under Detailed Study Review. Several of the other submitted proposals could be applied to all projects in both interconnection processes or just projects that interconnect using the Independent Study Process under Detailed Study Review.

Energy Division staff recommends adopting a hybrid approach to imposing cost certainty onto the interconnection process by incorporating two proposals, one for Fast Track Process projects and another for Independent Study Process projects under Detailed Study Review.

For Fast Track Projects, the Commission should accept the utilities' joint proposal with a few modifications to streamline the process across all three utilities.

For all of the projects that attempt to interconnect to the distribution grid using the Independent Study Process under Detailed Study Review, the Commission should consider adopting the State of Massachusetts' process instituting a cost limitation on utility-created interconnection distribution grid upgrade cost estimates.[14] California can mirror Massachusetts' process by instituting rules that an interconnection customer will not be held responsible for any increases in distribution grid upgrade costs triggered by an interconnection project that exceed the utility engineer generated estimate by more than 10 percent.[15] In Massachusetts, all costs that exceed the 10 percent limit are borne by utility shareholders, not ratepayers, thus preventing cost shifting. This cost limitation has successfully been employed in the State of Massachusetts since 2005. The intent of setting a limit is to reduce the instances when negotiations over new cost estimates appear mid-interconnection process and lead to delays and inefficiencies that affect the applicant and later queued applicants.

A few areas in the proposal require slight modification to ensure harmonization across all utilities:

1. Ensure that all of the Joint Proposal definitions are the same across all of the utilities.
2. Provide utilities with a cost limitation waiver mechanism for new technologies not yet interconnected to the distribution grid via written request to Energy Division.
3. Institute a system of utility penalties for instances where utilities fail to proactively resolve interconnection issues pursuant to Commission designated timelines delineated in Rule 21.
4. Create an Advanced Interconnection Consultation team, potentially outside of the Rule 21 process, to encourage developers and cross-functional utility personnel to collaboratively and pro-actively plan the interconnection of a new project, promote

[14] Massachusetts Standards for Interconnecting Distributed Generation, D.P.U. 09-03-A, Exhibit E, Detailed Study Agreement at Section 7. The State of Massachusetts' cost limitation was adopted in 2005 and detailed in conversations with the Massachusetts PUC, is now part of the utility culture.

[15] "Adopting a cost cap on estimates provided to interconnection customers provides the utilities with a buffer for any unexpected upgrades that may arise subsequently due to revised study results of later queued generators, but also provides sufficient certainty to developers to enable them to evaluate their true cost exposure." Comments of the Interstate Renewable Energy Council, Inc. on Amended Scoping Memo and Ruling Requesting Comments, October 25, 2012, p. 8.

smooth passage through the interconnection process and signify the movement to collaborative interconnection between utilities and developers.

V. Options for Consideration

The utilities filed their Joint Proposal for Fast Track Projects [Joint Proposal] on January 18, 2013. The proposals discussed at the workshop included the Joint Proposal, the Interstate Renewable Energy Council's (IREC) Fixed Cost Proposal, the Massachusetts Model described by IREC, and a Cost Decoupling Process from the Clean Coalition.

a. IOU Joint Cost Certainty Proposal

The utilities' Joint Proposal targeted only Fast Track projects in their cost certainty proposal since Fast Track projects do not generally trigger significant distribution grid upgrades due to the small size of fast track projects.[16] The Joint Proposal attempted to approach cost certainty in a way that would not result in cost shifting, and would promote the interconnection of projects with the lowest overall interconnection costs.

If a Fast Track project does trigger a distribution grid upgrade, those upgrades are often less expensive and less significant than non-Fast Track Projects. Fast Track projects that do not require significant upgrades are easier to estimate accurately.[17]

The utilities proposed to offer Fast Track interconnection applicants the option to pre-purchase a fixed distribution grid upgrade cost estimate that would not change if a) the applicant chooses to interconnect in a "low impact area" on the electrical grid, b) the applicant provides additional site and project information upfront, and c) the applicant pays an additional fee which would allow the utility to determine the fixed price.

The proposal would require the applicant to confirm the facility configuration, detail the final point of interconnection, point of change of ownership, request service voltage, and size and type of generating facility up front.[18] The proposal excludes the costs triggered by environmental studies and related mitigation.[19] Finally, if there is any difference in estimated and actual costs, the utilities propose to true up the difference in customer rates through the normal General Rates Case capital work order process.[20]

The general rule of thumb regarding interconnection costs says that smaller projects located in load centers and near to substations require fewer distribution grid upgrades resulting in smaller

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[16] Rule 21 Sec. E.2.b.i: Interconnection Request Submission Process, Fast Track Eligibility. The eligibility threshold for generators is 3 MW in PG&E and SCE territory and 1.5 MW in SDG&E territory.

[17] Joint Proposal, January 18, 2013, p. 3.

[18] Joint Proposal, January 18, 2013, p. 6.

[19] *Ibid*, p. 5.

[20] *Ibid.* p. 6.

interconnection upgrade costs. The smaller expense should entice the applicant to utilize the Fast Track interconnection process. And since there is less variability in Fast Track interconnection projects that in larger projects, Fast Track project costs are simpler to estimate and create a cost that does not change.

This proposal indicates that the utilities are capable of making accurate and unchanging interconnection upgrade cost estimates. However, this cost certainty proposal only applies interconnection requests for the simplest of projects – those that trigger no further study of substantive grid upgrades. Larger or more complicated projects do not receive any benefits from this cost certainty proposal.

b. IREC Fixed Cost Proposal

IREC proposed a cost certainty strategy whereby a methodology, based on available data, would be created to determine a fixed cost system applicable to generators with an interconnection location within 2.5 miles of a substation.[21]

IREC proposed that the Commission consider adopting a strategy that would drive applicants towards low cost areas. IREC proposed that a pre-determined, fixed per-kW fee for generator interconnections occurring in lower cost locations on the distribution system based on historical data. A balancing account could absorb any interconnection costs over or under the portion assigned to a project in a study based on the IREC proposed per-kW fee.[22]

Sustainable Conservation also proposes that the utilities publish a set of average interconnection costs based on analyzing prior interconnection studies performed, benchmarking, and creating cost categories or ranges.[23] Sustainable Conservation wants to remove the need for studies to provide a detailed price for every interconnection application to decrease the inefficiency of the interconnection process. An Interconnection Rate Schedule increases predictability of the interconnection process and even if an applicant does not end up paying the "actual" costs," each applicant contributes a fair share to the process such the ratepayer is not subsidizing interconnection.[24]

This proposal's strength lies in its relative simplicity. However, to make this regime workable, it would require analysis of data that, to date, has not been produced by the utilities despite persistent prodding by multiple interested parties.[25]

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[21] Comments of the Interstate Renewable Energy Council, Inc. on Amended Scoping Memo and Ruling Requesting Comments, October 25, 2012, p. 4.

[22] *Ibid.*

[23] Sustainable Conservation, Comments in Response to Ruling Requesting Comments, October 25, 2012, p. 3.

[24] *Ibid,* p. 5.

[25] In the utilities' Joint Proposal, SCE notes that projects that trigger significant upgrades do not choose to execute interconnection agreements which is why SCE cannot determine whether its estimated costs are accurate against its actual costs. Joint Proposal, January 18, 2013, p. 3.

The proposal also does not appear to make allowance for energy storage, which has very different impacts on the grid than generation. In addition, any fixed cost certainty regime based on a fixed per-kW risks shifting costs from the applicant to the ratepayers while shielding utilities.

c. Cost Envelope (Massachusetts model)

IREC alternatively suggested modeling a cost certainty regime for higher costs areas after the successful interconnection process used in the State of Massachusetts.[26] In Massachusetts, the utilities provide a cost estimate to the customers following completion of their final interconnection studies. The rules then provide that the customer cannot be held responsible for any increases in cost that exceed the original estimate by more than 10%. The exact language of this rule can be found in the Detailed Study Agreements applicants and utilities sign in the State of Massachusetts. [27]

This limitation relieves the interconnection customer from responsibility for upgrade expenses that exceed the utility created estimate by a buffer amount of 10%.

This proposal appears simple to execute. It places the onus for a proper interconnection upgrade cost estimate on the shoulders of the utility engineer, where is currently resides. It enables the applicant to rely on the cost estimate provided by the utility.

The rule in Massachusetts provides utilities with a buffer for additional upgrade costs (no more than 10% additional costs) that may arise after the interconnection cost estimate is finalized. At the same time, when applicants receive their interconnection cost estimate, the applicant receives the cost certainty that it and its financial backers are looking for from a contracting partner such that all parties may make project viability decisions based on the bounded cost of interconnection upgrades associated with the project. This cost envelope provides the interconnection customer and the utility with greater cost certainty in the interconnection process via a mechanism.

Ratepayers do not assume risk as a result of this proposal (there is no cost shifting from developers to ratepayers) because the utility shareholders (not the utility ratepayers) are responsible for the costs if the costs ultimately exceed 10% of the estimate.[28] This proposal holds the utility responsible for ensuring accurate cost estimates since the utility is in the best position to interpret their own proprietary distribution grid data and plan for the distribution grid upgrades required to accommodate a new facility

[26] Comments of the Interstate Renewable Energy Council, Inc. on Amended Scoping Memo and Ruling Requesting Comments, October 25, 2012, p. 7.

[27] Massachusetts Standards for Interconnecting Distributed Generation, D.P.U. 09-03—A, Exhibit E.

[28] Comments of the Interstate Renewable Energy Council, Inc. on Amended Scoping Memo and Ruling Requesting Comments, October 25, 2012, p. 7.

d. Clean Coalition Cost Decoupling Proposal

The Clean Coalition contends that standardized interconnection pricing should be available without detailed engineer-conducted studies, rather, a standardized pricing scheme should be used.[29] Instead of the "per unit cost guide" pricing scheme available to transmission interconnection customers, the Clean Coalition posits that "per configuration cost guides" should be developed with the configurations representative of common distribution grid upgrades. Alternatively, the Clean Coalition offers a cost averaging scheme based on the "aggregate coincident available load penetration at the line segment" via a formula for each kW of added capacity per application:

Figure 1. *Clean Coalition proposal for averaging distribution-grid interconnection costs.*

Aggregate Resulting Generation vs. Load:	5%	10%	15%	25%	50%	80%	90%	>90%
Average Cost per kW:	$x_1	$x_2	$x_3	$x_4	$x_5	$x_6	$x_7	$x_8

[30]

The Clean Coalition recognized that its simple DG penetration ratio might is not a perfect measurement, but offered the option as a way to start making reliable cost information available to interconnection applicants earlier in the process. The Coalition stated that if reliable cost information was available earlier in the interconnection process, non-viable projects would drop out of the process.

The problem with relying on a data-driven scheme for cost certainty is that the utilities have not produced enough data about the costs of actual interconnection from which to devise a reliable methodology. To develop the Clean Coalition's proposal to an implementable scheme, Staff understands that we would need actual data about interconnected projects. However, the utilities have not analyzed their own data in a comprehensive manner or provided Staff with cost data for complete interconnections that could be used for this formula. The recent changes to Rule 21 and the small number (and unique nature) of projects completing interconnection since the Rule 21 reforms has impeded utility presentation of data, but Staff does not fully understand whether this reason or other reasons are the barrier to utilities providing additional analyzable data.

If utilities can provide historical data on interconnection costs, it may be possible to further refine this Clean Coalition proposal and to implement it via this proceeding.

Applicants and utilities would benefit from a simple, straight forward approach to assessment and payment of interconnection costs. Ratepayers might need to bear some risk if the cost charges were consistently under charging such that the total cost of all interconnections exceeded the total amount paid by all applicants. Overtime, as more data and experience is available, these costs could be revised up or

[29] Clean Coalition Revised Comments on Amended Scoping Memo, October 29, 2012, p.8.

[30] *Ibid.* p. 9.

down to closely align with actual costs prior to that time. Additionally, a refund scheme for cancelled projects would need to be developed.

VI. Discussion

Imposing a cost certainty regime into the interconnection process should not become synonymous with either a no cost or a low cost interconnection process. Nor should instituting cost certainty shift costs outside of the utility and applicant binary. Imposing cost certainty into the interconnection process increases efficiency of the entire process by preventing mid-process haggling over new costs estimates, revised costs estimates, and resulting halts in interconnection process performance. The proposals on the record exhibit both strengths and weaknesses but overall mean to achieve a more productive interconnection conversation between applicant and utility. Most importantly, as the State of California moves towards interconnecting the waves of procured storage facilities, any proposal must be technology neutral and generally applicable.

In order to capture the strengths of the proposals and compensate for weaknesses, Staff recommends adopting a hybrid approach to resolving the cost certainty issue which draws mainly on aspects of the Joint Proposal to be applied to Fast Track projects, and the Massachusetts Model for more complex applications.

VII. Staff Proposal

The Staff proposal is based on recognition of the principle that underlies existing Interconnection application processing: simpler projects with little or no impacts should be afforded a streamlined application and review, while more complex projects require a somewhat more complex approach. In both cases, however, applying cost-certainty to the studies, cost estimates and construction process should be done in a reasonable manner without undue cost shifting.

By removing cost as a barrier to the interconnection process, the integrity of the interconnection process will be bolstered, the inefficient cost conversations that cause undue delays mid-interconnection process will be removed, and the goals of the Interconnection Rulemaking will be within reach.[31]

a. Proposal Part A: Fast Track Projects

Under the Joint Proposal, in order to receive the fixed distribution upgrade cost estimate, the applicant must complete three steps: 1) choose to receive a fixed price for their Fast Track project in their interconnection application, 2) provide utility engineers additional site and project information, and (3) pay a fixed fee allowing the utilities to determine the fixed distribution grid upgrade cost for the project.

[31] This proposal is *not* proposing a Net Energy Metering- type program that *waives* interconnection costs. Costs will be paid. The proposal wants the interconnection process to mirror the frictionless interconnection process enjoyed by NEM eligible facilities which do not need to stop mid-process to haggle over costs and instead pass right through the study process and sign interconnection agreements.

Energy Division Staff endorses the utilities' Joint Proposal for establishing cost certainty for projects that can successfully pass through the Fast Track process, with the following harmonizing modifications to ensure standardization across utilities and to provide sufficient information to the Commission to measure success of the program.

a. Rule 21 Tariffs should be modified to have harmonized definitions, terms and conditions as they pertain to this proposal. For example, the definition of "low impact area" should be the same across all IOU service territories. The additional information required to receive a fixed cost should also be standardized across all utilities.

b. Rule 21 cost estimates and actual costs should be reported by the utilities in their reporting to the CPUC. Utilities should institute a reporting mechanism that documents cost estimates, estimate changes, and actual costs incurred in the interconnection process. These reports should be included in the Interconnection Quarterly Report that is submitted to the Commission. Cost estimates and final costs presented to applicants for payment should include a breakdown of major cost categories.

c. Applicants should select the option for a Fixed Price for a Fast Track Interconnection as part of interconnection application. This price will not change throughout the interconnection process.

d. The fee to receive a fixed cost estimate should be set at $0. It is not clear that there needs to be a fee.

b. Proposal Part B: Non-Fast Track Projects

For projects that seek interconnection services outside of the Fast Track process, Staff proposes that the Commission adopt a modified version of the Massachusetts cost certainty process to ensure that all projects accessing interconnection services receive cost certainty.

In the State of Massachusetts, when utilities provide cost estimates to customers following the completion of their final interconnection studies, the customer is not held responsible for any increases in grid upgrade costs that exceeded the estimate by more than 10%. The exact language can be found in the Detailed Study Agreements applicants and utilities sign in Massachusetts.[32]

This cost envelope provides utilities with a buffer for addition upgrade costs that arise subsequent to the project's study process while also providing the interconnection applicant with greater cost certainty earlier in the interconnection process.

[32] Massachusetts Standards for Interconnecting Distributed Generation, D.P.U. 09-03—A, Exhibit E.

In addition, Staff proposes these modifications to the Massachusetts model to make the process run more smoothly:

i. Allowing the utilities an ability to request a waiver of the non-Fast Track Project cost limitation in cases where both it and the applicant can agree on a revised cost estimate for necessary upgrades for novel projects or technologies that exceed the 10 percent buffer, after the initial estimate has been incorporated into the agreement. This request, in writing to the Director of Energy Division must be received within 20 calendar days of discovering this cost issue. The waiver request should detail and describe the challenges and proposed solutions associated with interconnecting the new technology. Utilities should only be allowed to petition for the removal of the limitation due to a new technology up to three times.

ii. Utilities face monetary penalties for failure to proactively resolve interconnection issues proactively and in a timely manner.

iii. Establish an Advanced Interconnection Consultation process for all non-Fast Track projects which, will allow for a consultation with utility specialists who can work with applicants to derive solutions for novel interconnection problems. The fundamental principle should be that the utilities and applicants work together to develop a plan to ensure grid interconnection in a timely fashion, and that lessons learned from each new interaction be applied to subsequent applications.

iv. Require tracking and reporting on all Interconnection Costs.

v. All interconnection related documentation and forms should be received via an internet-based submission channel. All application materials should be received digitally to ensure the integrity of data and maximum interconnection process efficiency. All interconnection status information should be able to be checked by applicants electronically. The Interconnection Application and a corresponding process diagram should be posted prominently on the interconnection websites of the three utilities. The internet portal should be easily accessible and intuitive.

vi. Make distribution grid data transparent and accessible so that third parties can assist in the distribution grid study and optimization process.

VIII. Conclusion

Imposing cost certainty into the interconnection process is a necessary step to improve Rule 21. With the imposed cost certainty regime for both Fast Track projects and larger, more complicated projects, the State of California is placing its trust in the capabilities of utility engineers to understand the electrical environment of the distribution grid and enable new facilities to be integrated into the distribution grid. By providing a frictionless interconnection process, the ability to transform the California distribution grid to support the increased use of distributed technologies will advance the key goal of reducing greenhouse gas emissions.

Conversations and collaboration between utilities and applicants will increase as the distribution grid opens to greater participation by third parties and customers making energy consumption choices.

Permitting the interconnection process to change the character of the distribution grid without mid-process cost estimate-related breakdowns, change will occur more smoothly and in a more streamlined fashion.

Parties should use a numbering (outline) system that mirrors this document when filing comments and reply comments in this proceeding. Although occasionally explicitly stated, the idea that "Parties should comment on the issues mentioned herein." is implicit throughout the entire document. Additional or omitted issues may be added to the end of each related section, so long as they are within the scope of the proceeding. Please provide draft tariff language where applicable and appropriate.

(END OF ATTACHMENT A)

ATTACHMENT B

Issues, Priorities and Recommendations for Energy Storage Interconnection

Staff Proposal

July 18, 2014

I. Summary

This document outlines the issues that need to be addressed in the interconnection process to modify Electric Tariff Rule 21 to reduce barriers to deployment and integration of energy storage facilities in support of the policies of the State of California.[1] The goal of the California Public Utilities Commission (CPUC) Interconnection Proceeding, Rulemaking (R.) 11-09-011, is to promote timely, non-discriminatory, cost-effectively, transparent interconnection of new facilities to the grid.[2] The purpose of this document is to identify storage-related interconnection issues, to establish a prioritization of these issues and to establish an initial record for consideration within the Rule 21 Rulemaking.

The topics to be addressed may require tariff modification and/or changes to utility interconnection processes. This document will support the development of a record about the following topics: the establishment of a storage safety plan; standardizing the storage interconnection terms and concepts for insertion into the definitions section of Rule 21; identifying the Fast Track threshold and Fast Track study screens applicable to energy storage; and discussing other identified aspects of the interconnection process that require further refinement in order to achieve the goals of the proceeding.

This proposal is not a decision, and it does not speak for the CPUC. Instead, the review of issues and recommendations is intended to elicit comments in order to inform and help the CPUC make its decisions. If there are errors and omissions in various parts of the Staff document, parties' comments will clarify and improve the record.

II. Background

In 2010, California Assembly Bill 2514 (Skinner, 2010) opened the door for energy storage in California, stating that utilizing energy storage systems could help with grid optimization, the integration of distributed generation resources as well as reduction of greenhouse gas emissions.[3]

The CPUC determined, in R.10-12-007, that it is appropriate to set energy storage procurement targets for each investor owned utility, and identified a lack of appropriate interconnection policies as one of the major barriers toward the deployment of storage.[4] In 2013, the CPUC adopted an energy storage procurement framework and established a target of 1,325 MW of energy storage to be procured by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas

[1] The recent California Public Utilities Commission Decision 13-10-040, October. 17, 2013, set storage goals for the utilities.

[2] Order Instituting Rulemaking 11-09-011, September 27, 2011.

[3] Bill 2514. (Skinner, 2010)

[4] Staff Phase 2 report and proposals in R. 10-12-007, p. 25.

and Electric Company (SDG&E) by 2020, with solicitations starting in December 2014 and installations required no later than the end of 2024.

Separately, in the Long Term Procurement Plan (LTPP) proceeding, the CPUC directed to SCE and SDG&E to procure a minimum of 50 MW and 25 MW of storage, respectively, for Local Capacity Reliability needs. SDG&E is seeking approval for its storage procurement framework, as required by D.13-10-040, the CPUC's Decision adopting the energy storage framework and design program.[5]

The interconnection process has been identified as a barrier to integrating storage facilities into the grid despite procurement and policy intentions.[6] This document addresses a number of the interconnection issues that should be investigated to determine how CPUC jurisdictional Electric Tariff Rule 21 could be updated to streamline interconnection of storage facilities to the distribution grid.

The California Independent System Operator (CAISO) is responsible for Federal Energy Regulatory Commission (FERC) jurisdictional interconnection tariff called the Wholesale Distribution Access Tariff (WDAT).[7] The WDAT and Rule 21 interconnection are substantially similar to ensure compatibility between federal and state interconnection processes.[8]

The CAISO, in collaboration with the CPUC and the California Energy Commission (CEC), is concurrently developing a Storage Roadmap to assist in formally delineating the proper jurisdiction to resolve a number of cross-jurisdictional storage and interconnection related issues.[9] CAISO has also opened a Storage Interconnection stakeholder process to ensure that storage-related interconnection issues at the transmission and wholesale level are addressed.[10] Topics such as the lack of an applicable tariff enabling behind the meter storage facilities to directly access a future CAISO market, identification and valuation of storage services, and Rule 21 to WDAT interconnection request changeover issues should be taken into account and harmonized along the way.[11]

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[5] A. 14-02-006.

[6] R. 10-12-007, p. 7: the Order Instituting Rulemaking pursuant to Assembly Bill 2514 to consider the adoption of procurement targets for viable and cost-effective energy storage systems.

[7] The three Investor Owned Utilities (IOUs) use different titles for their FERC-jurisdictional tariffs. SCE and SDG&E use "Wholesale Distribution Access Tariff" and PG&E uses "Wholesale Distribution Tariff." This document will refer to these tariffs as "WDAT."

[8] D. 14-04-003, April 10, 2014, p. 31; D. 12-09-018, Sept. 13, 2012, p. 35-36 & COL #4 p. 59.

[9] For more information, please see: https://caiso-hc21.accellion.net/.

[10] For more information, please see: http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorageInterconnection.aspx.

[11] For more information on the CAISO Roadmap efforts, see: http://www.caiso.com/informed/Pages/CleanGrid/EnergyStorageRoadmap.aspx.

The Interconnection Rulemaking, R.11-09-011, was launched in September of 2011 to review the rules and regulations governing interconnecting generation and storage resources to the electric distribution systems, embodied in Rule 21.[12]

Four goals of the proceeding were described in the Order Instituting Rulemaking document:

- To review, and, if necessary, revise, Rule 21 to ensure that the interconnection process is timely, non-discriminatory, cost-effective, and transparent;
- To incorporate processes appropriate for new technologies, such as energy storage;
- To revise Rule 21 to ensure compliance with certain statutory obligations, such as those contained in Pub. Util. Code § 399.20(e); and
- To provide a procedural forum for then-pending settlement efforts to address matters related to Rule 21. The Revised Rule 21 Settlement was approved by the Commission in 2012.[13]

The CPUC advanced these goals in adopting the Revised Rule 21 Settlement in 2012 in D.12-09-019, September, 13, 2012, which updated Rule 21 for the modern era. More recently, the CPUC focused on streamlining the application process for interconnection applicants seeking interconnection services in the same electrical area by developing a Distribution Group Study in D.14-04-003.[14] This process will hopefully allow for more equitably sharing of interconnection costs across multiple projects in the same electrical area.[15]

Furthermore, the CPUC has ordered the utilities to commence interconnection process data reporting, quarterly, to improve everyone's understanding of the interconnection process.[16] This report is still in the development process.

Finally, the CPUC is committed to enabling smart inverters to assist with the integration of distributed generation on the distribution grid. The Smart Inverter Working Group's Phase I autonomous inverter functionalities recommendations have been integrated into a draft Rule 21.[17] The most recent

[12] Order Instituting Rulemaking (OIR), 11-09-011, September 27, 2011.

[13] D. 12-09-018, September 13, 2012.

[14] April 10, 2014.

[15] D. 14-04-003, April 10, 2014.

[16] Public versions of the Quarterly Interconnection Data Report can be found at: http://www.cpuc.ca.gov/PUC/energy/Procurement/LTPP/rule21.htm.

[17] Joint Motion of PG&E, SCE, and SDG&E regarding Implementation of Smart Inverter Functionalities, July 18, 2014.

Scoping Memo provided an initial procedural timeline for consideration of smart inverter communications recommendations.[18]

III. Topics for Consideration

Energy Division Staff has identified a number of topics, listed below, that are ready for CPUC consideration based on discussions with stakeholders, including utilities and storage developers.

The Rule 21 interconnection process is a standardized technical process that deals with the nuts and bolts of attaching a new device with various electrical characteristics to the distribution grid. The process initiates when an interconnection application is submitted. To date, Rule 21 has been used to interconnect generators to the grid in a standardized manner. Recently, storage devices have not received the benefits of a standardized interconnection process. Once the new technical issues related to storage are standardized and included in the interconnection tariff, storage projects should be able receive the benefits of a standardized interconnection process. This treatment will greatly facilitate the adoption rate of storage facilities.

The resolution of some of the topics identified in this document presents an opportunity for changes to interconnection rules that would better accommodate deployment of storage and other technologies in the changing distribution grid landscape. The topics identified are expected to necessitate text modifications to the Rule 21 Tariff, changes to utility interconnection processes, or both. Soliciting preliminary comment on them in the Rule 21 proceeding will help the CPUC focus on what items are actionable and ready for consideration.

This document will address the following topics in order of proposed priority:

1. Safety Planning
2. Pre-Interconnection Consultation Process
3. Define Storage Interconnection Terms and Concepts in the Definitions Section of Rule 21
4. Identify the Fast Track Threshold for Storage Projects and the Fast Track Study Screens for Storage Projects
5. Update the Interconnection Application to accommodate storage attributes
6. Update the Interconnection Agreement to account for storage attributes
7. Utility consideration of alternative interconnection metering and protection schemes
8. Electric Vehicle Interconnection Issues

[18] Assigned Commissioner's Amended Scoping Memo and Ruling," R. 11-09-011, May 13, 2014, p. 7. *See also*, a copy of the Smart Inverter Working Group's Phase I "Recommendations for Updating Technical Requirements for Inverters in Distributed Energy Resources," January 2014, can be found at: http://www.cpuc.ca.gov/PUC/energy/Procurement/LTPP/rule21.htm.

1. Safety Planning

Storage technology is about to become a transformative aspect of the California electrical infrastructure. These new systems have novel safety issues. To ensure that we are ready from a safety perspective, a pinch of prevention is more valuable than a pound of cure, we must make sure that the utilities are engaged with applicants and the CPUC to create and maintain appropriate safety plans.

In a recent Commission Decision on Net Energy Metering eligible storage systems, the issue of developing proper safety standards was addressed in a preliminary manner. The Commission ordered Safety Enforcement Division (SED) staff to work with Energy Division Staff and state-wide entities such as the Office of the State Fire Marshall and the Governor's Office of Planning and Research to develop a set of cohesive set of standards and practices to improve permitting and inspection by local authorities.[19]

As we move forward to include new storage technologies as permanent parts of the California infrastructure, utilities and regulators must be made aware of any and all safety issues and remediation techniques in advance of interconnection. Applicants, utilities and regulators must be prepared for the deployment and use of storage facilities.

The Interconnection Agreement should contain a requirement for a custom Safety Plan. A safety disclosure clause should be added to Rule 21 as a requirement of the interconnection process in the Interconnection Agreement Phase.

Applicants should submit to utilities a safety plan containing contingency plans and mitigation techniques as necessary. Utilities should coordinate with SED biannually to review such plans and to ensure that regulators are assured of utility preparedness.

- *Please provide comments on this proposed safety scheme meant to ensure safety for the people and environment of the State of California in a changing electrical environment. What elements should be part of the safety plan?*

2. Pre-Interconnection Consultation Process

New projects and new technologies *will* interconnect to the distribution grid.

In most cases, the interconnection process rules work well. New project configurations, however, call into question multiple areas within the utility: rates, tariffs, contracts, interconnection, metering, telemetry, and legal to name just some. New project configurations introduce novel challenges and projects can get stuck prior to interconnecting when rules cannot contort to fit new scenarios.

[19] D. 14-05-033, May 15, 2014, pg. 30.

Energy Division Staff has recently been involved in multiple transactions where applicants have attempted to escalate problems to Energy Division mid-way through the interconnection process. Sorting out new project problems post interconnection application submission is inefficient, expensive, time consuming, and frustrating for the project in question and potentially applicants of later queued projects impacted by the project applicant's decisions.

The utilities should develop and promote an optional Advanced Interconnection Consultation Process to assist Applicants to determine the project details to be submitted to the interconnection process. Two types of analysis are expected: a determination of the rules as they stand today as well as a brainstorming exercise that proposes better process possibilities for the future. The utilities should proactively assist Applicants to determine and submit thoughtful interconnection requests for projects that will enhance the functionality of the distribution grid. The possibilities for this interaction should be examined in comments.

- ❖ *In comments, please delineate the expected services to be provided by this consultation process, the timeframe and format for the delivery of results, and any other recommendations on this collaborative processs.*

3. Define Storage Interconnection Terms and Concepts in the Definitions Section of Rule 21

The Commission endorses the goal of harmonizing the interconnection processes defined by CPUC jurisdictional Electric Tariff Rule 21 and the FERC jurisdictional WDAT thus enabling the utilities to utilize a standardized process to interconnect facilities to the grid.[20] In order to do so, however, utility interconnection staff and applicants need to rely upon the common language housed within the tariffs to communicate.

Terminology related to energy storage and interconnection must be determined, defined and added to the definitions section of Rule 21.[21] Since the interconnection process must be standardized across all utilities[22], the utilities should develop a storage-specific vocabulary in order to properly communicate with the CPUC, CAISO, stakeholders, and applicants.

It may be possible to reference the outcome of A.14-02-006, et.al, where clarification of the definition of storage is being considered in the context of procurement. Otherwise, parties should work cooperative to develop a common lexicon of useful terms. At a minimum, Rule 21 should recognize that aspects of storage devices are different from generators so that the tariff may require the interconnection study process to consider such characteristics.

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[20] D. 14-04-003, April 10, 2014, p. 31; D. 12-09-018, Sept. 13, 2012, p. 35-36 & COL #4 p. 59.

[21] Rule 21, Section C.

[22] D. 12-09-18, September 13, 2012, p. 10, fn. 19.

- *In comments, please list the terms or concepts that require definition to be added to the Rule 21 Definitions section. Please also attempt to provide a working definition of the term or concept.*

4. Identify the Fast Track Threshold for Storage Projects and the Fast Track Study Screens for Storage Projects

A Fast Track Process threshold and appropriate Fast Track study screens for storage facilities should be determined and defined in Electric Tariff Rule 21 for increased process transparency. The threshold for generation devices to qualify for the Fast Track interconnection process varies by utility due to differences in grid conditions. The eligibility threshold for generators is 3 MW in PG&E and SCE territory and 1.5 MW in SDG&E territory.[23]

In the absence of any Fast Track process for storage, Fast Track eligibility is unclear, leading to the frustration of many project applicants. The parameters (system size, configuration, load and discharge duration times) under which a storage facility may access the Fast Track process should be added to Rule 21 tariff in Section E.2.b.i: Interconnection Request Submission Process, Interconnection Request Process, Applicant Selects a Study Process, Fast Track Eligibility. The Fast Track threshold for storage facilities should be determined since it will simplify project screening and reduce workload for utilities. It will make the interconnection process more predictable for applicants.

The existing Rule 21 Fast Track process for generators requires that generating devices pass standardized study screens. There are no specified study screens identified, however, for the load-side/charging function a storage device. Therefore, in addition to system parameters, Fast Track study screens must be identified and delineated in the tariff in Rule 21 Section G. 1. Engineering Review Details, Initial Review Screens, and, if necessary, Rule 21 Section G. 2. Supplemental Review Screens. Defining study screens in an understandable manner is important for process transparency.

- *Please comment on the threshold parameters for a storage facility to access the Fast Track Process. Please also discuss the aspects of the storage facility that should be studied in a standardized way for Fast Track Study Screen development.*

Applicants wanting to interconnect storage facilities located behind the meter contend that these types of facilities should not be subject to the interconnection process at all since they modify load and do not export power onto the grid.[24]

- *Please comment on the special case of "non-exporting" storage: What parameters and requirements should be considered to determine whether or not a storage device is "non-*

[23] Rule 21 Sec. E.2.b.i: Interconnection Request Submission Process, Fast Track Eligibility.

[24] Utilities engineers and testing teams use the Rule 21 Section L.7.a. Non-Exporting Test Procedures to bring generators online.

exporting"? What type of proof should be available to prove "non-exporting"? Should non-exporting storage devices be allowed to bypass the interconnection process entirely? Should some other process be required? If so, what?

The Independent Study Process for larger and more complicated systems (i.e. Non-Fast Track Eligible) also requires scrutiny: utilities harbor distribution grid data in multiple databases and data channels. This data is collected and analyzed in order to determine how a new device will affect the energy flows on various distribution circuits. The tariff permits the utility to take 90 days to complete this load flow analysis. Technology exists today that can standardize various data streams and enable the same or more robust analyses for the same facilities, including smart inverter functionalities and voltage and frequency mitigation techniques, to be performed in a few minutes.

- *Please comment on the practicalities of reducing interconnection study times by standardizing study data and system characteristic into algorithms made accessible through a visual platform. Please describe the potential benefits and expected costs of instituting such technology advancement in utility interconnection departments.*

5. Update the Interconnection Agreement to Account for Storage Attributes

Currently, the Generator Interconnection Agreement[25] defines the interconnection agreement for an Applicant and the Utility. This document will likely be used to define the interconnection agreement for storage facilities. The tariff and the document should be technology neutral and should therefore be re-titled simply the "Interconnection Agreement."

The Interconnection Agreement needs to be constructed to define agreement around, and accommodate, the unique attributes of storage facilities. While generators can export energy up to a maximum output, storage facilities have two functionalities: the charge and discharge mode. Discharge mode resembles the export of a traditional generator. Charging mode offers a different behavior and its parameters are not yet captured in an agreement. Both the charge and discharge functions can be programmed to behave at levels besides their maximum capacity.

These storage functions (or uses) can be permitted or restricted via settings. These settings can be created based on advice and guidance from utility experts who must analyze grid conditions at the point of common coupling. These setting could optimize the storage facility on the grid. Determining and developing these settings will need to be discussed and then become points of agreement that need to be captured in Interconnection Agreement. It may be beneficial to revisit the settings over time.

[25] Rule 21 Sec. 3.e.

Storage developers will be financially responsible for distribution grid upgrades triggered by their facilities just as generator developers are. Generators trigger distribution grid upgrades based on their maximum potential export. A storage facility may be set so that the facility cannot perform a maximum export. This setting could be agreed to in contract. There are many possible options. Accordingly, if a storage facility utilizes setting and modifies its functional characteristics, for example in response to a consultation with a utility engineer's description of local grid conditions at the point of common coupling, the operationally restricted storage facility could therefore trigger a different (potentially lesser) set of interconnection upgrades.

No form currently describes the cost responsibility / use restriction balance potential or contains a way to contract utilizing use restrictions. This process requires discussion and needs to be captured in the Interconnection Agreement document.

- *Please comment on how might the utility and applicant best consult to determine the optimal storage facility settings and prevent an extended Interconnection Agreement negotiation phase when a variety of distribution grid upgrades and storage facility working parameters are discussed as possibilities.*[26]

- *How best can the utility provide information to the applicant, and what type of information would be required at the conclusion of the study phase that would be most helpful to all parties in order to move smoothly into the Interconnection Agreement signing phase? Should study results reflect the possible high, mid and low level distribution upgrade costs and corresponding storage use restrictions or some other method?*

- *What type of penalties might accrue for operations outside of agreed-to use restrictions?*

6. Update the Interconnection Application to Accommodate Storage Attributes

Interconnection Applications must be updated to include a request to know storage system attributes. Standardized storage facility attributes and information should be collected via the Interconnection application Instead of a supplemental document.

Interconnection Applications for all facilities as modified to allow for storage should be standardized across the three IOUs since the data requested by each utility and used in each utility's interconnection process is substantially similar.[27]

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[26] Utilities can provide information to a developer to enable full usage of the storage device, which could require extensive and expensive upgrades. Utilities can also provide information to a developer to utilize portions of the storage device without triggering any or minimal upgrades. Utilities can also provide information to developers that would balance limited storage operation with upgrade expenses landing somewhere in between.

[27] D. 12-09-018, Sept. 13, 2012, p. 35-36 & COL #4 p. 59.

To maintain the integrity of the interconnection process, the utilities must ensure that all data required to interconnect a storage project is requested upfront, on the interconnection application, and not via iterative requests for preliminary information delaying the interconnection process.

All interconnection related documentation and forms should be received via an internet-based submission channel. All application materials should be received digitally to ensure the integrity of data and maximum interconnection process efficiency. All interconnection status information should be able to be checked by applicants electronically. The Interconnection Application and a corresponding process diagram should be posted prominently on the interconnection websites of the three utilities. The internet portal should be easily accessible and intuitive.

- *Please comment on the potential for utilizing the internet as the only submission channel for interconnection information, detail what information should be delivered to a utility on an interconnection request for a storage facility, provide any other recommendations for utilizing the interconnection application to maximizing the efficiency of the interconnection process. Should there be a single standard application?*

7. Utility Consideration of Alternative Interconnection Metering and Protection Schemes

Utilities rely on best practices and industry standards to ensure safety and reliability on the distribution grid. There can be disagreements among the utilities and between the utility and applicant regarding needs and requirements for interconnecting facilities to the grid in the areas of metering, disconnect requirements, and protection schemes. Safety may not be compromised.

Applicants are exploring novel ways of fitting generation and storage together in advanced technology systems. Applicants continually approach regulators requesting that we create new protocols to standardize protection schemes for the utilities and reduce the need to install additional safety components, thereby reducing overall project costs.

Recognizing that maintaining system reliability of service is a core function of the distribution utilities, the CPUC nonetheless also recognizes that policies can and should adapt to meet changing policy needs and accommodate new technologies. As technologies advance, so too must the utility's ability to evaluate the effectiveness and usability of new metering and protection schemes. Utilities should determine a process for testing the capabilities of alternative protection schemas brought forth by Applicants.

The utilities should create an internal process and add this process as another option for Applicants.

- *Please discuss how an Applicant might trigger a "New Technology/ New Schema" Testing Process, what that process should be, the information that should be submitted to it, and how we might involve standard writing bodies to respond to changing needs in the energy industry. How can utility test labs be leveraged? Discuss how Applicants should present*

proof-of-concept evidence, including what type of evidence is necessary, when making a request that any party consider altering best practices.

8. Electric Vehicle Interconnection Issues

Currently, Electric Vehicles (EVs) enjoy a waiver from the interconnection process under D.13-06-014. The joint IOUs are currently performing EV load research to help parties and the CPUC understand the distribution grid upgrade costs associated with EVs and EV charging. This research process and waiver of distribution grid related upgrade costs for electric vehicles remains until 2016.

Since EVs behave similarly to storage, they might one day participate in demand response programs or other markets at some point. We should be cognizant that ideas that solidify in relation to storage could impact EVs after the current interconnection process waivers lift.

IV. Conclusion

The Commission has already determined in several forums that energy storage is expected to play an important role in helping meet state policies for greenhouse gas reduction, renewable energy integration and optimization of the grid.

Parties should use a numbering (outline) system when filing comments and reply comments in this proceeding. Although occasionally explicitly stated, the idea that "Parties should comment on the issues mentioned herein." is implicit throughout the entire document. Additional or omitted issues may be added to the end of each related section, so long as they are within the scope of the question. Please provide tariff language where applicable and appropriate.

(END OF ATTACHMENT B)