



California Distribution System Interconnection Standards

Proposed Technical Advances and Policy Considerations Relevant to Proposed Rulemaking to Address Small Generator Interconnection Procedures

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Overview

1. Context: California Distribution System Interconnection Standards
2. CPUC's Interconnection Rulemaking and Proposed Rule 21 Settlement
3. Proposed Revised Rule 21 Modifications Relevant to Issues Raised in FERC Docket No. AD12-17-000
 - Issue 1: 100% of minimum load penetration threshold
 - Issue 2: Eligible size limits for Fast Track evaluation
 - Issue 3: Minimum load data collection
4. Complementary Advances Within Proposed Revised Rule 21
5. Near-Term Distribution System Interconnection Policy Considerations





1. Context: California Distribution System Interconnection Standards

July 17, 2012

3





California's standards for interconnection to utility distribution systems are contained in Electric Tariff Rule 21.

Rule 21 supports the success of key self-generation programs in California:

- California Solar Initiative, Self-Generation Incentive Program, Net Energy Metering Program rely on Rule 21 as the applicable interconnection tariff. These programs incentivize self-generation that primarily reduces the customer's on-site load.
- 117,929 solar PV generating facilities incentivized by these programs have been interconnected under Rule 21 as of 7/4/2012. See www.californiasolarstatistics.ca.gov.
- Californians enjoy highly reliable electric service even as penetration of these types of generating facilities on the distribution system has grown.

Foundation of Rule 21's success for this market segment:

- 8-screen Initial Review within Rule 21 designed and implemented by the CPUC and California Energy Commission in 2000
- Technical operating standards that protect the utility distribution system





- Implications of Rule 21's success for today's emerging distributed generation market segments:
 - Can an equally successful screening process be designed for generating facilities that export for sale and maintain safe and reliable electric service?
- Rule 21 was written in early 1980s to implement PURPA, and facilitated successful interconnection of exporting Qualifying Facilities (QFs) using individual system impact studies. Successful interconnection relied on low penetration levels and small numbers of QFs applying for interconnection.
- Over the past decade, CPUC initiated several major programs incentivizing generating facilities that interconnect to the utility distribution system and export for sale:
 - Renewable Feed-In Tariff Program
 - Water and Wastewater Feed-In Tariff Program
 - Renewable Auction Mechanism
 - Efficient Combined Heat and Power Feed-In Tariff Program
 - Investor-Owned Utility Solar PV Program





- Growth of emerging distributed generation market segments has contributed to the need for California to reform its distribution system interconnection standards
- The advent of generating facilities selling their exported power and interconnecting to the utility distribution systems has placed new pressures on interconnection procedures in California, including:
 - Generating facilities exporting power to the distribution system for sale make it more likely that aggregate generating capacity relative to line section load levels will exceed the 15% of peak load threshold present in Rule 21.
 - As small-scale (<20 MW) generating facilities exporting power to the distribution system for sale have become more common, efficient interconnection requires identifying technical conditions (e.g., size limits, relationship to load, absence of transmission constraints) permitting expedited interconnection or interconnection studies conducted for groups of projects.





2. CPUC's Interconnection Rulemaking and Proposed Rule 21 Settlement





CPUC Rulemaking (R.) 11-09-011 (opened September 23, 2011)

- Successor to past CPUC proceedings addressing interconnection of distributed generation
- Phase 1 scope includes:
 - Define appropriate interconnection study process for exporting generators, non-export, and storage technologies.
 - Review and modify the screening mechanism that limits an expedited interconnection evaluation to line sections where aggregate generating capacity is less than fifteen percent of that line section's peak load.
 - Establish data and reporting requirements.
- Note: Full Phase 1 scoping memo is filed in R.11-09-011 and is available at <http://docs.cpuc.ca.gov/efile/RULC/169188.pdf>





- The scope of R.11-09-011 is directly relevant to certain issues raised in FERC Docket No. AD12-17-000, including:
 - Reliable and safe operation and the 15% of peak load penetration threshold
 - Size limit for facilities eligible for Fast Track evaluation
 - Minimum load data collection





- CPUC General Counsel and Energy Division initiated a distribution system interconnection settlement process with the goal of resolving issues associated with interconnection to utility distribution systems (August 2011).
- Settlement package filed March 2012 by Settling Parties (available at <http://docs.cpuc.ca.gov/EFILE/MOTION/162852.PDF>):
 - Revised Rule 21 Tariff
 - Proposed Standard Interconnection Request for Exporting Generating Facilities
 - Proposed Standard Interconnection Agreement for Exporting Generating Facilities Following Fast Track
 - Settling Parties’ terms and conditions, such as agreement to support utilities’ filings before FERC to modify federal wholesale tariffs for alignment with Rule 21
 - Phase 2 recommended scope





The Settlement Process:

- Consensus-driven, although parties that typically operate at arms' length reached important compromises
- Open to any party with an interest in distribution level interconnection
- Subject to CPUC and FERC settlement rules, with emphasis on confidentiality
- 80+ parties joined weekly negotiations

14 Settling Parties:

California investor-owned utilities:

- Pacific Gas & Electric
- San Diego Gas & Electric
- Southern California Edison

Non-IOU Settling Parties:

- Aloha Systems
- California Farm Bureau Federation
- Center For Energy Efficiency and Renewable Technologies
- Clean Coalition
- Interstate Renewable Energy Council
- Sierra Club
- Solar Energy Industries Ass'n
- SunEdison
- Sunlight Partners
- Sustainable Conservation
- Vote Solar Initiative





The Settlement Process (*continued*):

Opposition to the Proposed Rule 21 Settlement:

- CPUC’s Division of Ratepayer Advocates contested the Proposed Rule 21 Settlement on a narrow issue of ratepayer reimbursement for transmission network upgrades triggered by applicants under Rule 21.

CPUC consideration of the Proposed Rule 21 Settlement :

- Does the Proposed Rule 21 Settlement respond to the scope of the CPUC Rulemaking 11-09-011, Phase 1?
- Pursuant to Rule 12.1(d) of CPUC’s Rules of Practice and FERC Rule 602, is the Proposed Rule 21 Settlement fair, reasonable, and in the public interest?

Note: The CPUC has not yet acted on the Proposed Rule 21 Settlement.





3. Proposed Rule 21 Modifications Relevant to Issues Raised in FERC Docket No. AD12-17-000

Issue 1: 100% of Minimum Load Penetration Threshold





Addressing penetration thresholds within the Proposed Revised Rule 21:

- Consistent with Rule 21's history, the Settling Parties seek to balance Fast Track evaluation with safety and reliability
- Proposed Revised Rule 21 expands study processes to:
 - Fast Track (Initial Review plus newly defined Supplemental Review)
 - Independent Study Process
 - Distribution Group Study Process
 - Transmission Cluster Study Process (by transferring to distribution provider's wholesale distribution access tariff)





Addressing penetration thresholds within the Proposed Revised Rule 21 (*continued*):

- Fast Track comprised of:
 - Initial Review: 13 screens, 15 business days for results
 - Supplemental Review: 3 screens, 20 business days for results
- Initial Review: Retains 15% of peak load penetration threshold
- Supplemental Review: Introduces a new penetration threshold:

“Where 12 months of line section minimum load data is available, can be calculated, can be estimated from existing data, or determined from a power flow model, is the aggregate Generating Facility capacity on the Line Section less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility?”





Addressing penetration thresholds within the Proposed Revised Rule 21 (*continued*):

Type of generation is taken into account when determining minimum load

- Solar PV: Use daytime minimum load (10 am – 4 pm)
- All other generating technologies: Use absolute minimum load
- Interconnected aggregate generating facility capacity counts net export of net energy metering systems, not nameplate capacity
- If interconnected generating facility capacity is counted as load reduction (e.g., net energy metering systems), then generation not counted as part of aggregate generation
- Applicants must also pass power quality, voltage, safety and reliability tests in Supplemental Review
- Settling Parties negotiated higher fee for Supplemental Review (increase to \$2,500 from \$600) to reflect utility work to determine minimum load and conduct additional testing





3. Proposed Rule 21 Modifications Relevant to Issues Raised in FERC Docket No. AD12-17-000

Issue 2: Eligible Size Limits for Fast Track Evaluation





Addressing eligibility size limits for Fast Track evaluation within the Proposed Revised Rule 21:

- Fast Track retains screen-based design and permits evaluation of exporting generating facilities within new size limits:
 - PG&E: 3.0 MW on a 12 kV or higher interconnection
 - SCE: 3.0 MW on 12 kV, 16 kV, or 33 kV interconnection
 - SDG&E: 1.5 MW on a 12 kV interconnection
- Size limits reflect balance struck by Settling Parties between permitting Fast Track evaluation of exporting generating facilities and ensuring that interconnection requests are generally directed to appropriate study process; i.e., larger exporting facilities above size limits are directed to Independent Study Process or other detailed study





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Issue 3: Minimum Load Data Collection





Addressing minimum load data collection within the Proposed Revised Rule 21:

- No requirement to collect or maintain minimum load data, except for application of 100% of minimum load screen in response to an individual interconnection request
- Capacity on circuits and at substations available in online utility interconnection capacity maps ordered by the CPUC (definition of capacity based on aggregate generating capacity relative to 15% of peak load)
- Pre-existing minimum load data newly available within proposed Pre-Application Report to aid distributed generation location decisions prior to full interconnection request. \$300 Pre-Application Report also includes:
 - Total, allocated, and queued capacity on substation/area bus or bank and circuit
 - Nominal voltages of substation or distribution circuit
 - Circuit distance to substation
 - Line section peak load estimate and minimum load data when available
 - Protective and voltage regulating devices; limiting conductor rating
 - Existing or known constraints at point of interconnection





4. Complementary Advances Within Proposed Revised Rule 21





The Settling Parties negotiated further advances to complement new penetration thresholds, eligibility for Fast Track, and study processes:

- Supplemental Review contains new screens addressing safety, reliability, and voltage alongside the 100% of minimum load penetration threshold.
- Transparency-driven provisions added to all study processes: timelines, communication requirements applicable to utilities and customers, customer options meetings, financial security postings to demonstrate viability, dispute resolution
- Utilities to maintain and publish integrated queue of Rule 21 exporting generating facilities and wholesale tariff applications on the utility distribution systems
- Transmission interdependency test introduced to identify distributed generation projects that are electrically interdependent with wholesale distribution tariff and California Independent System Operator queues and place in cluster studies





5. Near-Term Distribution System Interconnection Policy Considerations

July 17, 2012

23





- CPUC evaluation of the Proposed Rule 21 Settlement will include consideration of the Settling Parties' recommended scope of Phase 2, which prioritizes cost issues and utility reporting on compliance with terms of Proposed Revised Rule 21.
- As stated by CPUC in R.11-09-011, the technical operating standards in Rule 21 were put in place in 2000 and designed for non-exporting and net energy metering systems. To continue developing a smarter distribution system, certain technical operating standards may need to be reevaluated to take advantage of advances in technology, communications, and the potential need for utilities to control systems interconnected at the distribution level and exporting power for sale.
- Further harmonization of state and federal interconnection terms and conditions is desirable, as California and other states continue to incentivize the market segment of generating facilities that export for sale and interconnect to utility distribution systems.





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