California Independent System Operator

Clean Coalition Comments On 2013-2014 Transmission Planning Process Stakeholder Meeting, Non-Conventional Alternatives Proposal

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I. Introduction

The Clean Coalition is a California-based nonprofit organization whose mission is to accelerate the transition to local energy systems through innovative policies and programs that deliver cost-effective renewable energy, strengthen local economies, foster environmental sustainability, and enhance energy security. To achieve this mission, the Clean Coalition promotes proven best practices, including the vigorous expansion of Wholesale Distributed Generation (WDG) connected to the distribution grid and serving local load. The Clean Coalition drives policy innovation to remove major barriers to the procurement, interconnection, and financing of WDG projects and supports complementary Intelligent Grid (IG) market solutions such as demand response, energy storage, forecasting, and communications. The Clean Coalition is active in numerous proceedings before the California Energy Commission, the California Public Utilities Commission and other state and federal agencies throughout the United States, and works on the design and implementation of WDG and IG programs for local utilities and governments.

II. Comments on the Non-Conventional Alternatives Approach

The Clean Coalition supports the ISO's proposed Non-Conventional Alternatives (NCA) approach to new methodology for evaluating preferred resources as alternatives to transmission and conventional generation to meet local area reliability needs. This focus on proactive planning for local preferred resources as alternatives to transmission and conventional generation is consistent with our recommendations to the ISO on several occasions, as well as recent comments to the California Energy Commission

(CEC). [1] As noted in the ISO proposal, past approaches have "not required that each such assessment be scoped individually to fit the specific alternative that was proposed. As such it was very labor-intensive, was reactive to specific proposals, and did not provide any criteria for such alternatives."

The Clean Coalition commends the ISO for proposing a proactive process for evaluating alternatives to conventional transmission but will address specific concerns regarding the details of the proposed process in these comments. In general, the Clean Coalition recommends that the new methodology be revised to capture the full value of NCA resources, facilitate better coordination of distribution grid planning and policies among the ISO and the California agencies, give utilities more flexibility in implementing NCA resource mixes, clarify that a NCA mix cannot be discarded outside of a TPP, and ensure that stakeholders have ample opportunity to weigh in throughout the process.

The Clean Coalition also supports using the Southern California reliability area as the initial pilot local area. Southern California Edison's (SCE) Preferred Resources "Living Pilot" is the ideal opportunity to showcase the ability of preferred resources to cost-effectively replace conventional resources for providing real power, reactive power, and grid services. As noted in recent comments to the CEC from SCE, the SCE living pilot is "a means of informing future policy decisions surrounding the procurement of preferred resources and their ability to meet local reliability. A key component of this program…will be leveraging SCE's extensive experience in developing and managing EE, DR, and Advanced Technology projects and programs."[2]

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[1] Clean Coalition comments on 2013/2014 Unified Planning Assumptions to the CAISO (dated January 22nd, 2013), Transmission Planning Process Joint Clean Coalition/DECA Comments to the CAISO on 2013/2014 Draft Study Plan (dated March 14th, 2013) and Clean Coalition Comments to the CEC on Demand Response & Energy Efficiency Roadmap Workshop (dated May 13, 2013).

[2] "Southern California Edison Company's ("SCE's") Comments on the California Energy Commission Docket No. 13-IEPR-1D Workshop on Evaluation of Electricity System Needs in 2030," September 3rd, 2013. http://www.energy.ca.gov/2013_energypolicy/documents/2013-08-19_workshop/comments/Southern_California_Edison_Comments_on_Evaluation_of_Electricity_System_Needs_in_2030_2013-09-03_TN-71934.pdf

The Clean Coalition offers the following comments on each step of the proposed methodology. Appendix A describes the Clean Coalition's recommended alternative process for evaluating non-conventional resources.

Step 1: Develop generic resource catalogue

Starting the process by defining the relevant performance characteristics of resources makes sense, as it gives all participants clarity about which attributes are important to the ISO for reliability planning. However, rather than creating a generic resource catalogue of resources that focuses on minimum criteria, the ISO should create a specific resource catalogue that reflects the full value of NCAs for three reasons. First, the generic resource approach creates a bias against NCAs in favor of conventional solutions, since minimum criteria tend to be defined in relation to conventional resource performance characteristics. Second, a generic resource catalogue does not reflect the full value of NCA resources. Focusing on minimum criteria hides the strengths of preferred resources and highlights the differences between NCA resources and conventional resources, which is counterproductive. For example, many cost-effective energy storage technologies respond much faster than natural gas plants, but are available for shorter durations. Recently, the Federal Energy Regulatory Commission (FERC) has issued orders to address this issue. For example, FERC Order 784 requires transmission providers to take into account the "speed and accuracy" of regulation resources in the determination of reserve requirements for regulation and frequency response service.

The Clean Coalition's recommends that ISO create a specific catalogue of resources that includes the performance characteristics of each specific resource. Advocates and industry stakeholders should be given the opportunity to take part in defining the specific resource catalogue so that it captures the full benefits and value of each NCA resource.

The three performance characteristics defined in the ISO proposal (duration, response time, and availability) are a good starting point. In addition to the three performance characteristics identified in the proposal, the catalogue should also include at least three other attributes. First, it should specify whether the resource provides real and/or reactive power. For example, the catalogue should include advanced inverters paired with distributed solar or storage for providing reactive power for the reasons set forth in Appendix B. Second, it should include the expected date when the resource will be approved to deliver power with the performance characteristics described in the resource catalogue. For example, the catalogue listing for advanced inverters should note that commercial implementations are expected to begin in October 2015 as described in Appendix B.[3] As long as the resource will be available during the planning window, such resource should be included in the resource catalogue. Accordingly, the resource catalogue should be updated regularly in the beginning of each TPP cycle to reflect technological advances and expected approvals of new technologies. Third, the catalogue should specify whether the resource is capable of both supplying power and increasing load. For example, energy storage can both dispatch energy to supply power and charge to increase load.

The Clean Coalition also recommends that the ISO clarify the definitions of "demand-side" vs. "supply-side" resources, and confirm that such definitions are consistent across agencies, such as with the recent CPUC rulemaking on demand response that differentiates between "demand-side" and "supply-side" demand response markets.

Further, the Clean Coalition recommends that the ISO propose a method of evaluating demand-side resources without undervaluing the ability of such resources to mitigate system needs and free up supply-side resources. For example, demand response may

[3] Clean Coalition Comments on Preliminary Reliability Plan for LA Basin and San Diego, Prepared by Staff of the California Public Utilities Commission, California Energy Commission, and California Independent System Operator, dated September 23rd, 2013.

be used to address ramping issues (net load shape) raised by the ISO "Duck Chart," as noted in the NCA proposal.[4]

Step 2: Determine effective mix of resources

The Clean Coalition recommends that the NCA process explicitly include coordination with the distribution planning processes of the CPUC, CEC and IOUs. The validation process for the NCA resource mix should be synchronized with the utility distribution planning process of AB 327, a bill recently signed into law that creates a new requirement for IOUs, by July 2015, to "submit to the [CPUC] a distribution resources plan proposal, as specified, to identify optimal locations for the deployment of distributed resources, as defined.[5] In developing these distribution resources plans, the IOUs must determine the optimal locations for the deployment of distributed energy resources, based on value to the ratepayer. The potential for a resource to become part of a validated NCA resource mix would add significant value to the resource for utility planning purposes.

Conversely, resources that are already included in an IOU's plan should automatically be factored into any resource mix being considered as an alternative to conventional generation or transmission that was targeted for that area. Such resources will have already been deemed applicable to local needs and thus do not need further validation.

Similarly, the ISO should coordinate with the CEC and CPUC to ensure that the proposed resource mix reflects existing and near term policies and programs, like the proposed storage procurement targets and the demand response proceeding. Since policies may change, the TPP should give utilities flexibility for compliance in Long Term Procurement Plans to meet long-term renewable and reliability goals instead of requiring one specific validated resource mix. The TPP, in coordination with CPUC and

[4] "Consideration of alternatives to transmission or conventional generation to address local needs in the transmission planning process," Page 13.
[5] See Appendix C for the relevant language from AB 327. "Assembly Floor Analysis of Assembly Bill 327, dated September 11th, 2013." http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml;jsessionid=bbbf598e69fa62568c1b2075fe03#

CEC, should also identify which policies and programs may need to change so that the NCA mix can be deployed cost-effectively. For example, a new "locational benefits" adder may be required for power purchase agreements (PPAs) for 100 megawatts (MW) of distributed generation (DG) in a certain location. Locational benefits referred to the grid services provided by DG in that specific location, which can be considerable, as was found by E3 in a report for the CPUC in the RPS proceeding (R.11-05-005). As a more specific example, the Long Island Power Authority (LIPA) has recently proposed offering a 7¢/kWh premium to 40 MW of appropriately sited solar DG facilities to encourage locational capacity sufficient to avoid $84,000,000 in new transmission costs that would otherwise be incurred, resulting in a net savings of $60,000,000. LIPA's guidance states: "The rate will be a fixed price expressed in $/kWh to the nearest $0.0000 for 20 years applicable to all projects as determined by the bidding process defined below, plus a premium of $0.070 per kWh paid to projects connected to substations east of the Canal Substation on the South Fork of Long Island."[6]

Step 3: Monitor development of NCA

The NCA proposal should clarify that the validated NCA resource mix will only be reexamined and potentially discarded in the TPP. If the ISO is not satisfied with the progress of a validated NCA resource mix, stakeholders should have the opportunity to propose modifications and replacement of the NCA resource mix rather than defaulting to a conventional solution. This is consistent with increased transparency efforts in practice at the CPUC, which includes an established stakeholder participation process. [7]

III. <u>Conclusion</u>

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6 Proposal Concerning Modifications to LIPA's Tariff for Electric Service, FIT070113 http://www.lipower.org/pdfs/company/tariff/proposals-FIT070113.pdf 10 U.S. Energy Information Administration, Frequently Asked Questions, "How much electricity is lost in transmission and distribution in the United States?" 2011, available at http://www.eia.gov/tools/faqs/ faq.cfm?id=105&t=3. 11 Bill Powers and Sheila Bowers, "Distributed Solar PV: Why It Should Be the Centerpiece of U.S. Solar Energy Policy," available at http://solardoneright.org/index.php/briefings/post/ distributed_solar_pv_why_it_should_be_the_centerpiece_of_u.s._solar_energy_/

7 See: Res. L-436 http://www.cpuc.ca.gov/NR/rdonlyres/721E1F57-5E88-45E3-8D51-F3223042ADEE/0/DraftResL436.pdf

The Clean Coalition looks forward to continued collaboration with the ISO, and we appreciate the opportunity to offer comments on the NCA proposal.

Respectfully submitted,

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APPENDIX A – Clean Coalition's alternate process for consideration of alternatives to transmission or conventional generation to address local needs in the transmission planning process.

- **Step 1: Development of specific NCA resource catalogue**

  - ISO will propose an initial catalogue of *specific* Non-Conventional Alternative (NCA) resources with the maximum (rather than minimum) performance characteristics of each specific NCA resource. The catalogue should include the following performance characteristics: duration, response time, availability, real/reactive power, and expected date when resource will be approved to deliver power with the performance characteristics. In subsequent TPP cycles, the ISO will propose updates to the existing catalogue at this stage.

  - TPP stakeholders will be given the opportunity to provide comments on the NCA resource catalogue.

  - ISO will revise the NCA resource catalogue to reflect TPP stakeholder comments.

Table 1: Examples of Entries in NCA Resource Catalog

Resource Type	Duration (minimum / maximum)	Response Time	Availability (period between calls / maximum total hours per day)	Real/Reactive Power	Expected date of approval	Supply power/ load
Storage (Lithium Ion Battery)	15 minutes / 1 hour	Less than 1 second	Can continuously supply power (dispatch) and load (charge)	Yes / Yes with advanced inverters	Approved (see advanced inverters entry for details on advanced inverters)	Yes / Yes
Advanced inverters	Continuous available	Less than 1 second	Continously available	Yes / Yes	See Appendix B	Yes / No

- **Step 2: Determine an effective mix of resources**

  - ISO will specify and make available to TPP stakeholders the performance characteristics to meet the identified transmission needs for each local area, given the attributes and temporal operating conditions for that area. Elements that should be included are as follows: load profile, transmission limitations, existing local resource mix, reliability requirements, and real and reactive power needs.

  - Next, ISO will develop and propose an initial preferred volume and mix of NCA resource types from the catalog to provide the performance characteristics needed for a particular local area. This consists of aligning the required characteristics for each local area with the catalog of NCA resource types.
    - The ISO will also include any NCA resources that have already been included in the utility's distribution resources plan (as required by AB 327) for the designated local area.

  - TPP stakeholders will submit comments on the proposed NCA resource mix.

  - ISO will refine the initial proposal based on comments and perform an analysis to test one or more potential resource mixes to validate that it will meet the identified reliability needs in that local area.

  - The ISO will coordinate with the CEC and CPUC to ensure that the proposed resource mix reflects existing and near term policies and programs, like the proposed storage procurement targets and the demand response proceeding. Since policies may change, the TPP should give utilities flexibility for compliance in Long Term Procurement Plans to meet long-term renewable and reliability goals instead of requiring one specific validated resource mix.

  - The TPP, in coordination with CPUC and CEC, will also identify which policies and programs will need to change, or what new programs need to be added, so that the NCA mix can be deployed cost-effectively. For example, a new locational benefits adder may be required for power purchase agreements (PPAs) for 100 megawatts (MW) of distributed generation (DG) in a certain location. As part of this coordination effort, the ISO will work to make sure that the results of the TPP are incorporated into the next iteration of the utility's distribution resources plan and subsequent impacts to the utility's GRC.

- The validated non-conventional resource mix, along with the necessary policy and program impacts, would then be placed in the draft transmission plan (posted in January of any given TPP cycle) alongside the transmission or conventional generation solution that would be avoided or deferred by implementing the non-conventional solution.

- **Step 3: Monitor development of NCA**

  - ISO will monitor the progress of the validated NCA resource mix and work with the CPUC and CEC to remove barriers to the implementation of the validated mix.

- **Step 4: Propose refinements to NCA resource mix**

  - If the ISO is not satisfied with the progress of a validated NCA resource mix, the next TPP will include an ISO proposal for modifying or replacing the validated resource mix.

  - The ISO will solicit stakeholder input on potential modifications or replacement of the validated resource mix and reflect such comments in a revised proposal.

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Appendix B – Excerpts from the Clean Coalition's Comments to the California Energy Commission on Advanced Inverter Capabilities (dated September 23rd, 2013)

Summary of Recommendations

The Clean Coalition supports the Preliminary Reliability Plan's emphasis on reducing reliance on conventional resources in favor of preferred resources (energy efficiency, demand response, distributed generation, and storage). This approach is consistent with the Loading Order, the California Public Utilities Commission's proposed storage procurement targets decision, and Governor Brown's 12,000 megawatt distributed generation goal. However, the Preliminary Reliability Plan does not take full advantage of this opportunity to showcase the full value of preferred resources as alternatives to conventional resources and transmission for meeting system needs. The Clean Coalition urges the joint agencies to not rush to support new conventional generation and transmission investments before updating assumptions about the value and availability of preferred resources and system needs assessments through public procurement and planning processes.

The Clean Coalition has two specific recommendations for improving the plan. First, the Reliability Plan should be informed by an assessment of the full operational value of preferred resources, including the reactive power capabilities of distributed solar and energy storage paired with advanced inverters. Second, the Reliability Plan should be developed with the objective of maximizing the use of cost-effective preferred resources to meet local area needs, rather than setting a target of meeting 50% of needs with preferred resources.

Discussion and Specific Recommendations

1) The Reliability Plan should be informed by an assessment of the full operational and planning value of preferred resources, including the reactive power capabilities of distributed solar and energy storage paired with advanced inverters.

Ratepayers will be best served by a Reliability Plan that is informed by an accurate assessment of the full operational and planning value of preferred resources. For example, preferred resources take much less time to permit and deploy than transmission lines or conventional generation. The Preliminary Plan should take advantage of the short deployment time associated with these resources, and incorporate into the Plan.

Specifically, this assessment should include the reactive power capabilities of distributed solar and energy storage paired with advanced inverters. Slide 7 of the workshop presentation makes the outdated statements that rooftop solar provides "no" voltage support and that energy storage "may" provide voltage support. As the Preliminary Reliability Plan includes transmission upgrades that have not received all Commission and environmental approvals, there is no reason why the Reliability Plan should exclude the ability of distributed solar and storage to provide cost-effective voltage support through advanced inverter functions that will be approved in the next few years.

- *The Reliability Plan should include advanced inverters.* The Clean Coalition is actively involved in the Rule 21 Smart Inverters Working Group (SIWG) at the CPUC, which is focused on expediting revisions to operational safety technical standards to allow advanced inverters to ride-through voltage events and provision reactive power. The SIWG reasonably anticipates that the commercial implementations of advanced inverter systems will begin in October 2015.[8]

Table 1: Key milestones for advanced inverter approvals and implementation

Tasks	Milestones	Milestone Dates
Grp-A-1 Milestone	UL Publishes the Revised ANSI/UL 1741 with basic autonomous Phase 1 functions	March 31, 2014
Grp-A-5 Milestone	Start Commercial Implementations of Phase 1 DER Systems:	October 1, 2015
Grp-C-1 Milestone	UL Publishes the Second Revision of ANSI/UL 1741:	June 30, 2014
Grp-C-5 Milestone	Start Commercial Implementations of DER Systems	October 1, 2015
Grp-D-1 Milestone	UL Publishes the ANSI/UL 1741 Updates for Testing the Phase 3 Autonomous Functions:	September 30, 2014
Grp-D-5 Milestone	Start Commercial Implementations of DER Systems:	Jan 1, 2016

Source: CPUC Rule 21 (R.11-09-011) 'Recommendations for Updating DER Technical Requirements in Rule 21' Version 2, September, 2013.

Relying on near-term approvals for advanced inverters is no more speculative than relying on future Commission and permitting approvals for transmission upgrades. As the Preliminary Plan sets forth "the second project, the installation of a Static Var Compensator at San Onofre Mesa substation, requires an additional approval from the CPUC. *SDG&E is expected to file an application for approval by mid-2014, and if approved by mid-2015, the project could be online by summer 2016*." … Sycamore Canyon – Penasquitos Transmission Line - approved by CAISO, to be approved by CPUC by mid-2015."[9]

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[8] CPUC Rule 21 (R.11-09-011) 'Recommendations for Updating DER Technical Requirements in Rule 21,' Version 2, September 2013 (as edited by Francis Cleveland, appointed by the CPUC to lead the Working Group).
[9] "Preliminary Reliability Plan for LA Basin and San Diego," Prepared by Staff of the California Public Utilities Commission, California Energy Commission, and California Independent System Operator, DRAFT Version, dated August 30, 2013, pg. 4.

The Reliability Plan should also include acceleration of approvals for advanced inverters, consistent with Preliminary Plan's provision to accelerate authorizations and approvals for preferred resources. In addition, the Reliability Plan should include active collaboration with the Rule 21 SIWG to ensure consistency across regulatory agencies and to encourage a free flow of information.

- *The Reliability Plan should account for the full value of advanced inverters for distributed voltage control.*

Advanced inverters paired with distributed solar PV or storage facilities can provision reactive power 24 hours a day, regardless of whether the sun is shining. Advanced inverters can draw real power from the grid and convert it to reactive power, in the same manner that capacitor banks provision reactive power.

The Rule 21 SIWG has found that the implementation of advanced functions for inverters paired with distributed generation and storage can cost-effectively improve the reliability and power quality of the power grid. Further, the SIWG discovered that the European experience has shown that timely implementation is critical for avoiding costly upgrades and replacements in the future.[10]

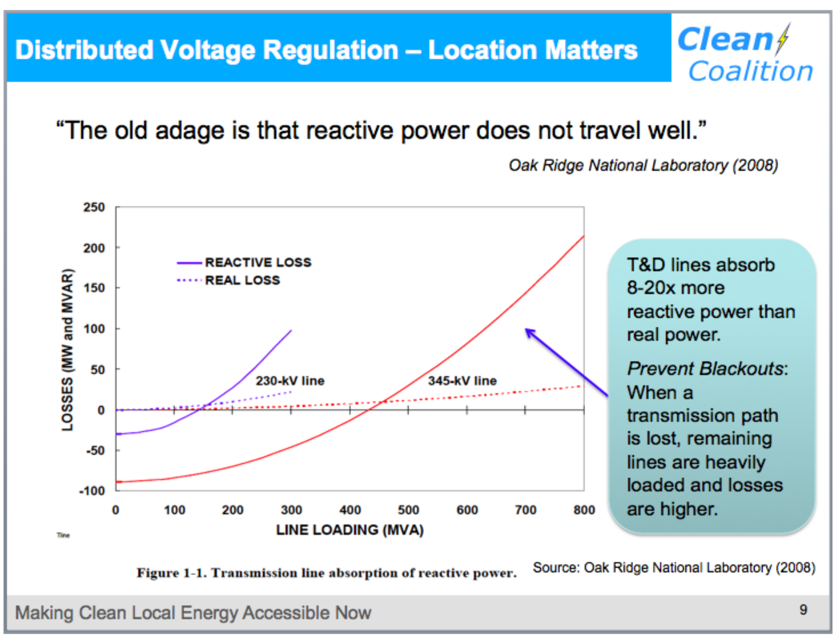
Forward-thinking utilities across the country are embracing advanced features inherent in almost all inverters that are deployed throughout the world today. For example, Georgia Power's requires small solar generators use advanced inverters to provision reactive power in exchange for compensation.[11] Similarly, a group of Western utilities, including the California investor-owned utilities, is working to make advanced inverters mandatory for all new solar facilities within their service territories. In a letter dated August 7, 2013, the Western Electric Industry Leaders urged state policymakers to encourage the "immediate" and "widespread" adoption of smart inverters, which

[10] CPUC Rule 21 (R.11-09-011) "Recommendations for Updating DER Technical Requirements in Rule 21" Version 2, September, 2013, pg. 1.
[11] See Section 1.8 of https://www.weboasis.com/OASIS/SOCO/Interconnection/SGIA.pdf

they called "simple and inexpensive devices" that will play a "transformative role" in voltage control.[12]

Advanced inverters are not just a solution for integrating variable renewable generators – distributed voltage control can make the power grid more reliable and efficient system-wide. A report by the Oak Ridge National Lab found that distributed voltage control significantly outperforms centralized voltage control. Reactive power suffers far greater line losses than real power, and those losses increase as a line is more heavily loaded. Distributed reactive power minimizes these significant reactive power line losses. Moreover, excessive line congestion can be avoided if distributed generation, energy storage, and advanced inverters are installed throughout the grid. As a result, distributed voltage regulation provides substantial system efficiency while preventing blackouts.[13] Additionally, advanced inverters can be programmed to ride-through minor voltage fluctuations on the grid, which eliminates unnecessary grid disconnects.[14]

<u>Graphic 1: Distribution Voltage Regulation – Location Matters</u>

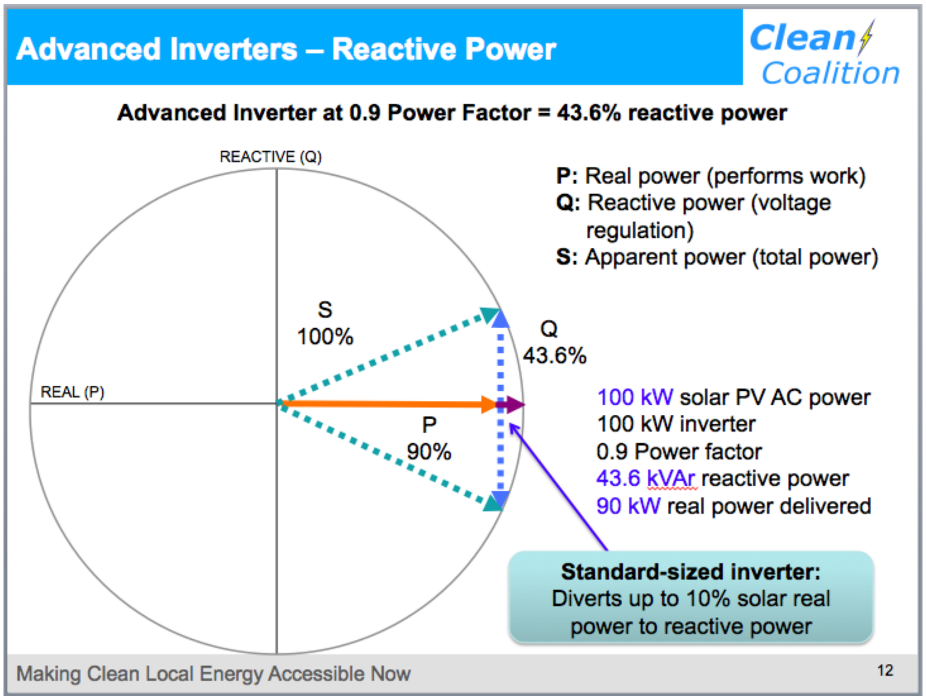


[12] www.weilgroup.org/WEIL_Smart_Inverters_Letter_Aug-7-2013.pdf
[13] "Local Dynamic Reactive Power for Correction of System Voltage Problems," Oak Ridge National Laboratory, September 2008.
[14] See http://www.fiercesmartgrid.com/story/advanced-inverters-providing-voltage-regulation-where-it-needed-most/2013-09-11 for details

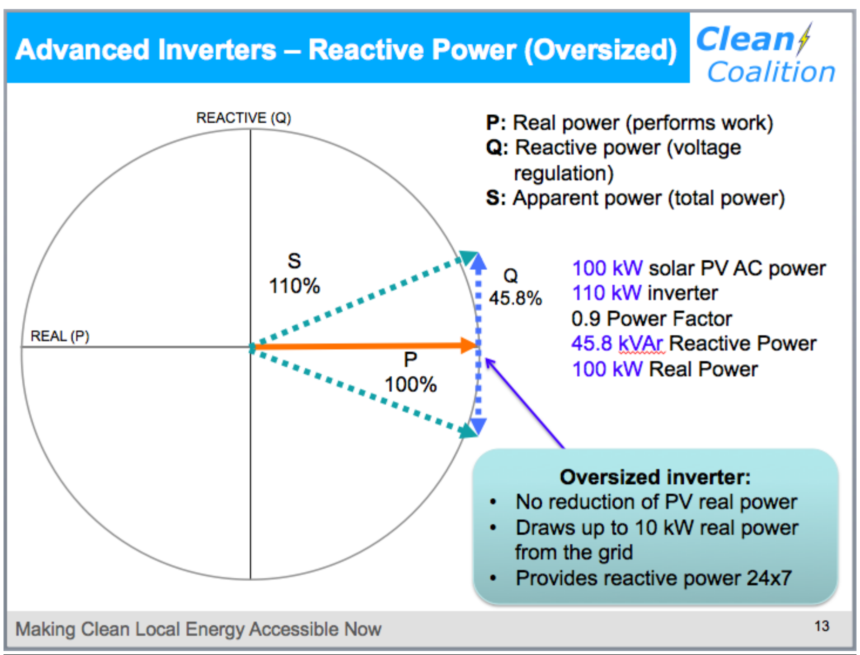
Since advanced inverters are a cost-effective solution for improving voltage control system-wide, ratepayers will be well served by cost allocation policies that facilitate their rapid adoption. Most inverters on the market have advanced capabilities built-in, so there are no significant costs to installing the advanced inverter, which is simply a standard inverter with the advanced features enabled. However, solar and wind generators with standard-sized inverters must divert a portion of real power production to provision reactive power when sun or wind resources are at their peak. Without compensation for the provisioning of reactive power, generators would lose revenue for curtailing real power output to provide reactive power.

If reactive power will be regularly needed during a generator's peak production hours, installing an "oversized" inverter makes economic sense. For example, a 100 kW solar facility with a 10% oversized inverter (110 kW inverter) set at a 0.9 power factor can draw 10 kW of real power from the grid to convert to 46 kVAr of reactive power even when the solar facility is producing a full 100 kW of real power. In comparison, a 100 kW solar facility with a standard-sized inverter (100 kW inverter) set a 0.9 power factor may need to divert up to 10 kW of real power output to deliver 44 kVAr of reactive power.

Graphic 2: Advanced Inverters and Reactive Power (Standard-Sized Inverter)



Graphic 3: Advanced Inverters and Reactive Power (Oversized Inverters)



This is the right time to showcase the extent to which distributed generation and intelligent grid resources can meet local area system needs. In addition to its work on advanced inverters described above, the CPUC has proposed significant energy storage procurement targets and has opened a demand response rulemaking to increase use of preferred resources. Meanwhile, the California Independent System Operator has proposed a new methodology for evaluating and planning for "non-conventional alternatives" to transmission and conventional generation projects as part of its transmission planning process.

APPENDIX C - Assembly Bill 327

Excerpt from law signed 10/7/13:

The Public Utilities Act requires each electrical corporation, as a part of its distribution planning process, to consider specified nonutility owned distributed energy resources as an alternative to investments in its distribution system to ensure reliable electric services at the lowest possible costs.

This bill would require an electrical corporation, by July 1, 2015, to submit to the commission a distribution resources plan proposal, as specified, to identify optimal locations for the deployment of distributed resources, as defined. The bill would require the commission to review each distribution resources plan proposal submitted by an electrical corporation and approve, or modify and approve, a distribution resources plan for the corporation. The bill would require that any electrical corporation spending on distribution infrastructure necessary to accomplish the distribution resources plan be proposed and considered as part of the next general rate case for the corporation and would authorize the commission to approve this proposed spending if it concludes that ratepayers would realize net benefits and the associated costs are just and reasonable.